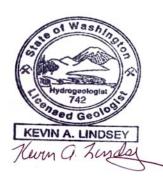
Project Completion Report for Shallow Aquifer Recharge Testing at the Hall-Wentland Site, Umatilla County, Oregon and Walla Walla County, Washington







Prepared for:

Walla Walla County Watershed Planning Department, Washington Department of Ecology, Walla Walla River Irrigation District, and Oregon Water Resources Department under Department of Ecology Grant No. G0600312





Summary

This report presents the results of the second season of shallow aquifer recharge (SAR) testing at the Hall-Wentland Site which began on December 22, 2006 and ended on April 15, 2007. Testing at the Site is permitted under a Limited License granted by the Oregon Water Resources Department to Walla Walla River Irrigation District. SAR testing utilized water in the East Little Walla Walla River, a portion of which was diverted towards the Site via Wells Ditch. As in the first season, water was not diverted from the Walla Walla River for the project. An estimated 190 to 250 acre-feet of water was diverted to the Site in the last 6 weeks of the test season. Increased flow to the Site followed reconfiguration of the diversion weir that resulted in a reduction in fish screen plugging which repeatedly reduced flow to the Site.

Based on data collected before, during, and after testing, water levels in on-site monitoring wells began to rise within a few hours after the start of testing. Down gradient effects extended several miles north, at least as far north as well MC-3, and may extend all the way to the Walla Walla River. Water table rise in response to testing is interpreted to have extended at least 0.5 miles up gradient. Based on the field and basic water quality parameters measured to-date, SAR testing at the Site are interpreted to have had no negative effect on groundwater quality in the Site area. This data does suggest a high degree of hydraulic continuity between local surface and groundwater, with surface water bodies in the immediate Site area, generally loosing water to the underlying shallow alluvial aquifer system. A few synthetic organic compounds (SOC's) were detected intermittently before and during the test. However, the timing of these detections suggests that they were not caused by the test activity and the measured concentrations represent background concentrations related to off site activities.

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1.0 INTRODUCTION

Shallow aquifer recharge (SAR) is one of several water resource management strategies being explored by water resources stakeholders in the Walla Walla Basin of southeastern Washington and northeastern Oregon (Figure 1). One of the locations where SAR is being tested is known as the Hall-Wentland Site (H-W Site). The H-W Site is located in the SE ¼, NE ¼, Section 14, T6N, R35E, on private property south of Stateline Road in Oregon (Figures 1 and 2).

SAR testing at the H-W Site is being done under Oregon Water Resources Department (OWRD) Limited License 915 issued to Walla Walla River Irrigation District (WWRID) in the fall of 2005. The H-W Site SAR work is being funded by Washington Department of Ecology (Ecology) through grants awarded to the Walla Walla County (Washington) Watershed Planning Department. Work described in this report was done under Grant No. G0600312. SAR testing done at the H-W Site under Limited License 915 can be conducted seasonally (with several stipulations and conditions) between November and April of the succeeding calendar year. This license expires in April 2010.

Under Limited License 915, the first SAR test season at the H-W Site began in early March 2006 and ended in mid-April 2006. The results of this first test season are described in Kennedy/Jenks (2006). That report also describes background conditions interpreted for the H-W Site prior to the start of testing in early 2006, H-W Site physical conditions, and the regulatory constraints under which testing can be conducted. That information will not be repeated in this report. Instead, this report focuses on describing the results of the recently completed second test season, which started in late December 2006 and ended in mid-April 2007. Topics and information presented in this report include the following:

- A timeline listing the major events associated with the 2006/2007 recharge season.
- Site modifications and changes relative to the first test season.
- Rates and volumes of water delivered to the H-W Site from the source water, which was, as is in the first season, ambient flow from the East Little Walla Walla River (ELWW) delivered to the H-W Site via Wells Ditch. For the second test season water was not diverted from the mainstem of the Walla Walla River for testing.
- Alluvial aquifer water levels, before, during, and after the second test season.
- Results of groundwater and surface water quality monitoring before, during, and after the second test season.
- Comparisons between conditions observed in the first and second test seasons.
- Summary and recommendations.

In addition, this report is accompanied by appendices that contain data and information collected during the course of the 2006/2007 test season. These appendices are as

follows:

- Appendix A. Field notes.
- Appendix B. Water quality data.
- Appendix C. A copy of an independently produced strategy report entitled: *Hall-Wentland Recharge Project Long-Term Implementation Strategy*. This strategy report, produced by Fountainhead for Walla Walla County (the County), is included herein per GSI Water Resources, Inc. (GSI) contract with the County. Our inclusion of the Fountainhead report in no way implies or warrants agreement with, or an endorsement of, the Fountainhead report by GSI.

For the second recharge season the Walla Walla County Watershed Planning Department contracted to GSI (formerly Groundwater Solutions, Inc.) to conduct testing, compile data, interpret test results, and prepare this report. Because the Limited License holder for this project is WWRID, GSI worked with Walla Walla County staff and WWRID staff (and stakeholders), to make sure both parties were satisfied with test operations, monitoring, and activities. The project team included:

- Kevin Lindsey, Ph.D., L.Hg. (GSI) project manager and hydrogeologist (Washington).
- Terry Tolan, R.G. (GSI) hydrogeologist (Oregon).
- Jon Travis (GSI) geologic and report production support.
- John Fazio, PE (Fazio Engineering) project engineer.
- Tom Page (Independent land owner) Site operator and local point of contact.

The basic site layout for the 2006/2007 test season was very similar to that of the preceding test season (Figure 3).

2.0 2006/2007 TIMELINE

The project timeline presented here lists the main project activities and actions for the 2006 through 2007 recharge season. Notes and documents describing many of these actions and events are attached to this report in the Appendix A.

- 03 October 2006; Initial water quality sampling event. Field and basic groundwater parameters collected. Results in Appendix B.
- 31 October 2006; Water quality sampling event. Field, basic, and synthetic organic compound (SOC) parameters collected for both groundwater and source water. Results in Appendix B.
- Late November 2006; Small ramp flumes installed at the Wells Ditch diversion

and in the branch ditch leading onto the H-W Site. Gated culverts installed in the pump sump pit on the H-W Site.

- 01 December 2006; Transducers installed in the ramp flumes.
- 06 December 2006; Project team met with Oregon Department of Fish and Wildlife (ODFW) staff on-site to get approval of the fish screen planned for use during testing. Approval granted.
- 21 December 2006; Second test season begins.
- 27 December 2006; Water quality sampling event. Field and basic parameters collected. Results in Appendix B.
- January and February, 2007; Test ongoing, but fish screen repeatedly plugged by fine suspended solids and vegetation. Site visited every 1 to 2 days to clean screen. Flow to H-W Site commonly less than 0.4 cubic feet per second (cfs).
- 02 March 2007; Reinstall weir boards (and associated transducer) in the Wells Ditch diversion structure for the H-W Site. This was done to collect weir flow data to compare to ramp flume data at the request of OWRD staff.
- March and early April, 2007; Test ongoing with weir boards installed. Fish screen plugging significantly reduced and flow to site generally exceeds 0.7 cfs.
- 12 April 2007; Water quality sampling event. Field, basic, and SOC parameters collected. Results in Appendix B.
- 15 April 2007; Test season ends. Fish screen and weir boards used to control the test are removed. Wells Ditch and branch ditch return to normal irrigators use.
- 7 May 2007; Post-test water quality sampling. Field and basic parameters collected. Results in Appendix B.
- Late June; Second season report prepared.

3.0 ON-SITE WORK

Work done on-site for the 2006-2007 test season focused primarily on changing the physical layout of the way water was delivered to the H-W Site and how flow through the delivery system was measured. This work was done to address several of the recommendations in the report written describing the results of the first test season (Kennedy/Jenks, 2006). This on-site work included: (1) installing a ramp flume at the Wells Ditch diversion, (2) replacing the branch ditch weir with a ramp flume, and (3) installing gated culverts in the pump sump pit on-site. Each of these modifications is described further below.

3.1 Diversion Ramp Flume

In the first test season the volume of water diverted from Wells Ditch was measured using a 3-foot rectangular weir, staff gauge, and transducer (Figure 4). However, to function properly, water needed to be backed up against the weir to generate the approximately one-foot drop required for proper functioning of the weir. This resulted in some water spilling out of Wells Ditch upstream of the weir, inundating a small portion (several hundred square feet) of pasture adjacent to Wells Ditch. For the second test season the project team decided to attempt to reduce or eliminate this ponded water by replacing the measurement weir with a calibrated, 3.5 cfs EZFlow [®] portable ramp flume.

The ramp flume (and an associated transducer) was installed in the branch ditch which transports water to the H-W Test site immediately downstream of the Wells Ditch diversion structure and fish screen (Figure 5). With ramp flume installed, several boards were removed from the weir, eliminating the back up of water above the diversion structure and removing the spill over out of Wells Ditch. Unfortunately, with the removal of the weir boards we found that the fish screen rapidly plugged with suspended organic debris. We surmised that this was because, with the boards gone, the Wells Ditch gradient was high enough above the fish screen to deliver fine suspended debris to the fish screen, thus plugging it. In this configuration the fish screen needed to be manually cleaned every 1 to 2 days. Flow through the screen and to the H-W Site, when the fish screen was plugged, generally was less than 0.4 cfs.

During preparation for the 2006-2007 recharge season, OWRD staff requested that at some point during the season we collect water level data and calculate flow concurrently for both the weir and the ramp flume. Doing this required reinstallation of the weir boards. The concurrent operation of the weir and flume was done between 02 March 2007 and 19 March 2007. With this configuration, even though some water spilled out of Wells Ditch up stream of the weir, we observed that fine debris settled out of the water column before it reached the fish screen.

3.2 On-Site Ramp Flume

For the first test season, flow and volume delivered to the H-W Site was measured using a rectangular 3-foot weir, the on-site weir (Figure 6), similar to that installed at the Wells Ditch diversion. Flow measurements collected using the on-site weir generally were found to be unsatisfactory because the gradient across it was so low that water commonly back-flooded across it, inundating it and generating water levels in the weir not representative of actual flow conditions (Kennedy/Jenks, 2006). For the 2006/2007 test season we attempted to address this by installing a Nu-Way 3.5 cfs EZFlow [®] portable ramp flume in place of the rectangular weir (Figure 7).

In conjunction with installation of the on-site ramp flume, the ditch down stream of it was cleaned by removing vegetation and mud. This was done in an attempt to increase the gradient between the flume and the pump sump pit and get water level measurements and flow measurements more indicative of actual flow conditions than we were able to collect in the first test season.

3.3 Gated Culverts

In the first test season water was diverted onto the H-W Site from the delivery ditch and/or the pump sump pit via breaks manually dug into the ditch and pit bank. Water was allowed to flow freely through these breaks onto the H-W Site. For the 2006/2007 test season two gated culverts were installed in the edge of the pump sump pit. One culvert leads from the pit onto the Hall pasture, the other from the pit onto the Wentland alfalfa field (Figure 8). Flow into either, or both, portions of the H-W Site was then controlled by opening and closing the culvert gates. For the 2006/2007 we estimate that over 75 percent of the total water delivered to the H-W Site was directed onto the Wentland alfalfa field.

4.0 WATER VOLUME USED IN 2006/2007 TEST SEASON

The water volume delivered to the H-W Site during the 2006/2007 test season was calculated from the staff gauge readings and transducer data collected at the two ramp flumes. Transducer data also was collected from the existing rectangular Wells Ditch diversion weir between 02 March 2007 and 19 March 2007, in the same way it was done for the previous seasons testing (Kennedy/Jenks 2006). Hydrographs for the two ramp flumes are shown on Figure 9.

Transducer data for the two ramp flumes was calibrated to the "0" flow mark on both ramp flumes by using a correction factor. For the Wells Ditch diversion ramp flume the correction was done by subtracting 4.62 inches from transducer measured water depth data. The on-site ramp flume correction was done by subtracting 0.93 inches from transducer water depth data. Following the correction for water depth, transducer data was converted to flow using the equation for the flumes:

 $Q = 0.07106 (h)^{1.615}$

where,

Q = flow in cfs,

and

h = depth of water (in inches) across the ramp flume measurement sill.

Based on the calculations described above approximately 253 acre-feet of water was diverted from Wells Ditch to the branch ditch (Figure 10). Average calculated instantaneous flow through the Wells Ditch diversion ramp flume, before installing the weir boards, was 0.80 cfs. Average calculated instantaneous flow through the ramp flume, after installing the weir boards on 02 March 2007 was 1.60 cfs.

Calculated flow through the diversion ramp flume was checked against calculated flow through the Wells Ditch diversion weir during the period of 02 March 2007 to 19 March 2007. Hydrographs for this event are shown in Figure 11. For this period a total of approximately 34.4 acre-feet of water is calculated to have flowed through the weir with

a calculated average instantaneous flow of approximately 1.0 cfs. The total flow volume calculated for the diversion flume over this same period was approximately 44.6 acrefeet with a calculated average instantaneous flow of approximately 1.8 cfs.

Total flow for the entire test period through the on-site ramp flume was calculated to be approximately 97.0 acre-feet (Figure 10). The calculated instantaneous average flow through the on-site ramp flume before installing the weir boards was 0.24 cfs. After installing the weir boards it is calculated to have been approximately 0.74 cfs.

Clearly there are some discrepancies in calculated flow data through the diversion ramp flume when compared to the diversion weir and when compared to the on-site ramp flume. Calculated instantaneous flow through the diversion ramp flume averages 0.4 cfs higher than those calculated for the weir. Total calculated flow through both structures was approximately 22 percent higher in the ramp flume. Comparing flow data from the diversion ramp flume to the on-site ramp flume, one again sees a significant difference between calculated total flows. Based on the calculated flows, we see an apparent loss in total calculated flow in the branch ditch of approximately 60 percent.

Other observations relevant to better understanding calculated flows onto the H-W Site during the 2006/2007 recharge season include the following:

- The differences between the diversion weir and the diversion ramp flume are greatest at higher flows, and generally decrease as flows decrease.
- During operations, the water surface above (up stream) of the weir, where the transducer was installed was generally less turbulent than the water surface above the ramp flume, where that transducer was installed.
- Similar turbulent conditions were observed when comparing the two ramp flumes. Flow through the diversion ramp flume generally was more turbulent than through the on-site ramp flume.
- Flow surges through the diversion flume were common when it was cleaned. These flow surges may have, at least on some occasions, generated calculated flows higher than normal.

Given these observations, determining the volume of water diverted from Wells Ditch towards the Site proved to be more problematic than anticipated. The volume diverted to the Site could be as high as approximately 253 acre-feet, as calculated from the diversion flume data. Alternatively, it could have been as low as 195 acre-feet (or less) based on the overestimation possibly associated with the diversion ramp flume when that data is compared to flow calculations generated from diversion weir data. In addition, the volume of water actually arriving at the Site appears to be open to question. If flow calculated through the on-site flume is accurate (e.g., 97 acre-feet), over 50 percent of the water diverted from Wells Ditch was lost to the ground through seepage from the branch ditch. Visual observations suggest this flow loss is unlikely and that data collection problems were encountered with the on-site flume during the 2006/2007 recharge season, just as they were with the previous season. This problem is likely due to the low gradient in the branch ditch and the difficulty in having the unimpeded flow through the measurement structure needed to collect representative water depth data for calculating flow.

5.0 WATER LEVELS IN ALLUVIAL AQUIFER

As was done in the previous season we tracked water levels in on-site monitoring wells HW-1, HW-2, and HW-3 and 14 off-site water supply wells. Water levels in the monitoring wells were collected using a digital transducer, in the off-site wells using an e-tape.

5.1 Transducer Data from Monitoring Wells

Water level data collected from each of the three monitoring wells is summarized below and shown in Figure 12. This summary generally focuses on water levels observed before, during, and after testing.

Water level in well HW-1, at the north end of and down gradient of the Site, generally declined in the three months prior to the start of testing, reaching a low of approximately 735.5 feet above mean sea level (amsl) just prior to the start of testing. It then rose to its first high of approximately 736.2 feet on 10 January 2007. Water level in the well declined during most of February but began to rise again after 02 March 2007, the day the weir boards at the diversion were installed. On 15 April 2007, the day of the test shutdown, HW-1 had a water level of approximately 738.1 feet, which continued to rise to a high of approximately 739.2 feet on 19 April 2007. Water levels begin to fall after 19 April 2007 and continued to fall until the end of data collection 04 May 2007. The final water level measurement is above the pretest level.

Water level in well HW-2, positioned up gradient of the Site, experience more and greater fluctuation than either HW-1 or HW-3. Because of problems with the transducer, data collection in HW-2 began approximately one month before the start of testing. During that time water level fluctuated between approximately 748 and 749.8 feet amsl. Within less than 1 day of the start of testing on 22 December 2007, water level rose from a pre-test low of 747.9 feet amsl to a high of approximately 753.3 feet amsl on 30 December 2007. Like HW-1, water level remained relatively stable in January 2007 before falling in February. After installing the weir boards 02 March 2007 at the diversion, water level in well HW-2 began to rise, reaching a high of approximately 757.9 feet one day after the end of the test. Water levels begin to fall after 16 April 2007 and continued to fall until the end of data collection on 04 May 2007. The final post test water level was still higher than any pretest level.

Well HW-3 is, like HW-1, located down gradient of the Site and it displayed water level changes similar to those seen in HW-1. In the several months prior to the start of testing water level in HW-3 generally fell, reaching a pre-test low on 22 December 2007 of approximately 732.8 feet amsl. It then rose to its first high of approximately 735.5 feet on 10 January 2007. Water levels fell during most of February but began to rise again after the weir boards were installed at the diversion on 02 March 2007. On the day of the test shutdown HW-3 had a water level of approximately 735.9 feet. Water level continued to rise to a high of approximately 736.5 feet on 19 April 2007. Water levels began to fall after 19 April 2007 until the end of data collection 04 May 2007. The final water level is still above pre-test levels.

All three monitoring wells display water level changes interpreted to be in response to testing. All wells appear to show a response to the pretest shutdown of Wells Ditch and

the branch ditch, a rise corresponding to the start of testing, and a decline in response to the shutdown of the test. Monitoring well water levels also showed a response to the decrease in branch ditch flow during February 2007, due to plugging of the fish screen until 02 March 2007 when weir boards were installed at the Wells Ditch diversion.

5.2 Manually Measured Water Supply Wells

Manually measured water levels were collected from 14 wells on a monthly to weekly basis (Figure 13). Water level data was collected from wells MC-1 through MC-10 during the first and the second (2006/2007) recharge seasons. Three new wells, designated MC-11, MC-12, and MC-13, were added to the manually measured wells for the 2006/2007 recharge season. Wells MC-11, MC-12, and MC-13 are located west of the H-W Site along Stateline Road (Figure 2), generally in a down gradient to cross gradient orientation with respect to groundwater flow in the H-W Site area. Of the other wells, MC-10 is located up gradient of the H-W Site and wells MC-1 through MC-6 are located down gradient from the H-W Site. Wells MC-7, MC-8, and MC-9 are located near the H-W Site, with MC-7 and MC-9 generally transverse gradient to the H-W Site and MC-8 essentially on-site.

Based on the water level data collected for the 2006/2007 recharge season, the off-site manually measured wells generally appear to fall into three basic groups. Water levels displayed by the manually measured wells are shown on Figure 13, and summarized below:

- The first group of wells (MC-1, MC-2, MC-7, MC-9, and MC-10) displays two
 water level highs, early and late in testing, separated by decreased water levels
 during the mid-test period. The two peaks generally occur early in testing, in
 January 2007, and late in testing, in March/April 2007. These peaks are
 separated by a drop in water levels, centered on February 2007, which generally
 corresponds to the period during the test when flow to the site was lowest
 because of fish screen plugging. Water levels in all of the wells in this group fell
 soon after the end of testing in mid-April.
- Another group of wells consists of the three wells located west of the H-W Site, MC-11, MC-12, and MC-13, and one well north of the H-W Site, MC-4. The highest water levels recorded in these wells appear late in, or soon after the end of, the test season. All of these wells seem to display relatively stable water levels for the month following the end of testing.
- The final group of wells, which includes MC-3, MC-5, MC-6, and MC-8, show late and post-test water level highs, similar to all the MC wells, followed by a drop in water level. However, the data for these wells is notable in that they all lack data for January 2007, limiting our ability to determine if the early test water level high followed by the mid-test water level decrease (as seen in wells MC-1, MC-2, MC-7, MC-9, and MC-10), occurred in this group of wells.

Based on the data collected during the 2006/2007 test season, it is possible that all the manually measured wells responded to the test. All of the wells show high water levels at, or following, the end of the test, and most of them show water level decreases following the end of testing. These level changes could reflect the spread and subsequent collapse of the groundwater mound generated by the test. In addition, at

least 5 of the wells show water level increases followed by decreases early in the test which could reflect the start of testing, followed by decreased recharge during the period when flow to the Site was restricted by repeated fish screen plugging.

Three of the four wells that showed relatively stable water levels following the end of testing, MC-11, MC-12, and MC-13, might also be seeing influences other than the test. These could include: (1) seepage from nearby Walsh Creek sustaining water level in the aquifer and/or (2) increased flow through lower Wells Ditch following the end of testing sustaining these higher levels and postponing or stopping a post-test water level drop. The cause of apparent stable post-test water level in well MC-4, which is located down gradient of the H-W Site and is near wells that show post-test water level decreases, is unknown.

6.0 WATER QUALITY

6.1 Field and Basic Water Quality

Field and basic water quality data was collected twice prior to testing from the three monitoring wells, HW-1, HW-2, and HW-3. The first sampling event was on 03 October 2007 and the second was on 31 October 2007. The branch ditch was sampled once prior to testing on October 31. This was done to better characterize background water quality conditions prior to testing. Water quality data was also collected from the three monitoring wells and surface water during testing and after testing. Samples were collected on 27 December 2007 following the beginning of testing, on 11 April 2007 before the end of testing, and on 07 May 2007 following the end of testing. Sample analysis results are shown in Table 1, summarized below, and included in Appendix B.

Pre-test field pH for source water was 7.33. Pre-test up gradient groundwater ranged from 5.95 to 6.24 and down gradient groundwater ranged between 6.23 and 6.84. During testing source water pH increased as the test continued. Up gradient groundwater ranged from 6.79 to 6.96 during testing, increasing as testing continued. Down gradient groundwater during testing had a pH ranging from 6.57 to 6.96, which generally increased as testing continued. Following the end of testing pH fell in source water, but continued to increase in the wells.

Pre-test field electrical conductivity (EC) for source water was 1370 micro Siemens per centimeter (mS/cm). In pre-test groundwater, both up and down gradient, EC was between 1430 and 1570 mS/cm. During testing EC in source water increased following the start of testing and decreased later in the test. Up gradient groundwater EC generally decreased during the course of testing. Down gradient groundwater showed little change from pretest levels and was relatively unchanged over the course of testing. Following the end of testing all wells show a decline in electrical conductivity and while source water did not change.

Nitrate-N in source water prior to testing was 0.870 milligrams per liter (mg/l). Concentrations in pre-test groundwater ranged from 0.470 to 0.910 mg/l. During testing nitrate-N concentration in source water first increased then decreased to below pre-test levels later in testing. Nitrate-N in all monitoring wells generally increased slightly over the course of testing. Following the end of testing, nitrate-N increased in all wells and source water.

Nitrite-N concentrations were below the minimum detection limit (MDL) of 0.0023 mg/l during pre-test sampling events in both the monitoring wells and surface water. During and following testing nitrite-N concentrations were at, or below, the MDL.

Hardness in pre-test source water was 53.6 mg/l. Concentrations in pre-test up gradient groundwater were approximately 63.0 mg/l and down gradient groundwater ranged from 59.4 to 67.9 mg/l. Hardness increased at all sampling locations following the start of testing, ranging from 87.20 to 98.70 mg/l. Later in the testing season hardness concentration fell at all sampling locations and following testing it continued to fall.

Total dissolved solids (TDS) concentration in pre-test source water was 92 mg/l. There was relatively no difference between up and down gradient TDS concentrations in pretest groundwater, with all values ranging from approximately 100 to 130 mg/l. TDS in source water and groundwater remained relatively unchanged following the start of testing. Following testing TDS in all wells and surface water fell with up gradient groundwater showing the greatest decline.

Chloride concentration in pre-test source water was 2.190 mg/l. In groundwater pre-test chloride concentrations were at, or below, the MDL of 0.297 mg/l for the 03 October 2007 sampling event. Chloride concentrations increased in wells HW-1 and HW-2 but stayed at, or below, the MDL in HW-3 in the 31 October 2007 pre-test sampling event. Following the start of testing chloride concentrations in source water and well HW-1 fell to, or below, the MDL. Concentrations in well HW-2 fell from 1.900 to 0.600 mg/l following the start of testing, and in HW-3 rose from at or below the MDL to 2.800 mg/l. Following testing chloride increased in well HW-1 and source water and decreased in wells HW-2 and HW-3.

Pre-test soluble reactive phosphorus (SRP) concentration in source water was 0.150 mg/l. In groundwater, pre-test SRP was lowest in well HW-3. The highest pre-test groundwater SRP was measured in well HW-2 in the second pretest sampling event (31 October 2007). Following the start of testing SRP increased in source water from 0.150 to 0.250 mg/l, but fell in both up and down gradient wells.

For all sampling event chemical oxygen demand (COD) was almost always at, or below, the MDL of 8.0 mg/l. The one exception was seen in source water which had a COD of 15 mg/l in the 11 April 2007 sampling event.

For the 2006/2007 season, source water and groundwater generally appear to show similar field and basic water quality conditions. Parameter concentrations generally increased and decreased together, although not always by the same amount. These data generally suggest surface water and groundwater throughout the vicinity of the Site display a high degree of continuity. Given the depth to groundwater described earlier, this continuity generally is restricted to surface water bodies leaking into and recharging the shallow alluvial aquifer.

6.2 SOC Water Quality

Samples for SOC analysis were collected during the 31 October 2006 and 11 April 2007 sampling events. Analysis results are provided in Table 2 and both sampling events are summarized as follows:

- No SOC's were detected in surface water.
- Two SOC's, di-n-butyl phthalate and dimethyl phthalate, were detected in pre-test groundwater analysis (31 October 2007). Dimethyl phthalate was detected in well HW-3 at a concentration of 3 micrograms per liter (ug/l) and di-n-butyl phthalate was detected in up gradient well HW-2 and down gradient well HW-3 at concentrations of 1.1 ug/L and 0.9 ug/L respectively.
 - Di-n-butyl phthalate and dimethyl phthalate are manufactured chemicals commonly used in plastic, paint, glue, and other household products.
- During testing (11 April 2007) di-n-butyl phthalate was again detected, this time in all three monitoring wells at concentrations of 0.7 ug/l, 0.5 ug/l, and 0.6 ug/l in wells HW-1, HW-2, and HW-3, respectively.
- Malathion also was detected during testing (11 April 2007) in all three monitoring wells at concentrations of 0.4 ug/l in HW-1, 0.3 ug/l in HW-2, and 0.4 ug/l in HW-3.
 - Malathion is a general use pesticide commonly used in mosquito control.

The SOC data is interpreted to indicate a very small number of these compounds are found in local groundwater. However, inconsistent occurrence, both temporally and spatially, and low concentrations suggest the detections represent intermittent background conditions and that Site operation has an extremely low potential to contribute to the presence of these compounds in groundwater as a result of testing.

7.0 FIRST AND SECOND TEST SEASON COMPARISONS

This section presents a simple qualitative comparison between data collected and observations made during the first test season (spring 2006) and the recently completed second season (winter/spring 2006/2007). In particular:

- The second aquifer recharge season was able to begin much earlier than the first season.
- During the first season most water was delivered to the Hall portion of the H-W Site, during the second season most water was delivered to the Wentland portion of the Site.
- Water level in the first season in HW-1 and HW-3 experienced maximum rises of approximately 9 feet and 2.5 feet, respectively (Figure 14). During the second

season water level rose approximately 2.5 feet and 2.0 feet in wells HW-1 and HW-3, respectively.

- Water levels observed in HW-2 for the second season are similar to those seen during the first season. At the start of both seasons the water level began to rise within a few hours of the start of testing. Water levels in HW-2 during both test seasons show larger responses than the other wells. It also responded quickly to the end of testing, with water level dropping soon after the end of the tests.
- Water level changes measured in the first season and the just completed second season in off-site wells MC-1 through MC-10 continue to suggest the effects of recharge can be seen some distance form the Site, and that shallow alluvial aquifer water level does rise in response to recharge at the Site. These water level rises do appear to migrate to the north along the valley of McEvoy Spring Creek. The rise in water level seen in MC-10 suggests that propagation of recharge effects extend at least 0.5 miles up gradient in both seasons.
- Both field and basic water quality constituents for source water and groundwater during the second season appear to be much like the first season. There were concentration fluctuations in many constituents, but no discernable trends that occur, other than the apparent close degree of hydrologic continuity between surface water and groundwater suggested by similar chemistry and changes.
- SOC's in both seasons saw intermittent detections of phthalates. This suggests phthalates may be present as part of the general background groundwater chemistry. Malathion was detected this season, but not last season.

8.0 SUMMARY AND RECOMMENDATIONS

8.1 Summary

This report presented the results of the second season of shallow aquifer recharge testing at the Hall-Wentland Site. Testing was done to continue to evaluate the feasibility of using SAR to help restore depleted shallow sediment aquifer groundwater levels and improve flow in spring creeks and streams. Testing at the Hall-Wentland Site is permitted under a Limited License granted by the Oregon Water Resources Department. The license authorizes testing for a total of five years, and specifies a recharge season each year extending from November of one calendar year to April of the following year.

The test event discussed in this report began on 22 December 2006 and ended on 15 April 2007. SAR testing utilized ambient stream flow in the East Little Walla Walla River. Water was diverted from this stream to the H-W Site via Wells Ditch. Calculating the total water flow diverted to the H-W Site proved to be more problematic than anticipated. Based on the data collected for the just completed recharge season, between approximately 250 and 190 acre-feet of water probably was diverted from Wells Ditch towards the Site. However, based on the on-site ramp flume measurements, as little as approximately 100 acre-feet may have reached the Site. The reasons for these discrepancies are not clear, but may include inaccurate measurements at the diversion ramp flume, problems similar to those encountered in the previous season which were related to low gradients through the measurement structures resulting in impeded flow and collection of inaccurate data, and/or repeated plugging of the fish screen. Low gradients are also interpreted to have contributed to repeated fish screen plugging in the 2006/2006 recharge season.

We started the test season with several weir boards removed from the diversion structure for the Site. Unfortunately, with the boards removed, stream gradient through the ditch was high enough to carry suspended debris up to, lodge against, and plug the fish screen. The boards were reinstalled on March 2, 2007, at which point ponding occurred and stream gradient above the weir decreased, allowing debris to fall out of suspension before reaching the screen. With this, flow through the diversion increased.

The shallow aquifer beneath the Site did respond to SAR testing by rising approximately 8.8 feet in HW-2 during testing. Based on data collected during testing, water levels in on-site monitoring wells began to rise within a few hours after the start of testing. We do not know exactly how far the water table response extends from the Site. Based on data collected at well MC-10 effects extend approximately 0.5 miles up gradient of the Site. Down gradient effects extend through the off-site wells at least as far north as MC-3, if not all the way to MC-1, MC-2, and the Walla Walla River. Following the end of testing water levels continued to rise a few days, before beginning to fall. At the end of data collection on 04 May 2007, 6 days short of a full month after testing ended, water levels were still above pre-test levels in December 2006.

Based on the field and basic water quality parameters measured to-date, SAR activities at the H-W Site are interpreted to have had no negative effect on groundwater quality in the Site area. This data does suggest a high degree of hydraulic continuity between local surface and groundwater, with surface water bodies in the immediate H-W Site area, generally loosing water to the underlying shallow alluvial aquifer system. A few SOC's were detected intermittently before and during the test. However, the timing of these detections suggests that they were not caused by the test activity and the measured concentrations represent background concentrations related to off site activities.

8.2 Recommendations

Based on the results of the second test season described in this report, we have several recommendations for changes to Site operation and testing for the 2007/2008 and 2008/2009 recharge seasons. These include:

- Install and instrument 3 new shallow aquifer monitoring wells near the Site. One of these wells should be located east of the Site. A second well should be located to the south, up gradient of the Site, if a suitable location can be found. The third well should either be placed to the east of the Site or further down gradient than the existing down gradient shallow aquifer monitoring wells.
- Conduct one or more infiltration tests on the Site to better constrain on-site infiltration rates as another way to get at the amount of water delivered to the Site.

- Install fiber optic transducers in at least 2 of the off site manually measured water wells to collect better off site water level data.
- Add additional water wells to the manually measured water well network, possibly further up gradient.
- Discontinue use of the diversion flume, returning to using the weir structure to measure flow and calculate water volume diverted from Wells Ditch towards the Site.
- Conduct an aquifer test in at least one of the existing off-site wells. If done, the selected well should be open to the majority of the Mio-Pliocene upper coarse unit, be accessible for the installation of a digital transducer, and be as close to the H-W Site as we can get. Such a test would require the cooperation of the well owner. This test would generate aquifer property data currently lacking.
- Revisit with Oregon Department of Fish and Wildlife staff the need for a fish screen at the Site. If that agency still requires one, we recommend replacing the fish screen used in the first 2 seasons with one that is self-cleaning.
- Following the end of the 2007/2008 recharge season, prepare an interim report outlining basic work activities and results for that season. Following the end of the 2008/2009 recharge season prepare a final report will focus on summarizing all data collected since the beginning of the project, analyze test performance, and make recommendations for future operations.

Longer term recommendations, all requiring additional funding. These include:

- Expand the size and capacity of the ELWW and Wells Ditch system.
- Address WWRID concerns (with physical structures and/or regulatory exclusions) regarding false fish attraction issues to the introduction of Walla Walla River water to the ELWW and Wells ditch system.

9.0 REFERENCES CITED

Kennedy/Jenks, 2006, Results of the First Season of Shallow Aquifer Recharge Testing at the Hall-Wentland Site, Umatilla County, Oregon and Walla Walla County, Washington. Consultants report prepared for HDR, Inc., 23 June 2006, 35 p., 5 tables, 34 figures, 4 Appendices.

Tables

MDL>							0.084		0.0023	0.11	21.1		0.297		0.0433 Soluble		8.0		
Sample ID	Date	Lab No.	pН	Temp. C	Electrical Conductivity (mS/cm)	Turbidity (NTU)	NO₃-N (mg/L)		NO ₂ -N (mg/L)	Hardness (mg/L)	TDS (mg/L)		CI (mg/L)		Reactive Phosphorous (mg/L)		COD (mg/L)	Total Coliform (per 100ml)	E-Coli (per 100ml)
Surface	2/2/2006	80603	7.29	10.0	1027	14.40	0.206		0.0300	50.42	100.0		18.700		0.197		14	present	present
Surface	2/22/2006	80884	7.21	9.5	1044	10.80	0.620			48.90	108.0		6.200		0.146		23	present	present
Surface	3/3/2006	81009	6.94	9.7	1144	26.50	0.940	<	0.0023		160.0	<	0.297	<	0.043		820	present	present
Surface	4/12/2006	81717	7.29	14.9	1300	16.10	0.610	<	0.0023	51.50	66.0		6.000		0.100		14	present	present
Surface	10/31/2006	85494	7.33	8.7	1370	27.40	0.870	<	0.0023	53.60	92.0		2.190		0.150	<	8		present
Surface	12/27/2006	86255	7.42	6.8	1530	8.36	1.130	<	0.0023	89.80	92.0	<	0.297		0.250	<	8	absent	
Surface	4/11/2007	87722	8.89	14.9	1100	5.68	0.290	<	0.0023	55.00	92.5		2.500		0.06		15	present	present
Surface	5/7/2007	88149	8.59	15.9	1100	6.51	0.600	<	0.0023	38.60	50.0		4.500		0.090	<	8	present	present

															Soluble				
					Electrical										Reactive			Total	
					Conductivity	Turbidity	NO ₃ -N		NO ₂ -N	Hardness	TDS			l	Phosphorou	s	COD	Coliform	E-Coli
Sample ID	Date	Lab No.	pН	Temp. C	(mS/cm)	(NTU)	(mg/L)		(mg/L)	(mg/L)	(mg/L)		CI (mg/L)		(mg/L)		(mg/L)	(per 100ml)	(per 100ml)
HW-1	2/2/2006	80600	6.67	10.3	1120	0.10	0.566		0.0200	57.75	110.0		25.000		0.224	<	8	absent	absent
HW-1	2/22/2006	80881	6.48	7.0	1000	0.34	1.690			55.00	98.0		9.400		0.139		9	present	present
HW-1	3/2/2006	81006	6.59	12.2	1178	0.15	0.680		0.0500	58.90	170.0		5.000		0.100		404	absent	absent
HW-1	3/9/2006	81156	6.62	11.3	1142	0.13	1.210	<	0.0023	62.00	112.0		5.000	<	0.043	<	8	absent	absent
HW-1	4/12/2006	81714	6.39	9.8	1400	0.12	1.420	<	0.0023	60.10	72.0		5.000		0.170	<	8	present	present
HW-1	5/10/2006	82240	6.55	12.0	1413	0.10	0.990	<	0.0020	59.30	116.0	<	0.200		0.150	<	10	absent	absent
HW-1	10/3/2006	85052	6.43	12.8	1440	0.50	0.750	<	0.0023	62.80	136.0	<	0.297		0.11	<	8	absent	
HW-1	10/31/2006	85491	6.84	12.2	1560	0.23	0.910	<	0.0023	64.40	108.0		2.100		0.13	<	8		absent
HW-1	12/27/2006	86252	6.57	12.1	1590	0.13	0.710	<	0.0023	90.00	108.0	<	0.297		0.12	<	8	absent	
HW-1	4/11/2007	87719	6.90	12.9	1540	0.12	0.800	<	0.0023	83.30	115.0		0.500		0.090	<	8	absent	absent
HW-1	5/7/2007	88146	7.32	13.3	1520	0.89	1.140	<	0.0023	56.70	76.7		5.000		0.130	<	8	present	absent

Sample ID	Date	Lab No.	рH	Temp. C	Electrical Conductivity (mS/cm)	Turbidity (NTU)	NO ₃ -N (mg/L)		NO ₂ -N (mg/L)	Hardness (mg/L)	TDS (mg/L)		CI (mg/L)		Soluble Reactive Phosphorou (mg/L)	s	COD (mg/L)	Total Coliform (per 100ml)	E-Coli (per 100ml)
HW-2	2/2/2006	80601	6.60	14.0	1434	6.82	0.390		0.0210	72.41	126.0		25.000		0.208	<	8	present	absent
HW-2	2/22/2006	80882	6.60	13.1	1441	1.23	0.930			77.00	128.0		7.800		0.114		19	present	absent
HW-2	3/3/2006	81007	6.74	12.8	1506	0.02	0.720		0.0500	77.50	166.0		5.000		0.100		743	absent	absent
HW-2	3/9/2006	81157	6.78	12.5	1470	0.71	0.950	<	0.0023	82.00	126.0	<	0.297	<	0.043	<	8	absent	absent
HW-2	4/12/2006	81715	6.30	13.4	1400	12.50	1.690	<	0.0023	63.00	82.0		5.000		0.120	<	8	present	present
HW-2	5/10/2006	82241	6.65	13.4	1708	4.53	1.710	<	0.0020	71.90	132.0	<	0.200		0.130	<	10	present	present
HW-2	10/3/2006	85053	5.95	18.0	1450	0.61	0.470	<	0.0023	63.10	130.0	<	0.297		0.090	<	8	absent	
HW-2	10/31/2006	85492	6.24	15.1	1570	2.23	0.740	<	0.0023	62.90	114.0		1.900		0.200	<	8		absent
HW-2	12/27/2006	86253	6.79	14.4	1370	4.12	0.780	<	0.0023	87.20	90.0		0.600		0.130	<	8	present	
HW-2	4/11/2007	87720	6.96	11.3	1370	0.83	0.810	<	0.0023	69.00	108.0		2.700		0.050	<	8	present	absent
HW-2	5/7/2007	88147	7.02	10.8	1360	1.67	0.850	<	0.0023	48.70	53.3		1.500		0.120	<	8	present	present

															Soluble				
					Electrical										Reactive			Total	
					Conductivity	Turbidity	NO ₃ -N		NO ₂ -N	Hardness	TDS				Phosphorou	S	COD	Coliform	E-Coli
Sample ID	Date	Lab No.	рН	Temp. C	(mS/cm)	(NTU)	(mg/L)		(mg/L)	(mg/L)	(mg/L)		CI (mg/L)		(mg/L)		(mg/L)	(per 100ml)	(per 100ml)
HW-3	2/2/2006	80602	6.53	12.4	1193	0.16	0.391		0.0170	60.38	108.0		31.200		0.083	<	8	absent	absent
HW-3	2/22/2006	80883	6.64	12.3	1181	0.14	0.900			62.70	106.0		15.600		0.107		14	absent	absent
HW-3	3/3/2006	81008	6.48	13.0	1223	0.12	0.700	<	0.0023	60.80	158.0	<	0.297	<	0.043		615	absent	absent
HW-3	3/9/2006	81158	6.86	12.4	1178	0.20	0.920	<	0.0023	64.00	96.0		8.000	<	0.043		13	absent	absent
HW-3	4/12/2006	81716	6.52	13.2	1500	0.05	1.020	<	0.0023	62.60	88.0		5.000		0.100	<	8	absent	absent
HW-3	5/10/2006	82242	6.45	13.2	1447	16.90	1.020	<	0.0020	62.20	144.0	<	0.297		0.160	<	10	present	present
HW-3	10/3/2006	85054	6.32	13.2	1430	0.20	0.700	<	0.0023	67.90	122.0	<	0.297		0.080	<	8	absent	
HW-3	10/31/2006	85493	6.76	12.7	1430	3.17	0.760	<	0.0023	59.40	98.0	<	0.297		0.090	<	8		absent
HW-3	12/27/2006	86254	6.8	12.5	1470	2.44	1.120	<	0.0023	98.70	94.0		2.800		0.060	<	8	absent	
HW-3	4/11/2007	87721	6.96	13.1	1490	0.27	0.870	<	0.0023	78.90	105.0		3.000	<	0.043	<	8	absent	absent
HW-3	5/7/2007	88148	7.07	13.2	1480	0.11	1.160	<	0.0023	56.80	76.7		2.000		0.07	<	8	absent	absent

Table 1. Field and basic water quality results for the first and second recharge seasons.

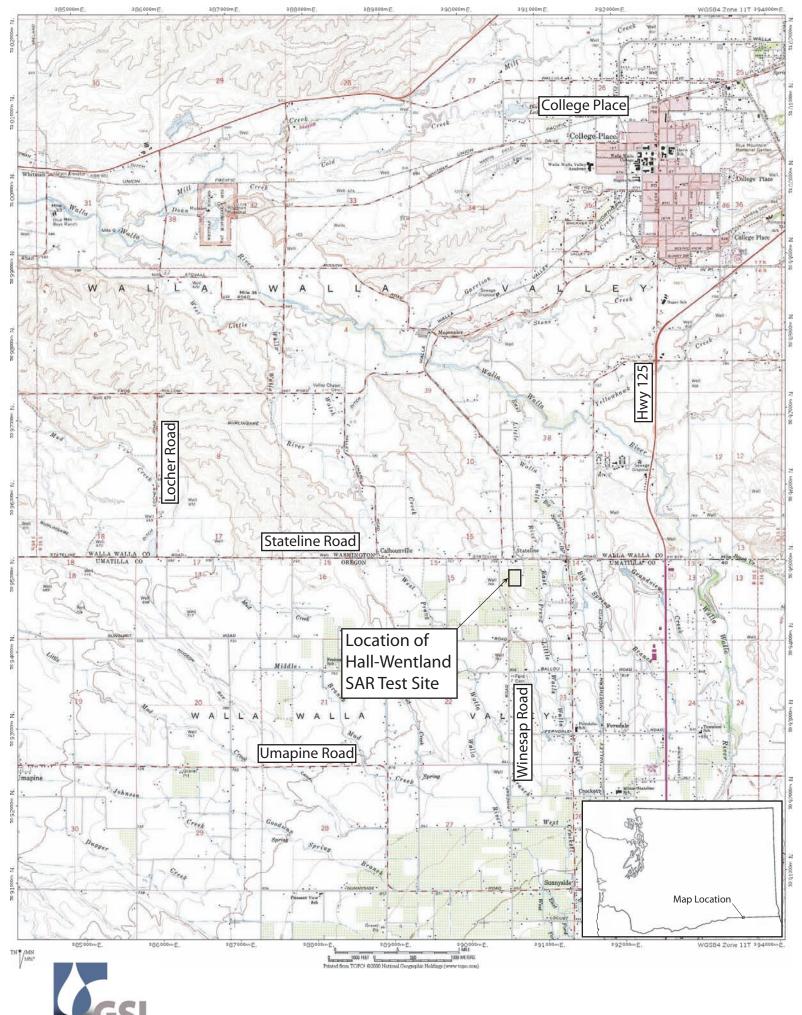
Date	10/31/2006	10/31/2006	10/31/2006	10/31/2006
Well ID	HW-1	HW-2	HW-3	Surface
Chemical				
	mates in Drink			
Carbofuran	ND	ND	ND	ND
Oxymal 3-Hydroxycabofuran	ND ND	ND ND	ND ND	ND ND
Aldicarb	ND	ND	ND	ND
Aldicarb sulfone	ND	ND	ND	ND
Aldicarb sulfoxide	ND	ND	ND	ND
Carbaryl	ND	ND	ND	ND
Methomyl	ND	ND	ND	ND
Propoxur (Baygon)	ND	ND	ND	ND
Methiocarb	ND	ND	ND	ND
	etic Organic Co			
Endrin	ND	ND	ND	ND ND
Lindane (BHC-Gamma)	ND ND	ND ND	ND ND	ND
Methoxychlor Alachlor	ND	ND	ND	ND
Atrazine	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND
Chlordane Technical	ND	ND	ND	ND
Di(ethylhexyl)-Adipate	ND	ND	ND	ND
Di(ethylhexyl)-phthalate	ND	ND	ND	ND
Heptachlor	ND	ND	ND	ND
Heptachlor Epoxide A&B	ND	ND	ND	ND
Hexachlorobenzene	ND	ND	ND	ND
Hexachlorocyclo-Pentadiene	ND	ND	ND	ND
Simazine Aldrin	ND ND	ND ND	ND ND	ND ND
Butachlor	ND	ND	ND ND	ND ND
Dieldrin	ND	ND	ND	ND
Metolachlor	ND	ND	ND	ND
Metribuzin	ND	ND	ND	ND
Propachlor	ND	ND	ND	ND
Bromacil	ND	ND	ND	ND
Prometon	ND	ND	ND	ND
Terbacil	ND	ND	ND	ND
Diazinon	ND	ND	ND	ND
EPTC	ND	ND	ND	ND
4,4-DDD	ND	ND	ND	ND
4,4-DDE	ND	ND	ND	ND
4,4-DDT	ND ND	ND ND	ND ND	ND ND
Cyanazine Malathion	ND	ND	ND	ND
Trifluralin	ND	ND	ND	ND
Napthalene	ND	ND	ND	ND
Fluorene	ND	ND	ND	ND
Acenaphthylene	ND	ND	ND	ND
Acenaphthene	ND	ND	ND	ND
Anthracene	ND	ND	ND	ND
Benz(A)anthracene	ND	ND	ND	ND
Benzo(B)fluoranthene	ND	ND	ND	ND
Benzo(G,H,I)peryene	ND ND	ND ND	ND ND	ND ND
Benzo(K)fluoranthene Chrysene	ND	ND	ND	ND
Dibenzo(A,H)anthracene	ND	ND	ND	ND
Fluoranthene	ND	ND	ND	ND
Indeno(1,2,3-CD)pyrene	ND	ND	ND	ND
Phenanthrene	ND	ND	ND	ND
Pyrene	ND	ND	ND	ND
Benzyl Butyl Phthalate	ND	ND	ND	ND
Di-N-Butyl Phthalate	ND	1.1BQ	0.9	ND
Diethyl Phthalate	ND	ND	ND	ND
Dimethyl Phthalate	ND	ND	3	ND
Toxaphene Aroclor 1221	ND ND	ND ND	ND ND	ND ND
Aroclor 1221 Aroclor 1232	ND	ND	ND	ND
Aroclor 1232 Aroclor 1242	ND	ND	ND	ND
Aroclor 1248	ND	ND	ND	ND
Aroclor 1254	ND	ND	ND	ND
Aroclor 1260	ND	ND	ND	ND
Aroclor 1016	ND	ND	ND	ND
	icides in Drinki			
2,4-D	ND	ND	ND	ND
2,4,5-TP (Silvex)	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND
Dalapon	ND	ND	ND	ND
Dinoseb	ND	ND	ND	ND
Picloram	ND	ND	ND ND	ND
Dicamba 2,4 DB	ND ND	ND ND	ND ND	ND ND
2,4 DB 2,4,5 T	ND	ND	ND	ND
2,4,5 I Bentazon	ND	ND	ND	ND
Dichlorprop	ND	ND	ND	ND
Actiflorfin	ND	ND	ND	ND
Dacthal (DCPA)	ND	ND	ND	ND
	ND	ND	ND	ND
3,5-Dichlorobenzoic Acid	ND			
Velpar (hexazinone)	ND	ND	ND	ND
			ND ND	ND ND

Table 2. SOC results for the 2006/2007 recharge season.

Date	4/11/2007	4/11/2007	4/11/2007	4/11/2007
Well ID	HW-1	HW-2	HW-3	Surface
Chemical				
	amates in Drink			
Carbofuran	ND ND	ND ND	ND ND	ND ND
Oxymal 2 Hydroxyoobofurop				
3-Hydroxycabofuran Aldicarb	ND ND	ND ND	ND ND	ND ND
Aldicarb sulfone	ND	ND	ND	ND
Aldicarb sulfoxide	ND	ND	ND	ND
Carbaryl	ND	ND	ND	ND
Methomyl	ND	ND	ND	ND
Propoxur (Baygon)	ND	ND	ND	ND
Methiocarb	ND	ND	ND	ND
	hetic Organic Co			
Endrin	ND	ND	ND	ND
Lindane (BHC-Gamma)	ND	ND	ND	ND
Methoxychlor	ND	ND	ND	ND
Alachlor Atrazine	ND ND	ND ND	ND ND	ND ND
Benzo(a)pyrene	ND	ND	ND	ND
Chlordane Technical	ND	ND	ND	ND
Di(ethylhexyl)-Adipate	ND	ND	ND	ND
Di(ethylhexyl)-phthalate	ND	ND	ND	ND
Heptachlor	ND	ND	ND	ND
Heptachlor Epoxide A&B	ND	ND	ND	ND
Hexachlorobenzene	ND	ND	ND	ND
Hexachlorocyclo-Pentadiene		ND	ND	ND
Simazine	ND	ND	ND	ND
Aldrin	ND	ND	ND	ND
Butachlor	ND	ND	ND	ND
Dieldrin	ND	ND	ND	ND
Metolachlor	ND	ND	ND	ND
Metribuzin	ND	ND	ND	ND
Propachlor	ND	ND	ND	ND
Bromacil	ND	ND	ND	ND
Prometon	ND	ND	ND	ND
Terbacil	ND	ND	ND	ND
Diazinon	ND	ND	ND	ND
EPTC	ND	ND	ND	ND
4,4-DDD	ND	ND	ND	ND
4,4-DDE	ND	ND	ND	ND
4,4-DDT	ND	ND	ND	ND
Cyanazine Malathion	ND 0.4	ND 0.3	ND 0.4	ND ND
Trifluralin	ND	ND	ND	ND
Napthalene	ND	ND	ND	ND
Fluorene	ND	ND	ND	ND
Acenaphthylene	ND	ND	ND	ND
Acenaphthene	ND	ND	ND	ND
Anthracene	ND	ND	ND	ND
Benz(A)anthracene	ND	ND	ND	ND
Benzo(B)fluoranthene	ND	ND	ND	ND
Benzo(G,H,I)peryene	ND	ND	ND	ND
Benzo(K)fluoranthene	ND	ND	ND	ND
Chrysene	ND	ND	ND	ND
Dibenzo(A,H)anthracene	ND	ND	ND	ND
Fluoranthene	ND	ND	ND	ND
Indeno(1,2,3-CD)pyrene	ND	ND	ND	ND
Phenanthrene	ND	ND	ND	ND
Pyrene	ND	ND	ND	ND
Benzyl Butyl Phthalate	ND	ND	ND	ND
Di-N-Butyl Phthalate	0.7	0.5KK	0.6	ND
Diethyl Phthalate	ND	ND	ND	ND
Dimethyl Phthalate Toxaphene	ND ND	ND ND	ND ND	ND ND
Aroclor 1221	ND	ND	ND	ND
Aroclor 1232	ND	ND	ND	ND
Aroclor 1242	ND	ND	ND	ND
Aroclor 1248	ND	ND	ND	ND
Aroclor 1254	ND	ND	ND	ND
Aroclor 1260	ND	ND	ND	ND
Aroclor 1016	ND	ND	ND	ND
	bicides in Drink	ng Water		
2,4-D	ND	ND	ND	ND
2,4,5-TP (Silvex)	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND
Dalapon	ND	ND	ND	ND
Dinoseb	ND	ND	ND	ND
Picloram	ND	ND	ND	ND
Dicamba	ND	ND	ND	ND
2,4 DB	ND	ND	ND	ND
	ND	ND	ND	ND
2,4,5 T	NID	ND	ND	ND
Bentazon	ND			
Bentazon Dichlorprop	ND	ND	ND	ND
Bentazon Dichlorprop Actiflorfin	ND ND	ND	ND	ND
Bentazon Dichlorprop Actiflorfin Dacthal (DCPA)	ND ND ND	ND ND	ND ND	ND ND
Bentazon Dichlorprop Actiflorfin Dacthal (DCPA) 3,5-Dichlorobenzoic Acid	ND ND ND ND	ND ND ND	ND ND ND	ND ND ND
Bentazon Dichlorprop Actiflorfin Dacthal (DCPA)	ND ND ND	ND ND	ND ND	ND ND

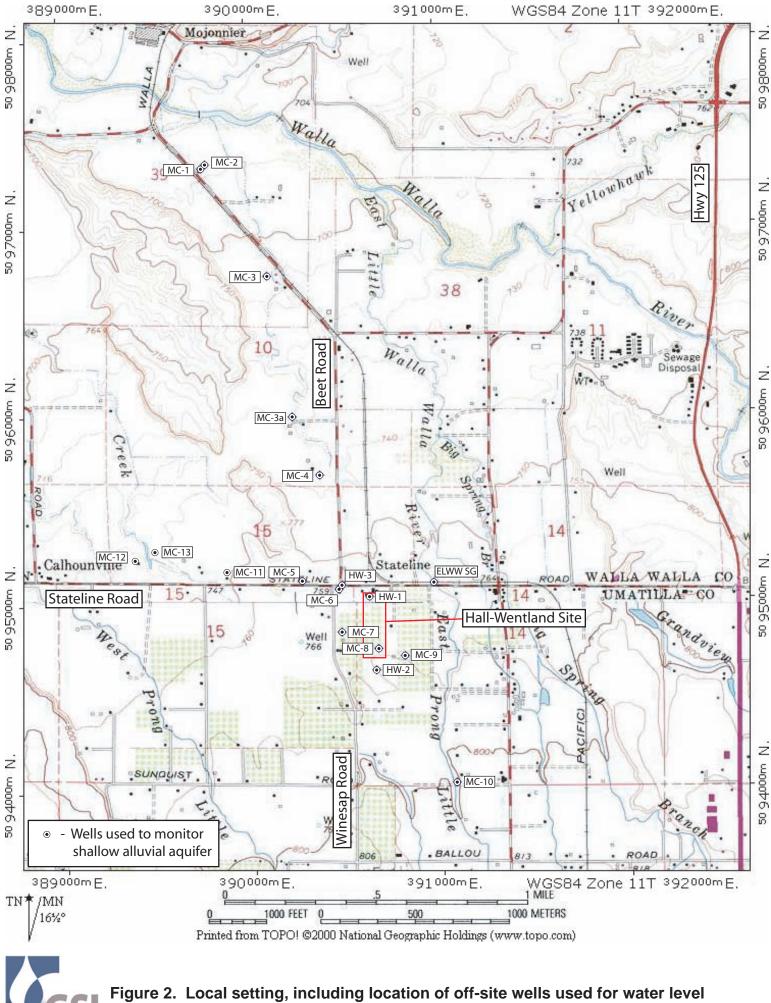
Table 2 (continued)

Figures





Water Solutions, Inc.



monitoring and onsite wells used for water level and water quality monitoring.

Water Solutions, Inc.

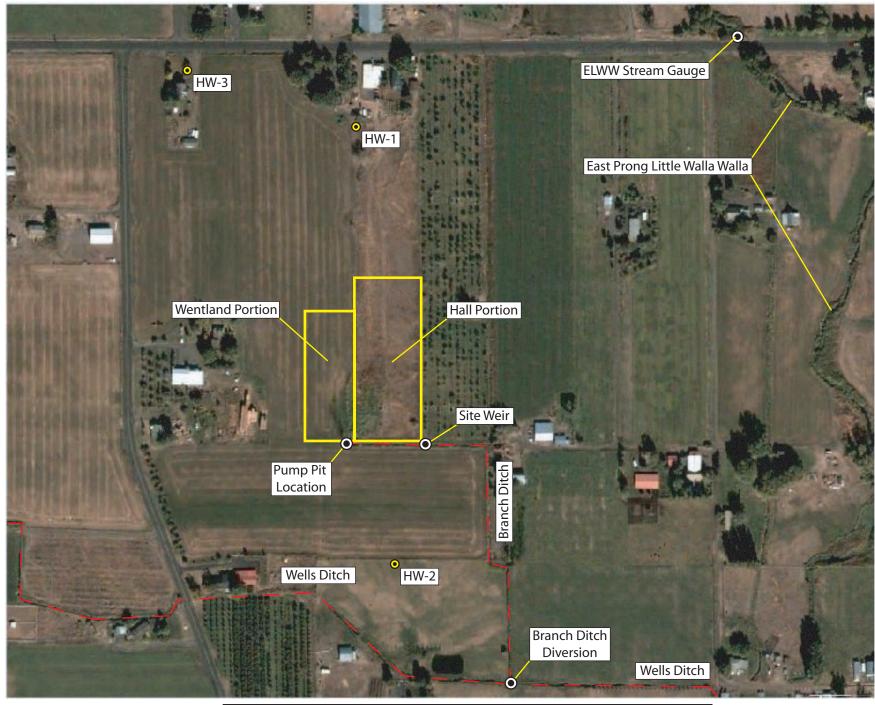




Figure 3. Local setting, showing ditches, site boundaries, and location of water quality monitoring wells.

0.25 Miles

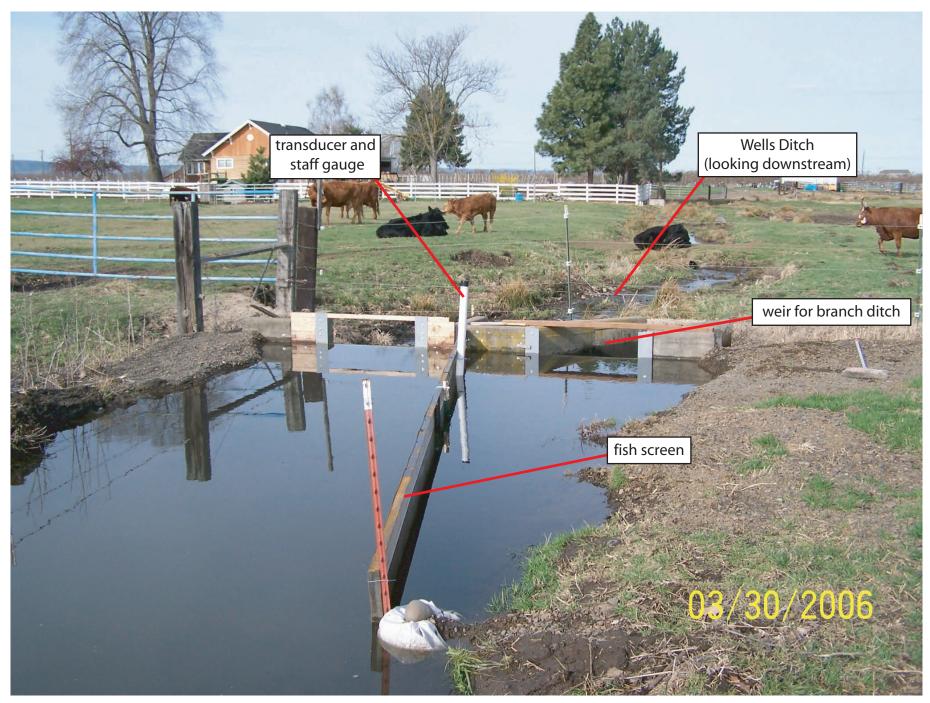




Figure 4. Photograph of the fish screen at the branch ditch diversion off Wells Ditch. This configuration shows weir installed.





Figure 5. Photograph of branch ditch ramp flume just below the diversion off Wells Ditch.





Figure 6. Photograph of the on-site branch ditch measurement weir used during the 2006 recharge season. Notice the small drop across the weir.





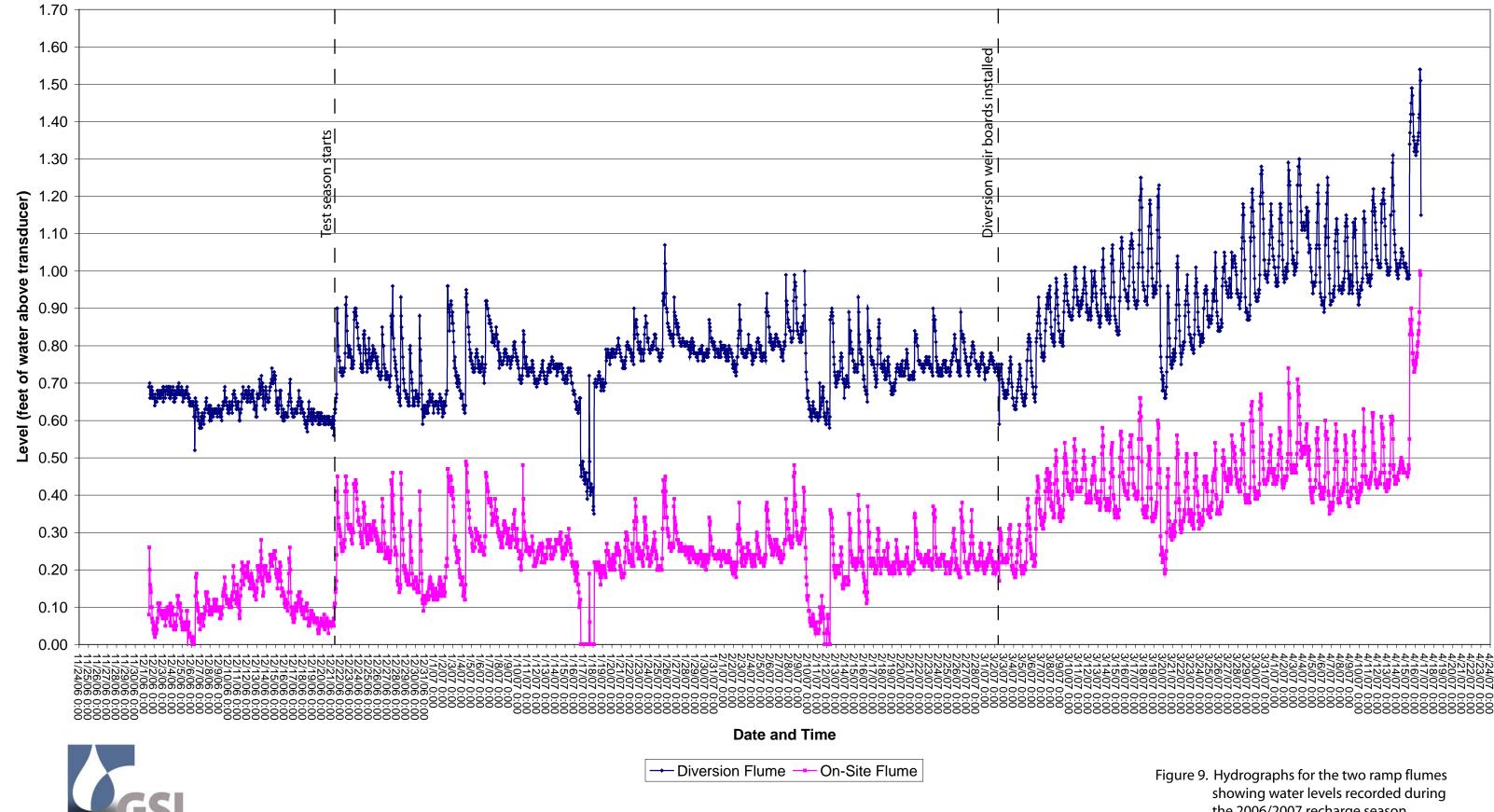
Figure 7. Photograph of the on-site ramp flume that replaced the on-site weir for the 2006/2007 recharge season. View is towards the Site.





Figure 8. Photograph of the gated culvert used to control flow from the pump sump pit to the Hall portion of the Site.

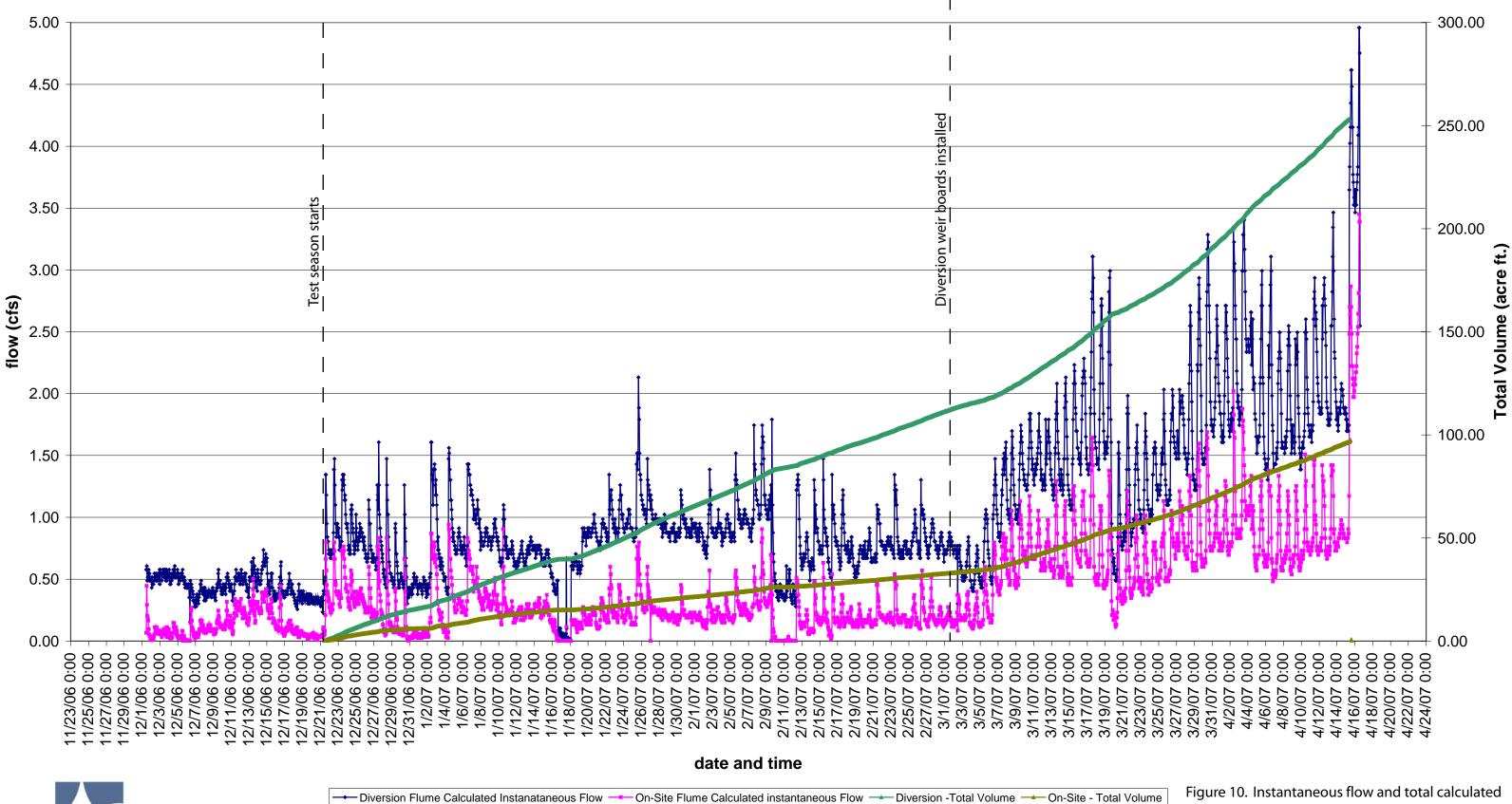
Hall-Wentland Surface Water Monitoring



Water Solutions, Inc.

showing water levels recorded during the 2006/2007 recharge season.

Calculated flow





volume for the two ramp flumes during the 2006/2007 recharge season.

3.500 3.000 2.500 2.000 flow (cfs) 1.500 1.000 0.500 0.000 3/3/2007 0:00 3/1/2007 12:00 3/2/2007 12:00 3/3/2007 12:00 3/7/2007 0:00 3/7/2007 12:00 3/8/2007 0:00 3/8/2007 12:00 3/11/2007 0:00 3/12/2007 12:00 3/13/2007 12:00 3/14/2007 0:00 3/16/2007 0:00 3/2/2007 0:00 3/4/2007 0:00 3/4/2007 12:00 3/5/2007 0:00 3/5/2007 12:00 3/6/2007 0:00 3/6/2007 12:00 3/9/2007 0:00 3/9/2007 12:00 3/10/2007 0:00 3/10/2007 12:00 3/11/2007 12:00 3/12/2007 0:00 3/13/2007 0:00 3/14/2007 12:00 3/15/2007 0:00 3/15/2007 12:00 date and time

total volume - weir



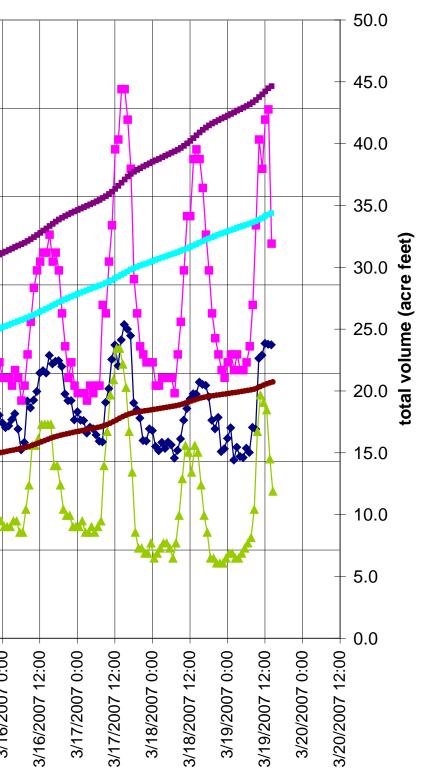
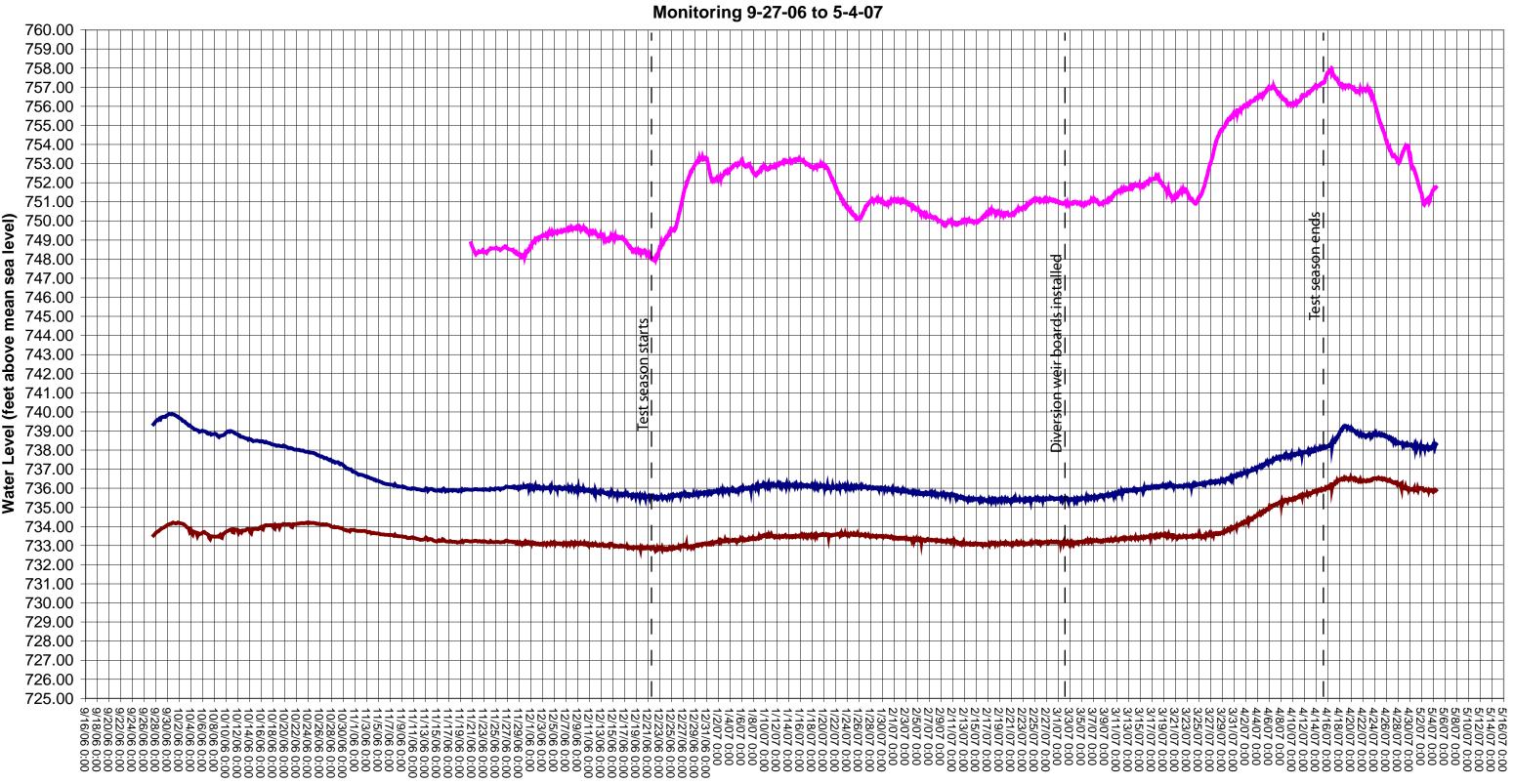


Figure 11. Comparison between calculated flows through both ramp flumes and the diversion weir.



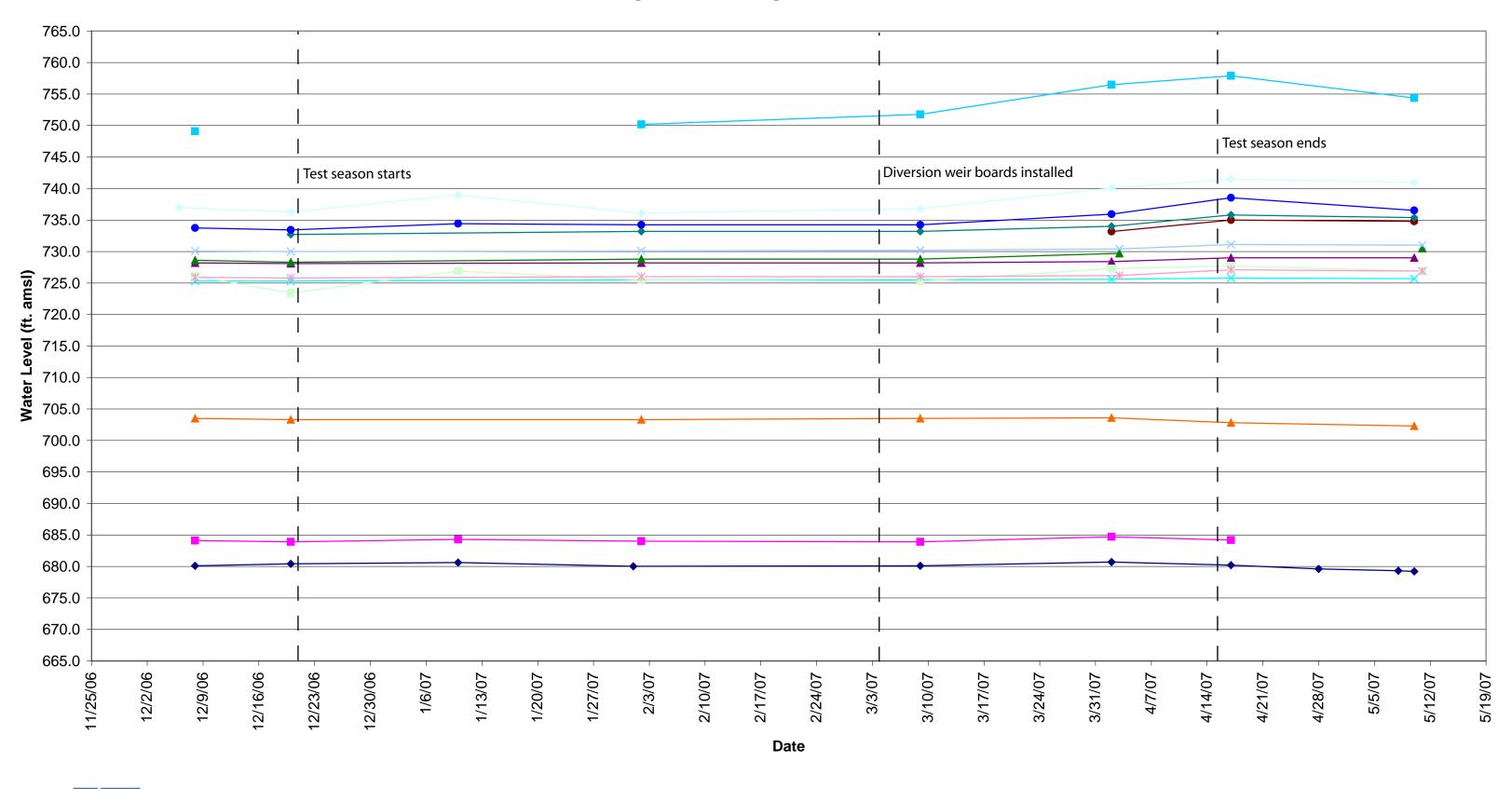
Hall Wentland Water Level Monitoring

Date and Time



Figure 12. Hydrographs for moniroting wells HW-1, HW-2, and HW-3 for the period preceding, during, and following the 2006/2007 recharge season.

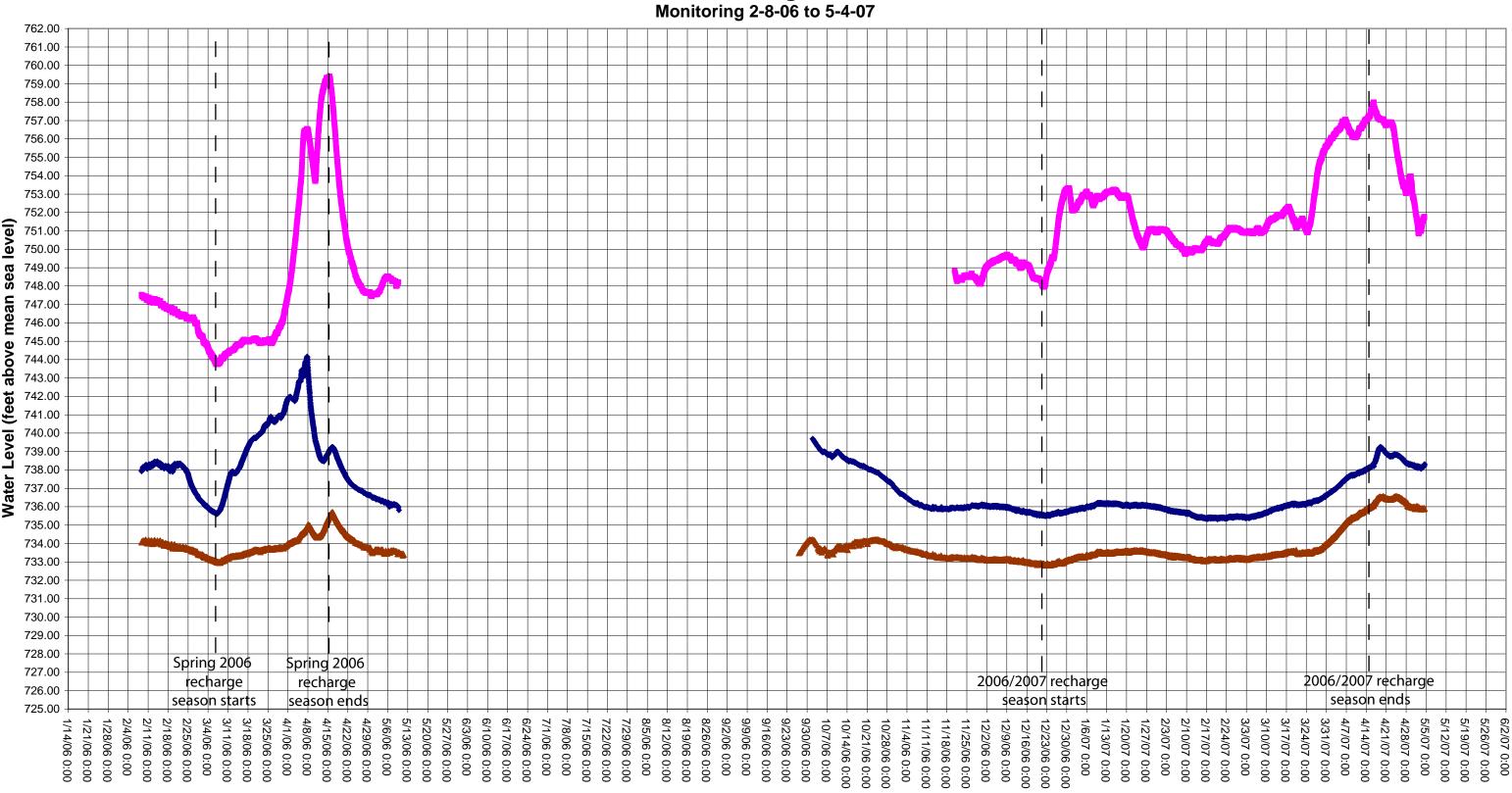
Page Monitoring Well Levels





MC-10 — MC-11 — MC-12 — MC-13

Figure 13. Hydrograph for the manually measured off-site wells for the period preceding, during, and following the 2006/2007 season.



Hall Wentland Water Level Monitoring - 2006 and 2006/2007Seasons

Water Solutions, Inc.

◆ HW-1 ■ HW-2 ▲ HW-3

Date and Time

Figure 14. Comparison between water levels in wells HW-1, HW-2, and HW-3 during the 2006 and 2006/2007 recharge seasons.

Appendix A

Field notes from the 2006/2007 recharge season

9/27/OC down lond transduis **,CONTENTS** download @ 12:20 HW -1 ÷----DTW-24-25 DATE ELAOE. REFERENCE 1 down load @ HW -2 1 DTW-10.5 2000 lord @ 12 37 HW-3 . . DTW-23.33 HW-2 cable rusted through . . . donot have materials ; _ to fix will reinstall soon Transducer reasonal HW-diversion download @ 13150 state @ 0.62 i)

		<u>v/31/00</u>
	10/31/2006	Call Tom P ~ 11:20, ELWIN you'se hus
:	Goong to HW SED today to meed house of Kus and give her lab blank (blund teed sampler	At FLUW/ Wells OFT and 1145, Flor
:	Bottle marked "A" a low range. hardness sample.	a pretty star in ELWID, Sat has a lot of pair debra in Ed. Will weed to be alcaned.
	Total 100 mg/1 calcium 50 mg/1	ELWW at the chapel Lu, law you, Jainly swar, cours in field & channel
	Bottle marked "B' is an marganics standard	1150 C StateLma Bruge in ELNW
	Nitrate-N 2ms/1 orthorpolysed - 2mg/1	Nuch better flav here thin abure gauge @ 0.41 to 0.42
•	Met fille and at will in heeps field as ~ 1120, Grace he the two blank samples A + B	Manhavier 5th ort in MWZ, 62 old wire Man houra MATE C. 1210
	C	Back un Sta e. 1:10 PM (1310)

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11/20/2000 11/27/2006 Griste 14 W & 1400 to ustall herber thanschucer + fix ather au 50 at HW-3 @ 1120 Transluce you fallow if calls oner. " recovered C 1128 23,74' Jolas RP 19.82 broc e 1410 7_1 (TEW 49.B on well 10 3 Bottom M. Commy 419 18" Kunson part on thomselvier & 15.45 Thansdure back in these C 11:45 below topy cap gasket 3 Mandere back in hober Mal-2 e 1437 ONSITE HW-1 C 1150, waiting for trap 58,5€ € 14150 to Show up : Thanklund had broken off, still trying to catch. Revuended transforma e 1215 07W 21:60 blav 10 @ 1217 Pepth to bothom 53 Back an e 1730

 \bigcirc 0450 e HW-2 1240 1104 Do ser @ Hw 1015 OTW 20,24' Below RP compta true tota 10:47 Done e. 1245 of allow Shore par Tine 0.22 6/5 10-17 0.04 10:00 1052 ø المن باريد المدرية 1053 4.7 10.54 1.1 105506 0.6 ck 0,15 1057 0.6 1058 1059 1.05 1.1 1100 0.14 1161 0.15 1102:36 1125 e on site flutte + gauge plaw right was un florre @ 0.3 At 1130 m so, stoll save @ 0,360.23 (Hurse rance reading)

12/6/06 12/1/06 pg2 1 9:20 - met ODFW at Out Flunc gauge @ 1334 in an 0.30 55 (wells toward) John F and Tam P. onside ELWW Gauge 0.48 to 0.49 e 1342 diversion Flume gauge: 0.21 cf 5@9:36 Flume gauge at 1.50 @ 1347 at 0.23 cfs downloading transducer. 9:35 ELWW stall gauge : 0.34 HW-1 DTW = 27.60' TOC 10:05 HW-3 DTW = 23.86' Toc 10:16 on site Flune gense: 0.16 cAs 10:22 HU-2 DTW = 19.21' TOC 10:32

12/27/2006 2/27/2006 l:1 another Think : 0.60 Sample prep for H-W How Montoring 12:28 event. HW-2 - 12:40 - 16.84 Sample A, highrange handness diversion there : 2.0 sample total hundress, 1000 ing/1 12:57 Ca 500 mg/1 after deanns scher .) 12/27-A ELWW: 041 13,06 Sample B, Inlongamics Nitrate-N 2 Ng/1 phosphato (PO4) 2mg/1 6 w (son) 30 mg/1 12127 - B onsite 110-3 11:40 gave lawon simple standards download HW-3. DTW-11:47-2402 HW-1 / bero DTW-12:01-23.99

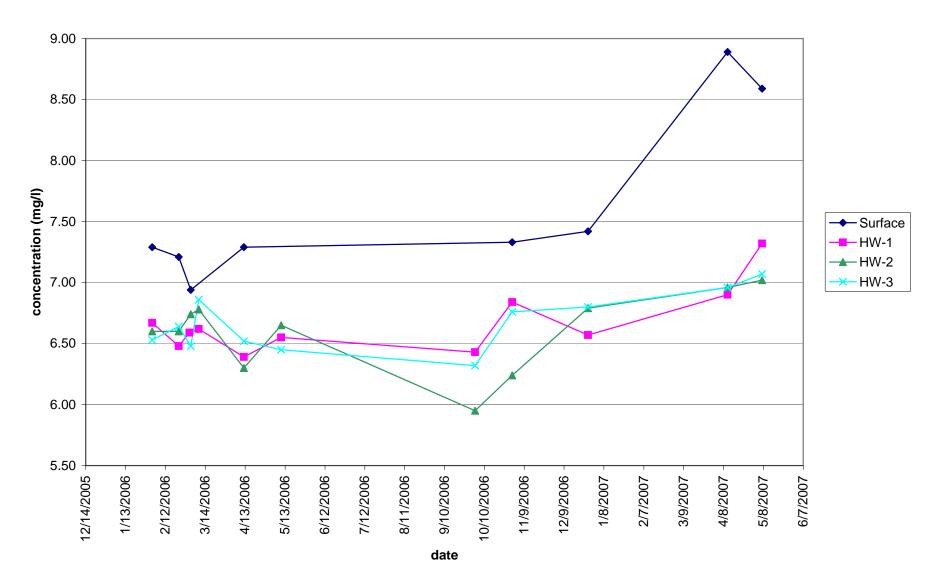
02 March 2007 2/1/07 Onsite 13.10 Dasite e 1030 e wells Ditch garge HW-1 DTIJ - 27.97' TOC Ramp / ume gauxe e Didits HW-3 DTW-2376' TOC Working on cleaning surprise. Thanklurg my alled in your gauge and + 1050 onsite flume gauge - 0.35 13:45 Lefore cleaning diversion schen Aunay alcanay flow an range flurace commonly e oil cfs **P** HW-2 DTW - 15.93' TOL 1110 flow @ 0,05 cfs diversion flyme gauge + 0.40 14:12 hefor channes screen 1118, poll staf janp floure transder to geter cleaning screw 1.50 14:17 dourstand -0.70 14:2Z 1125, Trandorg, buch in samp floor - 0.70 11:30 Alumic reality 0,15.45 -0.69 14:36 14.15 - filled gap at east and Flow over win reads 1.06 It on same a "D' on which of fish screen. 1N 1 0- 94P 1135, at HW-1 OTW 28,20 /+ belaurp @ 1137 figh sure e. ا ب ز 14:23 - 1.12 klow Jopof Screen Norda 1.21 below top of some Side 14:45 - ELWW gauge - 0.33

3) 19/07 ∅ on side HW-1 14:00 DTW-27.45 1145 at HW-3 OTW 23.83 e 1147 @ HW-3 14:27 1153 e glume onito sod Flumue still e 0.15 c/s PTW -23.35' @ HW-2 14:38 1201 e Hw-2 DTW - 17.10' 1203 OTW 17.83- 17.78 been R.R. @ oncide Alume 14342 gauge reads : 0.72 cfs 1205 01/ 5D H-4 a division @ 15.10 Hast sigds: 1.25' Flyme rigds: 0.72 cfs ELWW Fange 15:26 - 0.36'

4/16/07 KAL prisite a H-w, getting auter +ACUMPERER? - **1** most pulka giot Then e wells dutin tornart, flurre here been by passing. 1545 1/500 - (A -) н (back onside C 1750 to download HW-1 ્ય + barologia momund measurement e 1752 OTW 25,26 brp 6 3 5 5 C 1800

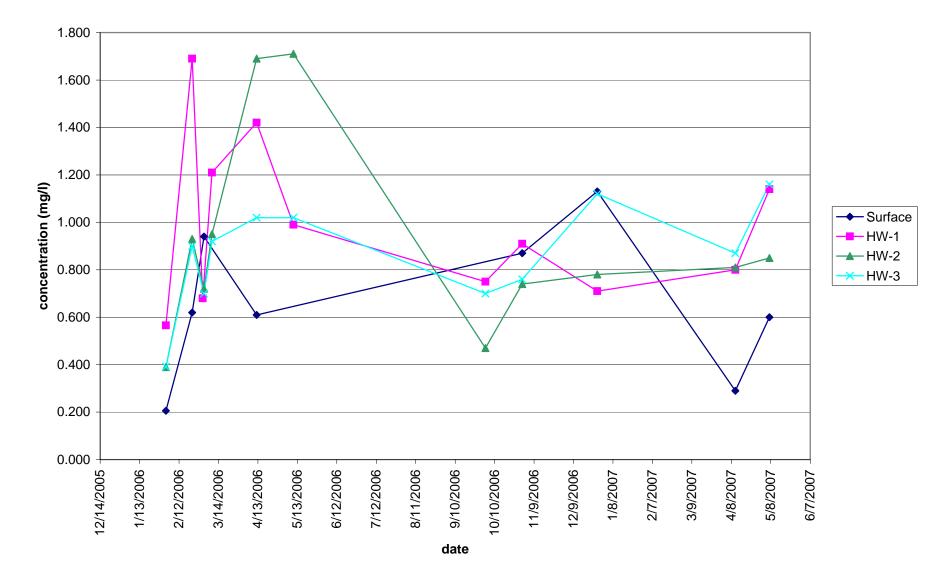
Appendix B

Water quality results for the 2006/2007 recharge season

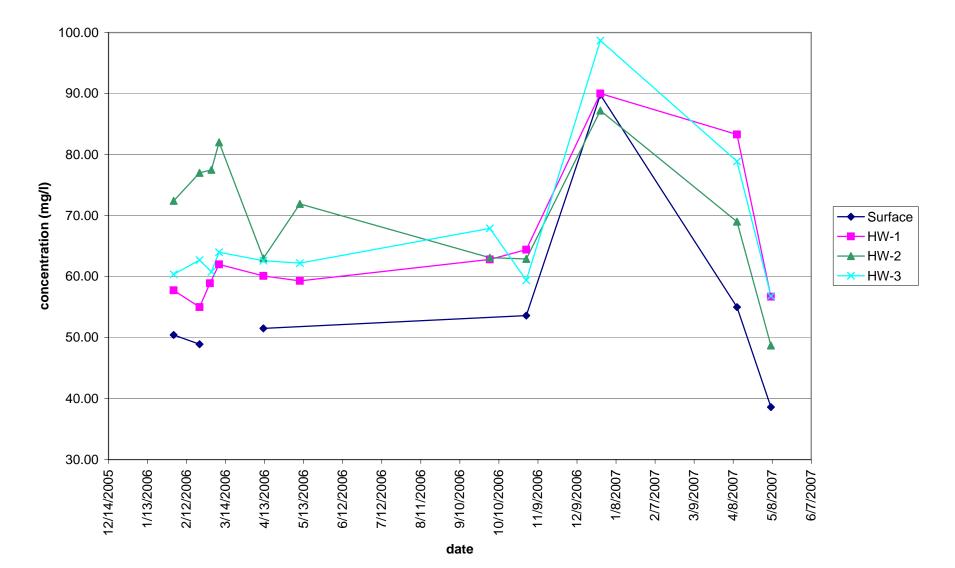


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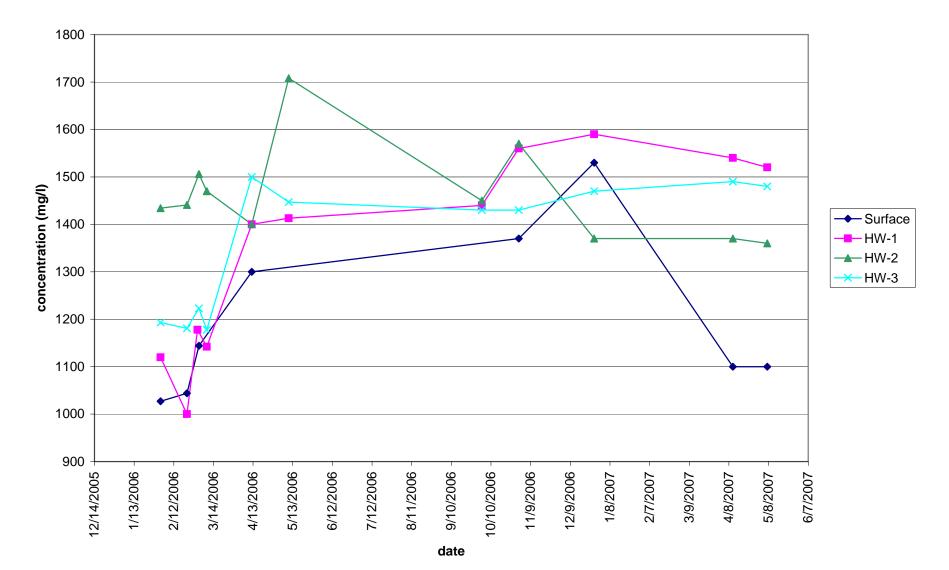




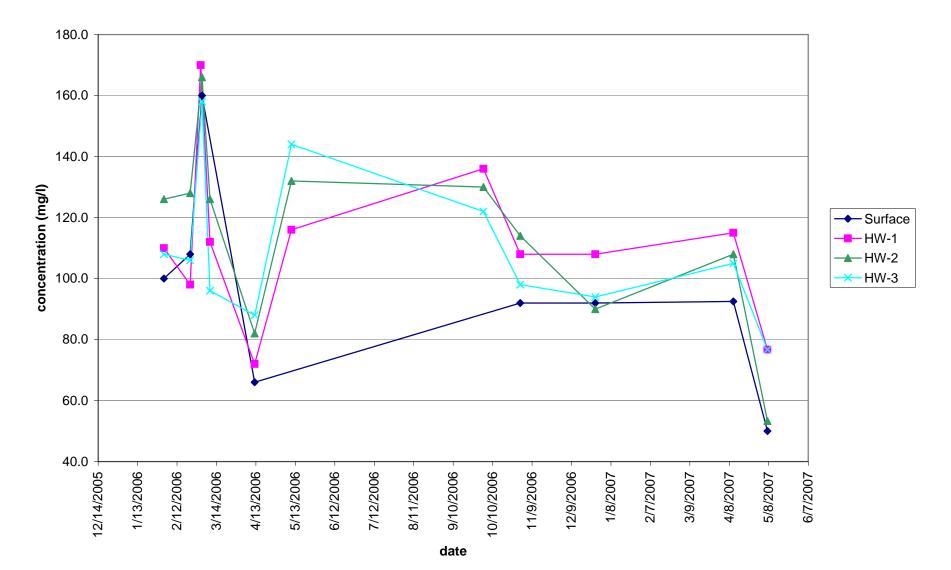
Hardness



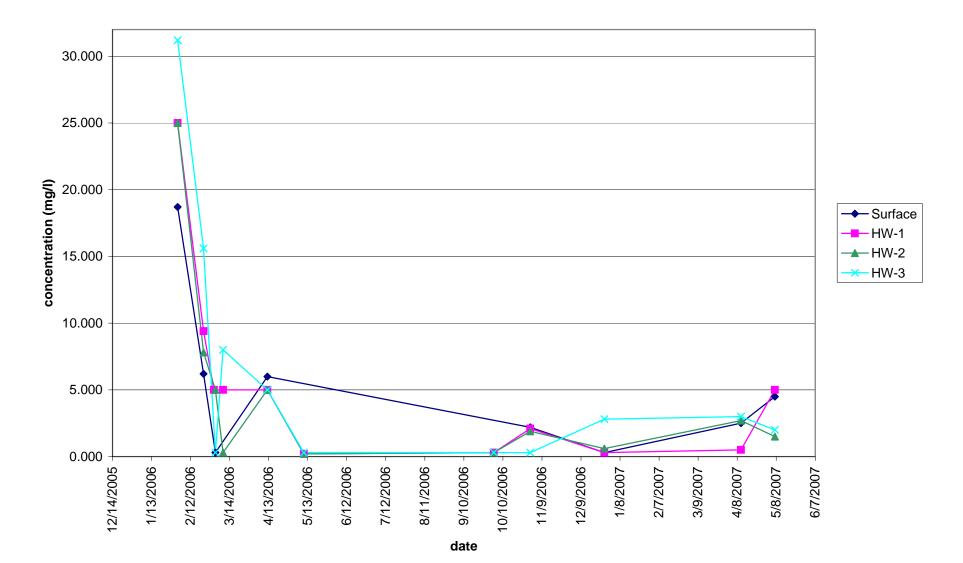
Electrical Conductivity



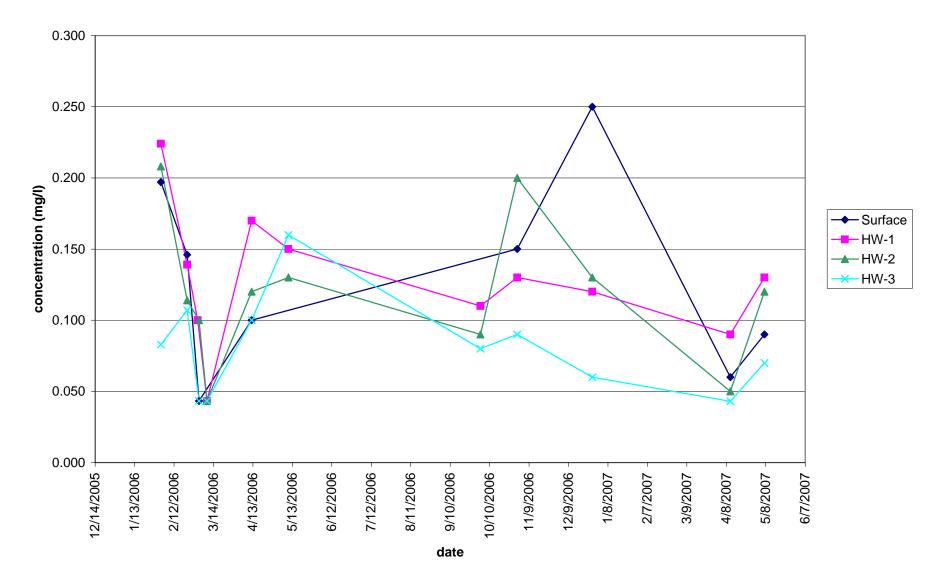
Total Dissolved Solids







Soluable Reactive Phosphorus



Project: Contractor: KTL Personnel: Meather: TIME: 11:38 on 8 01:38 on 8 01:36 on 8 01:56 on 8	Hall - Wentland SAR Monitoring Kuo Testing Labs, Inc. Laura Hofbauer Site HW - 2 Site HW - 2 Site HW - 2 Site HW - 1 Site - HW - 1	Project#: Task #: Date:04/11/07



Kuo Testing Labs, Inc.

Groundwater Sampling Field Data Sheet

Solinst Water Level Meter Model 101 HF Scientific ORT-15 CE Turbidi Meter	Hach Conductivity Meter	FIELD INSTRUMENTS USED: Origination of the second s	SAMDI INC METHOD D	FIELD ANALVET. I ATTA ILUIDAUEI	FIELD SAMPLER: Lanra Hofkanon	FRUJECT NAME: Hall-Wentland SAR Project No.:	
satisfactory	CONDITION of WELL:			DATE: 04/11/07		WELL NO: HW - 1	Page
							of

		Well Construction Data		Well Purging Data	
1) Total Well Depth (feet)	52.30	Outside Casing Diameter D; (in.)	2"	Calculate Casing Volume	
 Initial Depth to Water WT** (feet) 	85.82	Bore Hole Diameter D ₃ (in.)	6"	$L_1 \underline{\mathcal{A}_0 \mathcal{U} \mathcal{B}} * 0.16 = \underline{\mathcal{H}_1 \mathcal{A}_2 \mathcal{C} V}$ in Gallons	
3) Final Depth To Water	25.84	Filter Pack Length L ₂ (feet)	12	CV 4.23 /2=2./2 BV	
		Porosity of Filter Pack N (%)	25	Total Purge Volume (gals) CV*(3)= TPV(gals)	19 21
				Actual Volume	15
4) Length of Water in Column L ₁				Number of Bore	
lue on Line I– Value on Line 2 et)	26.48			Volumes Purged	6
The surveyed point on the inside (usually PVC) casing	de (usually	PVC) casing			

The surveyed point on the inside (usually PVC) casing The depth to the water table before removing any water from the well

WELL PURGING MEASUREN **NENTO**

F	 -	 -	174			_				
			41.00	01 20	00.00	00:20	10.07			!
			1.7	12		0	14	٤	Cumulative Gallons Purged	
			0,10	6.70	010	91.0	124	2	Hd	
		End purge	1,2,1	8.81	12.8	12.4		began	Temperature °C	
		Collected	0154		0154	0154	0154	purge	Conductivity Jis/cm 2mS 20mS	
		sample	0.12	0.15	0.19	0.23	0.44		Turbidity	
									Purge Rate GPM	
									Comments	

Forms by Gina Clark

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Web Site: (509) 488-0112 Phone (509) 488-0118 Fax (800) 328-0112 Toll Free http://www.kuotesting.com e-mail: č s 1st Avenue, Uthello, WA 99344 kuotest@atnet.net

87719 HW-1 Nitrate as Nitrogen 87719 HW-1 Nitrite as Nitrogen 87719 HW-1 Nitrite as Nitrogen 87719 HW-1 Hardness 87719 HW-1 Environmentation 87719 HW-1 Chloride 87719 HW-1 Chloride 87719 HW-1 Conthophosphate as P 87719 HW-1 COD 87719 HW-1 Coliform and E. Coli 87719 HW-1 SOC/Synthetic Organic Compounds 87719 HW-1 Total Dissolved Solids		DATE COLLECTED SYSTEM / CLISTOMER 4/11/2007
RESULTS MEM. UNITS Anial YSTS 0.80 0.015 mg/L Reed NID 0.0023 mg/L Reed 83.3 0.11 mg/L Reed 0.50 0.297 mg/L Reed 0.09 0.043 mg/L Reed 0.09 0.043 mg/L Reed 4bsent/Absent 8 mg/L Reed Attached Report 21.1 mg/L Reed	Ground Water Solutions, Inc. 1020 N. Center Pkwy, Ste F Kennewick WA 99336 Attn: Jon, Kevin	DATE REDEIVED DATE REPORT TO: 4/12/2007 5/22/2007

⁾r. Eugene Kuo, Quality Assurance Manager

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<(0.001): indicates the analyte was not detected at or above the concentration indicated.</p>
ND: None Detected
ND: Indicates milligrants per litre
*PQL=Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions
ADL: Method Detection Limit
*Ideate check out our new Web Sile at <u>http://www.huotesting.com</u>

Date с О Lo-Se-

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Page 2 of 2

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SYNTHETIC ORGANIC COMPOUNDS (SOC) REPORT

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		ວ ອ	0.0 6 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0 0 0 0 0 0	0.6 0.6 0.6 0.6 0.6 0.6 0.6	0.6 0.6 0.6 0.6 0.6 0.6 Fred	0.6 0.2 0.6 0.6 0.6 0.2 0.6 0.6 0.2 0.2 0.2 0.6 0.6 0.2 0.2 0.2 0.5 0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	0.6 0.2 0.2 0.2 0.6 0.6 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2	0.2 0.2 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6	0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2	0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2	0.5 0.2 0.2 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2	02 02 02 02 02 02 02 02 02 02 02 02 02 0	0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2	0.1 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2	0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2	0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2	0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2	0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2	0.6 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2	02 02 02 02 02 02 02 02 02 02 02 02 02 0						

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 Asimum Containinent Level, maximum permissible level of a contarninant in water established by EPA, NPDWR. State Advisory Level (SAL) for Unreputated compounds.
 A blank MCL or SAL value infocates a level is not currently established.
 If a compound is detected > or ≤ to the State Reporting Level, SRL, specified increased monitoring frequencies may occur per DOH.
 Bethod Detection Limit is the lab's minimum concentration is greater the second and reported with 69% confidence that the compound concentration is greater the J. Estimated value. und concentration is greater than zero

*- Maximum Con	- An amount of										DOH#									Clie			
- or SAL	Z		36 T		·	176 A		174												int Na		The	Z
**- Maximum Contaminant Level, maximum permissible layel of a contaminant in varier established by Epit, worker	An amount of "ND" indicative that the compound was not		AROCLOR 1016 TOXAPHENE	AROCLOR 1280	AROCLOR 1254	AROCLOR 1248	AROCLOR 1242	AROCLOR 1221	PCBS (Total Arodons)	PCBs/Toxaphene	COMPOUNDS	sampler Phone:	County:	Sample Location:	Sample Type: Sample Pumose	Multiple Sources:	System ID Number: DOH Source Number:	System Name:	Othello, WA 99344	Client Name: KUO Testing Labs Inc 337 S 1st	SYNTH	lab ya	
detected above the (EPA Me						1)9344	Labs Inc		, , , , ,	
Lab's Method Detectic n water established h		Ž		N	ND	N i		5 No	ND		EPA Method 508.1 For State Drinking Water Compliance			87719							SYNTHETIC ORGANIC COMPOUNDS (SOC) RI		Bellinghar Microbiology
on Limit - MDL.			ug/		ug l		ug/L	ng/L	ug/L		For State Dri						·						Corporate Other 800.755.9295 • 360.757.1400 • 360.757.14021ax Bellingham WA 805 Orchard Dr Suite 4 - 98225 Microbiology 360.671.0688 • 360.671.1577fax
		N	0.1	0.2	0.1	0 0.0	0.5	20	0.2	ļ	nking Wa										MPOU		9295 • 360,79 ard Dr Suite 4 9688 • 360,67
		N	0.1	0.2	0.1	0.3	0.5	20	0.2	- Her	ter Complia									Ref	INDS (57.14 <u>00 • 360.7</u> - 98225 '1.1577fax
		ω							0.5	MC F	ance	-	Supervisor	Report Date: Analyst:	Date Analyzed:	Date Collected:	Field ID: Lab Number:	Project	1	erence Numt	SOC) F		<u>57,1402iax</u>
								·							ed: 300_070416 ed: 4/16/2007	• ••	ID: 87719 xer: 04610230			Reference Number: 07-04495	REPORT		
																						Page 1 of 1	

FORM: SOC_St

eximu mContaminant Level, maximum permissible level of a contaminant	327 METHIOCARB		State Unregulated - Other	142 ALDICARB			143 ALDICARB SULFONE	144 ALDICARB SULFOXIDE	140 CARBOFURAN		EPA Regulated			Sampled By: Sampler Phone:	County:		Sample Type:	DOH Source Number:	System ID Number:	System Name:	Client Name: KUO Testing Labs Inc 337 S 1st Othello, WA 99344	CAR	A NALYTICAL	
In water established by	ND	N	Ŋ	Ŋ	ND	N a	Z	Ŋ	ND	N		RESULTS	EPA Method 531.2 For State Drinking Water Counting			Investigative or Other 87719						CARBAMATES IN DRINKING WATER		Caparate Ott Bellinghau Microbiology
· EPA, NPDWR, Stat	ugit	l ng/L	ugyt	ug/L	l ng/L	n Byr			ug/L	ug/L		Units	⁻ or State Dri									ES IN D		Bellingham WA 800.755.9295 360.757.1402 Bellingham WA 805 Orchard Dr Suite 4 - 98225 Mcrobiology 360.671.0688 360.571.1577
e Advisorv Level	4.0	1.0	2.0	1.0	2.0	1.0		1 5	1.8	4.0	ORF		inking Wa									DRIN		vainut st - 98; 9295 • 360.7; ard Dr Suite 4 9688 • 360.6;
			2.0	1.0	2.0	- 1.6			1.8	4.0	Ingger										Ref	CING M		233 <u>57.1400 • 360.7</u> - 98225 71.1577fax
		_		··				į	40	200	MCL			oupervisor.	Analyst	Date Analyzed: Report Date:	Date Extracted:	Date Collected:	Field iD:	Project:	Reference Number:	ATER	·	57.1402fax
											COMMENT		U č					led: 4/11/2007		lect: 87719> 87722	ber: 07-04495			
																							Page 1 of 1	x

FORM: SOC_S



Kuo Testing Labs, Inc.

Groundwater Sampling Field Data Sheet

PROJECT NAME: Hall-Wentland SAR Project No.: FIELD SAMPLER: Laura Hofbauer	
FIELD ANALYSE, LAURA HOIDAUER	DATE: 04/11/07
SAMDI INC METTION IN CONTRACT OF THE SAMDI INC METHION INC METHION IN CONTRACT OF THE SAMDI INC METHION INCONTINUE INCONTINALINAL INCONT	
FIELD INSTRUMENTS USED: Original Water Mini Purge Pump	
Hach Conductivity Meter	CONDITION of WELL:
Solinst Water Level Meter Model 101	satisfactory

L ₁ Valu (feet)	e e	<u> </u>		<u>بار</u>	र्ग ट	
L ₁ Value on Linel – Value on Line 2 (feet)	4) Length of Water in Column		3) Final Depth To Water	WT** (feet)	Ê	
57.48			Q.35	Q.30	49.78	
		Porosity of Filter Pack N (%)	Filter Pack Length L ₂ (feet)	Bore Hole Diameter D ₃ (in.)	Outside Casing Diameter D ₂ (in.)	Well Construction Data
		25	12	6"	2"	
Number of Bore Volumes Purged	Actual Volume Purged (gals)	Total Purge Volume (gals) CV*(3)= TPV(gals)	CV 6.0 2 = 3.6 BV in Gallons	L ₁ <u>37, 48</u> *0.16 = <u>6, 0</u> CV in Gallons	Calculate Casing Volume	Well Purging Data
Л	175	17.99				

*

The surveyed point on the inside (usually PVC) casing The depth to the water table before removing any water from the well

WELL PURGING MEASUREMENTS

Callons •C us/cm NTU Rafe Purged 2mS 2mS CPM 3.5 7,12 11,2 0127 6,04 8/7 7.03 10.9 0137 2.36 9/05 7,00 10.6 0137 1.54	10.7 0130	18/1 c 1/ a/ 1/ 2 1 2 2 4	<u>Leto Cui al al a cuica</u>	End purge Collected sample									Temperature •C lo. 6 lo. 5 lo. 5 End purge	Conductivity 2mS 20mS 20mS 0137 0137 0137 0137 Collected	0.01+e+v 3	Grave	
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Forms by Gina Clark

UO estir Othello, WA 99344 **ה**

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Web Site: (509) 488-0112 Phone (509) 488-0118 Fax http://www.kuotesting.com e-mail: 337 South 1st Avenue, (800) 328-0112 Toll Free kuotest@atnet.net

SAMPLE NO. CLISTCARES 87720 HW-2 87720 HW-2	Vos1, Inc. 1020 N. Center Pkwy, Ste F Kennewick WA 99336 Project Name:Hall Wentland	SYSTEM / CUSTOMER
ANA: YEIS Nitrate. as. Nitrogen Nitrite. as. Nitrogen Total Dissolved Solids Hardness Chloride Orthophosphate. as. P. COD Total Coliform and E. Coli SOC/Synthetic. Organic. Compounds	Ste F 1 99336 mtland	DATE COLLECTED 4/11/2007
Present/Absent Attached Report	Ground Water Solutions, Inc. 1020 N. Center Pkwy, Ste F Kennewick WA 99 Attn: Jon, Kevin	DAT SEND REPORT TO: 4/
UNITS Arial YS mg/L Reed mg/L Reed mg/L Reed mg/L Reed mg/L Reed mg/L Reed mg/L Reed mg/L Reed mg/L Reed	bolutions, Inc Pkwy, Ste F WA 9	DATE RECEIVED 4/12/2007
AkiAL YSTE Reed Reed Reed Reed Reed Reed Morris Edge Analytical	99336	DATE REPORTED 5/22/2007

Dr. Eugene Kuo, Quality Assurance Manager

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<(0.001): indicates the analyte was not detected at or above the concentration indicated.</p>
ND: None Detected
mg/L-Indicates milligrams per litre
PQL=Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions
MD: Method Detection Limit
Please check out our new Web Site at <u>http://www.kuotesting.com</u>

Date 0 - 017

- An amount of "NO" - Maximum Contami		_	-			136		222		138	140	139	137	134	38	37	DOH#								Client Name;		T		
An amount of ND: indicates that the compound was not detected above the Lab's Method Detection Link - MDL. Multi MCL or SAL value indicates that the permissible twel of a contaminant in water established by EPA, NPDWR. State Advisory Level (SAL)		CHLORAMBEN	ACIFLUORFEN		2,4,3 I BENTAZONI	14,4 UB	DCPA (ACID METABOLITES)	TOTAL DCPA	State Unregulated	DICAMBA	PICLORAM	DINOSEB	DALAPON	PENTACHLOROPHENOL	 2,4,5 - TP (SILVEX)	2,4 - D			Sampled By: Sampler Phone:	County:		System ID Number: DOH Source Number:	System Name:	337 S 1st Othello, WA 99344	KUO Testing Lab	HE	The lab you can must."		7)
ND re the Lab's Method Detect		5 8		S	B	ND	ND	ND	P	5	N	ND	N	N	ND	5	RESULTS	EPA Method 515.1 For State Drinking Water Compliance			Investigative or Other 87720					HERBICIDES IN DRINKING WATER		Bellingha	Burlingto
ug/L ten Linit - MDL. by EPA, NPDWR, S	ng/L	ug/L	ng/L	-log/L	ug/L	ug/L	- ngvî	ug/L	lug/L		J/Gn	ug/F	ug/r		ug/		Units	For State D								ES IN E		Bellingham WA 805 Orchard Dr Suite 4 - 98225 Microbiology 360.671.0688 • 360.671.1577fax	00 WA 1620 S
0.5	0.2	2.0	0.5	0.5	0.4	1.0	0.1	0.1	0.2		0.2	0.4	2	0.4	0.2		SRL	rinking W								DRINK		2.929 <u> • 360.</u> chard Dr Suite 1.0688 • 360.6	Walnut St - 98
0,5 0.5 O.5 State Advisory Level (SAL) for Unregulated compounds	0.2	2.0	0.5	0.5	0.4	1.0	0.1	0.1	0.2	,-	0.2	0.4	2 0.08	0.4	0.2		Trigger	ater Compli						Ş	Ð	ING W		<u>'97,1400 • 360,7</u> 4 - 98225 171.1577fax	233
											500	702	30 -1	50	70		MCL	ance		Supervisor	Date Collected Date Extracted: Date Analyzed: Report Date: Analyst	Field ID: Lab Number:	Pro	voletorive Multiper.	farance Num	ATER		57.1402fax	1
								7	•						·		COMMENT	2	P		ted: 4/11/2007 ted: 515_070417 ted: 4/30/2007 ate: 5/3/2007 set: HY/CC	• •• ••	Project: 87719> 87722	07-04495					
																											Page 1 of 1		

** Maximum Contaminant Lavel, maximum permissible level of a contaminant in water A blank MCL or SAL water indicarts a level is not currently established. *** If a compound is detucted at pre-solve is not currently established.	An amount of "ND" indicates that the compound was not detected above the	208 EPTC	202 DIAZINON	190 TERBACIL	179 BROMACIL	State Unregulated - Other	132 PROPACHLOR	131 METRIBUZIN	130 METOLACHLOR	123 DIELDRIN	121 BUTACHLOR	118 ALDRIN	EPA Unregulated					-					119 ATRAZINE	117 ALACHLOR	35 METHOXYCHLOR	34 LINDANE (BHC - GAMMA)	33 ENDRIN	DOH# COMPOUNDS		Sampler Phone:	Sampled Rv.		Sample Purpose:	Sample Type:	Multiple Sources:	System ID Number	System Name:	Othello, WA 99344	Client Name: KUO Lesting Labs Inc 337 S 1st		ų į	The lab you can trust		
el of a contaminant in water established by EPA, NPDWR. State Advisory Law shifty established.	detected above the Lab's Method Detect	5 8	5		ł			ND	ND	R	N	Ŋ		5 7			ND	ß	ATE ND	ND	N	ND	N	ND	<u> </u>		2	RESULTS	EPA Method 525.2 For State Drinking Water Compliance						ה זי		æ	99344	Labs Inc				Burlingto Gaporate C Bellingto	
eased monitoring frequencies may	ug/L	uĝ/L			5		ug/l					ug/L	uffin L	ų,	ng/L	лgл	ng/L	ug/L	Jugu	ug/L	ug/L		-ug/L	ug/r				Units	For State L												- 	r 1360.67	Bellingham WA 1620 S Walnut St - 98233 Coprovate Office 800.755.9295 • 360.757.1400 • Bellingham WA 605 Orchard Dr Suite 4 - 98225	
State Advisory Lev 2 occur per DOH.	0.3	0.2	2 6						-	0.1	04	0,2	0,4	0.15	0.2	0.2	0.04	0.08	1.3	1.3	0.4	0.04	0.2	0.4		0.02	 }	SRL	Drinking W											MPO		1.0688 • 360	5 Walnut St - 9 5.9295 • 360 Chard Dr Suite	
State Advisory Level (SAL) for Unregulated compounds	0.3	0.2	0.2	0.2	> >	U.Z	0 C	ο δ έ				2 2 2	0.08	0.15	0.2	0.2	0.04	0.08	1.3	1.3	0.4	0.04	0.2	0.4	0.04	0.02		Trigger	later Compl										R	COMPOUNDS		67 1 .1577fax	8233 757.1400 • 360 •4 - 98225	
alled compounds,														4	55	 	0.2	0.4	6	400	2	0.2	 •	 ຈີ	0.2	> \>		MCL	ance		Supervisor:	Analyst:	Report Date:	Date Extracted:	Date Collected:	Lab Number	! -	0	Reference Number:	(SOC)			360.757.1402fax	
		Unstable in AcidIfied Sample Matrix						-					screening only / compliance by 515.1															COMMENT	C	Z			ate: 4/17/2007			d ID: 87720 Iber: 04610231		87740 .	nber: 07-04495	(SOC) REPORT				
				_									y 515.1																												Page 1 of 2		٩	

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Reference Number: 07-04495 Lab Number: 04610231 Report Date: 4/25/2007

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SYNTHETIC ORGANIC COMPOUNDS (SOC) REPORT

DD/H4 COMPCINUOS RESULTS Inits SRL Trigger MCL COMMENT 223 44007 N0 91 0.2 <th>S SRL Trigger MCL 0.2 0.2 0.2 0.2 0.5 0.6 0.6 0.6 0.6 0.6</th> <th></th> <th></th> <th></th> <th></th> <th>_</th> <th>(SOC) RE</th> <th>EPORT</th>	S SRL Trigger MCL 0.2 0.2 0.2 0.2 0.5 0.6 0.6 0.6 0.6 0.6					_	(SOC) RE	EPORT
33 4-000 33 4-000 34 4-000 35 C/MARZNE 36 C/MARZNE 37 MACTOR 38 MACTOR 39 MACTOR 39 MACTOR 39 MACTOR 39 MACTOR 39 MACTOR 39 MACTOR 30 MACTOR 31 MAD 31 MAD 31 MAD 31 MAD 31 MAD 30 MACTOR 30 MACTOR 31 MAD 31 MAD 31 MAD 31 MAD 32 MAD 33 MAD 34 MAD 35 MADARTHERE 36 MAD 37 MAD 37 MAD 38 MAD 39 MADARTHERE 30 MAD 30 MAD 31 MAD 32 MAD 334 MAD 34 MAD 34 MAD <	0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2	5	RESULTS	Units	SRL	Trigger	MCL	COMMENT
331 44007 ND vol. 0.2 0.2 351 (AMDT) ND vol. 0.2 0.2 361 (AMDT) ND vol. 0.2 0.2 362 (AMDT) ND vol. 0.2 0.2 363 (AMDT) ND vol. 0.2 0.2 361 (ADDPHTHENE ND vol. 0.2 0.2 361 (ADDPHTHENE ND vol. 0.2 0.2 362 (ADDPHTHENE ND vol. 0.2 0.2 363 (ADDPHTHENE ND vol. 0.2 0.2 364 (ADDPHTHENE ND vol. 0.2 0.2 365 (ADDPHTHENE ND vol. 0.2 0.2 366 (ADDPHTHENE ND vol. 0.2 0.2 367 (ADDPHTHENE ND vol. <td< td=""><td>0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2</td><td></td><td>ND</td><td>ug/L</td><td>0.2</td><td>0.2</td><td></td><td></td></td<>	0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2		ND	ug/L	0.2	0.2		
36 CAMAZINE ND upt 0.2 0.2 37 RANCHON NO upt 0.2 0.2 38 RANCHON NO upt 0.2 0.2 39 MACHINON NO upt 0.2 0.2 39 RANCHON NO upt 0.2 0.2 37 FREURALIN NO upt 0.2 0.2 38 GENACTORISE NO upt 0.2 0.2 39 GENACTORISELUCEANTHENE NO upt 0.2 0.2 30 GENACTORISELUCEANTHENE NO upt 0.2 0.2 30 GENACTORISELUCEANTHENE NO upt 0.2 0.2 31 FULCREANT REVERSE NO upt 0.2 0.2 31 FULCREANTHENE NO upt 0.2 0.2 32 FULCREANTHENE NO upt 0.2 0.2 31 FULCREANTHENE <td>ND ND ND 39 Gravathov N0 39 Gravathov N0 39 MARTHAN N0 40 PAAthov N1 41 ACRAPHTMERE N0 42 REUCASH N0 43 RUNCENE N0 44 ACRAPHTMERE N0 45 REACORFUTATION N0 44 ACRAPHTMERE N0 45 REACORFUTATION N0 44 ACRAPHTMERE N0 45 RUNDRAWTHRACENE N0 46 DEBACORFUTATION N0 47 DEBACORFUTATION N0 48 N0 N0 49 DEBACORFUTATION N0 40 DEBACORFUTATION N0 41 CORRAWTHRACENE N0 41 CORRAWTHRACENE N0 41 CORRAWTHRACENE N0 41 CORRAWTHRACENE N0 42 DEBACORFUTATION N0 44 N0 N0 44 N0 N0 45 PINERA N0 46 N0 N0 47 N0</td> <td></td> <td>ND</td> <td> ug/L</td> <td>0.2</td> <td>0.2</td> <td></td> <td></td>	ND ND ND 39 Gravathov N0 39 Gravathov N0 39 MARTHAN N0 40 PAAthov N1 41 ACRAPHTMERE N0 42 REUCASH N0 43 RUNCENE N0 44 ACRAPHTMERE N0 45 REACORFUTATION N0 44 ACRAPHTMERE N0 45 REACORFUTATION N0 44 ACRAPHTMERE N0 45 RUNDRAWTHRACENE N0 46 DEBACORFUTATION N0 47 DEBACORFUTATION N0 48 N0 N0 49 DEBACORFUTATION N0 40 DEBACORFUTATION N0 41 CORRAWTHRACENE N0 41 CORRAWTHRACENE N0 41 CORRAWTHRACENE N0 41 CORRAWTHRACENE N0 42 DEBACORFUTATION N0 44 N0 N0 44 N0 N0 45 PINERA N0 46 N0 N0 47 N0		ND	ug/L	0.2	0.2		
NO NO NO NO NO 30 INALTHION NO <	0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2		ND	1/gu	0.2	0.2		-
MULTINION NO NU	0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1		R		0.2	0.2		
43 PRACHANN ND upd. 0.2 44 PATEURALIN ND upd. 0.2 45 FULCENE ND upd. 0.2 46 FULCENE ND upd. 0.2 47 FULCENE ND upd. 0.2 48 FULCENE ND upd. 0.2 49 BENZORATHENE ND upd. 0.2 40 BENZORATHENE ND upd. 0.2 41 ACEMAPHTHENE ND upd. 0.2 41 ACEMAPHTHENE ND upd. 0.2 41 BENZORATINENE ND upd. 0.2 41 CHRACONFLUCRANTHENE ND upd. 0.2 41 CHRACONFLORATHENE ND upd. 0.2 0.2 42 DIBENZORATINENTHENE ND upd. 0.2 0.2 0.2 43 FUNCENCIL2_ACONFLUCRANTHENE ND upd. 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 </td <td></td> <td></td> <td>0.3</td> <td>ug/L</td> <td>0.2</td> <td>0.2</td> <td></td> <td></td>			0.3	ug/L	0.2	0.2		
ND ND<			Ŋ	ug/L	0.2	0.2		
Box MAPTHALENE ND Side FLUORENE ND Side FLUORENE ND Side FLUORENE ND Side ACEMAPHTHMLENE ND Side ACEMAPHTHMLENE ND Side Senzo(B)FLUORANTHENE ND ugl. 0.1 Side BENZO(G)FLUORANTHENE ND ugl. 0.2 Side DUDANTHENE ND ugl. 0.2 Side DUT/L Phthalates ND ugl. 0.2 DIENT/L PHTHALATE ND ugl. 0.2 0.2 DIMETHYL PHTHALATE ND ugl. 0.3 0.6 DIMETHYL PHTHALATE ND ugl. 0.6 0.6 DIMETHYL PHTHALATE ND ugl. 0			N	- ng/	0.2	0.2		
94 FLUORENE ND <				5	2	2		
14 ACENAPHTHYLENE ND upp. 15 ACENAPHTHYLENE ND upp. 0.2 16 ANTHRACENE ND upp. 0.2 17 BENZO(G,H,JANTHRACENE ND upp. 0.2 16 BENZO(G,H,JANTHRACENE ND upp. 0.2 17 BENZO(G,H,JANTHRACENE ND upp. 0.2 17 BENZO(G,H,JANTHENE ND upp. 0.2 17 BENZO(G,H,JANTHENE ND upp. 0.2 17 BENZO(G,H,JANTHENE ND upp. 0.2 16 INDENO(1,2,3-CD)PYRENE ND upp. 0.2 17 BENZO(I, DUTA, IPHTHALATE ND upp. 0.2 10 INDENO(1, 2,3-CD)PYRENE ND upp. 0.2 10 INDENO(1, 2,3-CD)PYRENE ND upp. 0.2 10 BENZO(I, IPHTHALATE ND upp. 0.2 0.2 10 IND upp. 0.2 0.2 0.2 10 IND upp. 0.2 0.2 0.2 10 IND upp. 0.2 0.2 0.2 10 IND upp. 0.2 <td< td=""><td></td><td></td><td></td><td></td><td></td><td>0.1</td><td></td><td></td></td<>						0.1		
ND ND ND ND BENZO(G,HJ)PERVLENE ND ug/L 0.2 DIBENZO(G,HJ)PERVLENE ND ug/L 0.2 PRENE ND ug/L 0.2 POINSTANT PHTHALATE ND ug/L 0.2 DIMETHYL PHTHALATE ND ug/L 0.6 ND ug/L 0.6 0 DIMETHYL PHTHALATE ND ug/L 0.6 DIMETHYL PHTHALATE ND ug/L 0.6 DIMETHYL PHTHALATE ND ug/L 0.6		_	N i			0.2		
Isolation ANTHRACENE ND ug/L 0.2 Isolation BENZQ(S)FLUORANTHENE ND ug/L 0.2 Isolation BENZQ(S)FLUORANTHENE ND ug/L 0.2 Isolation CHRYSENE ND ug/L 0.2 Isolation Isolation ND ug/L 0.2 Isolation Isolation ND ug/L 0.2 Isolation ND ug/L 0.2 0.2 Isolation ND ug/L 0.2 <td></td> <td></td> <td>N</td> <td></td> <td></td> <td>0.2</td> <td></td> <td></td>			N			0.2		
Image: Problem in the image						0.2		
8 BENZOGR/FLUORANTHENE ND ND ND 9 BENZOGK/FLUORANTHENE ND ND ND ND 1 CHRYSENE ND ND ND ND ND 2 DIBENZOGA/HJANTHRACENE ND ND ND ND ND 3 FLUORANTHRENE ND ND ND ND ND ND 4 PRENO(1,23-CD)PYRENE ND <			5	uger	2 0	0.2	_	
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	0		5	, r	0.0	0.6		
			R	ug/L	0.6	0.6		

- An amount of "ND" indicates that the compound was not detected above the Lab's Method Detection Limit - MDL.
 - Maximum Contaminant Level, maximum permissible level of a contaminant in water satablahed by EPA, NPDWR, State Advisory Level (SAL) for Unrepulated compounds.
 - A black MCL or SAL value indicates a level is not currently established in water satablahed by EPA, NPDWR, State Advisory Level (SAL) for Unrepulated compounds.
 - A black MCL or SAL value indicates a level is not currently established in water satablahed by EPA, NPDWR, State Advisory Level (SAL) for Unrepulated compounds.
 - T a compound is detected > or = to the State Reporting Level, SRL, specified increased monitoring frequencies may occur per DOH.
 - Method Detection Limit is the lab's minimum concentration a compound can be measured and reported with 99% comfidence that the compound concentration is greater than zero.
 - J Estimated value.

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The lab you can must
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 Burlington WA
 1620 S Wahut St - 98233

 Copposite Office
 800.755.9295 • 360.757.1400 • 360.757.1402fax

 Bellingham WA
 805 Orchard Dr Suite 4 - 98225

 Microbiology
 360.671.0688 • 360.671.1577fax

Page 1 of 1

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SYNTHETIC ORGANIC COMPOUNDS (SOC) REPORT

Client Name: KUO Testing Labs Inc DOH Source Number: System ID Number: 337 S 1st Othello, WA 99344 Sample Location: Sample Purpose: Multiple Sources: System Name: Sample Type: Sampled By: County: 87720 Investigative or Other Reference Number: 07-04495

Project: 87719 ---> 87722

Date Extracted: Date Analyzed: Date Collected: Lab Number: Field ID: 87720 508_070416 4/25/2007 4/18/2007 4/11/2007 04610231

Report Date: Supervisor: Analyst

MM/CC \geq

Sampler Phone:

36	180	178	177	176	175	174	173	153		DOH#	
TOXAPHENE	AROCLOR 1016	AROCLOR 1260	AROCLOR 1254	AROCLOR 1248	AROCLOR 1242	AROCLOR 1232	AROCLOR 1221	PCBS (Total Aroctors)	PCBs/Toxaphene	COMPOUNDS	
 		7	7		-			_			EPA Met
ND	Ŋ	Ŋ	9	ND	9	N	Ŋ	B		RESULTS	EPA Method 508.1 For State Drinking Water Compliance
цр/Г	цġЛ	ng/L	μ β μ	ug/L	L/Gn	ug/L	лðуг	ngvL		Units	or State Dri
N	0.1	0.2	0.1	0.1	0.5	0.5	20	0.2		SRL	nking Wa
N	0.1	0.2	0.1	0.1	0.3	0.5	20	0.2		Trigger	ter Complia
ω								0.5		MCL	nce
										COMMENT	

concentration is greater than zero

Maximum Contaminant Level, maximum permissible level of a conteminant A blank MCL of SAL value indicates a lavel le not common details.	A namount of YUV' indicates that the compound was not detected above the LLD's Method Detection Linh - MOL	327 METHIOCARB		State Unregulated - Other				143 ALDICARB SULFONE			146 CARBOFIBAN		EPA M	Sampler Phone:	County:	Sample Purpose: Investigat Sample Location: 87722		Multiple Sources:	DOH Source Number	System Name:	Othello, WA 99344	Client Name: KUO Testing Labs Inc 337 S 1st	CAR	The lab you can must."	
t in weler established b	e La b's Method Detecto	N	ND	ND	ND	N	ND	ND	ND	NO	5 8	 RESULTS	EPA Method 531.2 For State Drinking Water Compliance			Investigative or Other 87722							CARBAMATES IN DRINKING WATER		Gorporate Office Bellinghan Microbiology
YEPA, NPDWR. Sta	ar Lleniti - Lleniti - MDD	ug/L	цруг Г	ug/L	ug/L	ug/L	ug/L	ug/L	lug/L	ng/L	ng/L	Units	or State Dri										ES IN D		Corporate Office 800,755,9295 • 360,757,1400 • 360,757,1402/ax Bellingham WA 805 Orchard Dr Suite 4 - 96225 Microbiology 360.671.0688 • 360.671.1577fax
ile Advisory Leve		4.0	1.0	2.0	1.0	2.0	1.0	1.6	1.0	1.8	4.0	SRL	Inking Wa												ramut st - 962 3295 • 360,72 ard Dr Suite 4 1688 • 360,67
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ed compounds.						_				40	200	MC.	INCe		Supervisor	Report Date:	Date Analyzed:	Date Collected:	Lab Number.	Field ID:	Project	Reference Number:	ATER		17.1402fax
							<u> </u>					COMMENT		2			ed: 4/18/2007			87722	ect 87719> 87799	ber: 07-04495			
																					*			Page 1 of 1	

FORM: SOC_SI

** Maximum Contentinant Level, maximum permasible and contentinant in water established by EPA, NPDWR: State Advisory Level (SAL) for Unregulated compounds, A blank MCL or SAL value indicates a level is not currently established	n amount of "NO" indicates that the compound was not detected above to	327 METHIOCARB		State Unregulated - Other	142 ALDICARB			143 ALDICARB SULFONE		146 CARBOFURAN			<u>EPA M</u>	Sampled By: Sampler Phone:			System Name:	Othello, WA 99344	Client Name: KUO Testing Labs Inc 337 S 1st	CARI	The lab you can trust!	
ie Laus Method Vetectii 11 in water established b	s I and the second se	ND	N	ND	N	ND	ND	Đ	N	S	ß	RESULTS	EPA Method 531.2 For State Drinking Water Compliance			Investigative or Other 87720				CARBAMATES IN DRINKING WATER		Burlington Corporate Office Bellingham Microbiology
on Limit - MDL. 17 EPA, NPDWR. Su		ug/T	ug/L	ug∕⊓	ug/L	ug/L	υg/L	<u>لو</u>	ug/L	цgЛ	ug/L	Units	or State Dri							ES IN D		Burlington WA 1620 S Walnut St-98233 Connected Office 800.755.9295 • 360.757.1400 • 360.757.1402/tax Bellingham WA 805 Orchard Dr Suite 4 - 98225 Microbiology 360.671.0688 • 360.671.1577 fax
ete Advisory Leve		4.0	1.0	2.0	1.0	2.0	1.0	1.6	1.0	1.8	4.0	 SRL	inking Wa							ORINK		alnut St - 982 295 • 360.75 1rd Dr Suite 4 688 • 360.67
el (SAL) for Unregule				-2.0	1.0	2.0	1.0	1.6	1.0	1.8	4.0	Trigger	ter Complia						Refe	ING W		33 7.1400 • 360.75 - 98225 1.1577fax
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												COMMENT	c				07720	ect: 87719> 87722	рег: 07-04495			
																					Page 1 of 1	



Kuo Testing Labs, Inc.

Groundwater Sampling Field Data Sheet

	Meter	HF Scientific ORT-15 CE Turbidi Meter
satisfactory	01	Solinst Water Level Meter Model 101
		Hach Conductivity Meter
CONDITION of WELL:		FIELD INSTRUMENTS USED: Orion pH Meter model 210A
	i Purge Pump	SAMPLING METHOD: Battery Operated Whale Water Mini Purge Pump
		FIELD ANALYST: Laura Hofbauer
DATE: 04/11/07		FIELD SAMPLER: Laura Hofbauer
WELL NO: HW - 3	No.:	PROJECT NAME: Hall-Wentland SAR Project
Page of		
	•	

Water Level Data		Well Construction Data		Well Purging Data	
1) Total Well Depth (feet)	50.05	Outside Casing Diameter D ₂ (in.)	2"	Calculate Casing Volume	
2) Initial Depth to Water WT** (feet)	र्था.५०	Bore Hole Diameter D ₃ (in.)	6"	L ₁ <u>28.65.016 = 4.58</u> CV in Gallons	
3) Final Depth To Water	21.43	Filter Pack Length L ₂ (feet)	12	CV <u>4.5 8</u> /2 = <u>A. A</u> BV in Gallons	
		Porosity of Filter Pack N (%)	25	Total Purge Volume (gals) CV*(3)= TPV(gals)	13.75
				Actual Volume Purged (gals)	15
4) Length of Water in Column L ₁ Value on Linel-Value on Line 2 (feet)	28,65			Number of Bore Volumes Purged	6

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The surveyed point on the inside (usually PVC) casing The depth to the water table before removing any water from the well

WELL PURGING MEASUREMENTS

				W LELL I ONOTING INTERSORVENDEN IS	TEAS ONE	VIENIS	
Time	Cumulative Gallons Purged	Ъđ	Temperature	Conductivity µs/cm 2mS 20mS	Turbidity	Purge Rate GPM	Comments
01:14			began	purge			
01:16	ω	7.03	13,3	bhlo	1.29	_	
81:10	6	7,03	P. 61	p410	0.79		
06:10	9	6.98	18.8	6410	0.58		
<u>ec: 10</u>	12	698	12.7	2410	0.35		
he: 10	15	6.76	13.1	6410	0:20		
			End purge	Collected	sample		
			QUIN	plicate.			

Forms by Gina Clark

Kuo lesting 337 South 1st Avenue, Othello, WA 99344 р С

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Web Site: (509) 488-0112 Phone (509) 488-0118 Fax (800) 328-0112 Toll Free http://www.kuotesting.com e-mail: kuotest@atnet.net

87721 HW-3 87721 HW-3			2 O	V51, Inc. 1020 N. Center Pkwy, Ste F Kennewick WA 99 Project Name:Hall Wentland	SYSTEM/CLISTOMER
COD <8 Total Coliform and E. Coli Absent/Absent SOC/Synthetic Organic CompoundsAttached Report	Chloride Orthophosphate as P	Nitrite as Nitrogen Total Dissolved Solids Hardness	Anal ysis Nitrate as Nitrogen	kwy, Ste F WA 99336 l Wentland	DATE COLLECTED 4/11/2007
8ng/L	3.00 0.297 mg/L Reed 				

<(0.001): indicates the analyte was not detected at or above the concentration indicated.</p>
ND: None Detected
mg/L:Indicates milligrants per litre
*PQL=Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions
MDL: Method Detection Limit
Please check out our new Web Site at <u>http://www.kuotesting.com</u>

Ken

Dr. Eugene Kuo, Quality Assurance Manager

Date

0 $\tilde{\gamma}_{1}$ 31-07

- An amount of "ND" indicates that the compound was not detected above the Lab's Method Detection Limit - MDL	226 3	224 0		_		-	135	_		138	140	139	137	134	38	37	DOH#								Client Name:		A
An amount of "ND" indicates that the compound was not detected above the Lab's Method Detection Limit . MD	3.5 - DICHLOROBENZOIC ACID	CHLORAMBEN	ACIFLUORFEN	DICHLORPROP	BENTAZON	245T	DCPA (ACID METABOLITES)	TOTAL DCPA	State Unregulated	DICAMBA	FICLORAM	DINOSEB	DALAPON	PENTACHLOROPHENOL	2,4,5 - TP (SILVEX)	2,4 - D			Sampled By: Sampler Phone:	County:	Sample Type: Sample Purpose: Invest Sample Location: 87721	DOH Source Number: Multiple Sources:	System ID Number:	System Name	KUO Testing 337 S 1st	н	The hab you can inter
	ß	ND	N	3 8		Ŋ	ND	ND	ą		ND	N	ND	N	Bi	5	RESULTS	EPA Method 515.1 For State Drinking Water Compliance			Investigative or Other 87721				ดี	HERBICIDES	Bellingh Mcrobiology
	y		ug/L	Se l	ų	ug/L	ug/F	ug/∟	ug/L		ηθη		ų v	- ug/r	ug r		Units	For State D								ES IN D	Bellingham WA 805 Orchard Dr Sutte 4 - 98225 Microbiology 360.671.0688 • 360.671.1577fax
	0.5	0.2	0.0	0.0	0.4	1.0	0.1	0.1	0.2))	0.2	0.4	2	0,4		 > >	SRL	rinking W								RINK	hard Dr Suite .0688 • 360.6
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SYNTHETIC ORGANIC COMPOUNDS (SOC) REPORT

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** Maximum Contambant Level, maximum permissible level of a contaminant in water established by EPA, NPDVR. State Advisory Level (SAL) for Unregulated compounds. A blank MCL or SAL value indicates a level is not currently established.
*** If a compound is detected > or = to the State Reporting Level, SRL, specified increased monitoring frequencies may occur per DOH.
**** Hethod Detection Link is the lab's minimum concentration a compound can be measured and reported with 90% comfidence that the compound concentration is greater than zero.
J - Estimated value.

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- Maximum Contentinent I A blank MCL or SAL v I a controcted is detect		36 TOX			175 AR	_			153 PC	DOH# CO					F	7		Client Name:		The h	
ures mais the compound was not detected above it level, mattimum permissible level of a contamina alue indicates a level is not currently established.		TOXAPHENE	AROCLOR 1016	AROCLOR 1260	AROCLOR 1248 AROCI OR 1254	AROCLOR 1242	AROCLOR 1232	AROCLOR 1221	PCBS (Total Aradors)		Sampler Phone: EPA N	Sampled By:		Sample Type: Sample Purpose: Investiga	Multiple Sources:	System ID Number:	Othello, WA 99344	e: KUO Testing Labs Inc 337 S 1st	SYNTHETIC		
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* An amount of "ND" indicates that the compound was not detected above the Lab's Method Detection Limit - MDL. ** Maximum Contaminant Level, maximum permissible level of a contaminent in water established by EPA, NPDWR. State Advisory Level (SAL) for Unregulated compounds A blank MCL or SAL value indicates a level is not currently established. ** M a compound is detected > or = to the State Reporting Level, SRL specified increased monitoring frequencies may occur per DOH.		METHOCARB	METUDOADD	State Unregulated - Other	CARBARYL	ALDICARB	METHOMYL	ALDICARB SULFONE	ALDICARB SULFOXIDE	EPA Unregulated	CARBOFURAN	OXYMAL	COMPOUNDS				DOH Source Number: Multiple Sources: Sample Type: Sample Purpose: Investig: Sample Location: 87721	System Name: System ID Number:	Othello, WA 99344	ame: KUO Testing Labs Inc 337 S 1st	CAR	A MYTICAL A INTICAL	
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	Kuc) Testin	Kuo Testing Labs, Inc.	Daily Field Report	, A
Project:		Hall - Wentla	Hall - Wentland SAR Monitoring	Project#:	
Contractor:	,	Kuo Testing Labs, Inc.	Labs, Inc.		
KTL Personnel:	inel:	Laura Hofbauer	ler	Page OF Date: 04/11/07	
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Suo 337 South 1st Avenue, estir Othello, WA 99344

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Web Site: (509) 488-0112 Phone (509) 488-0118 Fax (800) 328-0112 Toll Free http://www.kuotesting.com e-mail: kuotest@atnet.net

SAMPLE NO. SAMPLE NO. 87722 HW- SW 87722 HW- SW	GSI, Inc. 1020 N. Center Pkwy, Ste F Kennewick WA 99336 Project Name:Hall Wentland	SYSTEM/ CLASTONER
ANAI, YSIS RESULTS Nitrate as Nitrogen 0.29 Nitrite as Nitrogen 0.29 Total Dissolved Solids 92.5 Hardness 55.0 Chloride 55.0 Orthophosphate as P 0.06 COD 15.0 Total Coliform and E. Coli Present SOC/Synthetic Organic Compounds Attached Report	Ste F A 99336 Intland	DATE COLLECTED 4/11/2007
SESULTS MEL 0.29 0.015 ND 0.0023 92.5 21.1 55.0 0.11 2.50 0.297 0.06 0.043 Present/Present Attached Report	Ground Water Solutions, Inc. 1020 N. Center Pkwy, Ste F Kennewick WA 99 Attn: Jon, Kevin	SEND REPORT TO 4
UNITS AFAALYS mg/L Reed mg/L Reed mg/L Reed mg/L Reed mg/L Reed mg/L Reed mg/L Reed mg/L Reed	Solutions, Inc. Pkwy, Ste F WA 99	DATE RECEIVED 4/12/2007
Afray yors Reed Reed Reed Reed Reed Reed Reed Bage Analytical	1.3	DATE REPORTED

Dr. Eugene Kuo, Quality Assurance Manager

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<(0.001): indicates the analyte was not detected at or above the concentration indicated, ND: None Detected mg/L:Indicates milligrams per litre PQL=Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions MDL: Method Detection Limit Please check out our new Web Site at <u>http://www.kuotesting.com</u>

Date 10-25-20

An smount of ND Ansmum Confism	226	224			-				2222	138	140	139		134	38	37	DOH#		Client Name:
- An amount of "ND" indicates that the compound was not detected above the Lab's Method Detection Limit - MDL Anamount Contaminant Level, maximum permissible level of a contaminant in water established by EPA, NPDWR. State Advisory Leve - A black MCL or SAL value indicates an level is not be established.	3,5 - DICHLOROBENZOIC ACID	CHLORAMBEN	ACIFLUORFEN	DICHLORPROP	BENTAZON	2,4,5 T	2.4 DB	DCPA (ACID METABO) ITES)	State Unregulated	DICAMBA	PICLORAM	DINOSEB	DALAPON	PENTACHLOROPHENOL	2,4,5 - TP (SILVEX)	2,4 - D	COMPOUNDS EBA Booling		KUO Testing Labs 337 S 1st Othello, WA 9934 System ID Number: Multiple Sources: Sample Purpose: Inv Sample Location: 87 County: Sample Location: 87
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SYNTHETIC ORGANIC COMPOUNDS (SOC) REPORT

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249 Service, Hypermene ND upt 0.2 251 CHRYSENE ND upt 0.2 0.2 253 FUDGANTHENE ND upt 0.2 0.2 255 FUDGANTHENE ND upt 0.2 0.2 256 FUDGANTHENE ND upt 0.2 0.2 257 FMEME ND upt 0.2 0.2 258 ENCYLBUTA PHTHALATE ND upt 0.2 0.2 259 DIRETHYL PHTHALATE ND upt 0.6 0.6 261 DIRETHYL PHTHALATE ND upt 0.6 0.6 261 DIRETHYL PHTHALATE ND upt 0.6 0.6 0.6 0.6 <td< td=""><td>0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2</td><td></td><td>BENZO(B)FLUORANTHENE</td><td>5</td><td>- ugr</td><td></td><td>0.1</td><td></td><td></td></td<>	0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2		BENZO(B)FLUORANTHENE	5	- ugr		0.1		
250 BENZOR/SELUDRANTHENE ND ND </td <td>0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2</td> <td></td> <td>BENZO(G,H,I)PERYLENE</td> <td>3</td> <td></td> <td></td> <td>0.2</td> <td>-</td> <td></td>	0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2		BENZO(G,H,I)PERYLENE	3			0.2	-	
251 CHRYSENE ND ug/L 0.2 0.2 252 DIBENZO(A-HANTHENCE/NE ND ug/L 0.2 0.2 253 FULORANTHENE ND ug/L 0.2 0.2 256 IPRENE ND ug/L 0.2 0.2 256 IPRENE ND ug/L 0.2 0.2 257 IPRENE ND ug/L 0.2 0.2 258 IPRENE ND ug/L 0.2 0.2 259 IPMENUTL PHTHALATE ND ug/L 0.2 0.2 261 IDIMETHYL PHTHALATE ND ug/L 0.6 0.6 261 IDIMETHYL PHTHALATE ND ug/L 0.6 0.6 263 IDIMETHYL PHTHALATE ND ug/L 0.6 0.6 264 IDIMETHYL PHTHALATE ND ug/L 0.6 0.6 265 IDIMETHYL PHTHALATE ND ug/L 0.6 0.6 <t< td=""><td>0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2</td><td></td><td>BENZO(K)FLUORANTHENE</td><td>2</td><td></td><td>2 0 Z</td><td>0.2</td><td></td><td></td></t<>	0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2		BENZO(K)FLUORANTHENE	2		2 0 Z	0.2		
252 DIBENZO(A-HYANTHRACENE ND ugt 02 253 FLUORANTHENE ND ugt 0.2 0.2 256 PHENANTHRENE ND ugt 0.2 0.2 256 PHENANTHRENE ND ugt 0.2 0.2 257 PYRENE ND ugt 0.2 0.2 258 BENZYL, BUTN, PHTHALATE ND ugt 0.2 0.2 259 DHABUTYL, PHTHALATE ND ugt 0.2 0.2 261 DIRETHYL, PHTHALATE ND ugt 0.6 0.6 261 DIMETHYL, PHTHALATE ND ugt 0.6 0.6 261 DIMETHYL, PHTHALATE ND ugt 0.6 0.6 263 DIMETHYL, PHTHALATE ND ugt 0.6 0.6 264 DIMETHYL, PHTHALATE ND ugt 0.6 0.6 265 DIMETHYL, PHTHALATE ND ugt 0.6 0.6 0.6	0.5 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2		CHRYSENE	5 i	ug r	0.2	0.2		
253 FLUORANTHENE ND ug1 0.2 0.2 256 PHENAMTHRENE ND ug1 0.2 0.2 257 PYRENE ND ug1 0.2 0.2 258 BENZYL BUTYL PHTHALATE ND ug1 0.2 0.2 259 DEHMUTL PHTHALATE ND ug1 0.2 0.2 261 DEHMUTL PHTHALATE ND ug1 0.2 0.2 261 DIEHMULPHTHALATE ND ug1 0.6 0.6 261 DIEHMULPHTHALATE ND ug1 0.6 0.6 261 DIMETHYL PHTHALATE ND ug1 0.6 0.6 262 DL Ug2 0.2 0.2 0.2 263 DIEHMULPHTHALATE ND ug1 0.6 0.6 264 DIELMULPHTHALATE ND ug4 0.6 0.6 265 DIELMULPHTHALATE ND ug4 0.6 0.6 265			DIBENZO(A, H)ANTHRACENE	5 i	ug/L	0.2	0.2		
255 INDENO(1,2,3-CO)PYRENE ND 49/L 0.2 0.3 0.6 0.6		_	LUORANTHENE	5	- ugr		0.2		
256 PHENANTHRENE ND ug/L 0.2 0.2 257 PYRENE ND ug/L 0.2 0.2 0.2 258 BENZYL BUTYL PHTHALATE ND ug/L 0.2 0.2 0.2 259 DHABUTYL PHTHALATE ND ug/L 0.6 0.6 0.6 261 DIMETHYL PHTHALATE ND	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0		NDENO(1,2,3-CD)PYRENE	5	UQ1		0.2		
257 PYRENE ND upp 258 BENZYL BUTN PHTHALATE ND upf 0.2 0.2 260 DIETHYL PHTHALATE ND upf 0.2 0.2 261 DIMETHYL PHTHALATE ND upf 0.6 0.6 262 DIMETHYL PHTHALATE ND upf 0.6 0.6 263 DIMETHYL PHTHALATE ND upf 0.6 0.6 264 DIMETHYL PHTHALATE ND upf 0.6 0.6 265 DIMETHYL PHTHALATE DIMETHYL PHTHALATE Upf 0.6 0.6	0.6 0.0 0.6 0.6 0.0 0.6 0.0 0.0 0.0 0.0		HENANTHRENE				0.2		
- Phthalates ND ug/L 0.6 0.6 259 DIN-BUTYL PHTHALATE ND ug/L 0.6 0.6 261 DIMETHYL PHTHALATE ND ug/L 0.6 0.6 0.6 261 DIMETHYL PHTHALATE Ug/L 0.6 0.6	0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6		YRENE		U U U		0.2		
258 BENZYL BUTYL PHTHALATE ND ug/l. 0.6 0.6 261 DIMETHYL PHTHALATE ND ug/l. 0.6 0.6 0.6 261 DIMETHYL PHTHALATE Ug/l. 0.6			Phthalates		uĝ/L	0.2	0.2		
259 DHA-BUTYL PHTHALATE 261 DIMETHYL PHTHALATE ND 197L 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6		_	ENZYL BUTYL PHTHALATE	ð	ug/l	06	n		
260 DIETHYL PHTHALATE 261 DIMETHYL PHTHALATE ND 190L 100 100 100 100 100 100 100 1			I-N-BUTYL PHTHALATE			0.6	<u>ה מ</u>		
261 DIMETHYL PHTHALATE ND 1991 0.6 0.6 0.6			IETHYL PHTHALATE		ц <u>р</u> /-	0.6			
	0.6		METHYL PHTHALATE						
						0.6	0.6	<u></u>	
					•				
		<u> </u>							
					_,		. <u>.</u>		
	nt of "ND" indicates that the compound was not delected above the Lativ Mathed Revealed Lativ Link								
	nt of "ND" indicates that the compound was not detected above the Lativ Mathod Revealed a Lativ Lativ								-
	nt of "ND" indicates that the compound was not detected above the Latve Mathive Townson			<u> </u>					
	nt of "ND" indicates that the compound was not delected above the Lativ Mathed Deservoirs Lativ Lativ					<u> </u>			
	Int of "ND" indicates that the compound was not detected above the Lahre Mathing December 1 and						<u> </u>		
	unt of "ND" indicates that the compound was not detected above the Lark Mathing Press								

*** Maximum Contaminant Leval, maximum permissible level of a contaminant in water established betection Link - MDL.
A blank MCL or SAL value indicates a leval is not currently established.
**** If a compound is detected > or = to the State Reporting Level, SRL, specified increased monitoring frequencies may occur per DOH.
****. If a compound is detected > or = to the State Reporting Level, SRL, specified increased monitoring frequencies may occur per DOH.
****. Hetinod Detection Link is the ably minimum concentration a compound can be measured and reported with 89% confidence that the compound concentration is greater to J - Estimated value.

entration is greater than zero

Page 2 of 2

337 South 1st Avenue	Kuo Testinc
Othello WA 00311	1 Labs. Inc.

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Web Site: ישער איז איזער איזערע איזער איזערעער, איזער איזער איזער (509) 488-0112 Phone (509) 488-0118 Fax (800) 328-0112 Toll Free http://www.kuotesting.com e-mail: kuotest@atnet.net

GSI, Inc. 1020 N. Center Pkwy, Ste F Kennewick WA 99336	DATE COLLECTED 4/11/2007 4/99336	DATE RECEIVED SEND REPORT TO: 4/12/2007 5/22/2007 Ground Water Solutions, Inc. 1020 N. Center Pkwy, Ste F Kennewick WA 99336
Kennewick WA 99 Project Name:Hall Wentland	A 99336 entland	Attn: Jon, Kevin
Ş	Anal ysis	
87723 Duplicate	Nitrate as Nitrogen	-
	Total Dissolved Solids	
87723 Dunlicate	Chlorido	0.11
	Orthophosphate as P	பிதிய
	COD	ma/I 8 ma/I
87723. Duplicate	Total Coliform and E. Coli	Absent/Absent Reed

Dr. Eugene Kuo, Quality Assurance Manager

<(0.001): indicates the analyte was not detected at or above the concentration indicated.</p>
ND: None Detected
mg/L:Indicates milligrams per litre
*PQL=Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions
MDL: Method Detection Limit
Please check out our new Web Site at http://www.kuotesting.com

Date 5 20-017

337 South 1st August	Kuo Testin
huth 1st August Only 11 The August Only 1	Labs_Inc_

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Web Site: (509) 488-0112 Phone (509) 488-0118 Fax (800) 328-0112 Toll Free http://www.kuotesting.com e-mail: South 1st Avenue, Uthello, WA 99344 kuotest@atnet.net

STAMPLE NO. CLUB PLANES 87724 Field Blank Nitrate as Nitrogen 87724 Field Blank Nitrite as Nitrogen 87724 Field Blank Total Dissolved Solids 87724 Field Blank Total Dissolved Solids 87724 Field Blank Hardness 87724 Field Blank Hardness 87724 Field Blank Chloride 87724 Field Blank Orthophosphate as P 87724 Field Blank COD	GSI, Inc. 1020 N. Center Pkwy, Ste F Kennewick WA 99336 Project Name:Hall Wentland	DAVE COLLECTED SYSTEM / CUSTOMER 4/11/2007
PRESULTS MEL LINITS AliaL YSTE ND 0.015 mg/L Reed ND 0.0023 mg/L Reed 143 21.1 mg/L Reed ND 0.11 mg/L Reed 2.20 0.297 mg/L Reed ND 0.043 mg/L Reed ND 0.043 mg/L Morris	Ground Water Solutions, Inc. 1020 N. Center Pkwy, Ste F Kennewick WA 99336 Attn: Jon, Kevin	DATE RECEIVED DATE REPORTED SEND REPORT TO: 4/12/2007 5/22/2007

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Dr. Eugene Kuo, Quality Assurance Manager \mathcal{V}

Re

<(0.001): indicates the analyte was not detected at or above the concentration indicated. ND: None Detected mg/L:Indicates milligrams per litre PQL=Practical Quantifiation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions MDL: Method Detection Limit Please check out our new Web Site at <u>http://www.kuotesting.com</u>

Date 5 107

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KUO TESTING LABS

PAGE

02/14

MB: Method Blanks are used to determine background levels of analytes in digested and extracted laboratory reagent water.

LRB: Laboratory Reagent Bisinke are used to determine the background level of the analytes in a laboratory batch. Therefore, this report may include analytes not requested for your submittied samples.

					3		
Batch	Analyte	Result	Units	Limit	QC Qualifier Method	Type*	Comments
508_070416	AROCLOR 1221	ND	5	0.12	508.1	MB	
	AROCLOR 1292	N		0.02	508.1	N.	
	AROCLOR 1242	ß	E ·	0.02	508.1	M₿	
	AROCLOR 1248	8	بر ال	0.02	508.1	MB	
	AROCLOR 1254	B	ug/	0.02	508.1	MB	
	AROCLOR 1280	S	ug/L	0.02	508.1	MB	
	AROCLOR 1018	S	ng/-	0.02	508,1	B	
	Tetrachlóro-M-Xylene (Surr)	22	*	0,00	508.1	MB	
515_070417	2,4 - D	Ş	ng/L	0.05	515.1	MB	
	2,4,5 - TP (SILVEX)	ß	19 1	0.10	515.1	MB	
	PENTACHLOROPHENOL	ND	ug/L	0.02	515.1	F	
	DALAPON	8	Ъ.	0,50	515.1	MB	
	DINOSEB	ND	цĝ	0.10	515.1	MB	
	PICLORAM	8	ngil	0.05	515.1	MB	
	DICAMBA	8	Ъ,	0.05	515.1	MB	
	TOTAL DCPA	ND	٩	0.02	515.1	MB	
	DCPA (ACID METABOLITES)	ND	ug/L	0.10	515.1	MB	
	2,4 DB	Ŋ	β. -	0.25	515.1	MB	
	2,4,6 T	N		0,10	515.1	MB	
	BENTAZON	S	۶. ۲	0.12	. 515.1	MB	
		ND	٩ ۲	0,12	515.1	MB	
	ACIFLUORFEN	Ş	u g/ L	0.50	515.1	MB	
	CHLORAMBEN	g	1 ,GN	0.20	515.1	MB	
525_070416	ENDRIN	ND	1/gu	0.02	525.2		
	LINDANE (BHC - GAMMA)	B	БV-	0.02	525.2	MB	
	METHOXYCHLOR	8	'l'ên	0.02	525.2	MB	
	ALACHLOR	8	ug/L	0.02	525.2	MB	
	ATRAZINE	D	ug/L	0.02	525.2	MB	
	BENZO(A)PYRENE	N		0.02	525.2		
	CHLORDANE, TECHNICAL	£	ug/L	0.02	526.2		
	DI(ETHYLHEXYL)-ADIPATE	8	ų L	0.02	525.2	\$ i	
	, DI(ETHYLHEXYL)-PHTHALATE	â	μQ/L	0.60	525.2		
	HEPTACHLOR	S		0.02	525.2		
	HEPTACHLOR EPOXIDE	B	Б Д	0.02	525.2		
	HEXACHLOROBENZENE	8	ug/L	0.02	525.2		
	HEXACHLOROCYCLO-PENTADXENE	ß	ug/I	0.02	525.2	MB	
		8	ug/L	0.02	525,2	8	
"Notation:							

Burlington WA 1620 S Walnut St - 98233 Croporte 026+ 800.755.9285 + 360.757.1400 = 360.757.1402ter. Bellingham WA 805 Orchard Dr Suña 4 - 98225 Microbiology 1960.671.0658 = 360.671.1577tax

Page 1 of 3

QUALITY CONTROL REPORT

BLANK REPORT

Reference Number: 07-04495 Report Date: 05/08/07

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06/15/2007

KUD TESTING LABS

03/14 PAGE MB: Method Blanks are used to determine background levels of analytes in digested and extracted laboratory reagent water

LR8: Laboratory Reegent Blanks are used to determine the background level of the analytes in a laboratory batch. Therefore, this report may include analytes not requested for your submitted samples.

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Balch	Analyte	Result	Cinta	Umi	Qualifier Method	Type*
525_070416	PENTACHLOROPHENOL	S	۶,	0.04	525.2	MB
	ALDRIN	8	υg/L	0.05	525.2	MB
	BUTACHLOR	ß	Ð,	0,10	525.2	MB
	DIELDRIN	S	Ē	0.05	525 -2	<u>7</u> 0
	METOLACHLOR	8	ug/L	0.25	525.2	MB
	METRIBUZIN	5	- D	0.05	525.2	MB
	PROPACHLOR	8	ę,	0.05	525.2	ΜÐ
	BROMACIL	B	ug/L	0.05	525.2	
•	TERBACIL	Ŋ	Ę	0.05	525.2	B
	DIAZNON	B	۶ ۲	0.05	525.2	MB
	EPTC	Ŋ	ug/L	0.07	525.2	MB
	4,4-000	Ŋ	ugy/L	0,05	525.2	MB
	4,4-DDE	S	Ē	0.05	525.2	MB
	4,4-0DT	Ŋ	JAGN	0.05	525.2	MB
	CYANAZINE	S	٩ <u>۶</u>	0.05	525.2	MB
	MALATHION	Ŋ	ug/L	0,05	525.2	MB
	PARATHION	g	<u>ل</u> ې	0,05	525.2	MB
	TRIFLURALIN	8	ng/	0.05	525.2	MB
	NAPTHALENE	ß	Ъ,	0.02	525.2	MB
	FLUORENE	5	ug/L	0.05	525.2	MB
	ACENAPHTHENE	Ŋ	ĥ	0.05	525.2	MB
	ANTHRACENE	Ŋ	1/g/1	0.05	5 25.2	MB
	BENZ(A)ANTHRACENE	8	8 7	0.02	525.2	MB
	BENZO(B)FLUORANTHENE	N	۶.	0.05	525.2	MB
	BENZO(G,H,I)PERYLENE	Ş	ug/L	0.05	525.2	MB
	BENZO(K)FLUORANTHENE	Ŋ	ч <u>9</u> /г,	0.05	525.2	MB
	CHRYSENE	ß	уу) Д	0.05	525.2	MB
	DIBENZO(A,H)ANTHRACENE	Ŋ	Ъ,	0,05	525.2	MB
	FLUGRANTHENE	Ŋ	<u>ل</u> ور ا	0.05	525,2	MB
	INDENO(1,2,3-CD)PYRENE	Ŋ	ug/t	0.05	525.2	MB
	PHENANTHRENE	ß	ug/L	0.05	525.2	MB
	PYRENE	8	uQ/L	0.05	525,2	MB
	BENZYL BUTYL PHTHALATE	Ş	ц9/г	0.60	525.2	MB
	DI-N-BUTYL PHTHALATE	Ŋ	1 97	0.60	525.2	N.
	DIETHYL PHTHALATE	8	ug/L	0.60	525.2	MB
	DYMETHYL PHTHALATE	8	ų į	0,60	525.2	MB
	1,3-0IMETHYL-2-NITROBENZENE (Sui 87	87	*		525.2	B
		8	×		525.2	
	PERYLENE-D12 (Surr)		2			30

Burlington WA 1620 S Walnut St - 98233 convext oraz 600.765.9295 - 360.757.14021ax Bellingham WA 805 Orahard Dr Sutte 4 - 98225 Manubiology 1360.671.0688 - 360.671.1577tax

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Page 2 of 3

QUALITY CONTROL REPORT

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QC Qualifier Method 525.2

Comments

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Reference Number: 07-04495 Report Date: 05/08/07

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Page 3 of 3

QUALITY CONTROL REPORT **BLANK REPORT**

Reference Number: 07-04495 Report Date: 05/08/07

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Batch	Analyte	Result	Units	Limit	QC Qualifier Method	Туре*	Comments
526_070416	TRIPHENYLPHOSPHATE (Sur)	110	*		525.2	MB	
531_070418	OXYMAL	N	ug/L	1.00	531.2	MB	
	CARBOFURAN	g	ugil	0,45	531.2	MB	
	ALDICARE SULFOXIDE	Ŋ	19	0.25	531.2	MB	
	ALDICARB SULFONE	8	Б <u>а</u> г	0.40	531.2	MB	
	METHOMYL	ß	ug/∟	0.25	531.2	MB	
	3-HYDROXYCARBOFURAN	8	ugi	0.50	531.2	MB	
	ALDICARB	8	ų.	0.25	531.2	MB	
	CARBARYL	Ŋ	<mark>بو</mark>	0.50	531.2	MB	
	PROPOXUR (BAYGON)	S	ų F	0.25	531.2	MB	
	METHIOCARB	ND	ug/L	1.00	531.2	MB	
531_070503	OXYMAL	Ŋ	۶.	1.00	531.2	MB	
	CARBOFURAN	R	ug/	0,45	531.2	MB	
	ALDICARB SULFOXIDE	Ŋ	цу Г	0.25	531.2	MB	
	ALDICARE SULFONE	Ş	5	0,40	531.2	MB	
	METHOMYL	D	μ	0.25	531.2	MB	
	3-HYDROXYCARBOFURAN	ß	ug∕L	0.50	531.2	MB	
	ALDICARB	Ş	ug/r	0.25	531.2	MB	
	CARBARYL	Ŋ	5	0.50	531.2	MB	
	PROPOXUR (BAYGON)	ND	Joh	0.25	531.2	MB	
	METHIOCARB	ß	Ш	1.00	531.2	MB	

I Notation:

MB: Method Blanks are used to determine background levels of analytes in digeated and extracted laboratory reagent water. 04/14 PAGE

KUD TESTING LABS

LRB: Laboratory Reagent Blanks are used to determine the background level of the analytes in a laboratory batch. Therefore, this report may include analytes not requested for your submitted samples.

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		QUALITY CONTROL REPORT	CONT	ROL F	EPORT				
		ace	ILFB F	QCS/LFB REPORT	स				
							Rate	Reference Number: Report Date:	n 07-04495 n 05/08/07

9			Тпю			*		8	
	Analyse	Result	Value	Units	Medhod	Recovery Limits	i	Quulifier Type*	Comment
attn/nTanc	ARUCLUR 1260	0.44	0.5	ц 9 Д	508.1	88	60-140	541	
	TETRACHLORO-M-XYLENE (SURR)	2		¥	508 ,1		70-130	LFB	
525_070416	ENDRIN	1.36		Ę.	525.2	136	70-130	F	
	LINDANE (BHC - GAMMA)	1.01	<u></u>	۶	525.2	101	74-130		
	METHOXYCHLOR	1.2	-	ug/L	525.2	120	70-130	旧	
	ALACHLOR	2.21	N	ug/L	525.2	111	70-130	표	
	ATRAZINE	2.16	N	u¶/	525.2	108	70-130	E-1	
	BENZO(A)PYRENE	0,86		ngvit	525.2	88	70-130	LEB	
	CHLORDANE, TECHNICAL	1.05	. <u> </u>	ug/	525.2	105	70-130	LFB	
	DIGETHYI HEXYI YEHTHALATE	1.19		þ	525.2	119 911	70-190	i 5	
	HEPTACHLOR	i j	_		525.2	110	70-130		
	HEPTACHLOR EPOXIDE	1.05	-	Ę.	525.2	105	70-180		
	HEXACHLOROBENZENE	1.03	-	۶ ۲	525.2	103	70-130	LFB	
	HEXACHLOROCYCLO-PENTADIENE	0.83	· _	ug/L	525.2	83	70-130	LFB	
		1,04	.	5	525.2	ī A	70-130	旧	
	ALDRIN	0.94	4 4		525.2	22	70-130		
	BUTACHLOR	1.14	<u> </u>		525.2	14		5	
	DIELDRIN	1.13	-	ξ.	525.2	113	70-130		
	METOLACHLOR	1.12	-	۶ ۲	525.2	112	70-130	58	
		1,48		чQ/Г	525.2	148	70-130	나태	
	BROMACIL	• <u>-</u>	.	- EP	525.2	011	70-130	LFB	
	TERBACIL	1	. .						
	DIAZINON	0.99	-	₽ ₽	52 5.2	83	70-130		
	EPTC	1.02	-	ug/L	525.2	102	70-130		
	4.4-DDE	1.01	· -•	Ъ,	525.2	101	70-130	(F8	
	4.4-DDT	1.03	·	β.	525.2	103	70-130	명	
	CYANAZINA	1.07	• -	<u></u>	525.2	1 da	70-130	LF B	
	MALATHION	1.22	 .	ug/1	505	133		5	
	PARATHION	; 1,09		Ę.	525.2	100 100	70-130		
		1.11	-	hðv.	525.2	111	7 130		
	THURENE	1.02	-*	ųg/L	525.2	102	70-130	1 FB	
"Notation:									
% Recovery = (Rosult	% Recovery = (Rosatt of Analysis)/(True Value) * 100								
NA = 1003466 % Hac	NA a rescales for hearth and the calculated.								
te used to check lab po	a construction of the second	ions of method analyte	s which is us	ed io fortify :	in aliquor of reagon	f matrix. The (DCS is obta	inud from sin cide	inin shotenej tomo and
					•			The second se	

The CCS is obtained from an external yource and

• every users as provinces.
LFB: abortiony formed Bank, an aliquet of reagent matrix to which known quendlass of method analytes are edded in the lab. The LFB is analyzed exactly like a sample, and its purpose is to determine whether method performance is within accepted control limits.

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Page 1 of 4

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KUO TESTING LABS

PAGE

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QCS: Quality Control Sample, a solution containing known concentrations of method analyses which is used to fortify an adjust of reagent matrix. The QCS is obtained from an external source and Is used to check to performance.

NA = Indicates % Recovery could not be calculated. % Recovery - (Rusuit of Analysis)/(True Value) * 100 "Notation:

METHOMYL ALDICARB SULFONE ALDICARB SULFOXIDE CARBOFURAN OXYMAL METHIOCARB PROPOXUR (BAYGON)

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531_070418

CARBARYL

3-HYDROXYCARBOFURAN

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70-130 70-130 70-130 70-130 70-190 70-130 70-130 70-130 70-130 70-130

METHOMYL ALDICARD SULFONE 531_070418

OXYMAL

TRIPHENYLPHOSPHATE (Sum)

PYRENE-Dto (Sun) PERYLENE-D12 (Sun)

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DIMETHYL PHTHALATE

DIETHYL PHYHALATE DHN-BUTYL PHTHALATE BENZYL BUTYL PHTHALATE

1,3-DIMETHYL-2-NITROBENZENE (Surt)

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₹ 11 11 112 ŝ 88 66 107 Ξ ឪ 46 112

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1.1 Ľ PYRENE

PHANNNY HRANE INDENO(1,2,9-CD)PYREN# DIBENZO(A, H)ANTHRACENE

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CHRYSENE

BENZO(K)FLUORANTHENE BENZO(G,H,I)PERYLENE BENZO(B)FLUORANTHENE **BENZ(A)ANTHRACENE** ANTHRACENE

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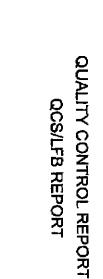
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1.12 1.05 0.97 0.77 Result

ALDICARB SULFOXIDE

CARBOFURAN



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Batch 525_070418

Analyte ACENAPHTHYLENE

Value ŝ

Method 525.2

8 Fields *

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Qualifier Type?

Comment

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Report Date: 05/08/07

Reference Number: 07-04495

Page 2 of 4

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Page 3 of 4

QUALITY CONTROL REPORT **QCS/LFB REPORT**

Reference Number: 07-04495 Report Date: 05/08/07

			True			*		8	
Satch	Analyta	Result	Value	Units	Method	Recovery		Qualifier Type*	Comment
531_070418	3-HYDROXYCARBOFURAN	18.3	20	Ę,	531.2	97 70-130		Lfa	
	ALDICARB	19.1	20	ų,	531.2	8	70-130	LFB	
	CARBARYL	21	8	Ъ.	531.2	105	70-130		
	PROPOXUR (BAYGON)	19,6	20	цġЛ	531.2	88	70-130	LEB	
	METHIOCARB	19.5	20	ug/L	531,2	8	70-130	LF8	
531_070503	OXYMAL	1.8	N	Ę.	531.2	88	70-130	L FB	
	CARBOFURAN	N	N	ų p	591.2	100	70-130	LFB	
	ALDICARE SULFOXIDE	2,1	N	ug/L	531.2	105	70-130	LFØ	
	ALDICARE SULFONE	N	N	Ð,	631.2	18	70-130	LFB	
	METHOMYL	1.7	N	Ę.	531.2	8	70-130	LFB	
	S-HYDROXYCARBOFURAN	1.8	N	Б Г	591.2	80	70-130		
	ALDICARB	2.1	N	Ę,	531.2	ธิ	70-130	LFB	
	CARBARYL	N	N	ug/⊢	531.2	100	70-130	LFB	
	PROPOXIJR (BAYGON)	N	2	٩ <u>٢</u>	531.2	100	70-130	LFB	
	METHIOCARB	2.4	N	ug/L	531.2	120	70-130	LEB	
531_070 503	OXMAL	20.5	20	ģ	531.2	103	70-130	5	
	CARBOFURAN	21.2	20	пĝ/Г	\$31.2	8	70-130	5	
	ALDICARB SULFOXIDE	23	20	ų F	531.2	115	70-130	50	
	ALDICARB SULFONE	19.7	20	цр/г	531 2	86 8	70-130	LEB	
	METHOMYL	20.6	20	ş	531.2	สิ่	70-130	L FB	
	3-HYDROXYCARBOFURAN	20,8	20	ug/L	531.2	104	70-130	وعلا	
	ALDICARE	21,4	8	ų.	591.2	107	70-130	LFB	
	CARBARYL	21,5	20	ş	531,2	108	70-130	LF B	
	PROPOXUR (BAYGON)	21,9	20	ş	531.2	110	70-130	LFB	
	METHIOCARB	20.9	20	Đ,	531.2	105	70-130		
515_070417	2,4 - D	1.7	N	ц р /г	515.1	g	7 130	QCS	
	2,4,5 - TP (SILVEX)	0.93	-	ųg/L	515,1	සි	70-130	QCS	
	PENTACHLOROPHENOL	6.0	-+	ug/L	515.1	8	70-130	202	
	DALAPON	9.7	13	۶.	515,1	75	70-130	003	
	DINOSEB	1.6	N	<mark>ل</mark> ې	515.1	8	70-130	00%	
	PICLORAM	0.74	-	Ð,	<u>515.1</u>	74	70-130	202	
	DICAMBA	0.91	-	ng/r	\$15,1	91	70-190	200	
ļ	TOTAL DCPA	1.1		ug/L	515.1	110	70-130	000	
Notalon:									
% Recovery = (Resu	% Recovery = (Result of Analysis)(True Value) = 100								

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NA = Indicable % Recovery could not be calculated.

CCS: Cusilly Control Sample, a solution containing known concentrations of mathod analyses which is used to fortify an adquot of reagont matrix. The QCS is obtained from an external source and is used to check tab performance.
LFB: Laboratory Fortified Risnit, an eliquet of reagent matrix to which isnown quantities of mathod analytes are added in the lab. The LFB is analyzed exactly like a sample, and its purpose is to detarmine whether method performance is within accurated control limits.

FORM: d.FB

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QCS/LFB REPORT

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Reference Number: 07-04495 Report Date: 05/08/07

t Value	True Value Units	True Value Units Method	True Value Units Method	True QC Value Units Method Recovery Limits QualifierType*
	ugy γ Ω Ω Ω Π Π Π Π	Units Method Ug/L 515.1	Units Method Ug/L 515.1	Units Method Ug/L 515.1
		Method 515.1 515.1	Method 515.1 515.1	% QC Method Recovery Limits Qualifier Type* 515.1 B1 70-130 QCS 515.1 90 70-130 QCS 515.1 100 70-130 QCS

Notation:

•

% Recovery = (Result of Analysis)/(True Value) * 100

NA = Indicates % Recovery could not be calculated.

QCS: Quality Central Sample, a solution containing known concentrations of method analytes which is used to fortify an aliquet of reagent metric. The QCS is obtained from an external source and to used to deck lab performance. LFB: Laboratory Fortiled Blank, an alique of reagent matrix to which known quantities of method analytes are solded in the lab. The LFB is easilyzed exactly like a sample, and its purpose is to determine whethor method performance is within accepted control limits.

FORM: cLFB

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QUALITY CONTROL REPORT

Reference Number: 07-04495

Duplicate and Matrix Spike/Matrix Spike Duplicate Report

Report Date: 5/8/2007

Duplicate

Batch	Receive	4		Duplicate					ac		
<u> </u>	oampie		Result	Result			%RPD	Limite	Quelifier	•	Commente
515_070417											
		TOTAL DCPA	0.5	0.5	up/L		0.0	0-45		DUP	
	10200	2,4 - DCAA (SURR)	98	103	*		5.0	0-45		DUP	
525_070416											
	9595	BROMACIL	1.4	1.45	ug/L		3.5	0-45		DUP	
	959 5	1,3-DIMETHYL-2-NITROBENZENE (Sur	95	94	%		1.1	0-45		DUP	
	9595	PYRENE-D10 (Surr)	100	100	%		0.0	0-45		DUP	
	959 5	PERYLENE-012 (Surr)	97	92	ч.		5.3	0-45		DUP	
	8 59 5	TRIPHENYLPHOSPHATE (SVIT)	104	76	%		31.1	0-45		DUP	
	8598	DI(ETHYLHEXYL)-PHTHALATE	2.5	1.3	սցն		63.2	0-45	FID	DUP	
	95 96	BROMACIL	5.2	4.9	- ug/L		5.9	0-45		DUP	
	9598	1.3-DIMETHYL-2-NITROBENZENE (Sum	101	97	%		4.0	0-45		DUP	
	9596	PYRENE-D10 (Surr)	103	108	%	-	4.7	0-45		DUP	
	9596	PERYLENE-D12 (Surr)	92	99	%		7.3	0-45		DUP	
	95 96	TRIPHENYLPHOSPHATE (SVIII)	107	60	%		28.9	0-45		DUP	
	10230	MALATRION	0.4	0.3	ugá.		28.6	0-45		DUP	
	10230	DI-N-BUTYL PHTHALATE	0.7	0.6	ug/L		15.4	0-45		OUP	
	10230	1,3-DIMETHYL-2-NITROBENZENE (Suit	95	102	*		7.1	0-45		DUP	
	10230	PYRENE-D10 (Sun)	104	107	%		2.8	0-45		DUP	
	10230	PERYLENE-D12 (Surr)	102	103	%		1.0	0-45		DUP	
	10230	TRIPHENYLPHOSPHATE (Suit)	108	100	%		8.6	0-45		DUP	
	10233	1,3-DIMETHYL-2-NITROBENZENE (SUIT	98	93	%		5.2	0-45		DUP	
	10233	PYRENE-D10 (Surr)	103	104	%		1.0	0-45		DUP	
	10233	PERYLENE-D12 (Surr)	102	107	%		4.8	0-45		DUP	
	10233	TRIPHENYLPHOSPHATE (Suit)	110	112	%		1.8	0-45		DUP	

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%RPD = Relative Percent Difference

NA = Indicates % RPD could not be calculated

Matrix Spike (MS)Matrix Spike Duplicate (MSD) analyses are used to determine the eccuracy (MS) and precision (MSD) of a analytical method in a given sample matrix. Therefore, the usefulness of this report is impled to samples of similar matrices analyzed in the same analytical batch.

Only Duplicate sample with detections are listed in this report



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Page 2 of 4 Reference Number: 07-04495 Report Date: 5/8/2007

Matrix Spike

				Spike	Spike	6plke		Percer	u Recovery				QC		
Baich	Sample	: Ánstyle	Result	Reaut	Result	Conc	Units	MS	MSD	Limits	%ጽዖው	Limite	Qualifies		Comments
515_070417							· · · · · · · · · · · · · · · · · · ·								- · · · · ·
	10230	2,4 - D	ND	1.6		2	ugáL	80	NA	65-135	NA	0-60		LFM	
	10230	2,4,5 - TP (SILVEX)	ND	0.9		1	ugit	90	RA	65-135	NA	0-60		LIFM	
	10230	PENTACHLOROPHENOL	ND	0.86		1	ugit	86	NA	65-135	NA	0-60		LIFM	
	10230	DALAPON	ND	8.9		13	սց/Լ	66	NA	65-135	NA	0-60		LFM	
		DINOSEB	ND	1.5		2	ug/L	75	NA	65-135	NA	0-60		LFM	
	10230	PICLORAM	ND	0.68		1	ug/L	66	NA	65-135	NA	0-60		LFM	
	10230	DICAMBA	ND	0.86		1	ugiL	86	NA	65-135	NA	0-60		LFM	
	10230	TOTAL DCPA	ND	1.1		1	սցու	110	NA	65-135	NA	0-60		LFM	
		2,4 DB	ND	7.2		8	ugrL	96	NA	65-135	NA	0-60		LFM	
	10230	2,4,5 T	ND	0.67		1	սց.Ղ	87	NA	65-135	NA	0-80		LIFIM	
	10230	BENTAZON	ND	1.8		2	ugA	90	NA	65-135	NA	0-60		LFM	
	10230	DICHLORPROP	ND	2.4		3	ugA	60	NA	85-135	NA	0-60		LFM	
	10230	ACIFLUDRFEN	ND	0.7		1	ug/L	70	NA	65-135	NA	0-60		LFM	
	10230		ND	0.75		1	ug/L	75	NA	65-135	NA	0-50		LFM	· •
	10230	2,4 - DCAA (SURR)	106	107			%		NA	70-130	NA	0-60		LFM	
525_070416															
	9334	ENDRIN	ND	1.34		1	սցվե	134	NA	70-130	NA	0-60	на	LFM	
	9334	LINDANE (BHC - GAMMA)	ND	1.1		1	ug/L	110	NA	70-130	NA	0-60		LFM	
	9334	METHOXYCHLOR	ND	1.39		1	ug/L	139	NA	70-130	NA	0-60	нQ	LFM	
	9334	ALACHLOR	ND	2.1		2	սցու	105	NA	70-130	NA	0-60		LFM	
	9334	ATRAZINE	ND	2.08		2	ug/L	103	NA	70-130	NA	0-60		LFM	
	9334	BENZO(A)PYRENE	ND	1.07		1	սքոլ	107	NA	70-130	NA	0- 80		LFM	
	9334	CHLORDANE, TECHNICAL	ND	0.96		1	ug/L	96	NA	70-130	NA	0-6 0		LFM	
	9334	DI(ETHYLHEXYL)-ADIPATE	ND	1.19		1	ug/L	119	NA	70-130	NA	0-60		LFM	
	8334	DI(ETHYLHEXYL)-PHTHALATE	ND	1.61		1	ug/L	161	NA	70-130	NA	0-60		LFM	
	9334	HEPTACHLOR	ND	1.06		1	ugil	106	NA	70-130	NA	0-60		LFM	
	9334	HEPTACHLOR EPOXIDE	ND	1.04		1	սցի	104	NA	70-130	NA	0-50		LFM	
	9334	HEXACHLOROBENZENE	ND	1.01		1	ug/L	101	NA	70-130	NA	0-60		LFM	
	8334	HEXACHLOROCYCLO-PENTADIENE	ND	0.98		1	ug/L	98	NA	70-130	NA	0-60		LFM	
		SIMAZINE	ND	1.03		1	ug/L	103	NA	70-130	NA '	0-60		LFM	
	9334	PENTACHLOROPHENOL	ND	4.27		4	սցդե	107	NA	70-130	NA.	0-60		LFM	
		ALDRIN	ND	1.02		1	ug/L	102	NA	70-130	NA	0-60		LFM	
		BUTACHLOR	ND	1.08		1	ug/L	108	NA	70-130	NA.	0-60		LFM	
		DIELDRIN	ND	1.12		1	ບສູກັບ	112	NA	70-130	NA	0-60		LFM	
	9334	METOLACHLOR	NÐ	1.03		1	ugiL	103	NA	70-130	NA	0-60		LFM	

Duplicate

%RPD = Relative Percent Difference

NA = Indicates %RPD could not be calculated

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) analyses are used to determine the accuracy (MS) and precision (MSD) of a analytical method in a given sample matrix. Therefore, the usefulness of this report is limited to samples of similar matrices analyzed in the same analytical betch.

Only Duplicate sample with detections are listed in this report.



Matrix Spike

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Page 3 of 4 Reference Number: 07-04495 Report Date: 5/8/2007

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Matrix					Duplicat										
Balch	<u>Remain</u>	Analyte		Spike	Spike	Spike			Recovery				QC		
		METRIBUZIN	Result	Result	Result	Conc	Units	MS	MSD	Lindis	%RPD	Um ts -	Quilline		Comments
		PROPACHLOR	ND	1.53		1	ug/L	153	NA	70-130	NA	0-60	HQ	LFM	
			ND	1.04		1	ug/L	104	NA	70-130	NA	0-80		LEW	
		BROMACIL	ND	1.12		1	ug/L	112	NA	70-130	NA	0- 60		LIFM	
			ND	1.15		1	ug/L	115	NA	70-130	NA	0-60		LIFM	
		DIAZINON	ND	1.1		1	ug/L	110	NA	70-130	NA	0-60		LFM	
		EPTC	ND	0.8		í	ug/L	90	NA	70-130	NA	0-60		LFM	
		4.4-DDD	ND	1.01		ĩ	nðir	101	NA	70-130	NA	0-8/0		LFM	
		4,4-DDE	ND	0.97		1	ug/L	97	NA	70-139	A/ł	0-80		LFM	
		4,4-DDT	ND	1.1		1	ug/L	110	NA	70-130	NA	0-60		LFM	
		CYANAZINE	ND	1.02		1	യ്യവ്	102	NA	70-190	NA	0-60		LFM	
	9334	MALATHION	ND	1.22		í	ലൂറ്	122	NA	70-130	NA	0 -80		LFM	
	9334	PARATHION	ND	1.2		ſ	սցմ	120	NA	70-130	NA	0-60		LFM	
	9334	TRIFLURALIN	ND	0.97		1	ug/L	87	NA	70-130	NA	0-60		LFM	
	9334	FLUORENE	ND	1.02		1	ug/L	182	NA	70-130	NA	0-60		LFM	
	9334	ACENAPHTHYLENE	ND	0.99		1	ug/L	99	NA	70-130	NA	0-60		LFM	
	9334	ANTHRACENE	ND	0.97		1	ug/L	97	NA	70-13D	NA	0-60		UFM	
	9334	BENZ(A)ANTHRACENE	ND	1		1	ug/L	100	NA	70-130	NA	0-60		LFM	
	9334	BENZO(8)FLUORANTHENE	ND	1.04		í	սցչե	104	NA	70-130	NA	0-60		LFM	
	93 34	BENZO(G,H,I)PERYLENE	ND	1.3		ſ	ug/i	130	NA	70-130	NA	0-80		LFM	
	8334	BENZO(K)FLUORANTHENE	ND	1.05		1	ugiL	105	NA	70-130	NA	0-60		LFM	
	9334	CHRYSENE	ND	1.02		1	ug/L	102	NA	70-130	NA	0-60		LFM	
	9334	DIBENZO(A,H)ANTHRACENE	ND	1.3		1	ug/L	130	NA	70-130	NA	0-60		LFM	
	8334	INDENO(1,2,3-CD)PYRENE	NÐ	1.29		1	- <u>-</u>	129	NA	70-130	NA	0-60		LFM	
		PHENANTHRENE	ND	1.04		1	ug/L	104	NA	70-130	NA	0-60		LFM	
	9334	PYRENE	ND	1		1	-9 UQ/L	100	NA	70-130	NA	0-60		LFM	
	9334	BENZYL BUTYL PHTHALATE	ND	1.14		1	ug/L	114	NA	70-130	NA	0-60		LFM	
	9334	DHN-BUTYL PHTHALATE	ND	1.16		1	ug/L	116	NA	70-130	NA	0-60		LFM	
		DIETHYL PHTHALATE	ND	1.11		- {	ացչը ացչը	111	NA	70-130	NA	0-80		LFM	
		DIMETHYL PHTHALATE	ND	1.12		1	ug/L	112	NA	70-130	NA.	0-00		LFM	
		1,3-DIMETHYL-2-NITROBENZENE (Sur	93	92		•	u.ju∟ %	116	NA	70-130	NA	0-60		LFM	
		PYRENE-D10 (Surr)	108	105			76 96		NA	70-130 70-130	NA	0-60		LFM	
		PERYLENE-D12 (Sum)	104	104			×		NA						
		TRIPHENYLPHOSPHATE (Surr)	113	112			≫ %-		NA NA	70-130 70-130	NA NA	0-60 0-60		lfm LFM	
1 070418		and the second second second		112			70		ax	10-190	na.	0-00			
		OXYMAL	10	40.7											
		CARBOFURAN	ND	10.7		10	nðyr -	107	NA	70-130	NA	0-50		LFM	
	0891	UNROUFURAN	ND	10.3		10	പർഗ്ര	103	NA	70-130	NA	0-60		LFM	

06/15/2007 %RPD = Relative Percent Difference

NA = Indicates %RPD could not be calculated

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) analyses are used to determine the accuracy (MS) and precision (MSD) of a analytical method in a given sample matrix. Therefore, the usefulness of this report is limited to samples of similar matrices analyzed in the same analytical batch.

Only Duplicate sample with detections are listed in this report



Page 4 of 4 Reference Number: 07-04495 Report Date: 5/8/2007

matrix	Spike				Duplicat	la i								
Delah	- ·			Spike	Spike .	Spike		Percer	t Recovery	:			QC	
Belch		Anayle	Result	Result	Result	Conc	Units	MS	MSD	Limits	%RPD	Umita	Quittler	Comments
	8957		ND	10		10	ug/1.	100	NA	70-130	NA	0-50		
	6 957		ND	10.6		10	ug/L	106	NA	70-130	NA	0-50	LFM	
	8957		ND	10.7		10	ugit	107	NA	70-130	NA	0-50	LFM	
	8957	3-HYDROXYCARBOFURAN	NÐ	10.8		10	ug/L	108	NA	70-130	NA	0-50	LFM	
	5957	ALDICARB	ND	10.4		10	սցչ	104	NA	70-130	NA	0-50	LIFM	
	6957		ND	10.8		10	ug/L	108	NA	70-130	NA	0-50	LFM	
	8957	PROPOXUR (BAYGON)	ND	10.9		10	ugnL	109	NA	70-130	NA	0-50	LFM	
	8857	METHIOCARB	ND	11.4		10	ug/L	114	NA	70-130	NA	0-50	LFM	
	9337	OXYMAL	ND	9.6		10	ug/L	96	NA	70-130	NA	0-50	LIFM	
	9337	CARBOFURAN	ND	10		10	ugil.	100	NA	70-130	NA	0-50	LFM	
	9337	ALDICARB SULFOXIDE	Ъ	9.1		10	ացու	81	NA	70-130	NA	0-60	LFM	
	9337	ALDICARB SULFONE	ND	9.7		10	ug/L	97	NA	70-130	NA	0-60		
	9337	METHOMYL	ND	9.7		10	vg/L	97	NA NA	70-130 70-130	NA		LFM	
	9337	3-HYDROXYCAR8OFURAN	ND	9.9		10 10	ug/L	99	NA			0-50	LFM	
	9337		ND	9.5		10	-	85	NA	70-130	NA	0-50	LIFM	
	9337		ND	10.7		10	ug/L 			70-130	NA	0-50	LEM	
	9337		ND	10			ugAL	107	NA	70-130	NA	0-50	LFM	
		METHOCAR8	ND	8.5		10	սցի.	100	NA	70-130	NA	0-50	LFM	
31_070503			ND	8.0		10	ug¶_	95	NA	70-130	NA	0-59	LFM	
o I_0 (0903		OVAL.												
		OXYMAL	ND	10.4	10.5	10	սցչի	104	105	70-130	1.0	0-50	LEM	
			ND	10.8	10.2	10	ug/L	108	102	70-130	5.7	0-50	LFM	
		ALDICARE SULFOXIDE	ND	10.6	10.3	10	ug/L	106	103	70-130	2.9	Q-50	LFM	
		ALDICARE SULFONE	ND	10.5	10.3	10	ugiL	105	103	70-130	1.9	0-50	LFM	
		METHOMYL	ND	10.5	9.8	10	ug/L	105	96	70-130	9.0	0-50	LFM	
		3-HYDROXYCARBOFURAN	ND	11	10.8	10	ugЛ	110	108	70-130	1.6	0-50	LFM	
		ALDICARB	ND	9.4	9.1	10	ugL	94	191	70-130	3.2	0-50	LFM	
		CARBARYL	ND	11.7	11.3	10	ոնչ	117	113	70-130	3.5 <u>_</u>	0-50	LFM	
	12371	PROPOXUR (BAYGON)	ND	10,6	10.4	10	ug/L	106	104	70-130	1.9	0-50	LFM	
	12371	METHIOCARE	ND	11,2	11	10	ug/L	112	11D	70-130	1,8	0-50	LFM	

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%RPD = Relative Percent Difference

NA = Indicates %RPD could not be calculated

Mathx Spike (MS)/Matrix Spike Duplicate (MSD) analyses are used to determine the accuracy (MS) and precision (MSD) of a analytical method in a given sample matrix. Therefore, the usefulness of this report is limited to samples of similar matrices analyzed in the same analytical batch.

Only Duplicate sample with detections are listed in this report

FORM: QualifierDets Note: Some qualifier definitions found on this page may pertain to results or QC data which are not printed with this report.

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Qualifier Definitions

Page 1 of 1

Reference Number: 07-04495 Report Date: 05/08/07

	F	Duslifier
	The result is suspect, the field duplicate results do not agree.	

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The amount detected is below the State Reporting Level but greater then the lab's Practical Quantitation Level.	High QCS recovery due to increased detector response of the sample extract. The continuing calibration checks are within acceptance limits.

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06/15/2007 11:48

KUD TESTING LABS

PAGE 14/14

The Acceptance Limits (or Control Limits) approximate a 99% confidence interval around the mean recovery.

A surrogate is a pure compound added to a sample in the laboratory just before processing so that the overal efficiency of a method can be determined.

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"Notation:

QUALITY CONTROL REPORT SURROGATE REPORT

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Report Date:	Reference Number:
05/08/07	07-04495

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ab No	Analyte	Result Qualifier	l Inite	Matha	
900_070416 10230 515_070417	TETRACHLORO-M-XYLENE (SURR)	8 1	x	508.1	Arrentures Imir. The Ane
10230	2,4 - DCAA (SURR)	100	2		Acceleration films (0.%-190%
525_070416		3UF	×	\$15.1	Acceptance Range Is 70 - 130%
10230	1,3-DIMETHYL-2-NITROBENZENE (Sur)	95	8	525.2	Acceptance Ganne le 70%, in 1989
	TERSI RUBLING /Course	104	×	4	Acousting Rance is 70% to 130%
	TRIDHEANI DUCCOUNTS (Sur)	102	*:		Acceptance Ranne is 70% to 130%
	i RIFNEN? LFHQSPHATE (Sum)	109	*:		Acceptance Range is 70% to 130%
508_070416					
10231 515 070417	TETRACHLORO-M-XYLENE (SURR)	£	\$	508.1	Accentance Imite 704-1904
10231	24 - DCAA (SURR)		2		
525_070416		ŝ	ł	515,1	Acceptance Range is 70 - 130%
10231	1,3-DIMETHYL-2-NITROBENZENE (Sum)	8	¢	70A 0	
	(Surr)	105	F ;		
	TRIBURIUS DI CONTINUES DE LA CONTINUES	86	8		Attentance Cannols 70% to 130%
		105	ጜ		Acceptance Range is 70% to 130%
508_070416					
515_070417	IEIRACHLORO-M-XYLENE (SURR)	93	*	508.1	Acceptance Limits 70%-130%
10232 525 070418	2,4 - DCAA (SURR)	114	¥.	515.1	Actuations Danas in 70 1900
10232	1.3-DEMETHYL-24NITRORENTCHE (course	ł			
	PYRENE-010 (Sum)	2 d	1 <i>3</i> 7	525.2	Acceptance Range is 70% to 130%
	PERYLENE-D12 (Surr)	ŝ	* ¥		Acceptance Range is 70% to 130%
	TRIPHENYLPHOSPHATE (Sum)	22	f 3		Acceptance Range is 70% to 130%
508 070416		3	Я		Acceptance Range is 70% to 130%
10233 15_070417	TETRACHLORO-M-XYLENE (SURR)	6 9	ð	508.1	Acceptance Limits 70%-130%
10233	2,4 - DCAA (SURR)	• • • •	!	I	
525_070416		122	×	515.1	Acceptance Range is 70 - 130%
10233	1,2-DIMETHYL-2-NITROBENZENE /Sum)	0	!		
	PYRENE-D10 (Sum)	103	ر ب ر	<u>\$2</u> 5.2	Acceptance Range is 70% to 130%
	PERYLENE-012 (Sum)	102	f 3		Acceptance Range is 70% to 130%
	TRIPHENYLPHOSPHATE (Surr)		F 1		Acceptance Range is 70% to 130%

Page 1 of 1

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		K	uo T	estin	Kuo Testing Labs, Inc.	bs, I	nc.	Daily Field Report
	Project:		Hall	-Wentlar	Hall-Wentland SAR Project	roject	_	Project#:
	Contractor:	-	Kuo	Testing	Kuo Testing Labs, Inc.			
	NIL Personnel:	nnel:	Lau	Laura Hotbauer Diana Woolliams	uer lams			Page OF Date: 05/07/07
	Weather:	レルート	10 -1					
	TIME:			DES	DESCRIPTION OF WORK	N OF W	PR	
_	9:15	on site	1 01	N.	the W	12		
-		Γ		10	Cress.		5	
	9:57	2			E)	11:: Lu		
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Kuo Testing Labs, Inc.

Groundwater Sampling Field Data Sheet

Water Level Data	Solinst Water Level Meter 1 HF Scientific ORT-15 CE T	Hach Conductivity Meter	FIFT D INCEDIMENTS TIGES OF THE AND A STATE OF THE STATE	SAMPI INC VETTOR	FIELD SAMELER: LAUFA HOIDAUEF	ETET D CAMPY ED. 1 Americand SAR Project	
and the Well Construction Data is the offer	Solinst Water Level Meter Model 101 HF Scientific ORT-15 CE Turbidi Meter	M Meter model 210A Munductivity Meter	rated Whale Water Mini Purge Pump			AR Project No.:	
Wall Duration Date	satisfactory	CONDITION of WELL:			DATE: 05/07/07	WELL NO: HW - 1	Page
							of

			urar 2m3rn russi
_	Dutside Casing Diameter	2"	Calculate Casing Volume
<u> Q</u>	3ore Hole Diameter D ₃ (in.)	6"	L ₁ <u>17,7/*0.16 = 1/, 4/3 CV</u> in Gallons
_		12	CV <u>リルマ パース,シン BV</u> in Gallons
	'orosity of Filter Pack N (%)	25	Total Purge Volume (gals) CV*(3)= TPV(gals)
			Actual Volume Purged (gals)
1			Number of Bore Volumes Purged
usually P	V(?) casino		
	1) Total Well Depth (feet) 52.50 2) Initial Depth to Water 24.72 3) Final Depth To Water 24.72 4) Length of Water in Column 2.7.7 L1 7.7.7 Value on Line1 – Value on Line 2 2.7.7 The surveyed point on the inside (usually P	Outside Casing Diameter D ₂ (in.) Bore Hole Diameter D ₃ (in.) Filter Pack Length L ₂ (feet) Porosity of Filter Pack N (%) Illy PVC) casing	Outside Casing Diameter 2" D ₂ (in.) Bore Hole Diameter 2" D ₃ (in.) D ₅ (in.) 6" Filter Pack Length 12 L ₂ (feet) 12 Porosity of Filter Pack 25 N (%) 25

The surveyed point on the inside (usually PVC) casing The depth to the water table before removing any water from the well

WELL PURGING MEASUREMENTS

						NT NT N	
Time	Cumulative Gallons	рĦ	Temperature °C	Ţ	Turbidity NTU	Purge Rate	Comments
	rurgea			2mS		GPM	
			began	purge		1	
5 1 2		4	0.0	50 BV			
	L	្នះ		0 M	の、		
	6						
	9		C I		0		
	د	· · ·					
10125	16		, * ,		۲. ۱. ۱.		
	CI	- - -	• •	<u>0152</u>			
			End purge	Collected	sample		

Forms by Gina Clark

Suo 10 Testing 337 South 1st Avenue, C Othello, WA 99344 ىم Ç

Web Site: (509) 488-0112 Phone (509) 488-0118 Fax (800) 328-0112 Toll Free http://www.kuotesting.com e-mail: kuotest@atnet.net

-1-A-1			88146 HW-1 (88146 HW-1	88146 HW-1	88146 HW-1	88146 <u>H</u> ₩-1	88146 HW-1	CUSTOMER SAMPLE NO. SAMPLE NO.	Project Name: Hall-Wetland SAR Project	Kennewick WA 99	GSI, Inc.	SYSTEM / CUSTOMER	
Iotal Coliform and E. Coli		COD	Orthonhosnhate as D	Chloride	Hardness	Total Dissolved Solids	Nitrite as Nitrogen	Nitrate as Nitrogen	ANALYSIS	land SAR Project	wy, Ste F WA 99336			5/7/2007
Present/Absent	8 8>	0.13 0.043							RESULTS	Attn: Jon. Kevin	1020 N. Center Pkwy, Ste F Kennewick W/A	Ground Water Solutions Inc	SEND REPORT TO:	
	mg/L N	mg/L F	mg∕L I	mg/L]	ng/L					_	Pkwy, Ste	Colutions 1	5/8/2007	האור אבמכואבת
Reed	Morris	Reed	Reed	Reed	Reed	Reed	Keed	ANALISIS		9500	F	3	5/22/2007	DATE REPORTED

Dr. Edgene Kuo, Quality Assurance Manager

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mgu:morates mungrans per arre
* PQL=Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions
MOL: Method Detection Limit
Please check out our new Web Site on <u>http://www.kuolesting.com</u>

(10-82-50

Date

Kuo Testing Labs, Inc.

Groundwater Sampling Field Data Sheet

	Meter	HF Scientific ORT-15 CE Turbidi Meter
satisfactory	01	Solinst Water Level Meter Model 101
		Hach Conductivity Meter
CONDITION of WELL:		FIELD INSTRUMENTS USED: Orion pH Meter model 210A
	i Purge Pump	SAMPLING METHOD: Battery Operated Whale Water Mini Purge Pump
		FIELD ANALYST: Laura Hofbauer
DATE: 05/07/07		FIELD SAMPLER: Laura Hofbauer
WELL NO: HW - 2	No.:	PROJECT NAME: Hall-Wentland SAR Project
Page of		
	۲ (

Water Level Data		Well Construction Data		Well Purging Data	
1) Total Well Depth (feet)	49.77	Outside Casing Diameter D ₂ (in.)	2"	Calculate Casing Volume	
 Initial Depth to Water WT** (feet) 	17.79	Bore Hole Diameter D ₃ (in.)	6"	L ₁ <u>3/,4 §</u> *0.16 = <u>5,1</u> CV in Gallons	
3) Final Depth To Water	17.85	Filter Pack Length L ₂ (feet)	12	CV <u>サイノ</u> /2 = <u>2, 5</u> 6 BV in Gallons	
		Porosity of Filter Pack N (%)	25	Total Purge Volume (gals) CV*(3)= TPV(gals)	15,4
				Actual Volume Purged (gals)	15
4) Length of Water in Column L _t Value on Line1-Value on Line 2 (feet)	31.98			Number of Bore Volumes Purged	67

* *

The surveyed point on the inside (usually PVC) casing The depth to the water table before removing any water from the well

		50:0	9:32	5:30	. ز.) د لا محک	9:26	2:20	Time	
		15	12	9	6	ω		Cumulative Gallons Purged	
		7.02	7.02	7.00	6.3 17	6.07		Hq	
	End purge	10. P	401	10.9	i I.O	9.11	began	Temperature °C	
	Collected	0136	2125 1	0136	0130	0135	purge	Conductivity µs/cm 2mS 20mS	
	sample -	1.67	2,02	3.37	6.49	11.7		Turbidity NTU	TEN DO LES
	a un	٨						Purge Rate GPM	
	d'un trade							Comments	

WELL PURGING MEASUREMENTS

Forms by Gina Clark

U I CUITIO LADS, 1 337 South 1st Avenue, Othello, WA 99344 G

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HW-2						HW-2	88147 HW-2 Nitrate as Nitrogen	SAMPLE NO. SAMPLE NO. AMALYSIS	Project Name:Hall-Wetland SAR Project	GSI, Inc. 1020 N. Center Pkwy, Ste F Kennewick WA 99336	System/customer	DATE COLLECTED
	-8	0.12	1.50	48.7		UN	0.85	RESULTS	Att	Grc 102 Ker	SEND R	0
	<8. 8. mg/L. Marris	0.043 mg/L	0.297 mg/L	றழி	mg/L	Jyam	0.20 mg/L	UNITS	Attn: Jon, Kevin	Ground Water Solutions, Inc. 1020 N. Center Pkwy, Ste F Kennewick WA 99336	SEND REPORT TO: 5/8/2007	DATE RECEIVED
Reed	Marris	, Reed	Reed	Reed	Ræd	Reed	Coffey	anal yots		Inc. e F 99336	5/29/2007	DATE REPORTED

 $<\!(0,001)_{\rm c}$ indicates the analyte was not detected at or above the concentration indicated ND: None Detected

mg/L_Indicates milligrams per litre * PQL=Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions MDL: Method Detection Limit Please check out our new Web Site at <u>http://www.kuotesting.com</u>

Upon Visual Observation

Dr. Eugene Kuo, Quality Assurance Manager

Date

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Kuo Testing Labs, Inc.

Groundwater Sampling Field Data Sheet

	Page	of
PROJECT NAME: Hall-Wentland SAR Project No.:	WELL NO: HW - 3	
FIELD SAMPLER: Laura Hofbauer	DATE: 05/07/07	
FIELD ANALYST: Laura Hofbauer		
SAMPLING METHOD: Battery Operated Whale Water Mini Purge Pump		
FIELD INSTRUMENTS USED: Orion pH Meter model 210A	CONDITION of WELL:	
Solinst Water Level Meter Model 101 HF Scientific ORT-15 CE Turbidi Meter	satisfactory	

		Well Construction Data		Well Purging Data	
1) Total Well Depth (feet)	49.01	Outside Casing Diameter D ₂ (in.)	2"	Calculate Casing Volume	
2) Initial Depth to Water WT** (feet)	21.00	2.00 Bore Hole Diameter D, (in.)	6"	L ₁ <u>28. ol</u> *0.16 = <u>U</u> / A_CV in Gallons	
3) Final Depth To Water	20,90	Filter Pack Length L ₂ (feet)	12	CV <u>U, 4 </u>	
		Porosity of Filter Pack N (%)	25	Total Purge Volume (gals) CV*(3)= TPV(gals)	13.0
			!	Actual Volume Purged (gals)	15
4) Length of Water in Column L ₁ Value on Line1–Value on Line 2 (feet)	22 52 54			Number of Bore Volumes Purged	6

The surveyed point on the inside (usually PVC) casing The depth to the water table before removing any water from the well

* *

WELL PURCING MEASUREMENTS

				WELL I UNGING MEASUREMENTS	TEASONE	ATRIVIO	
Time	e Cumulative Gallons Purged	pH	Temperature °C	Conductivity jus/cm 2mS 20mS	Turbidity NTU	Purge Rate GPM	Comments
10:04	L.	-	began	purge			
10;06	36 3	7.32	14.6	ה ו על	0.64		
16.08	2 <u>2</u> 6		12,2	52477	0.26		
61.01	9	1.	12.0	510%	22.10		
1012	2 12		.v .v		2.2		
1.	<u>4</u> 15	1.5	N N	214			
			End purge	Collected	sample		

Forms

by Gina Clark

South 1st Avenue, Othello, WA 99344

Web Site: (509) 488-0112 Phone (509) 488-0118 Fax (800) 328-0112 Toll Free http://www.kuotesting.com e-mail: kuotest(a)atnet.net

88148	88148	88148	88148	88148	88148	88148	88148	SAMPLE NO.	GSI, Inc. 1020 N. Ce Kennewick Project Nar	SYSTEM / CUSTOMER
HW-3	HW-3	HW-3	HW-3	HW-3	HW-3	HW-3	HW-3	CUSTOMER SAMPLE NO.	GSI, Inc. 1020 N. Center Pkwy, Ste F Kennewick WA 99 Project Name: Hall-Wetland	STOMER
Total Coliform and E. Coli	COD	Orthophosphate as P	Chloride	Hardness	Total Dissolved Solids	Nitrite as Nitrogen	Nitrate as Nitrogen	ANALYSIS	GSI, Inc. 1020 N. Center Pkwy, Ste F Kennewick WA 99336 Project Name: Hall-Wetland SAR Project	DATE COLLECTED 5/7/2007
Absent/Absent	<8	0.07	2.0	56.8	76.7	ND	116	RESULTS	Ground Wa 1020 N. Cer Kennewick Attn: Jon, K	SEND REPORT TO:
	8	0.043	0.297	0.11	21.1	0.0023	0.015	MDL	Ground Water So 1020 N. Center P Kennewick Attn: Jon, Kevin	
	mg/L	mg/L	mg/L	ng/L	ng/L	3ng/L		UNITS	blutions kwy, St WA	DATE RECEIVED
Reed	Morris	Reed	Reed	Reed	Reed	Reed	Reed	ANALYSTS	, Inc. e F 99336	DATE REPORTED 5/22/2007

Dr. Fagene Kuo, Quality Assurance Manager llar Upon Visual Observation

mgr.:noncares mungrants per nure
PQL=Practical Quanitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions
MDL: Method Detection Limit
Please check out our new Web Site at <u>http://www.kuolesting.com</u>

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Date

		 														SOURCE	SITE		KIL Personnel:	Contractor:	Project:	
																9:50	TIME		nnel:			Ku
																8.59	면		Laura Hofbauer	Kuo Testing Labs, Inc.	Hall - Wentl	o Testin
						•										0110	CONDUCTIVITY		luer	Labs, Inc.	Hall - Wentland SAR Monitoring	Kuo Testing Labs, Inc.
																- - - 0	TEMPERATURE	Date: 05/07/07	Page OF	Task #:	Project#:	Daily Field Report
																6.51	TURBIDITY					ň

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Web Site: (509) 488-0112 Phone (509) 488-0118 Fax http://www.kuotesting.com 337 South 1st Avenue, Othello, WA 99344 e-mail: (800) 328-0112 Toll Free kuotest(a)atnet.net

DATE COLLECTED

DATE RECEIVED

DATE REPORTED

SAMPLE NO. SYSTEM / CUSTOMER 88149 88149 GSI, Inc. 1020 N. Center Pkwy, Ste F WA 99 88149 88149 88149 88149 88149 Project Name: Hall-Wetland SAR Project CUSTOMER SAMPLE NO. HW-SW HW-SW HW-SW HW-SW HW-SW HW-SW HW-SW ANALYSIS god Orthophosphate as P Chloride Total Dissolved Solids Nitrate as Nitrogen Hardness Nitrite as Nitrogen 99336 5/7/2007 RESULTS 0.09 4.50 50,0 0.60 38.6 B 2 SEND REPORT TO: Ground Water Solutions, Inc. 1020 N. Center Pkwy, Ste F Kennewick Attn: Jon, Kevin MDL 0.0023 0.043 0.297 0.015 _21.1 0.11 00 5/8/2007 UNITS mg/L .mg/L _ng/L mg/L _mg/L mg/L T/Bur WA ANALYSTS Morris Reed Reed Reed Reed. Reed Reed 99336 5/22/2007

88149 HW-SW Total Coliform and E. Coli Present/Present. Reed

Dr. Eugene Kuo, Quality Assurance Manager 4ler

Upon Visual Observation

mgr.:indicates munigrams per inte * PQL=Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions MDL: Method Detection Limit Please check out our new Web Site at <u>http://www.kuotesting.com</u>

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Date

T on O I ESTING Labs, Il 337 South 1st Avenue, Othello, WA 99344 estin

(509) 488-0112 Phone (509) 488-0118 Fax (800) 328-0112 Toll Free

Web Site: http://www.kuotesting.com e-mail: kuotest@atnet.net

Reed			Present/Present	Total Coliform and E. Coli	Duplicate	00188
Morris	mg/L	8	8			00120
Reed	mg/L	0.043	0.12	Contraction of the second seco	Duplicate	88150
Reed	mg/L	0.297	1.0		Duplicate	88150
Reed		0.11	48.7	Chinese	Duplicate	88150
Reed	ng/L	21.1	60	Lotal Dissolved Solids	Duplicate	02150
Reed	mg/L	0.0023	ND	Nitrite as Nitrogen	Duplicate	88150
Reed	mg/L	0.015	0.85	Nitrate as Nitrogen		00150
ANALYSTS	UNITS	MOL			SAMPLE NO.	SAMPLE NO.
				ANALYSIS	CUSTOMER	
	·	Attn: Jon, Kevin	Atta	Project Name: Hall-Wetland SAR Project	Name: Hall-V	Project
Inc. F 99336	Ground Water Solutions, Inc. 1020 N. Center Pkwy, Ste F Kennewick WA 99	Ground Water 1020 N. Center Kennewick	Grou 1020 Keni	7, Ste F A 99336	Kennewick WA 99336	1020 N. C Kennewic
5/22/2007	5/8/2007	SEND REPORT TO:	SEND RE	5/7/2007	ISTOMER	SYSTEM / CUSTOMER
DATE REPORTED	DATE RECEIVED	Q		DATE COLLECTED		

Dr. Edgene Kuo, Quality Assurance Manager

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mg/L:noncares munigrams per une
* PQL=Practical Quantization Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions
MDL: Method Detection Limit
Please check out our new Web Site at <u>http://www.kuotesting.com</u>

Date

ŝ 28-07

			1:59	Project: Contractor: KTL Personnel: Weather: ()/O() TIME:	
			on site MW2 on site MW2 on site MW2	Hall - Wentland SAR Monitoring Project#: Pr: Kuo Testing Labs, Inc. Task #: Page OF Page OF Description OF WORK	Kuo Testing Labs, Inc. Daily Field Report

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Kuo Testing Labs, Inc.

Groundwater Sampling Field Data Sheet

	Page	of
PROJECT NAME: Hall-Wentland SAR Project No.:	WELL NO: HW - 1	
FIELD SAMPLED. Laura Datama		
THE STATE DAY, LAURA LIGIDAUET	DATE: 10/03/06	
FIELD ANALYST: Laura Hofbauer		
SAMPLING METHOD: Bettery One with With the With the		
FIELD INCOMPANY PARTY OPERATED Whate Water Mini Purge Pump		
	CONDITION OF METT:	
Solinst Water Level Meter Model 101		
HF Scientific ORT-15 CE Turbidi Meter	satistaciury	

1) Total Well Depth (feet)		Outside Casing Diameter	2.	Calculate Casing
2) Initial Depth to Water	53.14	D ₂ (in.) Bare Hole Diameter	6 33	
WT** (feet)	24.40	Bore Hole Diameter D ₃ (in.)	6"	L: 28,74
3) Final Depth To Water	11,40	Filter Pack Length L ₂ (feet)	12	CV <u>4.60</u> /Z= <u>2.30</u> BV in Gallons
		Porosity of Filter Pack N (%)	25	Total Purge Volum CV*(3)= TPV(gals)
				Actual Volume Purged (gals)
L ₁ Value on Line I-Value on Line 2 28,74 (feet)	28.74			Number of Bore Volumes Purged
The surveyed point on the inside (usually PVC) casing	de (usually	VC) casing		11

The surveyed point on the inside (usually PVC) casing The depth to the water table before removing any water from the well

WELL PURCING N 3

	-	_	-	-	_	_	_	_								
 						<u> </u>	2 12		2.09	10.7			12:24			Time
						1		13	œ	6	1.	د		Purged	Gallons	
						6.40	9 - E		621	6,37	6.32					
					End purge	2	12/20			2	13.1	1			Conductivity Turbally	a da da ana ang ang ang ang ang ang ang ang an
					Collected	4410		Ĺ		7710	0145	purge	2000 C	28	Conductivity	WEED FONGING WEASUREMENTS
				21411	Samnle	0.50	0.89	1.19		2	261				Turbidity	VIEASURE
		i					ĺ								a'n F	MENTS
															in the second	

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KUD TESTING LABS

89:43 10/25/2006

(509) 4 Web Si	(509) 488-0112 Phone (509) 488-0118 Fax (800) 328-0112 Toll Free Web Site: <u>http://www.kuotesting.com</u> e-mail: <u>kuotest@atnet.net</u>	9) 488-0118 Fa		28-0112 kuotest(5344 528-0112 Toll Free <u>kuotest@atnet.net</u>
SYSTEM / CUSTOMER	DATE COLLECTED 10/3/2006	SEND	DA" SEND REPORT TO:	DATE RECEIVED	DATE REPORTED 10/20/2006
r Sol ill St	¢ 400	វនុក្ខ	Ground Water Solutions 55 SW Yamhill St., Suite 400	Solutions St., Suite	400
Project NameHall Wentland SAR	97202 Jand SAR	Por	Portland O Attn: Kevin Lindsey	or or	97202
SAMPLE NO SAMPLE NO	ANALYSIS	RESULTS		LIMITS .	ANALYSTS
85052 HW-1	Nitrate as Nitrogen	0.75	0.21	ng/L	Hatch
85052 HW-1	Ninite as Nitrogen	ND	0.0023	mg/L	Hatch
85052 HW-1	Total Dissolved Solids	136	. 21.1	The state	Hatch
85052 HW-1	Hardness	62.8	.0.11	m⊮/L	Hatch
85052 HW-1	Chloride	ND	0.297		Hatch
85052 HW-1	Orthophosphate.as.P	<u></u>	0.0433		Hatch.
85052 Hw-1	000	ND.	œ	:	Hatch
85052 HW-J	Fecal Coliforms	0.0		Col/100ml	Col/100ml Cascade Analytical

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wy nextrains hanging putting in the lowest level that can be achieved within specified limits of presision and acturacy during rowine laboratory operating conditions MDL: Method Delevion Limit Mictor check out our new Reb Site of <u>http://puwe.kunfecting.com</u>

PAGE 02/08

Dr. Eugene Kuo, Quality Assurance Manager

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5094880118 10/25/2006 09:43

Date

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From by line Chest

DIRCINC

(Jeel)

Value on Linel-Value on Line 2

137,69

Volumes Purged Number of Bore Purged (gals)

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The surveyed point on the inside (usually PVC) casing The depth to the water table before removing any water from the well

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Final Depth To Water

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Initial Depth to Water WT** (feet)

ol rr

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(iii)

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Filter Pack Length

12

CV<u>(2.0.3</u> in Gallons

2

3.02

BV

L: (feet)

Porosity of Filter Pack

S.

Total Purge Volume (CV*(3)= TPV(gals) Actual Volume

(gals)

18,09

5

Z

(%)

E

Total Well Depth (feet)

49.79

D₂ (in.) Bore Hole Diameter **Outside Casing Diameter**

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L₁ $\frac{37.04}{1000}$ *0.16 = (a.03 CV)in Gallons

ស្ទ

Calculate Casing Volume

Well Purging Data

P

Water Level Data

Well Construction Data

SAMPLING METHOD: Battery Operated Whale Water Mini Purge Pump FIELD (NSTRUMENTS USED: Orion pH Meter model 210A

Hach Conductivity Meter

CONDITION of WELL:

satisfactory

HF Scientific ORT-15 CE Turbidi Meter Solinst Water Level Meter Model 101 FIELD ANALYST: Laura Hofbauer FIELD SAMPLER: Laura Hofbauer PROJECT NAME: Hall-Wentland SAR Project

No:

WELL NO: HW -

N

Page

12

DATE: 10/03/06

Kuo Testing Labs, Inc.

Groundwater Sampling Field Data Sheet

4) Length of Water in Column

WELL ζ,

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T	l,
-	2
	ΕŅ
n Derzeuren in Conductivity in The Catter in the second	WELL FORCING MEASUREMENT
	Z

. 0 337 South 1st Avenue, Othello, WA 99344 esti <u>S</u> С С <u>,</u>

Web Site: (509) 488-0112 Phone (509) 488-0118 Fax (800) 328-0112 Toll Free http://www.kuotesting.com e-mail: kuotest@atnet.net

Caseade Analytical	Cal/100ml		0.0	Fecal Coliforms	82053 HW-2
Harch	ng/L		ND	COD	
Hatch		0.0433	60.0	Orthophosphale as P	÷
Haich	ng/L	0.297	ND	Chloride	1
Hatch	L	0.11	63.1	Handness	
Hutch	mg/L	21.1	130	Total Dissolved Solids	
Hatch	mg/L	0.0023	ND	Nitrite as Nitrogen	
Harch	mg∕L	0.21	0.47	Nitrate as Nitrogen	
AWALYSTS	UNITS	S WIT	Results	ANALYSIS	â
400 97202	Solutions I St., Suite OR ndsey	Ground Water Solutions 55 SW Yambill St., Suite 400 Portland OR 97 Attn: Kevin Lindsey		ns jite 400 97202 ntlend SAR	Ground Water Solutions 55 SW Yamhill St., Suite 400 Portland OR 97202 Project NameHall Wentlend SAR
DATE REPORTED	DATE RECEIVED	DA SEND REFORT TO: 1		DATE COLLECTED 10/3/2006	SYSTEM / CUSTOMER

we wave and the set of the lowest level that can be achieved within apscified limits of precision and accuracy during routine inboratory operating conditions PPQL- Practical Quantization Limit MDL: Method Delection Limit

Please check out our new Web Site at <u>Interthewee keatevilup.com</u>

03/08 PAGE Dr. Eugene Kdo, Quality Assurance Mandger

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5094880118 10/25/2006 09:43

Date

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Kuo Testing Labs, Inc. Groundwater Sampling Field Data Sheet

Solinst Water Level Meter Model 101 HF Scientific ORT-15 CE Turbidi Meter	Hach Conductivity Meter	FIELD INSTRUMENTS USED.	SAMPI INC METTOR A DOIDENET	FIELD ANALVET: Laura Holbauer	FROJECT NAME: Hall-Wentland SAR Project No.:	
satisfactory	CONDITION of WELL:			DATE: 10/03/06	WELL NO: HW - 3	Page
-						e,

		Well-Construction Data		Well Purging Data	
1) Total Well Depth (feet)	T T	Outside Caving Diameter		e 1.	
2) Initial Depth to Water	00,00	D ₂ (in.)	ľ	CHARLE CASHE	
WT** (feet)	2307	Bore Hole Diameter D ₃ (in.)	6"	$L_{1} = \frac{2(p, 9, 3)}{10} \times 0.16 = \frac{4}{7} \cdot \frac{3}{5} CV$	
3) Final Depth To Water		Ritzer Daule Youngt	Ī		
	23.07	L ₂ (feet)	12	CV 14, 31 /2 = 2,15 BV	
		Parosity of Filter Pack N (%)	25	Total Purge Volume (gals)	12 02
			ľ	(2)- 1 PV(gals)	10, 73
				Actual Volume	15
4) Length of Water in Column				Number of Bore	
Value on Line 1- Value on Line 2 2093	2693			Volumes Purged	5
The surveyed point on the in-i					-

The surveyed point on the inside (usually PVC) casing The depth to the water table before removing any water from the well

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WELL PURGING MEASIN 2

F	4	-	Τ-	-	-			-	÷.					_		_			_	
			 				121.12			45.10		chi /w	01:40	2		-			Time	
							5		17	9		ע	زين				Purged	Gallons	Cumulative	
							6.32	05.01	`	いいの	50		6.15							
					admin http:	And Miners	13.2	/3.1	Į	1 2 1	13.2		2.4	began				-		
					Collected		571 W	0143		シート	212	×+10	>	purge	ZUIDS		E CA	Lamperature Conductivity	a state and the state of the st	THE FORGING MEASUREMENTS
					sample	200	3 5 7	0,20			0 5 8	0.11	}					Turbidity		
									-							CPM	Rate	Purge		くうどうか
														1111				Comments		

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Web Site: http://www.kuotesting.com e-mail: (509) 488-0112 Phone (509) 488-0118 Fax (800) 328-0112 Toll Free 337 South 1st Avenue, Othello, WA 99344 kuotest@atnet.net ۰.

DATE RECEIVED

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SYSTEM / CUSTOMER	ылив социестер 10/3/2006	sund report to:		10/4/2006	DATE REPORTED 10/20/2006
Ground Water Solutions 55 SW Yamhill St., Suite 400 Portland OR 97202	utions ., Suite 400 OR 97202	Ground W 55 SW Ya Portland	ld Water ; 7 Yamhill nd	Ground Water Solutions 55 SW Yamhill St., Suite 400 Portland OR 97	l Water Solutions. Yamhill St., Suite 400 d OR 97202
Project NameHall Wentland SAR	and SAR	Attn:	Kevin Li	Attn: Kevin Lindsey	
SAMPLE NO. CUSTOMER	ANALYSIS	RESULTS	MDL	UNITS	ANALYSTS
85054 HW-3	Nitrate as Nitrogen	0.70	0.21	mg/L	Hatch
85054 HW-3	Nitrite as Nitrogen	B	0,0023		Hatch
85054 HVV-3	Total Dissolved Solids	122	21.1	mg/1,	Hatch
85054 HW-3	Hardness	. 67.9	.0.11	nÿL	Hatch
85054 HW-3	Chloride.	ND	0.297	ng/L	Hatch
85054 JHW-3	Onthophosphate as P	0.08	0.0433		Hatch.
85054 H.W-3	COD	ND	œ	mg/L Hatch	.Hatch
85054 HW-3	Fecal Colifornis	0.0		Col/100m]	Col/100m) Created Analytical

8505.4 85054

Fecal Coliforms

00 NG

Col/100ml Cuscude Analytical

HW-3 HW-3

Modyl Starly end

наунламыные нанизана ростию * PQL=Practical Quantitation Limic is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions MDL: Montrod Delection Limit Pfease check out our new Web Site or <u>Ampr/Awrea kontexting.com</u>

Dr. Eugene Kuo, Quality Assurance Manager

Date Ģ 0

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10/25/2006 09:43

	Kuo Testing Labs, Inc. Daily Field Report
Project:	Hall - Wentland SAR Monitoring Project#:
Contractor: KTL Personnel:	Kuo Testing Labs, Inc.
Weather [.]	Date:10
TIME:	DESCRIPTION OF WORK
11:71	on sile H.W2
- • .	HTAL VARUE
12:43	M SIL HU-1
01:25	water
0c:10	Calle of source where same
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Web Site: http://www.kuotesting.com e-mail: (509) 488-0112 Phone (509) 488-0118 Fax (800) 328-0112 Toll Free 337 South 1st Avenue, Othello, WA 99344 kuotest(a)atnet.net

DATE RECEIVED

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85491 HW-1 85491 HW-1 85491 HW-1 85491 HW-1 85491 HW-1 85491 HW-1 85491 HW-1 85491 HW-1 85491 HW-1 85491 HW-1	Project NameHall Wentland SAR	Groundwater Solutions 55 SW Yamhill St., Suite 400 Fortland OR 972	amettera - CUSTOMER
Nitrate as Nitrogen Nitrite as Nitrogen Total Dissolved Solids Hardness Chloride Orthophesphate as P COD SOC/Synthetic Organic Compounds Fecal E-Coli	Wentland SAR	tions , Suite 400 OR 97202	MATE COLLECTED 10/31/2006
0.91 ND 108 64.4 2.10 0.13 ND Attached Report 0	2000 100 100	55 Pc	SENO
0.21 0.0023 21.1 0.11 0.297 0.0433 8	Atta: Kevin Lindsey	Ground Water Solutions 55 SW Yamhill St., Suite 400 Portland OR 97	SEND REPORT TO 1
mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L	ndsey	Solutions St., Suite OR	11/1/2006
mg/L Hatch mg/L Hatch mg/L Hatch mg/L Hatch mg/L Hatch mg/L Hatch mg/L Hatch mg/L Edge Analytical MPN/100ml Cascade Analytical	and the second sec	400 97202	12/8/2006

<(0.001): indicates the analyte was not detected at or above the concentration indicated. ND: None Detected mg/L:Indicates milligrams per litre * PQL=Practical Quantilation I.imit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions MDL: Method Detection Limit MDL: Method Detection Limit Please check out our new Web Site at <u>http://www.kuotexting.com</u>

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"*Sample passed hold time for Nitrate/Nitrite as Nitropen

Dr. Eugene Kuo, Quality Assurance Manager

Date

12-08 5

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Kuo Testing Labs, Inc. Groundwater Sampling Field Data Sheet

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		Page	of
PROJECT NAME: Hall-Wentland SAR Project	No.:	WELL NO: HW - 1	
FIELD SAMPLER: Laura Hofbauer		DATE: 10/31/06	
FIELD ANALYST: Laura Hofbauer			
SAMPLING METHOD: Battery Operated Whale Water Mini Purge Pump	Purge Pump		
FIELD INSTRUMENTS USED: Orion pH Meter model 210A		CONDITION of WELL:	:
Hach Conductivity Meter			
Solinst Water Level Meter Model 101	01	satisfactory	
HF Scientific ORT-15 CE Turbidi Meter	Aeter		

7	Number of Bore Volumes Purged			16.21	4) Length of Water in Column L ₁ Value on Line1-Value on Line 2 (feet)
15	Actual Volume Purged (gals)				
K .63	Total Purge Volume (gals) CV*(3)= TPV(gals)	25	Porosity of Filter Pack N (%)		
	$\frac{CV \underline{4}, \underline{3}}{\text{in Gallons}} / 2 = \underline{3}, /\underline{0} \text{ BV}$	12	Filter Pack Length L ₂ (feet)	26.35	3) Final Depth To Water
	$L_1 \frac{\partial \langle \mathbf{u}, 3 \rangle}{\partial \mathbf{u}} * 0.16 = \frac{4}{2} \frac{\partial \mathbf{u}}{\partial \mathbf{v}} CV$ in Gallons	6"	Bore Hole Diameter D ₃ (in.)	26.79	 Initial Depth to Water WT** (feet)
	Calculate Casing Volume	2"	Outside Casing Diameter D ₂ (in.)	53.10	1) Total Well Depth (feet)
	Well Purging Data		Well Construction Data		Water Level Data

* *

The surveyed point on the inside (usually PVC) casing The depth to the water table before removing any water from the well

			WELL	WELL PURGING MEASUREMENTS	IEASURE	MENTS	
Time	Cumulative	рH	Temperature	Conductivity	Turbidity	Purge	Comments
	Gallons		റ്	ino/sri	NTU	Rate	
	Purged			2mS		GPM	
				20mS			
12:51			began	purge			
12:53	3	6.84	12.6	0154	52,0		
12:55	6	6.46	12.4	0156	0.46		
R:57	6	6.49	12.4	0156	0,23		
P2 P1	12	698		0156	0.28		
01.0	15	6.84	12.2	0156	O. A3		
			End purge	Collected	sample		
					-		
					-		

From by Some Plante

A REPORT Reference Number: 06-14429 Reference Number: 06-14429 Report Date: 12/9/2000 Date Analyset: 11/15/200 Extraction Date: 12/9/2000 Date Analyset: 11/15/200 Extraction Date: 12/9/2000 Date Analyset: 11/15/200 Extraction Date: 12/9/2000 Paraquat Paraquat Paraquat Paraquat Nucl. COMMEN ugl. 2 1.0	re annum of "AD" hodowin that the compound was not deviced above the Leb's Method Detection Linet - J MCL- Maximum Consuminant Leval, maximum permissible level of a consuminant in water established by EP A blank MCL or SAL' viewe indexides a level is not convention of established. PQL - Procised Camittation Linet is the concentration of the discharac methods done has no serviced and monor MCL - Maximum Constant land is don in the maximum proceedings.		1910-42-5 PARAQUAT ND	CAS COMPOUND RESULTS	Project: 85491,85492,85493,85494 Field ID: 85491 Sample Description: 85491 Sample Date: 10/31/2006 Source Type: Sampler Phone:	Client Name: KUO Testing Labs inc 337 S 1st Othello, WA 99344	The lab you can inusit
a Number: 06-14425 sport Date: 12/8/2006 Analysed: 11/15/200 al Method: 549_061 MCL COMMEN	ADL M. NPDMR, State A		ug/L				A REF
a Number: 06-14425 sport Date: 12/6/2006 Analyzed: 11/15/200 al Method: 549_061 MCL COMMEN	dividuary Level (BAL) to				. •		- 360,871,1577t
a Number: 06-14425 sport Date: 12/6/2006 Analyzed: 11/15/200 al Method: 549.2 Paraquat MCL COMMEN	ar Unreguleried a		1.0	MDL	Analy Ex	Refere	, g
Pag 04630515 12/8/2006 11/15/2006 HY Paraquat Comment Comment	ampaounds	· · · · ·		MCL	Lab Number Report Date: ate Analyzed Iraction Date: Analyst: Supervisor flicat Method	nce Number	
				COMMENT		: 06-14429	Page 1 of 1

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FORM: SOC_GEN

114-26-1 PROPOXUR (BAYGON) 2032-65-7 METHIOCARB		63-25-2 CARBARYL	116-D5-42-6 3-HYDROXYCARBOFURAN		1648-88-4 ALDICARB SULFONE	1646-87-3 ALDICARB SULFOXIDE			EPA Regulated	CAS COMPOUND			Project: .85491,85492,85493,85494 Fleid ID: 85491 Sample Description: 85491	Othella, WA 99344	Client Name: KUO Testing Labs Inc 337 S 1st	CARBAMATES IN DRINKING WATER	The lab you can trust!
N		N N	n n	ND	ND	Ŋ		88	5	RESULTS			193,85494			ATES IN	Burnington, WA 1620 S Walnut St - 98233 corporate office 800,755.5295 - 360,757,1400 - 350,757,1402tax Bellingham WA 895 Orchard Dr Suile 4 - 98225 Memuloopy 360,671.0688 - 360.671.1577fax
명/ 명/	ų	ight ight	ų	ugil	ugıL	ngn	ŭ	נים קיר		Units						DRIN	1620 S Wainut St - 98233 800,755.9235 • 360,757.1400 • 893 Orchard Dr Suliba 4 • 98225 360,671.0688 • 360.671.1577fax
1.0 1.0	i	1.0	1.0	1.0	1.0	1.0	;	1.0		PQL						VKIN	982233 0.757.1400 16 4 - 98225 0.671.15776
0.72 0.76		0.53	1.0	0.86	0.83	0.71	ļ	0.87	D R1	MDL	Analy	Ū.	0		Refere	αW Σ	• <u>360,757,1</u> 4
							ä	40	300	MCL	Analyst: T Supervisor	Extraction Date:	Lab Number: Report Date: Date Analyzed:		nce Numbe	TER	
			•••			-				COMMENT	1 05		ar. 04630515 e: 12/6/2006 d: 11/14/2006	·	Reference Number: 06-14429		Page 1 of 1

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An annual of NCF industes their the compaund was not detected blowe the Labb Methad Detection Link - MOL. MCL- National Certainbare Level, maximum permissible level of a cartiterisant in water established by EPA, NPDMR. State Advisory Land (SAL) for Unrequiated compounds. A blank MCL of SAL value indicate a level is not currently statewished. POL- Practical Constitution Link is the concentration of the sandbard analyzed during the traits traitswiter. With state confidence that the Control compared compound can be meetered and apopulated with state confidence that the concentration is gnester than MCL - Method Detection Link is the concentration of the sandbard analyzed during the traits and apopulation with state confidence that the bard with maximum concentration is gnester than MCL - Method Detection Link is the bard bardward concentration or compound can be meetered and apopulated with state confidence that the compared concentration is gnester than J- Estimated value. und concentration is graster than 2010.

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	correspondent.	State Advisory Level (SAL) for Unregulated c	ry Lavel (SAL) 1	State Adviso	ostabished by EPA, NPCWR.	compound was an detected above the Lab's Method (Malineum permission level of a contemporation in writer)	An amount of "ND" indicates that the MCL- Meximum Contemporatic Level.
		0.043	U.1	υ <mark>ρ</mark> ί	ND	Ĕ	Z-L9-Z060
		0.031		je F	i e	UKUMACIL	
			5	•	5	State Unregulated - Other	344.40
		0.031	0.1	ng/L	Ŋ	PROPACHLDR	1918-16-7
		0.030	0.1	υg/L	ND	METRIBUZIN	21087-64-9
		0.024	0.1	ug∕L	ND	METOLACHLOR	51218-45-2
		0.031	0.1	лðуг	ND	DIELDRIN	60-57-1
		0.024	0.1	J/Gn	ND	BUTACHLOR	23184-66-9
		0.022	0.1	лðуг	ND	EPA Unregulated	309-00-2
screening only / compliance by 515.1	-	0.08	0.4	ug/L	N	PENTACHLOROPHENOL	87-86-5
	4	0.030	0.1	1/gu	ND	SIMAZINE	122-34-8
	50	0.024	0.1	ug/L	ND	HEXACHLOROCYCLO-PENTADIENE	77-47-4
	-	0.025	0.1	ug/L	Ŋ	HEXACHLOROBENZENE	118-74-1
	0.2	0.02	0.1	ngy	ND	HEPTACHLOR EPOXIDE	1024-57-3
	0.4	0.022	0.1	ηĝη	N	HEPTACHLOR	76-44-8
	6	0.063	0.1	ug/L	ND	DI(ETHYLHEXYL)-PHTHALATE	117-81-7
	400	0.022	0.1	ug/Г	N	DI(ETHYLHEXYL)-ADIPATE	103-23-1
	2	0.3	0.1	ng/L	ND	CHLORDANE, TECHNICAL	57-74-9
	0.2	0.012	0.1	ng/L	ND	BENZO(A)FYRENE	50-32-8
	ı	0.030	0.1	цðг	ND	ATRAZINE	1912-24-9
	N	0.044	0.1	ng/L	ND	ALACHLOR	15972-60-8
	40	0.015	0.1	ng/L	ND	METHOXYCHLOR	72-43-5
	0.2	0.028	0.1	ng/L	N	LINDANE (BHC - GAMMA)	58-89-9
	N	0.030	0.1	цų,	ND	ENDRIN (72-20-8
						EPA Regulated	
COMMENT	MCL	MDL	PQL	Units	RESULTS	COMPOUND	CAS
Oc.	Analyst: MM Supervisor St f- Analytical Method: 525.2	Anal				Sample Date: 10/31/2006 Source Type: Sampler Phone:	
	Extraction Date:	Ϋ́					
	Date Analyzed:	D					
er: 04630515 le: 12/8/2006	Lab Number: Report Date:	N			493,85494	Project: 85491,85492,85493,85494 71e년 ID: 85491	
		•				Othello, WA 99344	
er: 06-14429	Reference Number:	Retere					Client Name:
EPO	(SOC) REPORT		JUNE	COMPOUNDS	ORGANIC CC	SYNTHETIC ORG	
						ian ñon càu iursii	1110
			Me 4 - 98225 10.671.15771	chard Dr Su 1.0688 • 36	Beilingham WA 805 Orchard Dr Suite 4 - 98225 . Monohistory 1360.671.0688 • 360.671.15771ax		
	402tax	• 360 757 1	96233 D 757 1400	Walnut SI- 5.9295 • 36	ington WA 1520 S		
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1997 - 1997 1997 - 1997 - 1997 1997 - 1997 1997 - 1997

FORM: SOC_GEN

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Lab Number: 04630515 Report Date: 12/8/2005 Reference Number: 06-14428 Page 2 of 2

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SYNTHETIC ORGANIC COMPOUNDS (SOC) REPORT

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CA ₆	COMPOUND	RESULTS	Units			
333-41-5	DIAZINON	N	ųΩ.	0.1		- F
75 9-84- 4	EPTC	N	Ð	0.1	0.028	
72-54-8	4,4-000	N	7, gu	0.1	0.024	
72-55-9	4,4-00E	Ŋ	ug/L	0,1	0.024	
50-29-3	4,4-DOT	ŋ	ηg	0.1	0.022	
21725-46-2	CYANAZINE	ND	ug/L	0.1	0.13	Qualitative Analysis Only
121-75-5	MALATHION	UD	ug/L	0.1	0.015	
56-38-2	PARATHION	ND	nû/L	0.1	0.022	
1582-09-8	TRIFLURALIN	dN	Jrgu	0.1	0.024	
	- PAHs					
91-20-3	NAPTHALENE	ND	цр/Г	0.1	0.1^	
86-73-7	FLUORENE	ND	цр/Г	0.1	0.026	
208-96-8	ACENAPHTHYLENE	ND	ug/L	0.1	0.025	
83-32-9	ACENAPHTHENE	Ŋ	liĝ/⊑	0.1	0.1^	
120-12-7	ANTHRACENE	ND	иg/L	0.1	0.012	
56-55-3	BENZ(A)ANTHRACENE	Z	ոք/Լ	0.1	0.012	
205-99-2	BENZO(B)FLUORANTHENE	ND	чg/L	0.1	0.025	
191-24-2	BENZO(G,H,I)PERYLENE	Ŋ	ηðη	0.1	0.025	
207-08-9	BENZO(K)FLUORANTHENE	ND	ug/L	0.1	0.022	
218-01-9	CHRYSENE	ND	ng/L	0.1	0.022	
53-70-3	DIBENZO(A,H)ANTHRACENE	D	ug/L	0.1	0.024	
206-44-0	FLUORANTHENE	ND	ug/L	0.1	0.1^	•
193-39-5	INDENO(1,2,3-CD)PYRENE	Ŋ	ugiL	0.1	0.040	
85-01-8	PHENANTHRENE	ND	ug/L	0.1	0.015	
129-00-0	PYRENE	ND	ug/L	0.1	0.022	
	- Phthalates					
85-68-7	BENZYL BUTYL PHTHALATE	GN	ugʻiL	0.1	0.022	
84-74-2	DI-N-BUTYL PHTHALATE	GN	J/gu	0.1	0.085	
84-66-2	DIETHYL PHTHALATE	ND	ц р л	0.1	0.044	
131-11-3	DIMETHYL PHTHALATE	ND	ug/L	0.1	0.015	
	Other Compounds					
51235-04-2	HEXAZINONE	D	۲ G	0.1	0.1^	

An seriousi of "NU series" MCL- Maximum Consistions (Level, robotinum permis-A blank MCL or SAL volve Indicate breek in the with A blank MCL or SAL volve Indicate breek interactions of R Mothod water **esteblished by EPA, NPDWR.** State Advisory (Levol (SAL) for Unregulated comp ģ

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Pol. - Proclesi Ossattation Lind is the MOL - Method Celection (Jrat is the lab) J - Estimated value. ta grester than zero.



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 Burlington WA
 1620 S Welnut SI - 98,233

 Cospense Difference
 B00,715,9295 • 360,757,1400 • 360,757,1402(ax)

 Bellingham WA
 805 Orchand Dr Suite 4 - 98,225

 Marrowedery
 360,571,0686 • 360,671,1577(ax)

HERBICIDES IN DRINKING WATER

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Page 1 of 1

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Client Name: KUO Testing Labs Inc 337 S 1st Othello, WA 99344

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Project: 85491,85492,85493,85494

Field ID:

85491

Report Date:

12/8/2006

Lab Number: 04630515

Reference Number: 06-14429

		0.044	0.1	ug/L	ND	3,5 - DICHLOROBENZOIC ACID	51-36-5
		0.2	0.2	ugiL	ND	CHLORAMBEN	133-90-4
		0.088	0.1	սց/Լ	CN	50594-66-6 ACIFLUORFEN	50594-66-6
		0.089	0.3	J∕6n	ND	DICHLORPROP	120-36-5
		0.067	0.2	υg/L	Ŋ	BENTAZON	25057-88-0 BENTAZON
		0.044	0,1	ug/L	Ŋ	2,4 ,5 T	93-76-5
		0.10	0.8	ug/L	ND	2,4 DB	94-82-6
		0,1	0.1	ug/L	ND	DCPA (ACID METABOLITES)	E-14-02-8
		0.089	0.1	ug/L	ND	TOTAL DCPA	1861-32-1
						State Unregulated	
		0.045	0.1	սց/Լ	N	DICAMBA	1918-00-8
						EPA Unregulated	
	500	0.089	0.1	ug/Ľ	ND	PICLORAM	1918-02-1
	7	0,16	0.2	ng/L	UN	DINOSEB	88-85-7
	200	0,80	1.3	ug∕L	D	DALAPON	75-99-0
	-	0,044	0.1	ngil	N	PENTACHLOROPHENOL	87-86-5
	50	0.02	0.1	Jıðn	ND	2,4,5 - TP (SILVEX)	93-72-1
	70	0,11	0.2	ηgh	ND	2,4 - D	94-75-7
						EPA Regulated	
COMMENT	MCL	MDL	POL	Units	RESULTS	COMPOUND	CAS
Chiarophenoxy Herbicides						•	
d: 515.1	Analytical Method: 515.1	Analy				Sampler Phone:	
	Superviso					Source Type:	
Analyst TM	Analys					Sample Date: 10/31/2006	
Extraction Date: 515_061113	raction Dat	E A				Sampled By:	
Date Analyzed: 11/20/2006	te Analyze	Da				Sample Description: 85491	

MCL- Hand i of 'NU' belie swe ine Liaits Kontrod Divitedien Limit - NDL. contaminant in water esuptisched by EPA, NPDWRL State Advisory Lewel (ISAL) (or Umroquiated compounds

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A blank MCL or SAL value indicates a laval is not currently established.

PQ- 14 tal Quantitation Q International hyted during the Initial calibration ared and reported with DPM. that the instion is greater than 2010

MDL - Maßnod Desarchan Unit is lite labs minimum concentration a compound can be metriumed and reported 3 - Estimation value...

		DAT	DATA REPORT	ORT	-	· .	
Cite	Client Name: KUO Testing Labs Inc 337 S 1st Othelio, WA 99344	us Inc 144			Referen	Reference Number:	06-14429
	Project (Field ID: 4 Sample Description: 4 Sampled By: Sample Date: Source Type:	85491,85492,85493,85494 85491 85491 10/31/2006			Dat F	Lab Number: 0 Report Date: 12 Date Analyzed: 11 Extraction Date: 50 Analyst: M Supervisor 21	04630515 12/8/2006 11/14/2006 508_061113 MM MM
CAS							
	COMPOUND	RESULTS	rs Units	POL	MDL	MCL	Synthetic Organics COMMENT
1336		RESUL		PQL	MDL	MCL	Synthetic Organics COMMENT
1114	-36-3 4-28-2	RESUL		PQL 0.2	MDL	MCL	Synthetic Organics COMMENT
5346	-36-3 4-28-2	RESUL ND		PQL 0.2 0.1	MDL 0.1^	0.5	Synthetic Organics COMMENT
1267	-36-3 1-16-5 1-16-5	RESUL ND ND		PQL 0.2 0.1	MDL 0.1^ 0.1^	0.5	Synthetic Organics COMMENT
1109		RESUL ND ND		POL 0.2 0.1	MDL 0.17 0.17	0.5 MCL	Synthetic Organics COMMENT
1267	4-28-3 1-16-5 2-29-6 2-29-1 2-69-1	RESUL ND ND		POL 0.1 0.1 0.1 0.1	MDL 0.17 0.17 0.17	0.5 MCL	Synthetic Organics COMMENT
	4-28-2 1-16-5 1-21-9 1-21-9 1-229-6 2-229-6 2-229-6 2-229-6 2-229-6 2-229-6 2-229-6 2-229-6 2-229-6 2-229-6 2-229-6	RESUL ND ND		POL 0.1 0.1 0.1 0.1 0.1	MDL 0.1 0.1 0.1	9.5 MCL	Synthetic Organics COMMENT

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An amount of "ND" indicates that the compound vess on telesce above the Lab's Method Detection Limit - MOL. MCL-Matheman Contentions Livel, mailmain periodade (rev) of a condentrativity wear equiption by EPA, XPDWR. State Advidery Level (SAL) for theroguisted compounds. A Stamk MCL of SAL value indicates a level is not currently availabled. PCL - Practical Countertation Limit is the concentration of the sumstand analyzed during the indicate and the content and the compound concentration is provider that MCL - Mathematical Countertation Limit is the concentration of the sumstand and reported and reported with the indity minimum concentration is compound can be investigated and the ported with the compound concentration is provider that MCL - Mathematical Countert is the lab's minimum concentration is compound can be investigated and reported with the SM to advidence that the compound concentration is provide the labor that

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Kuo Testi ng Labs, li Ē

Web Site: <u>http://www.kuotesting.com</u> e-mail: (509) 488-0112 Phone: (509) 488-0118 Fax: (800) 328-0112 Toll Free 337 South 1st Avenue, Othello, WA 99344 kuotest@atnet.net

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1 (1) 1 (1) 1 (1)

DATE RECEIVED

85492 HW-2 85492 HW-2	A THE NO CASES AND A THE A	Groundwater Solutions 55 SW Yamhill St., Suite 400 Portland OR 97202 Project Name Hall Wentland- SAR	SYSTEM - OUS FOMER
Nitrate as Nitrogen Nitrite as Nitrogen Total Dissolved Solids Hardness Chloride Orthophosphate as P COD SOC/Synthetic Organic Compounds Fecal E-Coli		t, Suite 400 OR 97202	DATE COLLECTED 10/31/2006
0.74 ND 114 62.9 1.90 0.20 ND Attached Report 0		Ground V 55 SW Y Portland Attn: Ke	SEND RE
0.21 0.0023 21.1 0.11 0.297 0.0433 8		Ground Water Solutions 55 SW Yamhill St., Suite 400 Portland OR 97 Attn: Kevin Lindsey	SEND REPORT AL 1
mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L		Solutions St., Suite OR ndsey	11/1/2006
mg/L Hatch mg/L Hatch mg/L Hatch mg/L Hatch mg/L Hatch mg/L Hatch mg/L Hatch mg/L Hatch mg/L Edge Analytical MPN/100ml Cascade Analytical		400 97202	DATE REPORTED 12/8/2006

<(0.001): indicates the analyte was not detected at or above the concentration indicated. ND: None Detected mg/L:Indicates milligrams per litre * PQL=Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions MDL: Method Detection Limit MDL: Method Detection Limit Please check out our new Web Site at http://www.kuatesting.com

"Sample passed hold time for Nitrate/Nitrite as Nitrogen

Dr. Eugene Kuo, Quality Assurance Manager the

Date

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Kuo Testing Labs, Inc. Groundwater Sampling Field Data Sheet

		10 2911
PROJECT NAME: Hall-Wentland SAR Project No.:		WELL NO: HW - 2
FIELD SAMPLER: Laura Hofbauer		DATE: 10/31/06
FIELD ANALYST: Laura Hofbauer		
SAMPLING METHOD: Battery Operated Whale Water Mini Purge Pump	rge Pump	
FIELD INSTRUMENTS USED: Orion pH Meter model 210A		CONDITION of WELL:
Hach Conductivity Meter		
Solinst Water Level Meter Model 101		satisfactory
HF Scientific ORT-15 CE Turbidi Meter	~	

Water Level Data		Well Construction Data		Well Purging Data	
1) Total Well Depth (feet) $l_{+}^{+}q$	$\frac{\partial}{\partial}$	$4q. q_{\mathcal{D}}$ Outside Casing Diameter D_2 (in.)	2"	Calculate Casing Volume	
2) Initial Depth to Water WT** (feet) $\Im_i^{(1)}$	20	$\mathcal{A}[\mathcal{AO}]$ Bore Hole Diameter \mathcal{D}_3 (in.)	6"	$L_1 \frac{\partial S_1 \gamma}{\partial S_1} *0.16 = \frac{4}{5} \frac{54}{5} CV$ in Gallons	
3) Final Depth To Water	21.28	Filter Pack Length L_2 (feet)	12	$\frac{CV}{H} \frac{4}{59} \frac{59}{12} = \frac{3}{2} \frac{30}{50} BV$ in Gallons	
		Porosity of Filter Pack N (%)	25	Total Purge Volume (gals) CV*(3)= TPV(gals)	13,73
				Actual Volume Purged (gals)	15
4) Length of Water in Column L ₁ Value on Line1 – Value on Line 2	<u>لَّہُ</u>			Number of Bore Volumes Purged	6

* *

The surveyed point on the inside (usually PVC) casing The depth to the water table before removing any water from the well

			M RLL	WELL FURGING MEASUREMENTS	ILASURE	MENIS	
Time	Cumulative	pН	Temperature	Conductivity	Turbidity	Purge	Comments
	Purged			2mS		GPM	
	-			20mS			- ST
11:27			began	purge			
11:29	3	6.16	15.5	0160	58,3		
11.32	6	6.24	15.6	0157	19.3		
11:33	9	6.26	15.6	0157	9.52		
//:35	12	6.27	15,4	0157	4.69		
11:37	15	6.24	15.1	0157	ي. مي		
			End purge	Collected	sample		
			Colle	Collepted Suplicate somethis	plicate	and B	des
						6	

Terms by Sina Check

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An arrownt of "NC" indicate NaCL- Maximum Comtember NaCL- Practiced Quantization PQL - Practiced Quantization NCCL - Massim Descaton Lur J - Estimated value.	42-5	CAS	Client Name:	The La
the the compound was no the the compound was no K Lovel, maximum permana A Lovel, maximum permana I to the concentration of the the concentration on the the concentration	PARAQUAT	Field ID: Sample Description: Sample Date: Source Type: Sampler Phone:	KUO Testing La 337 S 1st Othello, WA 99	ab you can irusif
(Aktorial shows line Lab's Mellino) Detection Line: - MDL bin lavel of a condominant in water established by EPA, NPO/MR. State Advisory Level (SAL) for Unerguialed compo of currently established. (The standard analyzed during the follow culturation.)		85492 85492 10/31/2006	abs Inc 1344 1344 1344 1344	
Jakatisa (jmi) - ADA Jakatisa (jmi) - ADA saluka baj yep A, NPO/MR, j hitala calamilan.		RESULTS		Burlington WA 1620 S. Walnut St - 98233 converse difference (800.755.9295 • 360.757.1400 • Bellingham WA 805 Orbiand Dr. Suite 4 - 98225 Mercubalogy 360.671.06688 • 360.671.1577/ax
nfrdance the the compound ce		Units		1620 S. Walnut SI - 98233 800.755.9295 • 360.757.14021ai 805 Orchard Dr. Suite 4 - 98225 380.571.0658 • 360.671.1577/ax
Unity ulai od cartipounda. Interination is gradder linah zero.		Report Date: Date Analyzed: Extraction Date: Analysti Analytical Method: MDL MCL	Reference Number. Lab Number.	<u>360.757.14024a.</u>
		keport Date: 12/8/2006 action Date: 549_061106 Analyst: HY Supervisor: L./ W.J. cal Method: 549.2 MCL COMMENT		Page 1 of

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FORM: SOC_GEN

ND ug/L 1.0 1.0 ND ug/L 1.0 0.88 ND ug/L 1.0 0.53 ND ug/L 1.0 0.72
ացրե 1.0 ացրե 1.0 ացրե 1.0 ացրե 1.0 ացրե 1.0
ացու 1.0 ացու 1.0 ացու 1.0 ացու 1.0 1.0
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սց/ւ 1.0 սց/ւ 1.0 սց/ւ 1.0
чеу/L 1.0 чеу/L 1.0
ug/L 1.0
0.1 Jillin

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An securit of "ND" indicates that the compound was not debaced above the Leb's Mething Detection Linit - MOL MCL- Nethiman Cardanisers Loval, maximum permissible loval of a caravanaw le water catabilished by EPA, NPDWR. State Advisory Level (SAL) for Unerguidade compounds. A blank MCL of SAL value indicate a lovel is not carantly astabilished. POL- Practical Cuertitivon Linit is the concentration of the caravanaw lawing the Initial calibration. MCL - Method Detection Line is the left's minimum concentration is compound can be measured and reported with 00% confidence that the compound concentration is grader then MCL - Method Detection Line is the left's minimum concentration is compound can be measured and reported with 00% confidence that the compound concentration is grader than MCL - Method Detection Line is the left's minimum concentration is compound can be measured and reported with 00% confidence that the compound concentration is grader than J - Existing left value.

untion is greater then zero.

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5902-51-2	314-40-9		1918-16-7	21087-64-9	51218-45-2	60-57-1	23184-66-9	309-00-2		87-86-5	122-34-9	77-47-4	118-74-1	1024-57-3	76-44-8	117-81-7	103-23-1	57-74-8	50-32-8	1912-24-9	1 59 72-60-8	72-43-5	58-89-9	72-20-8	CAS		Client Name:	÷.	The	-
5902-51-2 TERBACIL	BROMACIL	State Unregulated - Other	PROPACHLOR	9 METRIBUZIN	2 METOLACHLOR	DIELDRIN	BUTACHLOR	ALDRIN	EPA Unregulated	PENTACHLOROPHENOL	SIMAZINE	HEXACHLOROCYCLO-PENTADIENE	HEXACHLOROBENZENE	HEPTACHLOR EPOXIDE	HEPTACHLOR	DI(ETHYLHEXYL)PHTHALATE	DI(ETHYLHEXYL)-ADIPATE	CHLORDANE, TECHNICAL	BENZO(A)PYRENE			METHOXYCHLOR	LINDANE (BHC - GAMMA)	EPA Regulated	COMPOUND	ojecti Id ID: ption: d By: Date: Type: Type:	re: KUO Testing Labs Inc 337 S 1st Othello, WA 99344	SYNTHETIC OI	lab you can itusii	
ND	ND		N	ND	ND	ND	ND	ND		СN	ND	ON	ND	ND	ND	NO	ND	ND	ND	ND	ŇD	NO	NO	NO	RESULTS	92,85493,		ORGANIC CO	Burlington WA 1620 S Walnut SI - 98233 Coponto Office 800,755,9295 • 360,757,1400 • 38 Bellingham WA 905 Gurdand Dr Sulie 4 - 98225 Ascresses 350,671,0568 • 360,671,1577 fax	
ų	црл		υg/L	ng/L	5 -	ų,	ug/L	_/Bn		ng/L	ug/L	μgγ	Ъ,	μġ	ş	ιų.	<u>ل</u> ور ال	ų V	иg/L	ug/L	nĝ/L	ug/L	Ъ Г	uq/L	Units			MPC	.9295 • 36 19295 • 36 19688 • 36	
0.1	0.1		0.1	0.1	0.1	0.1	0,1	0.1		0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	POL			COMPOUNDS	98233 <u>0.757 1400</u> 1a 4 - 98225 0.671.15771	
0.043	0.031		0.031	0.030	0.024	0.031	0.024	0.022		0.08	0.030	0.024	0.025	0.02	0.022	0.063	0.022	0.3	0.012	0.030	0.044	0.015	0.028	0.030	MDL	Anal E D	Refer	S) S(3 1400 • 360.757,1402(ax 9872257 15771fax	·
										_	4	50		0,2	0.4	Ø	400	2	0.2	ω	N	43	0.2	2	MCL		Reference Number	OC) RE	1021ax	
										screening only / compliance by 515.1															COMMENT	0-	· 06-14429	(SOC) REPORT	Page 1 of 2	

FORM: SOC_GEN



Reference Number: 06-14429 Page 2 of 2 Lab Number: 04630516 Report Date: 12/8/2006

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SYNTHETIC ORGANIC COMPOUNDS (SOC) REPORT

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CAS	COMPOUND	RESULTS	Units	POL	MD	MCL	COMMENT
333-41-5		ND	ş	0.1	0.035		Unstable in Acidified Sample Maintx
759-94-4		ND	Ę.	0.1	0.028		
72-54-8	4,4-000	ND	ųj/	0.1	0.024		
72-55-9	4,4-DOE	N	Ę	0.1	0.024		
50-29-3	4,4-DOT · ·	ND	рgл	0.1	0.022		
21725-46-2	CYANAZINE	ND	цр.	0.1	0.13		Qualitative Analysis Only
121-75-5	MALATHION	S	νg/t	0.1	0.015		
56-38-2	PARATHION	ND	nër	0.1	0.022		
1582-09-8	TRIFLURALIN	ND	лð	0.1	0.024		
	- PAHs						
91-20-3	NAPTHALENE	ND	лðуг	0.1	0.1^		
86-73-7	FLUORENE	ND	ug/L	0.1	0.026		
208-96-8	ACENAPHTHYLENE	Ŋ	ug/L	0.1	0.025		
83-32-9	ACENAPHTHENE	ND	ug/L	0.1	0.1^		
120-12-7	ANTHRACENE	ND	μgγt	0.1	0.012		
56-55-3	BENZ(A)ANTHRACENE	ND	ug/L	0.1	0.012		
205-99-2	BENZO(B)FLUORANTHENE	ND	ug/L	0.1	0.025		
191-24-2	BENZO(G.H.I)PERYLENE	ND	цgл	0.1	0.025		
207-08-9	BENZO(K)FLUORANTHENE	ND	ug/L	0.1	0.022		
218-01-9	CHRYSENE	ND	ug/L	0.1	0.022		
53-70-3	DIBENZO(A,H)ANTHRACENE	ND	ng/L	0.1	0.024		
206-44-0	FLUORANTHENE	ND	ug/L	0.1	0.1^		
193-39-5	INDENC(1,2,3-CD)PYRENE	ND	ug/L	0.1	0.040		
85-01-8	PHENANTHRENE	ND	ug/L	0.1	0.015		
129-00-0	PYRENE	N	ug/L	0.1	0.022		
·	- Phthalates						
85-68-7	BENZYL BUTYL PHTHALATE	B	ug/L	0.1	0.022		
84-74-2	DI-N-BUTYL PHTHALATE	1.180	ΰŷĹ	0.1	0.085		Fleid dup - 0.9 ug/L
84-66-2	DIETHYL PHTHALATE	B	ug/L	0.1	0.044		
131-11-3	DIMETHYL PHTHALATE	ND	ug/L	0.1	0.015		
	Other Compounds						
51235-04-2							

And of "HD" Indicates 104 5 104 Labris Method Derivation Linni - MOL. NABRI hi waler salabilished by EPA, NPDWR, Stale Advisory Lavel (SvL) ha Unregulated compativals.

5 A blank MCL or SAL value indicates a Jevel is net я́. Э

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PCL - Practical Dwentfailbe Unit is the c MOL - Method Detection Linui is the labs J - Entimated value. 5 Ē 쿻 ring the Indial culturation.

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Image: Note of the second of the se
VATER VATER VATER VATER VATER VATER Varea Report Date: 06-14429 Report Date: 06-14429 Report Date: 12/8/2006 Date Analyzed: 11/20/200 Extraction Date: 515_0611 Supervisor Supervisor VIL MCL COMMEN 02 50 044 067 089 0089 104
VATER VATER Reference Number: 0463051 Report Date: 12/8/2006 Date Analyzed: 11/20/200 Extraction Date: 515_0611 Analytical Method: 515_0611 Analytical Method: 515_0611 Analytical Method: 515_0611 0.02 50 0.04 1 0.045 0.089 0.045 0.089 0.089 0.044
1757.1402lax In VATER VATER Reference Number: 06-14429 Report Date: 12/8/2006 Date Analyzed: 11/20/2006 Extraction Date: 515_0611 Analytical Method: 515_0611 .02 50 .044 1 .045 200 .045 500 .045 500 .045 500 .044 1 .045 500 .044 1 .045 500 .044 1 .045 500 .044 1 .044 1 .044 1 .044 1 .044 1 .044 1 .044 1 .044 1 .044 1
1757.1402ax 1 VATER 06-14429 Report Date 12/8/2006 Date Analyzed: 11/20/200 Extraction Date: 515_0611 Analystical Method: 515_1 Analystical Method: 515_1 Analystical Method: 515_1 Analystical Method: 500 .045 200 .045 200 .045 200 .045 208 .045 208 .044 1 .045 208 .044 1 .045 204 .044 1 .044 1 .044 1 .044 1 .044
mber: 0463051 Date: 12/8/2006 Date: 515_0611 Pate: 515_0611 Chloropher Comment

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PCL - Practical Quentitation Limit is the capeonization of the Nandard analyzed during the initial cultivation. NDL - Method Defection Limit is the 1973 minimum concentration a compound can be measured and reported J - Entimated value.

		Client Name:					CAS		1336-36-3	11104-28-2	11141-16-5	53469-21-8	12672-29-6	11097-69-1	11096-82-5	12674-11-2	8001-35-2
The lab you can trust!		e: KUO Testing Labs Inc 337 S 1st	Project: 85491,85492,85493,85494 Field ID: 85492	Sample Description: 85492 Sampled By:	Sample Date: 10/31/2006	Sampler Phone:	COMPOUND	PCBs/Toxaphene	PCBS (Total Anoclars)	AROCLOR 1221	AROCLOR 1232	AROCLOR 1242	AROCLOR 1248	AROCLOR 1254	AROCLOR 1260	AROCLOR 1016	TOXAPHENE
	DATA REPORT		85493,85494				RESULTS		ND	ND	ND	ND	ND	ND	ND	ND	ND
 . [.]	REPO						Units		цgu	υĝ/L	ŊД	nĝr	ug/L	ng/L	ngr	սցվե	υgΛ
	DRT						POL		0.2	0.1	0.1	0.1	0.1	0.1	0,1	0.1	-
		Refere	•	קראינייט		Analy	MDL			0.1^	0.1^	0.1^	0.1^	0.1^	0.08	0.1	0.5
		Reference Number.	Lab Number: Report Date:	Date Analyzed: Extraction Date:	Analysi	Analytical Method:	MCL		0.5								ப
Page 1 of 1	•	r. 06-14429	n 04630516 n 12/8/2006	± 11/14/2006 ± 508 061113		ylical Method: 508.1 Synthetic Organics	COMMENT										

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An amount of "NO" Indicates that the company was not detected score the Lab's Method Detection Limit - MDL. MCL - Madrixent Constribution Level, and an international communication in water esticitatived by EPA, NPDVRR. State Aprildory Level (SAL) for Unregulated compounds. A blank MCL of SAL value (indicate a level in or controlling established. PDL - Produce) Questionion Limit is the lab's material analyzed during the instant cabbration. MCL - Method Detection Limit is the lab's material concentration analyzed during the instant. MCL - Method Detection Limit is the lab's material concentration accompany concentration is graviter lines zero. J - Entimated value.

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The lab you 337 s	b you can trust! INORO 337 S 1st	And Andrewsky and Antic St 98233 Bellingham WA 805 Orchard Dr Suite 4 - 98235 Microwsky 1 - 1000 State 4 - 98225 INORGANIC COMPOUNDS (IOC) REPORT Abs Inc Reference Numbe	Burlington WA 1620 S Walnut St. 98233 converte core: 800.755.9295 • 360.757.1400 • 360.757.14021ex Bellingham WA 805 Orthard Dr Suite 1 - 98225 Microsolegy 360.671.0688 • 360.671.15771ex Microsolegy 360.671.0688 • 360.671.15771ex Microsolegy REPO	II400 + 360.757.14021ax 99225 15771ax IOC) REPORT Reference Number	r. 06-14		
	KUO Testing Labs Inc 337 S 1st Othello, WA 99344			Reference N		۵	
Sampi	Project: 85491,85492,85493,85494 Field ID; 85492 Sample Description: 85492 ` Sample Date: 10/31/2006 Source Type:	492,85493,85494)6		Lab Number Report Data Date Received Sampler Phone Supervisor	Lab Number: 04630516 Report Data: 11/17/2006 ate Received: 11/2/2006 mpter Phone: Supervisor)06 16	
CAS ANALYTES		RESULTS UNITS	pol Mdr	MCL Analyst METHO		COMMENT	
15541-45-4 BROMATE		ND mg/L	0.005 0.0016	0.010 mvp 3	300.1		
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FORM: KIC_GEN

Kuo Testing Labs, Inc. 337 South 1st Avenue, Othello, WA 99344

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... ... Web Site: <u>http://www.kuotesting.com</u> e-mail: (509) 488-0112 Phone (509) 488-0118 Fax (800) 328-0112 Toll Free kuotest@atnet.net

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OATE RECEIVED

HW-3 SOC/Synthetic Organic Compounds Attached Report mg/L 1 HW-3 Fecal E-Coli 0 MPN/100mL 0	HW-3 COD ND 8 mg/L	85493 HW-3 Chloride as P 0.09 0.0433 mg/L Hatch	HW-3 Hardness 59.4 0.11 mg/L	HW-3 Total Dissolved Solids 98.0 21.1 mg/L	HW-3 Nitrite as Nitrogen ND 0.002.3 mg/L	HW-3 Nitrate as Nitrogen 0.76 0.21 mg/L	Project Name:Hall Wentland SAR Attn: Kevin Lindsey	Groundwater SolutionsGround Water Solutions55 SW Yamhill St., Suite 40055 SW Yamhill St., Suite 400PortlandOR97202PortlandOR97202	SYSTEMS CUSTOMER	
 Edge Analyticai Cascade Analytical	Hatch	latch	Hatch	fatch	latch	fatch		97202	0002/8/21	DATE REPORTED

<(0.001): indicates the analyte was not detected at or above the concentration indicated. ND: None Detected

mg/L: Indicates milligrams per litre

PQL=Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions

MDL: Method Detection Limit Please check out our new Web Site at <u>http://www.kuolesting.com</u>

**Sample passed hold time for Nürate/Nitrite as Nitrogen

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Dr. Eugene Kuo, Quality Assurance Manager

Date

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Kuo Testing Labs, Inc. Groundwater Sampling Field Data Sheet

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		Page	of
PROJECT NAME: Hall-Wentland SAR Project	No.:	WELL NO: HW - 3	
FIELD SAMPLER: Laura Hofbauer		DATE: 10/31/06	
FIELD ANALYST: Laura Hofbauer			1
SAMPLING METHOD: Battery Operated Whale Water Mini Purge Pump	i Purge Pump		
FIELD INSTRUMENTS USED: Orion pH Meter model 210A		CONDITION of WELL:	
Hach Conductivity Meter			
Solinst Water Level Meter Model 101	01	satisfactory	
HF Scientific ORT-15 CE Turbidi Meter	Meter		

		$\left \right $			
Ø	- Common y an Ban			L LOY	Value on Line1 – Value on Line 2
`	Number of Bore Volumes Purzed			2,011	4) Length of Water in Column
L J	Purged (gals)				
71	Actual Volume				
19.1	CV*(3)= TPV(gals)		N (%)		
5 0	Total Purge Volume (gals)	25	Porosity of Filter Pack		
	in Gallons		L_2 (feet)	do,co	
	$CV \frac{4}{3} \frac{3}{1} \frac{1}{2} = \frac{2}{3} \frac{1}{6} BV$	12	Filter Pack Length		3) Final Depth To Water
	in Gallons		D ₃ (in.)	x3,10	WT** (feet)
	$L_1 \frac{26.7}{4} \frac{4}{0.16} = \frac{4.3}{100} CV$	6"	Bore Hole Diameter	<u>,</u>	2) Initial Depth to Water
			\mathbf{D}_2 (in.)	50.12	
	Calculate Casing Volume	2"	Outside Casing Diameter		1) Total Well Depth (feet)
	Well Purging Data		Well Construction Data		Water Level Data

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The surveyed point on the inside (usually PVC) casing The depth to the water table before removing any water from the well

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			WELL	WELL FURGING MEASUREMENTS	ILAS OKEI	VIEINIS	
Time	Cumulative	рH	Temperature	Conductivity	Turbidity	Purge	Comments
	Gallons		റ്		NTU	Rate	
	Purged			2mS		GPM	. 1
				20mS			
12:17			began	purge			
12:19	З	6.02	12.7	0143	1.83		
00:10/	6	6.64	12.7	50143	1.79		
12:22	6	670		0143	3.06		
12.24	12	6. Ja	12.7	6410	3.36		
12,26	15	6.76	12.7	0143	3.17		
			End purge	Collected	sample		
							5

Tims by Some Chest

A REPORT Social of State 4:300-577-1402:a: 330-577-1402:a: 340-277-120:a: 340-277-120:	An annount of "ND" indicates that the compound was not detected above the Lab's Noticet Detection Link - ND. MCL-Matshaw Contentionent Lovel, maximum permissible wird of a contentional in wellor exilabilitied by EPA, A biank MCL or SCL value indicates a level is not carronity established. PCL - Product Countribution Link is the concentration of the standard everycet twenty the initial calibolities MDL - Method Detection Link is the technication of the standard everycet twenty the initial calibolities. MDL - Method Detection Link is the technication or concentration a compound can be measured and reported with		1910-42-5 РАПАСШАТ	CAS COMPOUND	Project: 85491,8549 Field ID: 85493 Sample Description: 85493 Sampled By: Sampled By: Sample Date: 10/31/2006 Source Type: Sampler Phone:	Clent Name: KUO Testing Labs Inc 337 S 1st Othello, WA 99344		The lab you can inusit
Number: 06-14429 ort Date: 12/8/200 on Date: 549_061 Analyst: HY Pervisor: 549_061 Paraquat Paraquat Paraquat	igoryky. Sine		идуг	Units	85491,85492,85493,85494 85493 85493 10/31/2006		DATA REPORT	Burilington WA 1620 S Wainuk SI - 98233 corporate 086.0 Bellingtram WA 805 Occhard Dr Suite 4 - 962 Microbiology 360.67 1.0688 • 360.67 1.157
	agudited compounds. Markon & greater than zero.		1.0	MDL MCL		Reference Number: 06-14429		Page 1 of

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FORM: SOC_GEN

20	11		63	11	16	16	16	16		15	23		CAS										
2032-65-7	114-26-1		63-25-2	116-06-3	16655-82-8	16752-77-5	1646-88-4	1646-87-3		1563-66-2	23135-22-0		5							Client Name:			The
METHIOCARB	PROPOXUR (BAYGON)	State Unregulated - Other	CARBARYL	ALDICARB	3-HYDROXYCARBOFURAN	METHOMYL	ALDICARE SULFONE	ALDICARE SULFOXIDE	EPA Unregulated	CARBOFURAN	OXYMAL	EPA Regulated	COMPOUND	Source Type: Sampler Phone:	Sample/Date: 10/31/2006	Sampled By:			Othelio, WA 99344	KUO Testing Labs Inc 337 S 1st	CARE		The lab you can trust!
ND	ND		N	N	UD	ND	UD	ND		ND	ND		RESULTS		0			85491,85492,85493,85494			CARBAMATES IN DRINKING WATER		Burlington WA 1620 S Wabut St - 98233 cuprent disc 680.755.9295 • 360.757.1402 • 360.757.14024i Bellingham WA 685 Orchard Dr Sulie 4 - 98225 Aerosubery 360.671.0668 • 360.671.1577 tax
ug/L	ug/L		ųg/i	ugʻi L	μg/Γ	Ug/L	ug/L	ug/L		ug/L	ug/L		Units					÷					1620 S Walvut SJ - 98223 880.755.9295 + 360.757.1400 + 805 Occhard Dr Suile 4 - 98225 360.671.0668 + 360.671.15771a
1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0		PQL								IKIN		98233 9 4 - 98225 1.671.15776
0.76	0.72		0.53	0.88	1.0	0.86	0.83	0.71		0.87	0.81		MDL	Analy		μ				Refere	ی MV- ک		• 360.787 1402rax
										40	200		MCL	Supervisor, Analytical Method:	Analyst:	Extraction Date:	Report Date: ate Analyzed:	Lab Number:		Reference Number: 06-14429]	
													COMMENT	cal Method: 531.2 Carbamates	TM,	531_061114	12/8/2006	04630517		06-14429		·	Page 1

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Page 1 of 1

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NC š ound of "NO" indicates that the ca send was not detected above like Latib Scienced Detection Limit - MDL. rum permixable lowel of a contaminant in weter astastished by EPA, NPDWR. State Attributy Level (BAL) for Unerguinted composites.

12- Mazimum Centerithium Lavel, maximum permissible k A bitanii: MCL, or BAL, valus indicates a tevel is not cu

ranity salabiluhed.

POL-P POL - Practical Quantitation Limit is the com MOL - Method Patersion Limit is the labor ni J - Estimated value. indice of the standard analyzed daring the initial calibration. Here concentration a compound call be measured and reported with 199% comfidence

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h is grouter than zero.

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	314-40-9 BROMACIL		1918-16-7 PROPACHLOR	21087-64-9 METRIBUZIN	51218-45-2 METOLACHLOR	60-57-1 DIELDRIN	23184-66-9 BUTACHLOR	309-00-2 ALDRIN	EPA Unregulated		122-34-9 SIMAZINE	_1	ω	76-44-8 HEPTACHLOR	117-81-7 DI(ETHYLHEXYL)-PHTHALATE	- - -			1912-24-9 ATRAZINE				EPA Regulated	CAS COMPOUND	The lab sam
		ated - Other							ited	HENOL	HEXACHLOROCYCLO-PENTADIENE SIMAZINE	NZENE	OXIDE		PHTHALATE	ADIPATE		m			BAMMA)		ä		AT abs Inc 9344 85491,85492 85493 85493 10/31/2006
Ŋ	ND		ND	N	Ŋ	ND	N	ß		ND		ß	ND	ND	ω	GN	5	8	s e	5 8	8	ND	į	RESULTS	Bellingham WA (905 Octhard Or Sulle 4 - 99225 GANIC COMPOUNDS (SOC) Reference N ,85493,85494 Lab N Reference N Date An Extraction A Supe
ug/L	ng/L		пðу	n9/L	ngr	ug/L	ng/	ug/L		μ Σ	5 5	nāur	ngy	ug/i_	ug/L	ų ۳	ug/L ·		in lie	j j	ng/L	ug/L		Unita	MPC
0.1	0,1		0.1	0.1	0.1	0.1	0.1	0.1		0.4	0 0	0.1	0,1	0.1	0.1	0.1	9	<u> </u>	2 2	0. 	0.1	0.1		PQL	
0.043	0.031		0.031	0.030	0.024	0.031	0.024	0.022		0.08	0.024	0.025	0.02	0.022	0.063	0.022	0.3	0.012	0.030	0.015	0.028	0.030		MDL	Referen F Dat
											4 50	-	0.2	0.4	ð	400	2 1	0,2	S N	3 43	0.2	N		MCL	(SOC) RE Reference Number Report Date: Date Analyzed: Extraction Date: Analyst Supervisor Analytical Method:
										screening only / compliance by 515.1														COMMENT	



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List Number: 04630517 Report Date: 12/8/2006 Reference Number: 06-14429 Page 2 of 2

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SYNTHETIC ORGANIC COMPOUNDS (SOC) REPORT

CAS 333-41-5 759-94-4	COMPOUND DIAZINON EPTC	RESULTS ND		ug vg Units	Units PQL ug/L 0.1 ug/L 0.1	ភ	1s PQL 0.1
72-54-8	4,4-DOD	ND	Æ	ng/L		0.1	0.1
72-55-9	4,4-DDE	ND	,e	Ϊġ	g∧∟ 0.1		0,1
50-29-3	4,4-DDT	ND	٨ĝ	7	И. 0.1		0,1
21725-46-2	CYANAZINE	ND	ца Г	٦	VL 0.1		0,1
121-75-5	MALATHION	ND	ŋðŋ	2	۲ 0.1		0.1
56-38-2	PARATHION	ND	uĝ∕r		0.1		0.1
1582-09-8	TRIFLURALIN	ND	ľ	-	L 0.1		0.1
	- PAHs						
91-20-3	NAPTHALENE	ND	ug/L	1	0.1		0.1
86-73-7	FLUORENE	ND	ug/L	Г	0.1		0.1
208-96-8	ACENAPHTHYLENE	ND	nð/r	r-1	L 0.1		0.1
83-32-9	ACENAPHTHENE	U.	hð/L	-	L 0.1		0.1
120-12-7	ANTHRACENE	ND	∩ĝ/L	-		0.1	0.1
205-9 8- 2	BENZO(B)FLUORANTHENE	ND ND		F ' F	, r 0, c		0,1
191-24-2	BENZO(G,H,I)PERYLENE	ND	-Vēn	I.	0.1	-	0.1
207-08-9	BENZQ(K)FLUORANTHENE	QN	,7gn	-	0.1		0.1
218-01-9	CHRYSENE	QN	1,vên	ſ	0.1		0.1
53-70-3	DIBENZO(A,H)ANTHRACENE	ND	ug/L	•	0.1		0.1
206-44-0	FLUORANTHENE	ND	1) Gu		0.1	•	0.1
193-39-5	INDENO(1,2,3-CD)PYRENE	ND	ug/Ľ	,	0.1		0.1
85-01-8	PHENANTHRENE	ND	-i/Bη		0.1		0.1
129-00-0	PYRENE	ND	ng/L	-	L 0,1		0.1
	- Phthalates						
85-68-7	BENZYL BUTYL PHTHALATE	ND	ug/L		/∟ 0.1		0.1
84-74-2	OHN-BUTYL PHTHALATE	0.9	ų gi	7	۸L 0.1		0,1
84-66-2	DIETHYL PHTHALATE	ND	J\Qu	7 7	л. 0.1	0.1	0.1
131-11-3	DIMETHYL PHTHALATE	S	ngu	4 4 4		∧ 0.1 0.015	0.1
51235-04-2 HEXAZINONE		ND		ר ה ה			un/L 0.1 0.1^

An ensent of VPC indexist then the compound was not detected income the Lab's Wathod Detection Luna - MDL. A chark MDC or SAL wake indicates a previation or currently stabilized and interview of the SAL VPC-WR. Shale Advisory Level (SAL) for Unrepuisied compo A black MDC or SAL wake indicates a breviation of the standard analyzed during the initial solaration. POL - Practice Completion Limit is the initial module of the standard analyzed during the initial solaration. MDL - Method Detection Limit is the initial module contexturbies a compound can be entraured and reported with VPM confidence that the compound concentration is greated A black MDC - Method Detection Limit is the initial module contexturbies a compound can be entraured and reported with VPM confidence that the compound concentration is greated. A DE Estimation value.

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51-36-5 3,5 - DICHLOROBENZOIC ACID	133-90-4 CHLORAMBEN	Ρ.		9 0		E-14-02-0 DUPA (AUD METABULTES)			1918-00-9 DICAMBA	Ξ	88-85-7 DINOSEB			84-75-7 2,4 - D	CAS COMPOUND	Sample Date: Source Type: Sampler Phone:	sanipie vescription. Sampied By:	Field ID:		Othelio, WA 99344	Clent Name: KUO Testing Labs.Inc 337 S 1st		ANALY IT	
	ND	ND	ND	dN	8				CN	N	N			ND	RESULTS	ate: 10/31/2006 pe: ne:	ын. оонуу Ву:			99344	g Labs Inc	HERBICIDES IN DRINKING WATER		Burlington WA 1620 S Wahut St - 99233 Corpute Office 800.755.9295 + 360.757.1400 + 360.757.14021ax Bellingham WA 805 Orchard Dr Suite 4 - 98225 Jacobiology 360.671.0688 + 360.671.15771ax
ug/L	J/Gn	ug/t	ug/L	ugiL	ng/L	נוסע עקר	ug/L	:	ng/L		טמַר ר	ug/L	սց/Լ	Jugu	S Units							I DRIN		0 S Wahut St - 1755.9295 • 36 Orchard Dr Sui 1671.0688 • 36
0.1	0.2	0.1	0.3	0.2	0.1	0 0 8 -	0.1	2	0.1	0.1	0.2	- 0. 	0.1	0.2	ב							KING		98233 0.757.1400 1112 4 - 98225 0.67 1.15771a
0.044	0.2	0.089	0,089	0.067	0.044	0.10	0.089		0.045	0.089	0.16	0.044	0.02	0.11	MDL	Analy		2	_		Refere	WAT		• <u>360,757,14</u> x
										500	7	2 →	50	70	MCL	Analyst, Th Supervisor:	Extraction Date:	Report Date:			nce Numbe	ĒŖ	•)2[ax
															COMMENT	0ϵ	a: 515_061113				Reference Number: 06-14429	• •	Page 1 of 1	

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alion is granter then zero.

POL - Practical Countitation Limit is the const MDL - Method Detection Limit is the lab's miss J - Eatimated value. 5 aboo al live sunndari avalyned dwing the trible collination. m conzentration a compositif can be measured and reported with 80% confidence live fire

, blank MCL of SAL value indicates a level is not curr Practical Quantization Limit is the concentration of the s	As amount of "RIP" indicates that the composed was not detected above the (Lab's Math MCL- Mauthaum Contentional Lavel, mathimum commissible levels of a contention in we		ADD1 35.2 TOVADULA		11097-69-1 AROCLOR 1254			11141-16-5 AROCLOR 1232		CAS COMPOUND	Sample Date: 10/31/2006 Source Type: Sampler Phone:		eroject: 85491,85492,85493,85494 Field ID: 85493 Sample Description: 85493	Othelin WA 99344	Client Name: KUO Testing Labs. Inc		ANALYTICAL The lab you can trustl		•
The lattice real frontions	od Obio Cion (Jmil - MOL) bio man bio had the FDA INDON'S Same Arthouse avail 1541 Vice Income	P	, N	ND	ND	ND	8	ND ND	N	RESULTS			85493,85494			DATA REPORT		Burlington WA 1620 S Walmut SI - 98233 Converte Office 800,755,9295 - 360,757,1400 • Bellingham WA 805 Orchard Dr Suile 4 - 98225 • Kentekkey 360,671,0688 • 360,671,1577(ar	
		QU.	Ξ.	ug/L	ugil	φ,	μų Li	ng l	ug/L	Units						REPO		Wainut SL 5.9295 = 34 Chard Dr Su 1.0688 = 38	
n read (not) is		-	0.1	0.1	0.1	0.1	5	2 1	0.2	PQL						ORT		98233 30.757,1400 14e 4 - 98222 14e 7 1.15771	
o nationale ain e		C,D	0	0.08	0.1^	0.1^		0.1 >		MDL	Anal	סיר	5		Refen			<u>> 360,757,1402(ar</u>	
anjaowa,		ن	,						0.5	MCL	Analyst: Supervisor: Analytical Method:	Extraction Date:	Lab Number: Report Date: Date Analyzed:		Reference Number.			4021ar	
	shashirada a									COMMENT	<i>n</i> .	: 508 061113			: 06-14429		Page 1 of 1		

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is greater than zero

AN' PILLS 3

A blank MCL or SAL value indicates a level le not currently satable hed. PCL - Practical Geentization Limit Is the concentration of the standard analyzed during the tablel calibration. MCL- Mother Detective Limit is the lab's mixtmum concentration a compound can be measured and reported with J - Calibrated value.

<u>NQTES:</u> SRL (Same Reporting Lendy): Indicates the minimum reporting level required by the Washington Department of Health (DCH). NCL (Nazional Lendy): maximum perminable level of a contaminant in water established by EPA; Federal Action Levels are QQ16 mpL for Lead and 1.2 mpL for Copper. Bodium has a recommanded limit of 20 mpL. A blank MCL value biddeles a level is and exercise stabilished. Trigger Level: DOH Orkering Water Response level. Systems with compounds detected in access of this levels are required to late additional samples. Contact your regional DOH office. ND (Not Detected): Indicates that the compound was not detected to access of this levels are required to late additional samples. Contact your regional DOH office.		CAS ANALYTES RESULTS UNITS POL MDL MCL ANalysi METHOD COMMENT 15541-45-4 BROMATE ND mg/L 0.005 0.0016 0.010 mvp 300.1	Client Name: KUO Testing La 337 S 1st Othello, WA 99 Project: Field ID: Sample Description: Sample Description: Sample Date: Source Type:	The lab you can inusti INORGANIC COMPOLINDS (IOC) REPORT
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ND (Hot Deviced or in the second of the compound was not deviced above the State Reporting Linet (SRL). NA (Hot Analyzed): indicates that this compound was not enalyzed. FORM: IOC_GEN

CLIENT : HALL - WENTLAND

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DATE: 10/03/06

KUO TESTING LABS, INC.

SOURCE	TIME Ol:45	7.33 7.33	GROUNDWATER SAMPLING FIELD DATA TIME Ph CONDUCTIVITY TEMP TURBIDITY 01:45 7.33 0.137 8.7 8.7 8.7,4 01:45 7.33 0.137 8.7 8.7,4 8.7,4 01:45 7.33 0.137 8.7 8.7,4 8.7,4 01:45 1.33 0.137 8.7 8.7,4	ING FIEL	
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Web Site: (509) 488-0112 Phone (509) 488-0118 Fax (800) 328-0112 Toll Free http://www.kuotesting.com e-mail: 337 South 1st Avenue, Othello, WA 99344 kuotest@atnet.net .

DATE RECEIVED

THE FERRIC DUSTORIER Groundwater Solutions 55 SW Yamhill St., Suite 400 Portland Project Name:Hall Wentland SAR 85494 85494 85494 85494 85494 85494 85494 HW-SW H₩-\$W HW-SW HW-SW HW-SW COCHARDS QR R COD Orthophosphate as P Hardness Chloride Nitrite as Nitrogen Nitrate as Nitrogen Total Dissolved Solids ANV YOR 97202 DATE COLLECTED 10/31/2006 ND 92.0 53.6 2.19 0.15 0.87 4 SEND REPORT TO Portland 55 SW Yamhill St., Suite 400 Ground Water Solutions Attn: Kevin Lindsey 0.0433 0.0023 21.1 0.11 0.297 0.21 œ 11/1/2006 mg/L mg/L mg∕L mg/L OR mg/L mg/L <u>1</u> Hatch Hatch Hatch Hatch Hatch Hatch Hatch 97202 DATE REPORTED 12/8/2006

85494

HW-SW HW-SW

85494

Fecal E-Coli

SOC/Synthetic Organic Compounds

Attached Report 5,000

MPN/100ml

Cascade Analytical

Edge Analytical

mg/L

<(0.001): indicates the analyte was not detected at or above the concentration indicated. ND: None Detected

mg/L:Indicates milligrams per litre
* PQL=Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions

MDL: Method Detection Limit Please check out our new Web Site at <u>http://www.kuotesting.com</u>

*Sample passed hold time for Nipate/Nivite as Nitrogen

Mrs

Dr. Eugene Kuo, Quality Assurance Manager

Date

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	CAS COMPOUND 1910-42-5 PARACUAT	t Name: KUO Testing La 337 S 1st Othello, WA 99 Project: Field ID: Sample Description: Sample Description: Sample Description: Sample Phone:	The lab you can fusti
ē	ND	DATA REPORT bs Inc 344 85491,85492,85493,85494 85494 85494 10/31/2006	Burlington WA 1620 S Walnut St - 98233 Corporate Office 800.755,9295 • 360.757,1400 • 360.757,1402fax Bellingham WA 805 Orchard Dr Suke 4 • 98225 Mercekkeyv 360.671.0688 • 350.671.1577fax
	un Units	REP() Watnut SI • 5.9295 • 36 chard Dr Su 1.0688 • 36
N	N POL		-98233 <u>30,757,1400</u> #e 4 - 98225 10,671,1577¢
ē		Analy Ex	• <u>360,757, 1</u> ax
	MCL	ference Number: Lab Number: Report Date: Date Analyzed: Extraction Date: Analyst: Supervisor; nalytical Method:	<u>102/fax</u>
	COMMENT	Reference Number: 06-14429 Lab Number: 04630518 Report Date: 12/8/2006 Date Analyzed: 11/15/2006 Editaction Date: 549_061106 Analyste HY Supervisor HY Supervisor 549_2 Paraquat	Page 1 of 1

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An amoust of "PC" indications that the compound was not detected above the Labox Marined Detection Lunk - MDL. MCL- Maximum Certametral Level, maximum permittable level of a contaminant is water extended to PCA, NPDIVRT. State Advisory Level (SML) for Unargulated compounds. A Blank MCL or SAL value indicatins a level is not currently established by EPA, NPDIVRT. State Advisory Level (SML) for Unargulated compounds. POL - Produced Overefunctions - Level is not extended and register and register and register balance that the compound concentration is greater than MDL. Method Detection Livel is the table materians and encompound can be measured and reported with 99% confidence that the compound concentration is greater than J. Estimated water.

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FORM: SOC_GEN

2032-65-7 METHIOCARE ND		State Unregulated - Other	63-25-2 CARBARYL ND	116-06-3 ALDICARB ND	16655-82-6 3-HYDROXYCARBOFURAN ND	18752-77-5 METHOMYL ND	1646-88-4 ALDICARB SULFONE ND	1646-87-3 ALDICAR6 SULFOXDE ND	EPA Unregulated	1563-66-2 CARBOFURAN ND	23135-22-0 OXYMAL ND	EPA Regulated	CAS COMPOUND RE		Sample Date: 10/31/2006	Sampled By:			Othelio, WA 99344	Client Name: KUO Testing Labs Inc 337 S 1st	CARBAMATES IN DRINKING WATER	The lab you can trust!	Burlington
								-		-	-		RESULTS					494			IS IN	сороля́а Облее <u>800.755.9295</u> • <u>360.757.1400</u> • <u>360.757.1402</u> ва Bellingham WA 805 Orchard Dr Sutie 4 - 98225 Авсоокнару 360.671.0668 • 360.671.1577 fax	WA 1620 S
Ъ	ug/L		μ Γ	5	l/g/	ug/L	ng/L	ug/L		Ē	цр.		Units								DRIN	.9295 • 360 hard Dr Sun .0688 • 360	Wahut Si - S
1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1	p								IKINO	1,757,1400 • e 4 - 98225 1,671,15771a)8233
0.76	0.72		0.53	0.88	1.0	0.86	0.83	0.71		0.87	0.81		MD	Analyt	50		'	_		Refere	S WA	<u>360.757.14</u> (
										4 0	200		MCL	Analyst Supervisor Analyticał Method:		Date Analyzed:	Report Date:	Lab Number.		Reference Number: 06-144	TER	02fax	
													COMMENT	S31.2 Carbamates		11/14/2006	12/8/2006	04630518		06-14429		Page 1 of 1	

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An amount of YEP Indivates that the compound was not delected above the Laip's Method Detection Lang - MD. MCL-Maximum Contember & Level, maximum permissible level of a contember of a contember of PCA. NPOWR. Brate Advisory Level (SAL) for Uprepublied compounds. A blank MCL of SAL value indicates a level is not currently existished. PCL- Practical Oversization Link is the concentration of the confidential control of the highlight culture for ACL Method Detection Link is the fails makimum concentration a compound can be measured and exponent with 90% confidence that the compound concentration is greater than zon. J. Estimated value.

An amount of "NC" indicat MCL- Maximum Contamin	5902-51-2	314-40-9		1918-16-7	21087-64-9	51218-45-2	60-57-1	23184-66-9	309-00-2	87-88-5	Ð	77-47-4	118-74-1	1024-57-3	76-44-8	117-81-7	103-23-1	57-74-8	50-32-8	1812-24-9	15972-60-8	72-43-5	58-89-9	72-20-8		CAS							Client Name:		The	
As amount of "AC" indicates that the compound was net defected above the Lat's Manhoat Deviction Lunk - MDL MCL- Machinem Contambered Level, maximum permessible level of a contamtnex in water established by EPA. I	TERBACIL	BROMACIL	State Unregulated - Other	PROPACHLOR	METRIBUZIN	METOLACHLOR	DIELDRIN	BUTACHLOR	ALDRIN	PENTACHLOROPHENOL	SIMAZINE	HEXACHLOROCYCLO-PENTADIENE	HEXACHLOROBENZENE	HEPTACHLOR EPOXIDE	HEPTACHLOR	DI(ETHYLHEXYL)+PHTHALATE	DI(ETHYLHEXYL)-ADIPATE	CHLORDANE, TECHNICAL	BENZO(A)PYRENE	ATRAZINE	ALACHLOR	METHOXYCHLOR	LINDANE (BHC - GAMMA)	ENDRIN	EPA Regulated	COMPOUND	Sampler Phone:	Sample Date: 10/31/2006		Field IJ: 85494 Sample Description: 85404		Othello, WA 99344	e: KUO Testing Labs Inc 337 S 1st	SYNTHETIC ORG	lab you can trusti	
Medion Linth - NOL Halabianed by EPA, NPOWR.	N	Ŋ		ND	ß	ND	N	ND	U	Ŋ	ND	ND	ND	CIN	ND	ND	ND	ND	ND	U	N	QN D	ND	N		RESULTS					493,85494			ORGANIC COMPOUNDS		Corporate Office 800,755,9295 = 360,757,1400 = 360,757,14026ax Bellingham WA 805 Orchard Dr Suite 4 - 98225 Acrossophy 360,671,0886 = 360,671,1577/ax
	ug/L	ug/L		лgл	ug/L	ug/L	чg/Г	ug/L	ug/L	ug/L	ng/L	uQ/L	Ę,	ĥ	υg/L	uĝ/L	υgΛ	ЪĜ	цр/L	ug/L	nôdi	лбу	l) D	ug/L		Units								OMPC		<u>55.9295 = 3</u> rchard Dr Su r1.0686 = 3
	0.1	0.1		0.1	0.1	0.1	0.1	0.1	0.1	0.4	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1		POL								JUNE		<u>30.757.1400</u> ite 4 - 98222 30.671.1577
	0.043	0.031		0,031	0.030	0.024	0.031	0.024	0.022	0.08	0.030	0.024	0.025	0.02	0.022	0.063	0.022	0.3	0.012	0.030	0.044	0.015	0.028	0.030		MOL	Analy			,			Refere	S) S(• 360.757.1 5 /ax
										-	4	8		0.2	0.4	đ	400	Ŋ	0,2	ن	N	40	0,2	N		MCL	Supervisor;(Analytical Method:	Analys	Date Analyzed: Extraction Date:	Report Date:	Lab Number:		ence Numb	(SOC) R		402tax
										screening only / compliance by 515.1																Synthetic Organics	L 1	st MM	ia: 11/13/2006 he: 525 081113		er: 04630518		Reference Number: 06-14429	REPORT	Page 1 of 2	

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FORM: SOC_GEN



Reference Number: 06-14429 Page 2 of 2 Lab Number: 04630518 Report Date: 12/8/2006

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SYNTHETIC ORGANIC COMPOUNDS (SOC) REPORT

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CAU			2	0			
333-41-5	DIAZMON	B	ug/L	0.1 F	0.035	Ĩ	Unstable in Acidified Sample Matrix
759-94-4	EPTC	N	ug/L	0.1	0.028		
72-54-8	4,4-DDD	ND	ug/t	0.1	0.024		
72-55-9	4,4-DDE	B	ug/L	2	0.024		
50-29-3	4,4-00T	ND	ug/L	0.1	0.022		
21725-46-2	CYANAZINE	N	ug/L	<u>.</u>	0.13		Qualizative Analysis Only
121-75-5	MALATHION	Ŋ	ng/L	0.1	0.015		
56-38-2	PARATHION	ND	ug/L	<u>.</u>	0.022		
1582-09-8	TRIFLURALIN	ß		0.1	0.024		
	- PAHs						
91-20-3	NAPTHALENE	N	ug/L	0.1	0.1*		
86-73-7	FLUORENE	N	ų,	0.1	0.026		
208-96-8	ACENAPHTHYLENE	N	ng/L	0.1	0,025		
83-32-9	ACENAPHTHENE	N	идл	2	0.1^		
120-12-7	ANTHRACENE	N	μġΛ	0.1	0.012		
56-55-3	BENZ(A)ANTHRAGENE	N	Б Р	0.1	0.012		
205-99-2	BENZO(B)FLUORANTHENE	ND	J/gu	<u>.</u>	0.025		
101-24-2	BENZO(G,H,I)PERYLENE	ND	ug/L	0.1	0.025		
207-08-9	BENZO(K)FLUORANTHENE	ND	цą/г	0.1	0.022		
218-01-9	CHRYSENE	N	цą/г	<u>0</u>	0.022		
53-70-3	DIBENZO(A,H)ANTHRACENE	ND	ц.	0,1	0.024		
206-44-0	FLUORANTHENE	NĐ	Ъ,	0.1	0,1^		
193-39-5	INDENO(1,2,3-CD)PYRENE	ND	J/Gn	0.1	0.040		
85-01-8	PHENANTHRENE	D	ug/L	0.1	0.015		
129-00-0	PYRENE	N	цў.	9.1	0.022		
	- Phthalates						
85-68-7	BENZYL BUTYL PHTHALATE	ND	ų.	0.1	0.022		
84-74-2	DHN-BUTYL PHTHALATE	ND	ц.	50	0.085		
84-66-2	DIETHYL PHTHALATE	ND	ър Г	0,1	0.044		
131-11-3	DIMETHYL PHTHALATE	N	ngv	0.1	0.015		
	Other Compounds						
51235-04-2 HEXAZINONE		5		2	1		

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An encouri of "HO" wolkates the ten compound was not detected above the Lab's Method Detection Linet - NGAL. NCL- Maximum Casterinani Level, machinen permasable lovel of a conference in weiter established by EPA, NPDWR. State Advisory Level (SAU) for Unregulated comp A black MCL of SAL value indicates a level to not currently satisfied. PCL- Practeel Countations Unit is the concentration of the standard anyone during the Initial calentifics. MDL- Method Detection Linet is the concentration of the standard anyone during the Initial calentifics. MDL- Method Detection Linet is the concentration of the standard anyone during the Initial calentifics.

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tion is grader than zoro.

FORM: SDC_GEN	An amount of "NO" MCL- Madawrs Co A blank MCL o POL - Pracilcal Qua MDL- Method Dela MDL - Method Dela J - Estimated valu	51-36-5	133-80-4	50594-66-6	120-36-5	83-70-0 25057-89-0	94-82-6	E-14-02-8	1861-32-1		1918-00-9	1918-02-1	88-85-7	75-99-0	87-88-5	83-72-1	94-75-7		CAS		Client Name:		
-	An amount of "ND" indicates that it is compared was not detected above the Lab's Mathed Detection Line - NDL. MCL- Andonew Contestinent Level, maximum pornetsitie test of a contestion taken is well or established by EPA NPOWR. A blank MCL or SAL value indicates a large far for currently or tabletted. POL - Practical Outerillation Link is the concentration of the standard saskyted due to massured and reported with 69% or MCL - Method Detection Link is the lab's misimum concentration a compound can be measured and reported with 69% or J - Estimated value.	3,5 - DICHLOROBENZOIC ACID	CHLORAMBEN		DICHLORPROP		2,4 DB				EPA Unregulated			DALAPON	PENTACHLOROPHENOL	2,4,5 - TP (SILVEX)	2,4 - D		COMPOUND	Project: 85491,8549 Field ID: 85494 Sample Description: 85494 Sampled By: Sample Date: 10/31/2006 Source Type: Sampler Phone:	Name: KUO Testing Labs Inc 337 S 1st Othello, WA 99344	HER	The lab you can trust!
	Nation Delection Linz NDL Is weller astabilited by EPA, NPOWR using the initial inflormation I be measured and reported with 02% or	N	ND	58	5 2	58	ND	ND	ND	n,	20	ND	ND	N	Ŋ	ND	N		RESULTS	85491,85492,85493,85494 85494 85494 10/31/2006		HERBICIDES IN	Burlington WA 1620 S Wahut St - 98233 Corpose Office 800,755,9295 = 360,757,1402/ar Bellingham WA 805 Orchard Dr Suile 4 - 98225 Mecaleory 360,671,0688 + 360,671,1577/ar
	Slate Advisor	β.	цу ^р			5	ца Г	Ę	ug/L	υĝη	•	u g /L	ug/L	μĝ	űg/	ngr	ng/L		Units			DRIN	S Walnut S 55.9235 • 3 Inchard Dr S 71.0688 • 3
	r Level (SAL) to	0.1	0.2	0.1	0.2	2	0.8	2		0.1	2	0.1	0.2	1.3	0.1	0,1	0.2		2				1- 98233 <u>660,757,140</u> Wile 4 - 9822 960,671,157 *
	State Advisory Level (SAL) for Unregulated compounds and denoe that the compound concentration is greater the	0.044	0.2	690'0 690'0	0.067	0.044	0.10	0.1	0.089	0,045	, , ,	0.089	0.16	0.80	0.044	0.02	0.11				Refe	IN DRINKING WATER	<u>0 • 360,757.</u> 25 74ax
	compounds: grader Vien znro,											500	7	200	→ :	50	70	INC.	M C	Lab Number Report Date: Date Analyzed: Extraction Date: Analyst: Supervisor. Analyticaj Method:	Reference Number: 06-14429	TER	<u>1402[ar</u>
																			Chlorophenoxy Herbicides	A ,	06-14429		Page 1 of 1

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	N			12672-29-6	53469-21-9 /	11141-16-5 /	11104-28-2 /			CAS		Client Name:		The la
OXAPHENE	ROCLOR 1016	ROCLOR 1280	NROCLOR 1254	VROCLOR 1248	NROCLOR 1242	AROCLOR 1232	ARDCLOR 1221	CBS (Total Arociors)	PCBs/Toxaphene	COMPOUND				The fab you can trust!
_	_	_			_						491,85492,85493, 494 494 /31/2006	4 Inc		Burlingt Corports Bellingt
										ł	,85494		DATA R	Burlington WA 1620 S Walnut St - 98233 <u>Compare Dates</u> 800,755,9295 • 360,757,1400 • 360,757,1402fax Bellingham WA 865 Orchard Dr Suite 4 - 98225 Microbiology 360,671,0668 • 360,671,1577fax
цуľ	ij	۹Ş.	5	ģ	۶ ۲	цâц	ug/L	۳	r c	Units			ĒΡΟ	(abrut St - 9 <u>9295 • 360</u> 9688 • 360 3688 • 360
-	0.1	0.1	0.1	0,1	0.1	0.1	0.1	0.2	ł	Po			アゴ	18233 1.7 <u>57,1400</u> 1.671,15771 1.671,15771
0.5	2.1	0.08	0.1^	0.1^	0.1^	0.1^	0.1^			MDL		Refer		• <u>360,757.</u>]
٤								0.5				ence Numbar:		402 Fax
										COMMENT	04630518 12/8/2006 11/14/2006 508_061113 MM Fr U/JL 508.1 Synthelic Organics	06-14429		Page 1 of 1
	TOXAPHENE ND ug/L 1 0.5	AROCLOR 1016 ND ug/L 0.1 0.1 TOXAPHENE ND ug/L 1 0.5	5 AROCLOR 1280 ND ug/L 0.1 0.08 2 AROCLOR 1016 ND ug/L 0.1 0.1 TOXAPHENE ND ug/L 1 0.5	1 AROCLOR 1254 ND ug/L 0.1 0.1^* 5 AROCLOR 1260 ND ug/L 0.1 0.08 2 AROCLOR 1016 ND ug/L 0.1 0.1 2 AROCLOR 1016 ND ug/L 1 0.1 2 TOXAPHENE ND ug/L 1 0.5	6 AROCLOR 1248 ND ug/L 0,1 0,1^/ 1 AROCLOR 1254 ND ug/L 0.1 0,1^/ 5 AROCLOR 1280 ND ug/L 0.1 0,1^/ 2 AROCLOR 1016 ND ug/L 0.1 0,1 2 AROCLOR 1016 ND ug/L 0.1 0,1 2 AROCLOR 1016 ND ug/L 1 0,1 1 TOXAPHENE ND ug/L 1 0,5	9 AROCLOR 1242 ND ug/L 0.1 0.1^ 6 AROCLOR 1248 ND ug/L 0.1 0.1^ 1 AROCLOR 1254 ND ug/L 0.1 0.1^ 5 AROCLOR 1280 ND ug/L 0.1 0.1^ 5 AROCLOR 1280 ND ug/L 0.1 0.1^ 2 AROCLOR 1016 ND ug/L 0.1 0.1 2 AROCLOR 1016 ND ug/L 1 0.1 2 AROCLOR 1016 ND ug/L 0.1 0.1	5 AROCLOR 1232 ND ug/L 0.1 0.1^{^{^{^{^{^{^{^{^{^{^{^{^{^{^{^{^{^{^{	Z AROCLOR 1221 ND ug/L 0.1 0.1^* 5 AROCLOR 1232 ND ug/L 0.1 0.1* 9 AROCLOR 1242 ND ug/L 0.1 0.1* 6 AROCLOR 1242 ND ug/L 0.1 0.1* 6 AROCLOR 1248 ND ug/L 0.1 0.1* 6 AROCLOR 1248 ND ug/L 0.1 0.1* 1 AROCLOR 1284 ND ug/L 0.1 0.1* 5 AROCLOR 1280 ND ug/L 0.1 0.1* 5 AROCLOR 1016 ND ug/L 0.1 0.1* 2 AROCLOR 1016 ND ug/L 0.1 0.1 2 AROCLOR 1016 ND ug/L 0.1 0.1 2 AROCLOR 1016 ND ug/L 0.1 0.1 5 MD ug/L 0.1 0.1 0.5	PCBS (Total Aracions) ND ug/L 0.2 2 AROCLOR 1221 ND ug/L 0.1 0.1^{^{^{^{^{^{^{^{^{^{^{^{^{^{^{^{^{^{^{	PCBs/Toxaphene ND ug/L 0.2 0.5 PCBs (Total Acadoms) ND ug/L 0.2 0.5 2 AROCLOR 1221 ND ug/L 0.1 0.1^ 5 AROCLOR 1232 ND ug/L 0.1 0.1^ 6 AROCLOR 1232 ND ug/L 0.1 0.1^ 7 AROCLOR 1232 ND ug/L 0.1 0.1^ 6 AROCLOR 1242 ND ug/L 0.1 0.1^ 6 AROCLOR 1246 ND ug/L 0.1 0.1^ 6 AROCLOR 1254 ND ug/L 0.1 0.1^ 7 AROCLOR 1280 ND ug/L 0.1 0.1^ 7 AROCLOR 1016 ND ug/L 0.1 0.1 7 AROCLOR 1016 ND ug/L 0.1 0.1 7 AROCLOR 1016 ND ug/L 1 0.5 3	COMPOLIND RESULTS Units PQL MDL MCL PCBs/Toxephene ND ug/L 0.2 0.5 PCBs/Toxephene ND ug/L 0.1 0.1^ PCBs/Toxephene ND ug/L 0.2 0.5 PCBs/Toxephene ND ug/L 0.1 0.1^ PCB/Toxephene ND ug/L 0.1 0.1^ PCB/Toxephene ND ug/L 0.1 0.1 PCB/Toxephene ND ug/L 0.1 0.1	Project: B5491,35492,85493,85494 Lab Number: Sample Description: 85494 Report Date: Sample Description: 85494 Date: Sample Description: 85494 Date: Sample Description: 85494 Date: Sample Description: 85494 Date: Sample Date: 10/31/2006 Field ID: Source Type: Sample Date: 10/31/2006 Source Type: Sample Date: ND Sample Phone: VInfts PQL PCBs/Toxaphene ND ugft 0.2 PCBs/Toxaphene ND ugft 0.1 0.1^n PCBs/Toxaphene ND ugft 0.1 0.1^n PCBs/Toxaphene ND ugft 0.1 0.1^n SamocLor 1221 ND ugft 0.1 0.1^n AROCLOR 1222 ND ugft 0.1 0.1^n AROCLOR 1240 ND ugft 0.1 0.1^n AROCLOR 1240 ND ugft 0.1 0.1^n AROCLOR 1280 ND ugft	Retenence Number: Sample Dascription: 85491,35492,85493,85494 Lab Number: Sample Dascription: 85491,35492,85493,85494 Lab Number: Sample Dascription: 85494 Lab Number: Sample Dascription: 85494 Dascription: Sample Dascription: 85494 Dascription: Sample Dascription: 85494 Date Analyzet Sample Date: 10/31/2006 Date Analyzet Surre: Sample Date: 10/31/2006 Sample: PCBs/Toxephene Vinfs PQL MDL PCBs/Toxephene ND upt. 0.1 0.1 Sample: ND upt. 0.1 0.1 AROCLOR 1221 ND upt. 0.1 0.1 0.1 AROCLOR 1242 ND upt. 0.1 0.1 0.1 AROCLOR 1242 ND upt. 0.1 0.1	TATA REPORt Retenence Number: Sample Description: 85491,85492,85493,85494 Lab Number: Sample Description: 85494 No PCI MCL COMPOUND RESULTS Unitis PQL MCL PCBs/Toxaphene PCBs/Toxaphene ND upt. 0.1 0.1 PCBs/Toxaphene ND upt. 0.1 0.1 AROCLOR 1221 ND upt. 0.1 0.1 AROCLOR 1224 ND upt. 0.1 0.1 AROCLOR 1224 ND upt. 0.1 0.1 0.1 AROCLOR 124 ND upt.

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 $(x,y,y) \in [0,\infty)$

An anover of "ND" indicates that the compound was net delected above the Lat's Mathod Detection Link - NDL. NDL - Modernam Contemposed Linnel, maximum permissible level of a contentiant in were middlened by EPA, NPDWR. State Advisory Level (SAL) for Unergulated compounds. A blank MCL or SAL value indicates a level is not commentiate substitution. POL- Practical Countrative Link is the concertation of the standard survivad country the initial calibration. MDL - Mathod Detection Link is the lat's infritant concertation is compound can be measured and reported with BMK conductors that the compound concentration is graviter than zero. J - Entimated value.

15541-45-4 BROMATE	CAS ANALYTES	The lab you can insti The lab you can insti INORC Client Name: KUO Testing Labs Inc 337 S 1st Othello, WA 99344 Project: 85491,8549 Field ID: 85494 Sample Description: 85494 Sample Description: 85494 Sample Date: 10/31/2006 Source Type:
N	R	INORG 9344 85491,854 85494
D mg/L	RESULTS UNITS	
0.005	POL	A B00.755.9 360.671.0 4
0.0016	MDL	Burlington WA 1620 S Welnut S1 - 96233 Copyred: Office 800,755,9295 • 360,757,1402 • 360,757,1402 tax Bellingham WA 805 Orchard Dr Suile 4 - 98223 Microbiology 360,671,0668 • 360,671,1577 tax NIC COMPOUNDS (IOC) REPO Reference 1 Reference 2 State 3,85494 E55493,85494 Lab N Supper State 3
0.010 mvp	MCL	400 - <u>100</u> 577 هم R
mvp 300,1	Analyst METHOD COMMENT	Page 1 of 1 Page
	ENT	1 0 1

يحادثني متقصرة فأراد الأراد

<u>NOTES</u>: SRL (Stale Reporting Level): indicates the minimum reporting level required by the Washington Department of Health (DOH). NCL (Maximum Contestinant Level) and campains level of a containnivent in water established by EPA; Federal Action Levels are 0.015 ang/L for Level and 1.3 mp/L for Capper. Sodium has a recommended levil of 20 mg/L. A Hearth MCL (Maximum Contestinant Level) and campained with compounds delacted in excass of Via level are negatived to take additioned samples. Centaed and 1.3 mg/L for Capper. Sodium has a recommended levil of 20 mg/L. A Trigger Level; DPH Dathing Valar Response tevel. Stratem with compounds delacted in excass of Via level are required to take additioned samples. Centaed your regional DOH office. ND (Not Center): Indicates use the ompound was not delacted above the State Reporting Umil (SRL). NA (Not Analyzed): ledEaste used this compound was not assigned.

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Web Site: <u>http://www.kuotesting.com</u> (509) 488-0112 Phone: (509) 488-0118 Fax: (800) 328-0112 Toll Free 337 South 1st Avenue, Othello, WA 99344 e-mail: kuotest@atnet.net

10/31/2006 DATE: COLLECTED

SEND REPORT FUT

DATE RECEIVED

DATE REPORTED

12/8/2006

POSTER OUSIGNED Portland 55 SW Yamhill St., Suite 400 Portland OR 972 Groundwater Solutions 85495 85495 85495 85495 85495 85495 85495 85495 Project Name Hali Wentland SAR CURITARIA MBACINES Duplicate Duplicate Duplicate Duplicate Duplicate Duplicate Orthophosphate as P Chloride Hardness Total Dissolved Solids Nitrite as Nitrogen Nitrate as Nitrogen 2007 12:00 97202 0.73 ND 106 64.5 2.20 Portland 55 SW Yamhill St., Suite 400 Ground Water Solutions Attn: Kevin Lindsey 0.21 0.0023 21.1 0.11 0.297 0.0433 11/1/2006 mg/L mg/L . ∐/∄ui mg/L mg/L mg/L 0R Hatch Hatch Hatch Hatch Hatch Hatch 97202

Duplicate Duplicate

Fecal E-Coli 600

 $\circ \omega$

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mg/L MPN/100ml

Hatch

Cascade Analytical

**Sample passed hold time for Nitrate/Nitrite as Nitrogen Please check out our new Web Site at http://www.kuotesting.com PQL=Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions MDL: Method Detection Limit

<(0.001): indicates the analyte was not detected at or above the concentration indicated. ND: None Detected mg/Lindicates milligrams per litre

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Dr. Eugene Kuo, Quality Assurance Manager

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Date

equally: indicates the malyte was not detected at or above the concentration indicated. ND: Note Detected mc: Indicates milligrams per line • PD: Indicates milligrams the line lower level that can be achieved within specified limits of procision and accracy during routine laboratory operating conditions. MD: Method Detection Lini: ND: Method Detection Lini: ND: Note of the line line for Minoreman. ND: The formation of the line line for Minoreman. The Torum With No. 1 Amountain Minoreman. ND: The formation of the line line line line line line line lin	Hardness	Groundwater Solutions 55 SW Yamhill St., Suite 400 Portland OR 97202 Project Name:	DATE COLLECTED 10/31/2006	Kuo Testing Labs, Inc. 337 South 1st Avenue, Othello, WA 99344 (509) 488-0112 Phone (509) 488-0118 Fax (800) 328-0112 Web Site: <u>http://www.kuotesting.com</u> e-mail: <u>kuotest(</u>
of precision and accuracy during routine laboratory operating conditions $12 - 05 - 25$		Ground Water Solutions 55 SW Yamhill St., Suite 400 Portland OR 97202 Attn: Kevin Lindsey	DATE RECEIVED ONTE REPORTED CEND REPORT TO 11/1/2006 12/8/2006	IO Testing Labs, Inc. 337 South 1st Avenue, Othello, WA 99344 12 Phone (509) 488-0118 Fax (800) 328-0112 Toll Free ttp://www.kuotesting.com e-mail: kuotest@atnet.net

Dr. Eugene Kuo, Quality Assurance Manager

Date

Dr. Eugene Kud, Quality Assurance Manager	<(0.001): indicates the analyte was not detected at or above the concentration indicated. ND: None Detected mgL:Indicates milligrams per litre * PQL=Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions MDL: Method Detection Limit MDL: Method Detection Limit Please check out our new Web Site at https://www.kuntesting.com **Sample passed hold time for Nitrate/Nitrite as Nitrogen (2> S	85497 Blind B Nitrate as Nitrogen 85497 Sind B Orthophosphate as P	Groundwater Solutions 55 SW Yamhill St., Suite 400 Portland OR 97202 Project Name:	VATE COLLECTED . 10/31/2006 TESTERAT CUSTOMER	Kuo Testing Labs 337 South 1st Avenue, Othello, WA (509) 488-0112 Phone (509) 488-0118 Fax (800) Web Site: http://www.kuotesting.com e-mail:
ager	nuration indicated. .ved within specified limits (0.69 0.59		nî U	IO Testing 337 South 1st Avenue, 12 Phone (509) 488-01 ttp://www.kuotesting.c
Date	of precision and accuracy during routine laboratory	6 0.21 mg/L 0.0433 mg/L	Ground Water Solutions 55 SW Yamhill St., Suite 400 Portland OR 97 Attn: Kevin Lindsey	DATE RECEIVED	
te	, operating conditions $\frac{1}{2}$	Hatch	ls te 400 97202	оо 0A1 с веролтер 12/8/2006	, Inc. 99344 328-0112 Toll Free <u>kuotest@atnet.net</u>
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MB: Method Blanks are used to determine background levels of analytes in digested and extracted laboratory reagent water.

ř	LRB: Laborationy Reagent Blanks are used to determine the background level of the analytics in a laboration, but
in instance, and report may include analytics not requested for	heinh Therefore this most and include and the second second

LRB: L Your su
R: Laboratory our submitted a
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determi
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batch.
Therefo
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request
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	525.2	0.02	Ę.	Ð	HEXACHLOROBENZENE	
MB	525.2	0.02	ĥ	ß	HEPTACHLOR EPOXIDE	
MB	525.2	0.02	ug/L	8	HEPTACHLOR	
MB	525.2	0.60	ng/L	0.2	DI(ETHYLHEXYL)-PHTHALATE	
MB	525.2	0.02	l/gu	S	DI(ETHYLHEXYL)-ADIPATE	
MB	525.2	0.02	ug/L	S	CHLORDANE, TECHNICAL	
MB	525.2	0.02	ug/L	Ŋ	BENZO(A)PYRENE	
MB	525.2	0.02	ng/L	S	ATRAZNE	
MB	525.2	0.02	ug) L	ß	ALACHLOR	
MB	526.2	0.02	ug/	8	METHOXYCHLOR	
MB	525.2	0.02	ug/L	Ð	LINDANE (BHC - GAMMA)	
MB	625.2	0.02	ng/L	Ŋ	ENDRIN	525_061113
MB	515.1	0.20	ug/L	S	CHLORAMBEN	
NB	515.1	0.50	ug/L	B	ACIFLUORFEN	
ŇB	515.1	0.12	ug/r	D	DICHLORPROP	
MB	515.1	0.12	цр/г	Ð	BENTAZON	
MB	515.1	0,10	nðyr	N	2,4,5 T	
MB	515.1	0.25	ug/L	Ŋ	2,4 DB	
MB	515.1	0.10	ng/L	Ð	DCPA (ACID METABOLITES)	
MB	515.1	0.02	ug/L	N	TOTAL DCPA	
M	515.1	0.05	ng/L	N	DICAMBA	
MB	515.1	0.05	μġΛ	Ð	PICLORAM	
MB	515.1	0.10	ngv	ß	DINOSEB	
MB	515.1	0.50	Ц	B	DALAPON	
MB	515.1	0.02	ug/t	N	PENTACHLOROPHENOL	
MB	515.1	0.10	ugul	Ð	2,4,5 - TP (SILVEX)	
MB	515.1	0.05	-Jogu	B	2,4 - D	515_061113
MB	508,1	0.00	*	86	TETRACHLORO-M-XYLENE (SURR)	
M	508.1	0.02	ng/r	ß	AROCLOR 1016	
MB	508.1	0.02	цр/Г	ß	AROCLOR 1260	
MB	508.1	0.02	19/1 1	ß	AROCLOR 1254	
MB	508.1	0.02	ug/L	ß	AROCLOR 1248	
MB	508.1	0.02	ug/L	S	AROCLOR 1242	
MB	508.1	0.02	цj,/	ß	AROCLOR 1232	
MB	508.1	0.12	ng/L	ð	AROCLOR 1221	508_061113
LRB	300.1	0.01	тg/L	Z		
				5	ABOMATE	D061113A
Туре*	QC Qualifier Method	Limit	Units	Result	Analyte	Batch

The Idu you can 10120 AT

(360) 757-1400 - FAX (360) 767-1402 Burlington, WA 98233 11525 Knudson Rd (800) 755-9285

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Page 1 of 3

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QUALITY CONTROL REPORT **BLANK REPORT**

W.C.P.

Reference Number: 06-14429 Report Date: 12/06/06

	THRACENE	× × × × × × × × × × × × × × × × × × ×		Product 0.05 Product 0.05 <th>REPORT Coc Cualifier Method 525.2</th> <th></th> <th>Report Date:</th> <th>06-14429 12/08/06</th>	REPORT Coc Cualifier Method 525.2		Report Date:	06-14429 12/08/06
					2	Rafe	nce Number: Report Date;	06-14429 12/08/06
1			Units	Limit	QC Qualifier Method	Type*	Comments	
001110	SIMAZINE			0.02	525.2 525.2	<u>N 8</u>	:	
	PENTACHLOROPHENOL	N	n9/L	0,04	525.2	MB		
	ALDRIN	; R	ug/L	0.05	525.2	MB		
		i c	ug/L	0.10	525.2	NB		
	METOLACHLOR	ß	ug/L	0.25	525.2	MB 0		
	METRIBUZIN	ND	ug/L	0.05	525.2	Ш		
	PROPACHLOR	58	ug/L	0.05	525.2	MB		
	TERBACIL	8 i	u ș	0.05	525.2			
	DIAZINON	N	ug/L	0.05	525 .2	MB		
	EPTC	58	- ngr	0.07	525.2	MB		
	4,4-DDE	8 8	ng/ Ng ng	0.05	525.2	<u>N 8</u>		
	4,4-DDT	N	прЛ	0.05	525,2	MB		
	CYANAZINE	5 8	ug/L	0.05	525.2	MB		
	PARATHION	8		0.05	525.2 525.2	MA NO		
	TRIFLURALIN	Ŋ	ug/L	0.05	525.2	<u>N</u>		
	NAPTHALENE	58	ų į	0.02	525.2	₩ B		
	ACENAPHTHENE	e e	ត្ ទ័	0.05	525.2			
	ANTHRACENE	€	ugi	0.05	525.2	MB		
	BENZ(A)ANTHRACENE	33		0.02	525.2	, W		
	BENZO(G,H,I)PERYLENE	8 i		0.05	525.2	1		
	BENZO(K)FLUORANTHENE	Ŋ	ug/L	0.05	525.2	M		
	DIBENZO(A.H)ANTHRACENE	3 2		0.05	525.2			
	FLUORANTHENE	ND	ų,	0.05	525.2	MB		
	INDENO(1,2,3-CD)PYRENE	ND	ug/L	0.05	52 5.2	MB		
	PHENANTHRENE	5	ηĝή	0.05	525.2	MB		
		5 8	ug/	0.05	525.2	MB		
	DEN SI ITYI BUTYI PHTHALATE	30		0.60	525.2	MB		
	DIETHYL PHTHALATE			0.60	525.2 525.2			
	DIMETHYL PHTHALATE	ND	րջր -	0.60	525.2	MB		·
	1,3-DIMETHYL-2-NITROBENZENE (Sui	(Sui 72	*		525.2	MB		

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*Notation:

LRB: Laboratory Reagent Blanks are used to determine the background level of the analytes in a laboratory batch. Therefore, this report may include analytes not requested for your submitted samples.

MB: Method Blanks are used to determine background levels of analytes in digested and extracted laboratory reagent water.

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Page 2 of 3

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(800) 755-9295 Burlington, WA 98233 11525 Knudson Rd

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(360) 757-1	Burlington,	11526 Knu



iudson Rd 1, WA 98233 **929**5 1400 - FAX (360) 757-1402

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Page 3 of 3

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QUALITY CONTROL REPORT **BLANK REPORT**

Reference Number: 06-14429 Report Date: 12/08/06

549_051106										531_061114	525X_061113			511100_020	Batch
PARAQUAT	METHIOCARB	PROPOXUR (BAYGON)	CARBARYL	ALDICARB	3-HYDROXYCARBOFURAN	METHOMYL	ALDICARB SULFONE	ALDICARB SULFOXIDE	CARBOFURAN	OXYMAL	HEXAZINONE	TRIPHENYLPHOSPHATE (Sum)	PYRENE-D10 (Surr)	PERYLENE-012 (Sun)	Analyte
ND	Ŋ	8	ð	5	8	ß	ND	ß	ß	Ŋ	8	8	8	86	Result
цруг	цр. Г	ng/L	19 19	lug/L	ug/L	ng/L	ug/L	ug/L	Non	ug/L	ug/L	3 5	8	*	Units
0.50	1.00	0.25	0.50	0.25	0.50	0.25	0,40	0.25	0.45	1.00	0.02				Limit
549.2	531.2	531.2	531.2	531.2	531,2	531.2	531.2	531.2	531.2	531.2	525.2	525.2	525.2	525.2	QC Qualifier Method
MB	MB	F	N	MB	MB	MB	MB	M	M₿	MB	MB	MB	MÐ	A.	Type*
															Comments

MB: Method Blanks are used to determine background levels of analytes in digested and extracted laboraboy reegent water.

"Notation: LRB: Laboratory Reagent Blanks are used to determine the background level of the analytes in a laboratory batch. Therefore, this report may include analytes not requested for your submitted samples.

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Page 1 of 3

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Reference Number: 06-14429 Report Date: 12/08/06

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Balch	Analyte	Result	Value	Units	Mathor		76 Decouery 1 mile		
508_061113	AROCLOR 1260	1.6	N	Бр/-	508,1	8	<u> </u>		
	TETRACHLORO-M-XYLENE (SURR)	91		¥	508,1		70-130	LF8	
515_061113	2,4 - D	1.73	N	μ _Ω Γ	515.1	87	70-130		
	2,4,5 - TP (SILVEX)	0.98	-	Ϋ́	515,1	88	70-130	5	
	PENTACHLOROPHENOL	0.84	-	ş	515.1	94	70-130	LFB	
	DALAPON	10.9	13	Ð	515.1	22	70-130	旧	
	DINOSEB	2,5	N	Ę	515.1	125	70-130	58	
	PICLORAM	0.86	-		515.1	88	70-130		
	DICAMBA	0,96		۶,	515.1	8	70-130	FB	
	2,4 - DCAA (SURR)	109		*	515.1		78-130	LFB	
525_061113	ENDRIN	0.84	-	۳ ۲	525.2	2	70-130	旧	
	LINDANE (BHC - GAMMA)	0.83	-	ng/	525,2	83	70-130	LFB	
	METHOXYCHLOR	1.3		ug/L	525.2	130	70-130	LFB	
	ALACHLOR	1.9	N	ц <mark>р</mark> Г	525.2	96	70-130	다리	
	ATRAZINE	1.91	N	ŋ J	525.2	8	70-130	다	
	BENZO(A)PYRENE	1.08	-	цуľ	525.2	108	70-130	다려	
	CHLORDANE, TECHNICAL	0.85		ug/L	525.2	8	70-130	LFB	
	DI(ETHYLHEXYL).ADIPATE	1.06	-	цg	525.2	106	70-130	LFB	
	DI(ETHYLHEXYL)-PHTHALATE	3,9	-	սցվ	525.2	390	70-130	LFB	
	HEPTACHLOR	1.001	-	црГ	525.2	8	70-130	LFB	
	HEPTACHLOR EPOXIDE	0.87	-	цр/L	525.2	87	70-130	LFB	
	HEXACHLOROBENZENE	0.91	د	hBy	525.2	91	70-130	LFB	
	HEXACHLOROCYCLO-PENTADIENE	0.94	-1	ug/L	525.2	94	70-130	LFB	
	SIMAZINE	0.95	-	ug/L	525.2	85	70-130	LF8	
	PENTACHLOROPHENOL	3.2	4	ug/L	525.2	80	70-130	LFB	
	ALORIN	0.98	-	ng/L	525.2	88	70-130	LFB	
	BUTACHLOR	0.9		цр/	525.2	90	70-130	LFB	
	DIELORIN	1.19		ng/	525.2	119	70-130	FB	
	METOLACHLOR	1.03	-	ng/L	525.2	103	70-130	LFB	
	METRIBUZIN	0.89		ng/L	525.2	89	70-130	명	
	PROPACHLOR	1.03		ng/L	525.2	103	70-130	۶.	
	BROMACIL	1.08	-	μġ	525.2	108	70-130	L43	
	TERBACIL	1.23	-	Jûn	525.2	123	70-130	LFB	
	DIAZINON	0.72	د .	ng/L	525.2	72	70-130	ᄪ	
-									
"Notation;									

% Recovery = (Result of Analysis)/(True Value) * 100

NA = Indicates % Recovery could not be calculated.

QCS: Quality Control Sample, a solution containing known concentrations of method analytes which is used to fortify an aliquot of reagent metrix. The QCS is obtained from an external acurce and is used to check lab performance. LFB: Laboratory Fouttled Blank, an aliquot of reagent matrix to which known quantities of method analytes are added in the lab. The LFB is analyzed exactly like a sample, and its purpose is to determine whether method performance is which accepted control limits.

FORM: cLFB

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Page 2 of 3



QCS/LFB REPORT

C. Marine

Reference Number: 08-14429 Report Date: 12/08/06

			True			ጽ		8	
Balch	Analyte	Result	Valuo	Units	Method	Recovery Limits		Quatiner Type"	Comment
525_061113	EPTC	1.07	-	۶ ۲	525.2	107	- I	Hall	Cumunan
	4,4-000	0.92	-	ц <mark>у</mark>	525.2	82	70-130		
	4,4-00E	0.9	-	J,Ēn	525.2	90	70-130		
	4,4-00T	0.94	-	ug/L	525.2	2	70-130		
	CYANAZINE	0.64	-	θų.	525.2	2		LR 148	
	MALATHION	1.09	-	ş	525.2	109			
	PARATHION	0.89	-1	ng/L	525.2	89	70-130		
	TRIFLURALIN	0.79	-		525.2	62	70-130		
	FLUORENE	1.05	-	ų,	525.2	105	70-130		
	ACENAPHTHYLENE	1	-	μ μ	525.2	11 11	70-130		
	ANTHRACENE	0.67	-	β, i	525.2	57		-	
	BENZ(A)ANTHRACENE	1,08	-	Ę.	525.2			5	
	BENZO(B)FLUORANTHENE	1.15	-		525.2	115		5	
	BENZO(G,H,I)PERYLENE	1.07	-	Б Г	525,2	107	70-130		
	BENZO(K)FLUORANTHENE	1.18	-	5	525.2	31B	70-130		
	CHRYSENE	<u>.</u>	-	1 9 1	525.2	110	70-130		
	DIBENZO(A,H)ANTHRACENE	1,06	-	ug/L	525.2	106	70-130		
	INDENO(1,2,3-CD)PYRENE	1.24		ug/Г	525,2	124	70-130	691	
	PHENANTHRENE	1.04	-	ug/r	525.2	1 1 1 1	70-130	臣	
			and the second secon	Lud Juni	525.2	104	70-130	841	
	DHN-BUTYL PHTHALATE			ug/L	525.2	- 4.	20 4 20		
	DIETHYL PHTHALATE		1		595 9			; ;	
				- Chick	7070		(70-130	ELT.	
-	1,2-DIMETRYL-2-NITROBENZENE (Sum)	81			525.2	NA .	70-130		4
	PERYLENE-D12 (Surr)	88		3°	525.2	ž	70-130		
	PYRENE-Dto (Surr)	97		×	525.2	5	70-130	1F8	
	TRIPHENYLPHOSPHATE (Sum)	9 4		*	525.2	NA	70-130	LFB	
525X_061113	HEXAZINONE	1.26	ح	ug/L	525.Z	126	70-130	LFB	
531_061114	OXYMAL	19.9	20	n8/r	531.2	100	70-130	LFB	
	CARBOFURAN	22.3	20	нgЛ	531.2	112	70-130		
	ALDICARE SULFOXIDE	21.9	20	ų į	531.2	110	70-130		
	ALDICARB SULFONE	18.5	20	ug/L	531.2	83	70-130		
	METHOMYL	17.8	20	Ş.	531.2	88	70-130		
	3-HYDROXYCARBOFURAN	19.7	20	цąл	531.2	99	70-130	158	
"Notalion:									
% Recovery = (Resul	% Recovery = (Result of Analysis)/(True Value) * 100								
NA ≈ Indicatos % Rec	NA = Indicates % Recovery could not be calculated								
CCS: Quality Control	CCS: Quality Control Sample, a solution containing known concentrations of method analytics which is used to fontify an ethnicit of meets	nelhod analyle:	s which is us	ed to fonity a	n Bilinum mi meenent				•

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CVCS: Quality Control Sample, a solution containing known coreantrations of method analytes which is used to fonlify an eliqued of reagent metrix. The QCS is obtained from an external source and is used to check tab performance. LED: Laboratory Fontained Blank, an eliqued of reagent matrix to which known quantities of method analytes are added in the lab. The LFB is analyzed exactly like a sample, and its purpose is to determine whether method performance is within accepted control limits.

FORM: CLFB

The lab you can ILLS1 AT



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QUALITY CONTROL REPORT **QCS/LFB REPORT**

Reference Number: 06-14429 Report Date: 12/08/06

CARBOFURAN 2.4 2 ug ALDICARB SULFOXIDE 2.1 2 ug ALDICARB SULFONE 2.1 2 ug METHOMYL 2.2 2 ug 3-HYDROXYCARBOFURAN 1.2 2 ug ALDICARB 1.2 2 ug ALDICARB 1.8 2 ug ALDICARB 1.8 2 ug ALDICARB 1.8 2 ug ALDICARB 1.9 2 ug METHOXYC (BAYGON) 1.9 2 ug METHIOCARB 1.95 2 ug	2.4 2.4 1.2 1.8 1.9 1.9	SAN 2.4 1.8 2.2 1.8 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2	AM 2.4 2 ug/t 531.2 2.4 2 ug/t 531.2 2.4 2 ug/t 531.2 2.2 2 ug/t 531.2 1.2 2 ug/t 531.2 1.8 2 ug/t 531.2 1.9 2 ug/t 531.2 1.95 2 ug/t 531.2 1.95 2 ug/t 531.2	2.4 2 ugA 531.2 105 2.4 2 ugA 531.2 120 2.2 2 ugA 531.2 120 1.2 2 ugA 531.2 120 1.8 2 ugA 531.2 60 1.9 2 ugA 531.2 90 1.9 2 ugA 531.2 115 1.95 2 ugA 531.2 95 1.95 2 ugA 531.2 98	AAN 2.4 2.4 2.4 2.1 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
2.1 1.9 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2	1.9 22 22 2.3 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2	2.1 2 ugA 2.4 2 ugA 1.2 2 ugA 1.8 2 ugA 1.9 2 ugA 1.9 2 ugA 1.95 2 ugA	2.1 2 ugA 531.2 2.4 2 ugA 531.2 2.2 2 ugA 531.2 1.2 2 ugA 531.2 1.8 2 ugA 531.2 2.3 2 ugA 531.2 1.9 2 ugA 531.2 1.95 2 ugA 531.2 1.95 2 ugA 531.2	2.1 2 ugAL 531.2 105 2.4 2 ugAL 531.2 120 2.2 2 ugAL 531.2 110 1.2 2 ugAL 531.2 110 1.8 2 ugAL 531.2 60 1.9 2 ugAL 531.2 90 1.9 2 ugAL 531.2 115 1.95 2 ugAL 531.2 95 1.95 2 ugAL 531.2 98	2.1 2 up/L 531.2 105 70-130 2.4 2 up/L 531.2 120 70-130 2.2 2 up/L 531.2 110 70-130 1.2 2 up/L 531.2 110 70-130 1.8 2 up/L 531.2 90 70-130 2.3 2 up/L 531.2 115 70-130 1.9 2 up/L 531.2 95 70-130 1.95 2 up/L 531.2 98 70-130
01 N N N N N N N	51 N N N N N N N	5 22 22 22 22 22 22 22 22 22 22 22 22 22	2 ugA 5312 2 ugA 5312 2 ugA 5312 2 ugA 5312 2 ugA 5312 2 ugA 5312 5 2 ugA 5312	2 ugA 531.2 120 2 ugA 531.2 110 2 ugA 531.2 60 2 ugA 551.2 90 2 ugA 551.2 115 2 ugA 551.2 95 2 ugA 551.2 98	2 ugA 531.2 12.0 70-130 2 ugA 531.2 11.0 70-130 2 ugA 531.2 11.0 70-130 2 ugA 531.2 60 70-130 2 ugA 531.2 90 70-130 2 ugA 531.2 115 70-130 2 ugA 531.2 95 70-130 3 2 ugA 531.2 95 70-130
81 10 10 10 10 10 10	N N N N N N	5 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 ug/t 531.2 2 ug/t 531.2 2 ug/t 531.2 2 ug/t 531.2 5 2 ug/t 531.2 5 2 ug/t 531.2	2 ug/L 531.2 110 2 ug/L 531.2 60 2 ug/L 531.2 90 2 ug/L 531.2 115 2 ug/L 531.2 95 3 2 ug/L 531.2 98	2 ugA 531.2 110 70-130 2 ugA 531.2 60 70-130 2 ugA 531.2 90 70-130 2 ugA 531.2 115 70-130 2 ugA 531.2 95 70-130 5 2 ugA 531.2 98 70-130
N N N N N	N N N N N	5 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 vg/L 5312 2 vg/L 5312 2 vg/L 5312 2 vg/L 5312 5 2 vg/L 5312	2 wg/L 531.2 60 2 wg/L 531.2 90 2 wg/L 531.2 115 2 wg/L 531.2 95 3 2 wg/L 531.2 98	2 wg/L 531.2 60 7(-130 2 wg/L 531.2 90 7(-130 2 wg/L 531.2 115 7(0-130 2 wg/L 531.2 95 7(0-130 5 2 wg/L 531.2 98 7(0-130
N N N N	N N N N	5 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 vg/L 531.2 2 vg/L 531.2 2 vg/L 531.2 5 2 vg/L 531.2	2 ug/L 531.2 90 2 ug/L 531.2 115 2 ug/L 531.2 95 3 2 ug/L 531.2 98	2 ug/L 531.2 90 2 ug/L 531.2 115 2 ug/L 531.2 95 3 2 ug/L 531.2 98
N N N	NNN	2 ug/. 2 ug/.	2 ug/L 531.2 2 ug/L 531.2 5 2 ug/L 531.2	2 ug/L 531.2 115 2 ug/L 531.2 95 3 2 ug/L 531.2 98	2 ug/L 531.2 115 2 ug/L 531.2 95 3 2 ug/L 531.2 98
N N	N N	5 2 սցրե	2 ug/L 531.2 5 2 ug/L 531.2	2 ug/L 531.2 95 5 2 ug/L 531.2 98	2 ug/L 531.2 95 5 2 ug/L 531.2 98
N	N	2 ug/L	2 ug/L 531.2	2 ug/L 531.2 98	2 ug/L 531.2 98
23.5 20 ug/		20	20 ugA 549.2	20 ugA 549.2 118	20 ugA 549.2
20	20	20 ugA	20 ugA 546.2	20 wgAL 546.2 118	20 wgAL 546.2 118
2) <u>-</u>	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	ug/L 549.2	ug/L 549.2 118	ug/L 549.2 118
ંદ દ	ug/		549,2 531,2 531,2	549.2 118 531.2 94	549.2 118 531.2 94
· – –		549.2 531.2		98 94 11 8	94 118

"Notation:

% Recovery = (Result of Analysis)/(True Value) * 100

NA = Indicates % Recovery could not be calculated.

LFB: Laboratory Fortilled Blank, an alique) of reagent metrix to which known quantities of method analytes are added in the lab. The LFB is analyzed exactly like a sample, and its purpose is to determine whether method performance is within accepted control limits. OCS: Quality Control Sample, a advition comialning known concentrations of method snalytes which is used to fortify an aliquot of reagent matrix. The QCS is obtained from an external source and to used to check tab performance.

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FORM: cLFB



11525 Knudson Rd Burlington, WA 98233

(800) 755-9295 (360) 767-1400 - FAX (360) 757-1402



Page 1 of 3

QUALITY CONTROL REPORT

Duplicate and Matrix Spike/Matrix Spike Duplicate Report

Reference Number: 06-14429

Report Date: 12/8/2006

Matrix S				Spike	Duplicat Splike	Spike		Dama							
9alch	Sampla	Analyte	Result	Result	Result	Солс	Units	MS	nt Recovery MSD	Limits	e cion	Umits	QC		-
515 061113	····						01110		mad	Liums	7811-0	umis	Qualifier		Comments
	30516	2,4 - D	ND	1.62		2	ug/L	9.4							
		2,4,5 - TP (SILVEX)	ND	0.96		1	-	81	NA	65-135	NA	0-80		LFM	
		PENTACHLOROPHENOL	ND	0.92		1	ug/L ug/L	96	NA	65-135	NA	0-80		LFM	
		DALAPON	ND	11.1		13	-	92	NA	65-135	NA	0-60		LFM	
		DINOSEB	ND	3.89		2	ug/L ug/L	85 195	NA NA	65-135	NA	0-60		LFM	
		PICLORAM	ND	0.82		1	ug/L		NA	85-135	NA	0-60	HQ	LFM	
		DICAMBA	ND	0.94			ug/L	82 94		65-135	NA	0-60		LFM	
		2,4 - DCAA (SURR)	88	105		•	ш <u>а</u> гс %	94	NA	65-135	NA	0-60		LFM	
525 061113			40	100			70		NA	70-130	NA	0-60		LFM	
	30517	ENDRIN	ND	0.98	0.86							_			
		LINDANE (BHC - GAMMA)	ND	0.93	0.88	1	ug/L	98 04	86	70-130	11.0	0-80		LFM	
		METHOXYCHLOR	ND	0.91	1.18	1	ug/L	91	88	70-130	3.4	0-60		LFM	
		ALACHLOR	ND	2.05	2.02	2	ug/L ug/L	86 103	118	70-130	31,4	0-80		LFM	Ŀ
		ATRAZINE	ND	1.8	1.82	2	ug/L	90	101	70-130	1.5	0-60		LFM	u 1
		BENZO(A)PYRENE	ND	0.78	1.06	1	սց,։ ug/L	50 78	91 106	70-130	1.1	0-60		LFM	
		CHLORDANE, TECHNICAL	ND	0.87	0.92	1	սց/Ը Ս <u>գ</u> /Ը	67	92	70-130 70-130	30.4	0-80		LFM	
		DI(ETHYLHEXYL)-ADIPATE	ND	0.86	1.38	1	ug/L	86	92 138	70-130	5.6 46.4	0-60		LFM	
		DKETHYLHEXYL)-PHTHALATE	3	0,99	1.43	1	ս ց/ Լ	-201	-157	70-130	40.4 24.6	0-60 0-60	VA	LFM	
		HEPTACHLOR	ND	0.93	0.96	1	սթ.ե	83	96	70-130	3.2	0-60	VA	LFM	
	30517	HEPTACHLOR EPOXIDE	ND	0.88	0.86	1	ug/L	86	86	70-130	0.0	0-50		lfm Lfm	
	30517	HEXACHLOROBENZENE	ND	0.82	0.84	1	ug/L	82	84	70-130	2.4	0-50		LFM	
	30517	HEXACHLOROCYCLO-PENTADIENE	ND	0.74	0.73	1	ug/L	74	73	70-130	2.4 1.4	0-60		LFM	
	30517	SIMAZINE	ND	0.98	0.89	1	ug/L	98	89	70-130	9.6	0-60		LFM	
	30517	PENTACHLOROPHENOL	ND	4.32	4.07	4	ug/L	108	102	70-130		0-50		LFM	
	30517	ALDRIN	ND	0.84	0.98	1	ug/L	84	96	70-130		0-60		LEM	
	30517	BUTACHLOR	ND	0.91	0.88	1	ug/L	91	88	70-130		0-60		LFM	
		DIELDRIN	ND	1.02	1.07	1	ug/L	102	107	70-130		0-60		LFM	
		METOLACHLOR	ND	0.96	1.01	1	ug/L	96	101	70-130		0-60		LFM	

%RPD = Relative Percent Difference

NA = Indicates %RPD could not be calculated

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) analyses are used to determine the accuracy (MS) and precision (MSD) of a analytical method in a given sample matrix. Therefore, the usefulness of this report is limited to samples of similar matrices analyzed in the same analytical batch.

Only Duplicate sample with detections are listed in this report



Matrix Spike

Page 2 of 3 Reference Number: 06-14429 Report Date: 12/8/2006

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					Craphica									
Baich	Da	Americka.		Spika	Spike	Spike		Perce	nt Recovery				`≁ QC	
		Anatyle	Result	Result	Result	Conc	Units	MS	MSD	Limite	%RPD	Limits	Qualitier	Comme
		METRIBUZIN	ND	1.01	0.92	1	ug/L	101	92	70-130	9.3	0-60		FM
		PROPACHLOR	ND	0.97	0.98	1	ug/L	97	98	70-130	1.0	0-60		FM
		BROMACIL	ND	1.03	1.04	1	ug/L	103	104	70-130	1.0	0-60		FM
		TERBACIL	ND	1.22	1.22	1	ug/L	122	122	70-130	0.0	0-8D'		FM
		DIAZINON	ND	1.03	0.87	1	ug/L	103	87	70-130	16.8	0-80		FM
		EPTC	ND	1.11	1.13	1 -	ug/L	111	113	70-130	1.8	0-60		FM
		4.4-000	ND	0.88	0.91	1	ug/L	88	91	70-130	3.4	0-60		FM
		4,4-DDE	ND	0.86	0.9	1	ug/L	86	80	70-130	4.5	0-60		FM
		4,4-ODT	ND	0.91	0.87	1	ug/L	91	87	70-130	4.5	0-60		FM
		CYANAZINE	ND	0.81	0.71	1	ug/L	81	71	70-130	13,2	0-60		
	30517	MALATHION	ND	1.11	1.02	1	ug/L,	111	102	70-130	8.5	0-60		FM
	30517	PARATHION	ND	0.95	0.89	1	ug/L	95	89	70-130	6.5	0-60		FM Tha
	30517	TRIFLURALIN	ND	0.74	0.68	1	ug/L	74	68	70-130	a.o 8.5	0-6D		FM
	30517	FLUORENE	ND	1.02	1.03	1	- <u>-</u> - υg/L	102	103	70-130			LF	
	30517	ACENAPHTHYLENE	ND	1.1	1.11	1	ug/L	110	111	70-130	1.0	0-60	LF	
	30617	ANTHRACENE	ND	0.98	0.88	1	ug/L	98	88	70-130	0.9	0-60	LF	
	30517	BENZ(A)ANTHRACENE	ND	0.72	1.1	1	ug/L	72	110		10.8	0-60	LF	
		BENZO(B)FLUORANTHENE	ND	0.8	1.1	1	ug/L	80	110	70-130	41.B	0-60	LF	
		BENZO(G,H,I)PERYLENE	ND	0.81	0.98	1	ug/L	81		70-130	31.6	0-80	LF	
		BENZO(K)FLUORANTHENE	ND	0.74	1.18	1	ug/L	74	98 118	70-130	19.0	0-60	LF	
	30517	CHRYSENE	ND	0.72	1.09	, 1	ug/L		109	70-130	45.B	0-80	LF	
	30517	DIBENZO(A,H)ANTHRACENE	ND	0.86	0.92	1	ug/L	72 86	92	70-130	40.9	0-60	LF	
		INDENO(1,2,3-CD)PYRENE	ND	0.89	1.11	1	ug/L	89	92 111	70-130	6.7	0-60	ĹF	
		PHENANTHRENE	ND	1.02	1.06	t.	ug/L	102	106	70-130	22,0	0-60	LF	
		PYRENE	ND	1.01	1.04	1	ug/L	101	104	70-130	3.8	0-60	LA	
	30117	SENTH CLIDI DUTIN ATT STORE					•		104	70-130	2.9	0-60	LFI	M
		UPNBUTTLY HIMALATE	0.9	-			ug/L			70 120	0.4		a nga ngangaa	
		DIETHYL PHTHALATE	ND				ug/L			70-130	3.1	0-60	S LFI	
										70-130	0.0	0-60	LFI	M
	30517	1,3-DIMETRYL-2-NITROBENZENE (Sur	74	71	87		1. 1925 1924	an Sin tan		70.400				
		PYRENE-D10 (Surr)	84	91	97		%		- NA	70-130	NA	0-60	LFI	
		PERYLENE-D12 (Surr)	99	109	101				NA	70-130		0-60	LF	
		TRIPHENYLPHOSPHATE (Sum)	95 91	92	96		% W		NA	70-130		0-60	LFN	
25X 061113				92	00		%		NA	70-130	NA	0-60	LFN	м
~~~_~~	30517	HEXAZINONE				_	_							
	00017		ND	1.24	1.18	1	ug/L	124	118	70-130	5.0	0-60	LFN	vi
49_061106	00546													
	30516	PARAQUAT	ND	9.91		20	ug/L	50	NA	70-130	NA	0-50	LQ LFN	đ

Duplicate

%RPD = Relative Percent Difference

NA = indicates %RPD could not be calculated

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) analyses are used to determine the accuracy (MS) and precision (MSD) of a analytical method in a given sample matrix. Therefore, the usefulness of this report is limited to samples of similar matrices analyzed in the same analytical batch.

Only Duplicate sample with detections are listed in this report

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EDECE ANALYTICAL Die kild grad cult by have	$\checkmark\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!$							Page 3 of 3 Reference Number: 06-14429 Report Date: 12/8/2006
Matrix Spike	•		Duplicate					
Batch Semple Analyte	Result	Spike Result	Spike Spik Result Conc	<u>Percent Recovery</u> MS MSD Lin	mits %RPD	Limits	'≁ QC Qualifier	Commenia

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) analyses are used to determine the accuracy (MS) and precision (MSD) of a analytical method in a given sample matrix. Therefore, the usefulness of this report is limited to samples of similar matrices analyzed in the same analytical batch.

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Only Duplicate sample with detections are listed in this report

[%]RPD = Relative Percent Difference

NA = Indicates %RPD could not be calculated



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Page 1 of 1

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## QUALITY CONTROL REPORT SURROGATE REPORT

Reference Number: 06-14429 Report Date: 12/08/06

30518	30518 525_061113	508_061113 30518 515_061113			30517	30517 525 061113	508_061113 30517 515_061113	30516	30516 525_061113	508_061113 30518 515_061113		30515	30515 525_061113	30515 30515	Lab No
1,3-DMETHYL-2-NJTROBENZENE (Swr) PYRENE-D10 (Swr) PERYLENE-D12 (Swr) TRIPHENYLPHOSPHATE (Swr)	2,4 - DCAA (SURR)	TETRACHLORO-M-XYLENE (SURR)	TRIPHENYLPHOSPHATE (Sun)	PERYLENE-D12 (Sum)	1,3-DRAETHYL-2-NITROBENZENE (Sun) PYRENE-D10 (Sun)	2,4 - DCAA (SURR)	TETRACHLORO-M-XYLENE (SURR)	1,3-DIMETHYL-2-NITROBENZENE (Sum) PYRENE-D10 (Sum) PERYLENE-D12 (Sum) TRIPHENYLPHOSPHATE (Sum)	2,4 - DCAA (SURR)	TETRACHLORO-M-XYLENE (SURR)	PERVLENE-012 (Sur) TRIPHENYLPHOSPHATE (Sur)	1,3-DIMETHYL-2-NITROBENZENE (Surr) PYRENE-D10 (Surr)	2,4 - DCAA (SURR)	TETRACHLORO-M-XYLENE (SURR)	Analyte
78 86 105 104	130	78	91	99	74	74	ß	97 22 88 80 97	88	01 89	102 94	812 818	8	71	Result Qualifier
***	*	ጽ	¥	농 귀	e %	×	ጽ	<b>ጽ</b> ጽዮጽ	¥	ጽ	* *	* *	ሄ	\$	Units
526.2	515.1	508.1			525,2	515.1	508.1	525-2	516.1	508.1		525,2	515.1	508.1	Method
Acceptance Range is 70% to 130% Acceptance Range is 70% to 130% Acceptance Range is 70% to 130% Acceptance Range is 70% to 130%	Acceptance Range is 60% to 140%	Acceptance Range is 42% to 137%	Acceptance Range is 70% to 130%	Acceptance Rance is 70% to 130%	Acceptance Range is 70% to 130%	Acceptance Range Is 60% to 140%	Acceptance Range is 42% to 137%	Acceptance Range is 70% to 130% Acceptance Range is 70% to 130% Acceptance Range is 70% to 130% Acceptance Range is 70% to 130%	Acceptance Range is 80% to 140%	Acceptance Range is 42% to 137%	Acceptance Range is 70% to 130% Acceptance Range is 70% to 130%	Acceptance Range is 70% to 130% Acceptance Range is 70% to 130%	Acceptance Range is 60% to 140%	Acceptance Range is 42% to 137%	Limit

"Notation:

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A surrogate is a pure compound added to a sample in the laboratory just before processing so that the overall efficiency of a method can be determined. The Acceptance Limits (or Control Limits) approximate a 99% confidence interval around the mean recovery.

ject#:       ject#:       Peerf       Peerf
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Forms λq Gina Clark

### يع (feet) 4) Length of Water in Column 5 U Value on Line 1- Value on Line 2 5 **Final Depth To Water** Initial Depth to Water Total Weil Depth (feet) WT** (feet) The surveyed point on the inside (usually PVC) casing Water Level Data **Hach Conductivity Meter** HF Scientific ORT-15 CE Turbidi Meter Solinst Water Level Meter Model 101 120.5X 28.05 20.84 53.10 **Outside Casing Diameter Porosity of Filter Pack** Filter Pack Length **Bore Hole Diameter** 2 5 Z **D**₃ (in.) % (feet) Î. Well Construction Data 6; 25 Ь³ 12 **Calculate Casing Volume** in Gallons L1 25.05 **Volumes Purged** Number of Bore Purged (gals) Actual Volume Total Purge Volume (gals) CV*(3)= TPV(gals) in Gallons CV 4,01 *0.16 = Well Purging Data <u>|</u> 2.00BV satisfactory 4.01 CV 2.00 3 15

SAMPLING METHOD: Battery Operated Whale Water

Mini Purge Pump

CONDITION of WELL:

FIELD ANALYST: Laura Hofbauer FIELD SAMPLER: Laura Hofbauer PROJECT NAME:

Hall-Wentland SAR Project

No.:

DATE: 12/27/06

WELL NO: HW - 1

Page

2

Kuo Testing Labs, Inc.

Groundwater Sampling Field Data Sheet

FIELD INSTRUMENTS USED: Orion pH Meter model 210A

The depth to the water table before removing any water from the well

# WELL PURGING MEASUREMENTS

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. . . Web Site: (509) 488-0112 Phone: (509) 488-0118 Fax http://www.kuotesting.com e-mail: 337 South 1st Avenue, Othello, WA 99344 (800) 328-0112 Toll Free -kuotest(a)atnet.net

12/27/2006 DATE COLLECTED

IN STER CONSTONER

Project Name:	Ground Water Solutions, Inc. 1020 N. Center Pkwy, Ste F Kennewick WA 993	
	utions, Inc. wy, Ste F WA 99336	

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HW-1 HW-1	HW-1	HW-1	HW-1	HW-1	
e					er Angla Angla
COD Fecal Coliforms	Chloride Orthophosphate as P	Total Dissolved Solids Hardness	Nitrite as Nitrogen	Nitrate as Nitrogen	소 말 :
oliform	e Iosphati	issolve	is Nitro	as Nitro	1
S.	e as P	i Solid	gen	gen	

PEND CONTRACTO 12/28/200 OVLE MOUND DATE REPORTED 2/7/2007 .

Ground Water Solutions, Inc. 1020 N. Center Pkwy, Ste F Kennewick 1.1.1 W/A 99336

<0.12 0.12 ND	0.71 108 90.0	REVILLES
0.297 0.0433 8	0.21 0.0023 21.1 0.11	
mg/L mg/L ng/L cfu/100mL	mg/L mg/L	- 
Hatch Hatch Micro Analytical	Hatch Hatch Hatch Hatch	2155-151 1

 ${<}0.001$  }: indicates the analyte was not detected at or above the concentration indicated. ND: None Detected mg/L:Indicates milligrams per litre PQL=Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions

MDL: Method Detection Luxit Please check out our new Web Site at <u>http://www.kuatesting.com</u>

TNTC= Too Numerous To Count

Dr. Eugene Kuo, Quality Assurance Manager 1k

Date

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Forms Åq Gina Clark

## **WET** PURGING MEASUREMENTS

Community The manager	Ξ	Temperature		Turhidity	Piiroe
ature Conductivity Turbidity			I		
	Ш	Temperature	tivity	Turbidity	Pu

			v PVC) casing	ide (usualh	The surveyed point on the inside (usually PVC) casing
ς.	G			32,93	Value on Line 1– Value on Line 2 32,93 (feet)
<u> </u>	Number of Bore				4) Length of Water in Column
15	Actual Volume Purged (gals)				
s) 15.8	Total Purge Volume (gals) CV*(3)= TPV(gals)	25	Porosity of Filter Pack N (%)		
<u></u> 2 BV	CV <u>5, 2'1</u> 12 = <u>2</u> , <u>63</u> BV in Gallons	12	Filter Pack Length L ₂ (feet)	17.10	3) Final Depth To Water
<u>7</u> CV	L ₁ <u>32</u> <u>H</u> 3 *0.16 = <u>5, 27</u> CV in Gallons	6"	Bore Hole Diameter D ₃ (in.)	16.97	<ol> <li>Initial Depth to Water WT** (feet)</li> </ol>
	Calculate Casing Volume	2"	Outside Casing Diameter D ₂ (in.)	49.70	1) Totai Well Depth (feet)
y Data	Well Purging Data		Well Construction Data		Water Level Data

	Porosity of Filter Pack	Final Depth To Water $ \gamma_{i} O$ Filter Pack Length L ₂ (feet)	Initial Depth to Water $W_7^{**}$ (feet) $W_7^{**}$ (feet) $W_7^{**}$ (in.)	Total Well Depth (feet) $4 \mathcal{Q}, \mathcal{P} \mathcal{O}$ Outside Casing Diameter $\mathbf{D}_2$ (in.)	Water Level Data Well (	Solinst Water Level Meter Model 101 HF Scientific ORT-15 CE Turbidi Meter
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Actual Volume	Total Purge Volume (gals) CV*(3)= TPV(gals)	CV <u>5,2'/</u> /2 = <u>2</u> , <u>63</u> BV in Gallons	L ₁ <u>32 G3</u> *0.16 = <u>5, 27</u> CV in Gallons	Calculate Casing Volume	Well Purging Data	satisfactory
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FIELD INSTRUMENTS USED: Orion pH Meter model 210A SAMPLING METHOD: Battery Operated Whale Water

Mini Purge Pump

CONDITION of WELL:

DATE: 12/27/06

WELL NO: HW - 2

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Hach Conductivity Meter

FIELD ANALYST: Laura Hofbauer FIELD SAMPLER: Laura Hofbauer PROJECT NAME:

Hall-Wentland SAR Project

No.:

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Kuo Testing Labs, Inc.

Groundwater Sampling Field Data Sheet

IO Test 337 South 1st Avenue, Othello, WA 99344 อ ц С , SQ

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* PQL=Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions MDL: Method Detection Limit

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Dr. Exgene Kuo, Quality Assurance Manager

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(feet)

# WELL PURGING MEASUREMENTS

Water Level Data	Well Construction Data		Well Purging Data	
1) Total Well Depth (feet) 50.05	Outside Casing Diameter D ₂ (in.)	2"	Calculate Casing Volume	
2) Initial Depth to Water $Q_{4}/\mathcal{O}$ WT** (feet)	Bore Hole Diameter D ₃ (in.)	6"	L ₁ <u>A595</u> *0.16 = <u>4,15</u> CV in Gallons	
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Groundwater Sampling **Field** Data Sheet

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PROJECT NAME: Hall-Wentland SAR Project No.:	WELL NO: HW - 3
FIELD SAMPLER: Laura Hofbauer	DATE: 12/27/06
FIELD ANALYST: Laura Hofbauer	
SAMPLING METHOD: Battery Operated Whale Water Mini Purge Pump	
FIELD INSTRUMENTS USED: Orion pH Meter model 210A	CONDITION of WELL:

Solinst Water Level Meter Model 101

satisfactory

HF Scientific ORT-15 CE Turbidi Meter

**Hach Conductivity Meter** 

Web Site: http://www.kuotesting.com e-mail: kuotest@atnet.net (509) 488-0112 Phone: (509) 488-0118 Fax uo lestin 337 South 1st Avenue, Othello, WA 99344 С О (800) 328-0112 Toll-Free (1999) n, SC 

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mg/L:Indicates milligrams per litre
* PQL=Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions

 $<\!(0.001)$ : indicates the analyse was not detected at or above the concentration indicated. ND: None Detected

MDL: Method Detection Limit P*tease check out our new Web Site at <u>http://www.kuotesting.com</u>* 

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Dr. Eugene Kuo, Quality Assurance Manager

Date 0 N 0 7-07

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* PQL=Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions
MDL: Method Detector Limit
Please check out our new Web Site or <a href="http://www.kuotesting.com">http://www.kuotesting.com</a>

**TNTC= Too Numerous To Count

Dr. Eugene Kuo, Quality Assurance Manager

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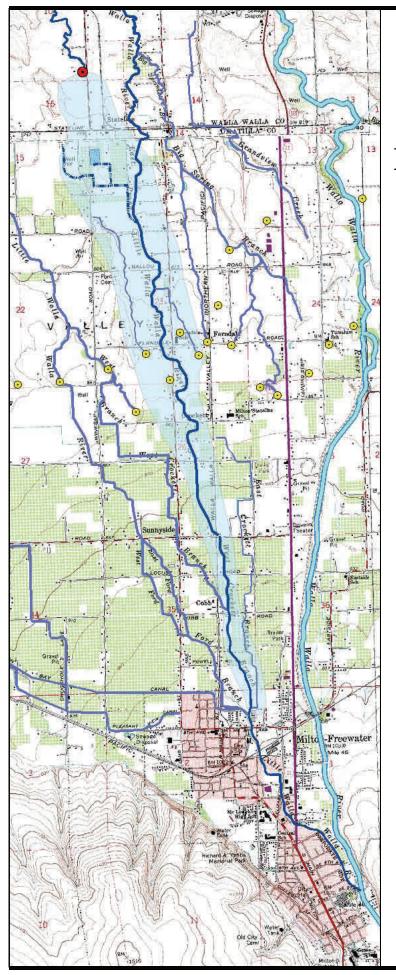
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Appendix C

Hall-Wentland Recharge Project, Long-Term Implementation Strategy, prepared by Fountainhead, June 2007



### STRATEGIC PLAN

### HALL-WENTLAND RECHARGE PROJECT

Long-Term Implementation Strategy

WALLA WALLA COUNTY WATERSHED PLANNING DEPT. GRANT NO. G0600312

> compiled by JOHN WARINNER, PE FOUNTAINHEAD

### in cooperation with

Native Creek Society Groundwater Solutions Washington Department of Ecology Walla Walla River Irrigation District Oregon Water Resources Department Walla Walla Basin Watershed Council Oregon Department of Fish and Wildlife Walla Walla County Watershed Planning Walla Walla County Conservation District

**JUNE 2007** 

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	Short-Term Implementation Strategy
	Long-Term Implementation Strategy
	Feedback
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	Rationale
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	Scope
3	Short-Term Implementation Strategy
	Desired Outcome
	System Description
	Core Activities
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### **1.0 Executive Summary**

### 1.1 Background and Purpose

Over the past 50 to 60 years, substantial increases in groundwater and surface water use – and various other factors – have resulted in declining shallow groundwater levels, diminished spring creek flows, reduced base streamflow, and increased water temperature in surface streams.

In 2003, Tom Page – a Walla Walla County landowner – initiated the Hall-Wentland Shallow Aquifer Recharge Project as an experiment to determine the degree to which intentional inundation of upgradient fields would increase the discharge of water from McEvoy Spring.

Over the past several years, Mr. Page and others have monitored and operated this project to improve our technical understanding of the hydrogeological response of the shallow gravel groundwater aquifer – and associated springs – to this intentional recharge activity, and to replenish upgradient groundwater to increase the base discharge from McEvoy Spring.

This monitoring and operational testing has been performed under Grant No. G0600312, funded by the Washington Department of Ecology (WDOE) and administered by the Walla Walla County Watershed Planning Department (WWCWPD).

The purpose of this Strategic Plan is to organize an ongoing strategic effort to:

- 1. Sustain short-term implementation of the Hall-Wentland Recharge Project through the duration of the Limited License authorized by the Oregon Water Resources Department.
- 2. Catalyze long-term, seasonal replenishment of McEvoy Spring which feeds McEvoy Spring Branch, a small tributary of the Walla Walla River.

### 1.2 Short-Term Implementation Strategy

The primary goal of the short-term implementation strategy is to sustain monitoring and operation of the Hall-Wentland Recharge Project through the duration of the Limited License authorized by the Oregon Water Resources Department (16 NOV 2005 through 1 NOV 2010, with a use season from November 1 through April 15 each year).

A secondary goal of the short-term implementation strategy is to supplement the flow of water in the East Prong Little Walla Walla River with water diverted from the Walla Walla River, so that the operators of the Hall-Wentland Recharge Project can test the capacity of the system to infiltrate water, and to evaluate the response of the system to an increased recharge rate.

Accomplishing the primary goal requires operation of the Wells Ditch system and the Hall-Wentland recharge site. Accomplishing the secondary goal requires the additional operation and management of systems that divert streamflow from the Walla Walla River and convey it to the East Prong Little Walla Walla River (both within and beyond the Walla Walla River Irrigation District).

Operation of the Hall-Wentland Recharge Project to accomplish the primary goal involves the following core activities:

- 1. Catalyze Project
- 2. Sponsor and Administer Project
- 3. Fund Project
- 4. Authorize Control and Use of Water and Potential Environmental Effects
- 5. Hold Limited License with OWRD (and other permits)
- 6. Provide Access to Land Used as Recharge Site
- 7. Hold Lease with Landowner
- 8. Monitor Hydrological Conditions
- 9. Evaluate Hydrological Conditions
- 10. Manage and Control Water
- 11. Underwrite Risks of Accidental Harm

Expansion of the Hall-Wentland Recharge Project to accomplish the secondary goal involves the following additional activities:

- 12. Confirm and/or Increase Hydraulic Capacity of Wells Ditch
- 13. Divert Streamflow from Walla Walla River
- 14. Convey Water to WWRID Boundary
- 15. Convey Water from WWRID Boundary to Wells Ditch
- 16. Underwrite Additional Risks of Accidental Harm

To sustain monitoring and operation of the Hall-Wentland Recharge Project through the duration of the Limited License authorized by the Oregon Water Resources Department, Fountainhead recommends an adaptive process featuring three main steps:

- Step One. Organize the People
- Step Two. Organize the Money
- Step Three. Implement the Current Possibilities

The first step is for the project Champion/Catalyst (Tom Page) to identify an appropriate Local Sponsor/Administrator to replace Walla Walla County Watershed Planning Department, who have communicated their intention to cease serving in this capacity. Fountainhead recommends the Walla Walla Basin Watershed Council as the most appropriate and capable replacement for the Sponsor/Administrator role.

The new Sponsor/Administrator and Mr. Page should then work together to identify and secure commitments from the remaining required parties. Fountainhead provides a table summarizing recommended parties for each required role, in the order they should be approached.

Once the Sponsor/Administrator and Champion/Catalyst have assembled the complete project team, they should request that each team member prepare an operational budget for each proposed activity under two scenarios: full operation of the system; and limited operation of the system (no supplementation of streamflow in the East Prong Little Walla Walla River).

The Sponsor/Administrator should then compile a complete budget for each of the two scenarios, then contact prospective funders to determine the level of funding available for the project.

Finally, the Sponsor/Administrator should secure an associated grant contract, execute associated subcontracts with each subcontractor, and implement the project.

### 1.3 Long-Term Implementation Strategy

The primary goal of the long-term implementation strategy is to catalyze and sustain long-term, seasonal replenishment of McEvoy Spring.

This goal can potentially be accomplished in a variety of ways – and it is likely to in the context of a comprehensive regional groundwater management program, rather than an independent effort targeted specifically at McEvoy Spring.

Since the specific recharge areas and water flow paths through which water flows to McEvoy Spring – and other springs similar to McEvoy Spring – are currently unknown, this is likely to remain an experimental effort into the foreseeable future.

To accomplish the stated goal of long-term, seasonal replenishment of McEvoy Spring, Fountainhead recommends an iterative, adaptive process featuring four main steps:

- Step One. <u>Measure</u> the location and timing of current water flow paths
- Step Two. <u>Communicate</u> monitoring results and cultivate the engagement of water users
- Step Three. Establish increasingly clear goals regarding desirable water flow paths
- Step Four. Experiment with systems that can potentially improve water flow paths

Over the past five-to-six years, the Walla Walla Basin Watershed Council has developed an extensive monitoring system to measure streamflows, groundwater table levels, and spring discharges throughout the alluvial fan associated with the Walla Walla River and Little Walla Walla River system. This basic hydrological information provides an excellent foundation upon which to develop a long-term program for adaptive management of water flowing through the Walla Walla River and Little Walla River system – and it should be continued into the future to inform future water management decisions and to evaluate the effects of water management activities.

As more water flow information is collected, it will become increasingly important to convert these raw data into useful information that can guide on-the-ground water management activities. It will become equally important to publicize the results in a manner that increases public awareness and facilitates public engagement in decisionmaking and improved water management actions.

Ultimately, the members of the Walla Walla watershed community should develop clearly identified management points (specific groundwater wells and springs that will be used to indicate hydrological performance) and clearly stated goals regarding the desirable hydrological performance at each of these management points. Specific working performance goals should be identified for all the springs of social, ecological and/or economic importance in the Walla Walla River system – and adaptively refined over time. These performance goals will likely be based on known or estimated historical performance, balanced with other current demands on the hydrologic system.

As citizens become more aware of how water is flowing – and how we desire for water to flow – the remaining step will be to learn the most effective ways to control the flow of water to generate the desired results. This should include experimentation with a variety of water management techniques, including the following systems:

- Operate Hall-Wentland Recharge Project through Limited License period
- Increase flows to the Hall-Wentland recharge site by diverting water from the Walla Walla River to supplement streamflows in the East Prong Little Walla Walla River
- Evaluate and consider the potential value of reconfiguring the lower Wells Ditch system
- Evaluate effects of sustaining year-round flow in streams/ditches within WWRID
- Investigate potential ways to retrofit bulges within WWRID to recharge groundwater
- Investigate potential ways to decrease groundwater pumping in M-F vicinity

### 1.4 Feedback

Please provide feedback and constructive comments and recommendations to:

John Warinner, PE Fountainhead 1860 Blue Creek Road Walla Walla, WA 99362 509.529.2646 phone warinner@gohighspeed.com

### 2.0 Purpose & Scope

### 2.1 Purpose

The purpose of this Strategic Plan is to organize a strategic effort to:

- 1. Sustain short-term implementation of the Hall-Wentland Recharge Project through the duration of the Limited License authorized by the Oregon Water Resources Department.
- 2. Catalyze long-term, seasonal replenishment of McEvoy Spring which feeds McEvoy Spring Branch, a small tributary of the Walla Walla River.

### 2.2 Rationale

The rationale for this project has been described extensively in various previous documents (see bibliography in Chapter 5). In summary, a high degree of hydraulic connection occurs between surface water and shallow groundwater flowing through the Walla Walla Basin. Over the past 50 to 60 years, substantial increases in groundwater and surface water use – and various other factors – have resulted in declining shallow groundwater levels, diminished spring creek flows, reduced base streamflow, and increased water temperature in surface streams. Sustaining sufficient water supplies and restoring the ecological health of the Walla Walla River and its tributaries will require effective, integrated management of surface and ground waters, including effective, seasonal recharge and replenishment of groundwater aquifers.

### 2.3 Background

Tom Page – a Walla Walla County landowner – initiated the Hall-Wentland Shallow Aquifer Recharge Project in 2003, as an experiment to determine the degree to which intentional inundation of upgradient fields would increase the discharge of water from McEvoy Spring, located apparently downgradient from these fields.

Over the past several years, Mr. Page has encouraged other parties to add value to the project that he initiated. At Mr. Page's prompting, Walla Walla County Watershed Planning Department secured and administered funding from the Washington Department of Ecology to formalize and enhance the Hall-Wentland Shallow Aquifer Recharge Project. Under the technical guidance of Dr. Kevin Lindsey (a hydrogeologist formerly with Kennedy/Jenks Consultants and now with Groundwater Solutions), this groundwater recharge project has been monitored and operated to:

- improve our technical understanding of the hydrogeological response of the shallow gravel groundwater aquifer – and associated springs – to this intentional recharge activity (primary goal); and
- replenish upgradient groundwater to increase the base discharge from McEvoy Spring.

This monitoring and operational testing has been performed under Grant No. G0600312, funded by the Washington Department of Ecology (WDOE) and administered by the Walla Walla County Watershed Planning Department (WWCWPD).

The Hall-Wentland Recharge Project involves intentional diversion of streamflow from the East Prong Little Walla Walla River, conveyance of this water to the recharge site via Wells Ditch, and application of the water to agricultural fields (adjacent properties owned by Gordon Hall and Loren Wentland) using a practice similar to flood irrigation. The project also involves an array of monitoring wells and streamflow measurement stations used to record and evaluate the hydraulic response of the groundwater aquifer to the recharge water.

Oregon water law states that under the legal practice of irrigation, water must be put to the beneficial use of growing a crop. While recharge of groundwater aquifers is socially beneficial in many cases, groundwater recharge is currently not included among the beneficial uses associated with the authorized practice of irrigation. Therefore, intentional practice of groundwater recharge requires specific authorization from the Oregon Water Resources Department (OWRD).

In the case of the Hall-Wentland Recharge Project, OWRD has provided this authorization in the form of a Limited License – a temporary permit for the purpose of testing the feasibility of this form of water use. Long-term operation of the Hall-Wentland Recharge Project, beyond the five-year duration of the Limited License (16 NOV 2005 through 1 NOV 2010, with a use season from November 1 through April 15 each year), will require a permanent water right specifically for the purpose of groundwater recharge.

### 2.4 Scope

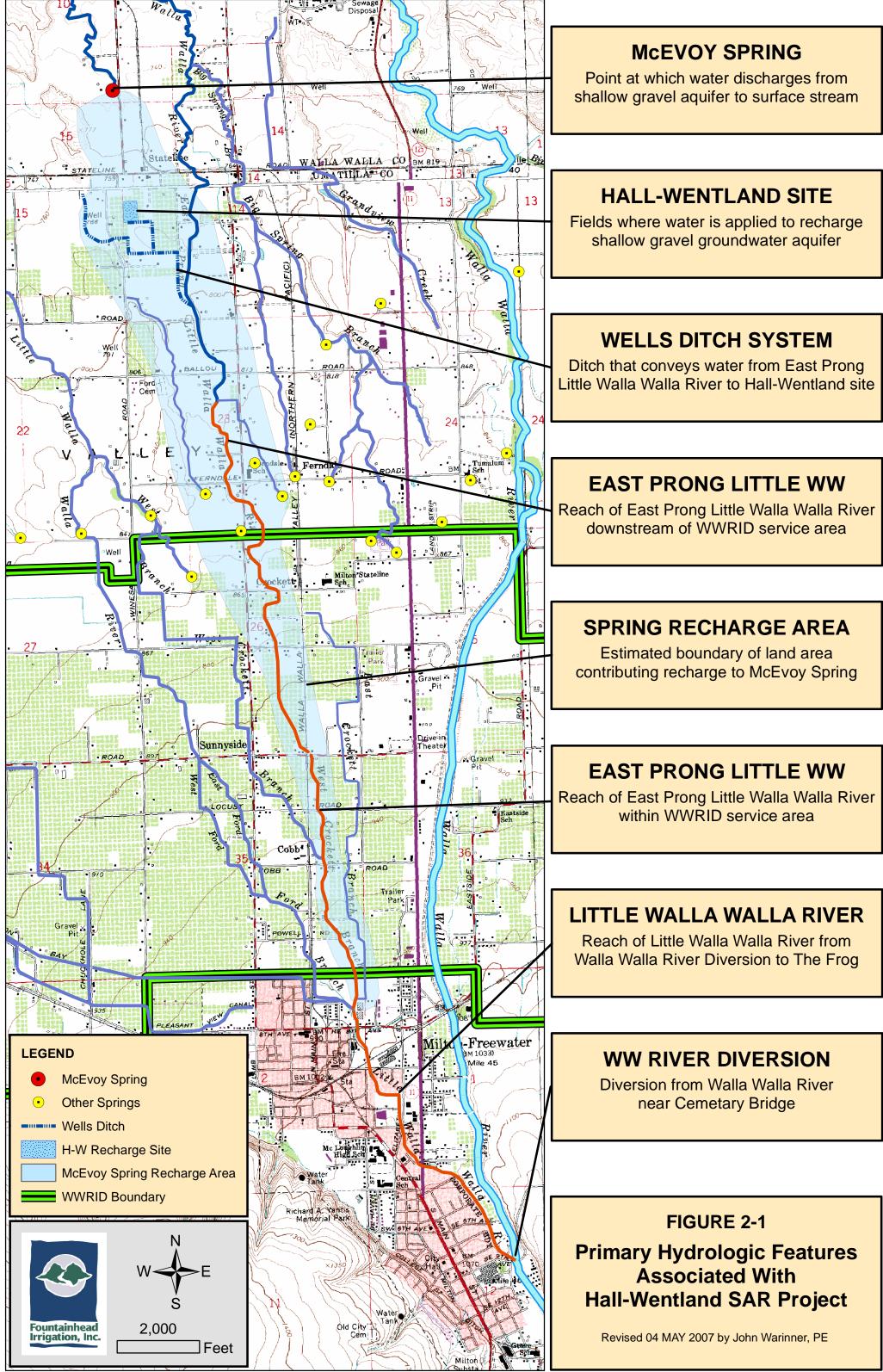
Due to the "ad-hoc" nature of this experimental project, Walla Walla County Watershed Planning hired the author of this Strategic Plan (Fountainhead) to develop a strategy for long-term operation of the Hall-Wentland Recharge Project. However, during the course of this effort, it became evident that the primary value of the Hall-Wentland Recharge Project is to gain practical information about one particular technique for recharging the shallow gravel aquifer. In time, it may become evident that there are more effective and/or more sustainable ways to seasonally replenish the flow of water through the shallow gravel aquifer to McEvoy Spring. Hence, operation of the Hall-Wentland Recharge Project (in its current form) may turn out to be a relatively short-term practice.

When these realizations came to light, Walla Walla County Watershed Planning Department requested a two-part strategy, including a short-term strategy for sustaining operation of the Hall-Wentland Recharge Project, and a long-term strategy for sustaining the flow of water from McEvoy Spring.

The geographic scope for both of these inquiries involves, to varying degrees, the complete hydrologic system upgradient of McEvoy Spring illustrated in Figure 2-1, including (from south to north):

- Walla Walla River, the stream reach conveying water from the Blue Mountains to the Little Walla Walla River diversion
- Little Walla Walla River diversion, the impoundment, headgate and screen system controlling the flow of water from the Walla Walla River into the Little Walla Walla River
- Little Walla Walla River, the stream reach conveying water from the Walla Walla River to the "Frog" (the point at which water is diverted into an array of various streams and ditches)

- East Prong Little Walla Walla River, the stream reach conveying water from the "Frog" to Wells Ditch
- Wells Ditch, the ditch system conveying water from the East Prong Little Walla Walla River to the Hall-Wentland Recharge Site
- Hall-Wentland Recharge Site, the agricultural lands owned by Gordon Hall and Loren Wentland (immediately south of Stateline Road and east of Winesap Road near Milton-Freewater, Oregon), and associated water control structures, used to spread water diverted from Wells Ditch and to allow it to infiltrate into the soil and percolate through the soil profile into the shallow gravel aquifer
- Shallow Gravel Aquifer, the geological deposits of coarse gravel, sand, silt and clay underlying the previously-listed elements that conveys water to McEvoy Spring (and other associated springs)



### 3.0 Short-Term Implementation Strategy

### 3.1 Desired Outcome

The primary goal of the short-term implementation strategy is to sustain monitoring and operation of the Hall-Wentland Recharge Project through the duration of the Limited License authorized by the Oregon Water Resources Department (16 NOV 2005 through 1 NOV 2010, with a use season from November 1 through April 15 each year).

A secondary goal of the short-term implementation strategy is to supplement the flow of water in the East Prong Little Walla Walla River with water diverted from the Walla Walla River, so that the operators of the Hall-Wentland Recharge Project can test the capacity of the system to infiltrate water, and to evaluate the response of the system to an increased recharge rate.

### 3.2 System Description

The primary elements of the hydrologic system associated with the Hall-Wentland Recharge Project was described and illustrated in Section 2.4.

Accomplishing the primary goal requires operation of the Wells Ditch system and the Hall-Wentland recharge site.

Accomplishing the secondary goal requires operation and management of the following elements of the hydrologic system:

- Little Walla Walla River diversion, the impoundment, headgate and screen system controlling the flow of water from the Walla Walla River into the Little Walla Walla River (normally operated and managed by Walla Walla River Irrigation District (WWRID))
- Little Walla Walla River, the stream reach conveying water from the Walla Walla River to the "Frog" (normally operated and managed by WWRID)
- East Prong Little Walla Walla River, the stream reach conveying water from the "Frog" to the northern boundary of the WWRID service area (normally operated and managed by WWRID)
- East Prong Little Walla Walla River, the stream reach conveying water from the northern boundary of the WWRID service area to Wells Ditch (normally operated and managed by individual, independent landowners)
- Wells Ditch, the ditch system conveying water from the East Prong Little Walla Walla River to the Hall-Wentland Recharge Site (normally operated by AJ Wentland and other landowners served by Wells Ditch)
- Hall-Wentland Recharge Site, the agricultural lands owned by Gordon Hall and Loren Wentland (immediately south of Stateline Road and east of Winesap Road near Milton-Freewater, Oregon), and associated water control structures, used to spread water diverted from Wells Ditch and to allow it to infiltrate into the soil and percolate through the soil profile

into the shallow gravel aquifer (recently operated by Tom Page as a subcontractor to Groundwater Solutions)

 Hall-Wentland Recharge Project groundwater monitoring system (recently operated by Groundwater Solutions and Tom Page)

### 3.3 Core Activities

Operation of the Hall-Wentland Recharge Project, in its current form, involves the following core activities.

#### 3.3.1 Catalyze Project

The Champion(s) or Catalyst(s) provide(s) the fundamental driving force behind the project. Project Champion/Catalysts are typically private landowners and/or local service providers with a personal understanding of the need for the project and the standing and will to vocalize and represent the value of the project. With the substantial need that exists for improved water management and ecological restoration throughout the Walla Walla Basin, potential projects are unlikely to occur in the absence of substantial representation by a Champion/Catalyst.

To date, Tom Page has served as the Champion/Catalyst. He remains committed to continue serving in this capacity, provided that public funding and administrative support remain available for the project.

#### 3.3.2 Sponsor and Administer Project

The Sponsor/Administrator organizes, assembles, and stewards the tasks, people, money and other resources required to perform the project. This task is especially necessary for projects that are unlikely to occur without substantial public funding. The Sponsor/Administrator must be an entity with authority/standing with the public funding agency(ies). In some cases, the Champion and the Sponsor/Administrator roles are performed by the same individual, or individuals within the same organization. However, in many cases, the Champion lacks the standing and/or capacity to play the Sponsor/Administrator role, so a third party performs this role.

To date, Walla Walla County Watershed Planning has served as Sponsor/Administrator. Walla Walla County Watershed Planning Department intends to discontinue operating in this role, due to their internal workload, production capacity, and professional qualifications. They desire for another, better-qualified organization to assume the role of Sponsor/Administrator for the project.

Participants in the development of this strategic plan discussed several possible organizations potentially suited to assume this role, including: Walla Walla Basin Watershed Council (WWBWC); Walla Walla County Conservation District (WWCCD); Walla Walla Water Management Initiative (WMI); Native Creek Society; McEvoy Spring Branch Restoration Group (an informal group of landowners currently restoring McEvoy Spring Branch); or an individual, such as Tom Page.

Private professional consulting firms (such as Groundwater Solutions and Fountainhead) are not the most appropriate organizations to serve as the Sponsor/Administrator for publicly-funded restoration projects.

### 3.3.3 Fund Project

The Funder(s) provide(s) the money required to purchase the labor, equipment and other resources required to implement the project.

To date, Washington Department of Ecology (WDOE) has served as primary Funder. In the context of the Walla Walla Water Management Initiative, WDOE and other local agencies have expressed an ongoing interest in – and commitment to – experimentation with recharge and replenishment of the shallow gravel aquifer.

Governmental funding of the Hall-Wentland Recharge Project is somewhat complicated by the Oregon-Washington state line. With the exception of some surface and ground water monitoring that occurs on the Washington side of the state line, almost all of the project activities occur in Oregon. However, the primary intent of these activities is to path Oregon surface water so that it flows underground through the shallow gravel aquifer to emerge (at least in part) from McEvoy Spring, which is located in Washington.

Due to complications with the expenditure of Washington State funds to pay for activities occurring in Oregon, it would be ideal to develop a project funding package combining funds from Oregonbased and Washington-based agencies. WDOE and Oregon Watershed Enhancement Board (OWEB) appear to be the leading candidates to serve as Funder for the Hall-Wentland project. However, the Walla Walla Basin Watershed Council, Walla Walla County Conservation District, and/or Walla Walla Watershed Alliance may be able and willing to secure funding from other sources.

### 3.3.4 Authorize Project

Depending on the project scope, project activities fall under the jurisdiction of one or more regulatory agencies.

#### 3.3.4.1 Authorize Control and Use of Water

According to state water laws in Oregon and Washington, water flowing through these states is owned by the respective state. Water flowing through Oregon is administered by the Oregon Water Resources Department. Water flowing through Washington is administered by the Washington Department of Ecology. These agencies must authorize the activities of other parties who desire to manage or otherwise affect the flow of water through these respective states. All the water control activities associated with the Hall-Wentland Recharge Project occur in the State of Oregon, and are therefore under the jurisdiction of Oregon Water Resources Department.

To date, OWRD has authorized the diversion of water from the East Prong Little Walla Walla River into and through Wells Ditch for application to the recharge site for the purpose of intentional groundwater recharge. OWRD has granted this authority in the form of a Limited License – a temporary permit for the purpose of testing the feasibility of this form of water use. The Limited License authorizes the diversion of water for a five-year term, beginning on November 16, 2005 and ending on November 1, 2010, with an annual season of use extending from November 1 through April 15 each year. This Limited License is actually held by WWRID, due to the fact that the license authorizes diversion of water from the Walla Walla River (at Cemetary Bridge), in addition to the East Prong Little Walla Walla River (at Wells Ditch).

This arrangement is somewhat problematic, as the Walla Walla River diversion system is an integral part of the WWRID system – however, the Wells Ditch system is not. Wells Ditch is used to

divert and convey water from the East Prong Little Walla Walla River at a location that lies far outside of the WWRID service area boundary. WWRID is concerned that this arrangement associates them with operations and risks that are beyond their jurisdiction and control. In light of the litigious battles they have been through in recent years, they are understandably reluctant to open themselves to liabilities in addition to those already associated with their own internal operations. At this juncture, they have expressed a willingness to consider shouldering this responsibility, but only if sufficient funds are provided to enable them to cover their associated y activities.

#### 3.3.4.2 Authorize Potential Effects on Threatened and Endangered Species

In the event that water control activities affect international treaties and/or threatened or endangered species, these activities are additionally subject to the jurisdiction of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), and state and federal agencies, including the Oregon and Washington Departments of Fish and Wildlife (ODFW and WDFW), National Marine Fisheries Service (NMFS), and the United States Fish and Wildlife Service (USFWS).

To date, no project participants have been required to grant express permission from these agencies to operate the Hall-Wentland Recharge Project, as the Hall-Wentland Recharge Project has been operated using only streamflows occurring naturally in the East Prong Little Walla Walla River. The primary goal of continuing to operate the recharge system in this manner can be accomplished without these additional activities and associated risks.

However, the secondary goal of supplementing streamflow in the East Prong Little Walla Walla River to increase the rate and volume of flow to the recharge project cannot be accomplished without addressing the fact that diverting streamflow from the Walla Walla River for intentional supplementation of flow in the East Prong Little Walla Walla River, may potentially attract threatened or endangered species of fish into upper reaches of the Little Walla Walla River system – where they are unlikely to survive due to migration barriers, out-of-stream uses of water, predation and other factors.

Prior to initiating operations of this nature, project participants must install structural devices to prevent problematic fish migration and/or obtain a "Safe Harbor Agreement" or similar written permission from the appropriate agency(ies) to protect themselves from legal liability.

These agencies have been involved in the regulatory review of the Limited License issued by OWRD – and have generally voiced their support for the project at this experimental phase.

#### 3.3.5 Hold Limited License with OWRD (and other permits)

The Limited Licensee holds the Limited License whereby OWRD grants permission to divert streamflows from the East Prong Little Walla Walla River and Walla Walla River for intentional recharge of groundwater at the Hall-Wentland Recharge site.

As discussed in Section 3.3.4, WWRID has served as the Limited License holder to date. They have expressed a willingness to continue serving in this capacity, provided that funds are made available to enable them to cover the costs associated with this function. Their responsibilities and associated costs are simpler and lower (respectively) if the Hall-Wentland Recharge Project is operated with streamflows flowing in the East Prong Little Walla Walla under normal operating conditions. WWRID is subject to more substantial risks and associated costs if they agree to divert

streamflow from the Walla Walla River to intentionally supplement streamflow in the East Prong Little Walla Walla River.

#### 3.3.6 Provide Access to Land Used as Recharge Site

The Landowners provide access to use their land as the surface that is intentionally inundated to path surface water to the shallow gravel groundwater aquifer. Historically, Gordon Hall and Loren Wentland have leased their land to Walla Walla County Watershed Planning Department for this purpose. Both parties have indicated a willingness to continue leasing their land for this purpose, provided they are equitably compensated and appropriately protected from liability for consequences of project activities.

#### 3.3.7 Hold Lease with Landowner

The Lease Holder holds the lease with the landowners whose property is used for the recharge site: Gordon Hall and Loren Wentland. To date, Walla Walla County Watershed Planning Department has served as the Lease Holder. However, Walla Walla County Watershed Planning Department intends to discontinue operating in this role, due to their internal workload, production capacity, and professional qualifications. They desire for another, better-qualified organization to assume the role of Lease Holder for the project.

Several possible organizations are potentially suited to assume this role, including: Walla Walla Basin Watershed Council (WWBWC); Walla Walla County Conservation District (WWCCD); Walla Walla Water Management Initiative (WMI); Native Creek Society; McEvoy Spring Branch Restoration Group (an informal group of landowners currently restoring McEvoy Spring Branch); or an individual, such as Tom Page.

In any event, the project budget should include sufficient funds to cover the cost of adequately insuring the Lease Holder and the Landowners against potential liability associated with the project.

#### 3.3.8 Monitor Hydrological Conditions

The Hydrological Monitor operates and maintains the monitoring system that measures the hydrologic response of surface and ground water features. Now that the monitoring system is installed and functional, this activity is limited to collecting (downloading) recorded data, servicing sensors and data recorders, and compiling recorded data into databases and/or spreadsheets that the project evaluator can use to evaluate the hydrological response of the system to recharge activities.

To date, Groundwater Solutions – in association with Tom Page – has served as the Hydrological Monitor. Groundwater Solutions and Tom Page remain interested in serving in this manner and they have clearly demonstrated their qualifications and capacity to perform these roles. However, since Groundwater Solutions is a private consulting firm, it is probably appropriate to invite them and other qualified organizations to competitively bid to provide these professional services as contracts are renewed to continue the project.

#### 3.3.9 Evaluate Hydrological Conditions

The Hydrological Evaluator analyzes the hydrological data collected by the project monitor to determine whether the recharge system ought to be operated, the rate at which the water manager(s) should deliver water to recharge project, and to characterize the hydrological performance and response of the groundwater recharge system. Functionally, the Hydrological

Evaluator serves as the technical leader of the project, with primary responsibility for directing the activities of the on-the-ground water manager(s) in coordination with the project champion/catalyst.

Historically, Kevin Lindsey of Groundwater Solutions (formerly with Kennedy/Jenks Consultants) has performed the role of Hydrological Evaluator and Technical Leader. Groundwater Solutions remains interested in serving in this manner and they have clearly demonstrated their qualifications and capacity to perform these roles. However, since Groundwater Solutions is a private consulting firm, it is probably appropriate to invite them and other qualified organizations to competitively bid to provide these professional services as contracts are renewed to continue the project.

#### 3.3.10 Manage and Control Water

The Water Manager(s) personally control(s) the headgates, ditches and other physical features that guide and control the flow of water from the original source(s) to the recharge site. Generally, these water control activities are performed under the direction of the Hydrological Evaluator (Technical Leader) who is responsible for evaluating hydrological conditions (see Section 3.2.5). Historically, Tom Page and AJ Wentland have served as Water Managers for the Hall-Wentland Recharge Project.

#### 3.3.11 Underwrite Risks of Accidental Harm

The Risk Underwriter(s) provide(s) insurance policies to cover potential harm that might occur as a result of intentional water control activities (see Section 3.3). Historically, Walla Walla County has opted not to purchase a specific insurance rider for this purpose. Rather, through contractual terms, they have required their subcontractors (such as Groundwater Solutions and Fountainhead) to demonstrate proof of professional liability insurance and to hold Walla Walla County harmless for any damages resulting from negligence of the professional services provider.

Since accomplishing the primary goal involves only operation of the Wells Ditch system and the Hall-Wentland recharge site, the risk exposure is substantially different than for the second goal which involves operation and management of the additional system elements between the Walla Walla River diversion and Wells Ditch diversion.

To accomplish the primary goal, insurance is required for seasonal operation of Wells Ditch and the Hall-Wentland recharge site.

Accomplishing the secondary goal is additionally complicated by other administrative and jurisdictional boundaries associated with the WWRID service area – and the associated presence and absence of formal maintenance of water conveyance channels within and outside of the WWRID service area. To accomplish the secondary goal, insurance is required for operation of the Walla Walla River diversion and the Little Walla Walla River channels from this point of diversion to the Wells Ditch point of diversion. This includes stream/ditch reaches both within and beyond the boundaries and jurisdiction of WWRID – which probably necessitates separate insurance policies held by separate organizations for these respective portions of the water conveyance system.

#### 3.3.12 Divert Streamflow from Walla Walla River

This activity is not necessary to achieve the primary goal. If the secondary goal is to be achieved, the secondary streamflow diverter must divert flow from the Walla Walla River (Diverter WWRID) and manage this water flow to supplement streamflow in the East Prong Little Walla Walla River system (Conveyor WWRID). As discussed previously, OWRD has granted permission for WWRID

to perform this function (from a water rights standpoint) via the Limited License. To date, this activity has not occurred for aforementioned reasons.

If the secondary goal is to be achieved, WWRID will almost certainly need to perform this role, due to their ownership of, and responsibility for, the existing streamflow diversion structure. The primary obstacles to this activity, which have been presented previously, are: (a) legal concerns relating to attraction of threatened and/or endangered species of fish into the upper reaches of the Little Walla Walla River system; (b) financial concerns relating to the need for additional insurance; and (c) jurisdictional concerns relating to operation and management of the stream system downstream of the WWRID boundary. All three of these issues must be addressed in order for WWRID to divert flow from the Walla Walla River and manage this flow to supplement flow in the East Prong Little Walla Walla River.

#### 3.3.13 Convey Water to WWRID Boundary

This activity is not necessary to achieve the primary goal. However, it is necessary to achieve the secondary goal. The discussion of this activity has been integrated into Section 3.3.13 regarding diversion of streamflow from the Walla Walla River into and through the WWRID system (Conveyor WWRID).

#### 3.3.14 Convey Water from WWRID Boundary to Wells Ditch

This activity is not necessary to achieve the primary goal. If the secondary goal is to be achieved, the secondary water conveyer must manage the supplemented streamflow downstream of the WWRID service area boundary to the point of diversion for Wells Ditch. As discussed previously, this stream reach lies outside of the WWRID service area and is therefore outside of their jurisdiction and control. For this reason, a different party (Conveyor Non-WWRID) must manage the flow of water – and associated risks – for this portion of the hydrologic system.

To date, no party has been required to perform this role, since WWRID has not diverted supplemental flows from the Walla Walla River. Possible organizations potentially suited to assume this role, include: Walla Walla Basin Watershed Council (WWBWC); Walla Walla County Conservation District (WWCCD); Walla Walla Water Management Initiative (WMI); Native Creek Society; McEvoy Spring Branch Restoration Group (an informal group of landowners currently restoring McEvoy Spring Branch); or an individual, such as Tom Page. If none of these parties are able and willing to provide this service, the function could potentially be included by a professional services contractor.

In any event, the project budget will need to include sufficient funds to cover the costs associated with this activity.

#### 3.3.15 Confirm and/or Increase Hydraulic Capacity of Wells Ditch

A Hydraulic Designer has determined the hydraulic capacity of Wells Ditch and designed the improvements required to enable Wells Ditch to convey additional streamflow to the Hall-Wentland recharge site. To achieve the secondary goal, a Hydraulic Contractor must improve Wells Ditch to provide additional hydraulic capacity.

Possible organizations potentially suited to assume this role, include: Walla Walla Basin Watershed Council (WWBWC); Walla Walla County Conservation District (WWCCD); Walla Walla Water Management Initiative (WMI); Native Creek Society; McEvoy Spring Branch Restoration Group (an informal group of landowners currently restoring McEvoy Spring Branch); or an individual, such as Tom Page or AJ Wentland. If none of these parties are able and willing to provide this service, the function could potentially be included by a professional contractor. In any event, the project budget will need to include sufficient funds to cover the costs associated with this activity.

### 3.3 Assumptions & Risks

An appropriate strategy for accomplishing the stated primary and secondary goals should carefully consider the following key assumptions and critical risks:

- 1. All water belongs to the state in which it occurs and its use is subject to the laws and policies of that respective state.
- 2. The portion of the shallow gravel aquifer associated with the Hall-Wentland project falls across the Oregon-Washington state line, presenting unique jurisdictional challenges.
- 3. The hydrologic system associated with the Hall-Wentland Recharge Project includes elements both beyond and within the Walla Walla River Irrigation District boundary, presenting additional jurisdictional challenges.
- 4. Oregon and Washington appear to have substantially different financial resources to invest in water conservation and ecological restoration projects and constraints on the geographic boundaries within which they can invest them.
- 5. No particular party is clearly responsible to seasonally replenish and sustain the flow of water into and through the shallow gravel aquifer.
- 6. Intentional control of water into and through surface streams and groundwater aquifers includes risks and hazards that must be anticipated and mitigated, including maintaining the hydraulic capacity of conveyance channels to safely convey flow under varying weather conditions, controlling the location and/or rate of water flow to prevent flooding, and minimizing the risk of drowning.
- 7. Intentional management of water to replenish groundwater flow is a relatively new and experimental practice for the people living in the Walla Walla Basin, requiring public subsidy and potentially new forms of organization and operation.
- 8. Leaders of the water conservation and ecological restoration community in the Walla Walla Basin have a finite capacity to initiate, administer and implement projects. Many, if not most, resource management organizations are currently operating at or near this capacity.
- 9. Walla Walla County Watershed Planning Department intends to discontinue operating in the role of sponsor/administrator for the Hall-Wentland Recharge Project, due to their internal workload, production capacity, and professional qualifications.

### 3.4 Strategic Path

Assembling the people and money required to accomplish a task is often a bit of a riddle. To attract public funding (money) you need a constituency (people) and a clear plan of action. However, it often seems easier to decide on a clear plan of action if you know how much money you have to work with – and who is going to do the work. So where is one to start?

In this situation, Fountainhead recommends an adaptive process featuring three main steps:

- Step One. Organize the People
- Step Two. Organize the Money
- Step Three. Implement the Current Possibilities

#### 3.4.1 Organize the People

Figures 3-1 and 3-2 illustrate a recommended way to organize the multiple parties required to perform the Core Activities identified in Section 3.3. Figure 3-1 illustrates the recommended flow of AUTHORITY and Figure 3-2 illustrates the recommended flow of MONEY.

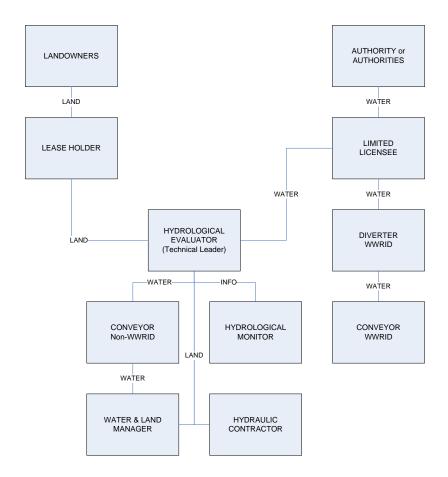


Figure 3-1. Organizational Chart Indicating Flow of AUTHORITY for Short-Term Implementation Strategy

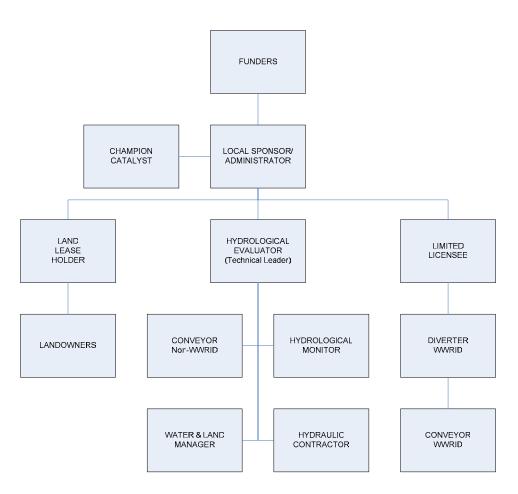


Figure 3-2. Organizational Chart Indicating Flow of MONEY for Short-Term Implementation Strategy

The first step is to fill in this organizational chart as completely as possible with committed project partners. This responsibility falls to the Champion/Catalyst – Tom Page – who initiated this project and remains the key party committed to its progress.

As Champion/Catalyst, Mr. Page's first priority should be to identify an appropriate Local Sponsor Administrator to replace Walla Walla County Watershed Planning Department, which has communicated its intention to cease serving in this capacity.

The new Sponsor/Administrator and Mr. Page should then work together to identify and secure commitments from the remaining required parties. Table 3-1 summarizes the local public service agencies recommended for each of the core activities described in Section 3.3. We recommend that the new Sponsor/Administrator and Mr. Page approach these parties in the order they are presented in this table. In light of current uncertainties regarding the availability of project funding, we recommend that Mr. Page and the new Sponsor/Administrator request commitments from the other parties subject to successful funding of the project.

To the maximum degree possible, local public service agencies should provide the required services. If local public service agencies lack capacity to provide a required service, the most qualified professional contractor(s) should be selected through an open, public solicitation for Statements of Qualifications from qualified parties.

ROLE	RECOMMENDED PARTNER	ALTERNATE PARTNER
Champion/Catalyst	Tom Page	None
Sponsor/Administrator	WW Basin Watershed Council	WW County Conservation Dist.
Landowners	Gordon Hall & Loren Wentland	None
Limited Licensee	WW River Irrigation District	WW Basin Watershed Council
Hydrological Evaluator (Technical Leader)	WW Basin Watershed Council	WW County Conservation Dist.
Hydrological Monitor	WW Basin Watershed Council	WW County Conservation Dist.
Lease Holder	WW Basin Watershed Council	WW County Conservation Dist.
Diverter WWRID	WW River Irrigation District	None
Conveyor WWRID	WW River Irrigation District	None
Conveyor Non-WWRID	WW Basin Watershed Council	Tom Page &/or AJ Wentland
Water Manager	Gordon Hall & AJ Wentland	Tom Page
Risk Underwriter(s)	Selected by Risk Holders	None
Authority	Oregon Water Resources Dept.	ODFW, CTUIR, NMFS, USFWS
Hydraulic Contractor	AJ Wentland	Private Contractor
Funder(s)	Washington Dept of Ecology	Oregon Watershed Enhancement Board

TABLE 3-1 Recommended Project Partners

#### 3.4.2 Organize the Money

Once the Sponsor/Administrator and Champion/Catalyst have assembled the complete project team, they should request that each team member prepare an operational budget for each proposed activity under two scenarios:

Scenario 1 should assume full operation of the system, including diversion of streamflow from the Walla Walla River to supplement streamflow in the East Prong Little Walla Walla River.

Scenario 2 should assume limited operation of the system, including no diversion of streamflow from the Walla Walla River and no supplementation of streamflow in the East Prong Little Walla Walla River (essentially continuation of the current operational program).

The Sponsor/Administrator should then compile two project budgets – one for each of the two scenarios.

Next, the Sponsor/Administrator should contact WDOE, OWEB, the Walla Walla Water Management Initiative (WMI) board, Funding Working Group and other prospective funders to determine the level of funding available for the project.

Finally, the Sponsor/Administrator should secure an associated grant contract – and execute associated subcontracts with each subcontractor as indicated in Figure 3-2 (chart of money flow).

#### 3.4.3 Implement the Current Possibilities

Clarifying the source(s) and amount(s) of available funding will greatly clarify how much is possible to accomplish at this juncture. It may prove possible to accomplish both the primary and secondary goals identified in Section 3.1. However, it may also become evident that sufficient funding is only available to accomplish the primary goal – and not the secondary goal – at this time.

### 4.0 Long-Term Implementation Strategy

### 4.1 Desired Outcome

The primary goal of the long-term implementation strategy is to catalyze and sustain long-term, seasonal replenishment of McEvoy Spring.

### 4.2 System Description

The primary elements of the hydrologic system associated with the Hall-Wentland Recharge Project were described and illustrated in Section 2.4.

### 4.3 Assumptions & Risks

An appropriate strategy for accomplishing the stated primary goal should carefully consider the following key assumptions and critical risks:

- 1. McEvoy Spring is one of over 30 springs associated with the shallow gravel aquifer and distributary stream systems flowing through and across the floor of the Walla Walla Basin.
- 2. No particular party is currently clearly responsible to seasonally replenish and sustain the flow of water into and through the shallow gravel aquifer to McEvoy Spring and other springs similar to McEvoy Spring.
- 3. Management of water to recharge McEvoy Spring is likely to occur in the context of a comprehensive regional groundwater management program, rather than an independent effort targeted specifically at McEvoy Spring.
- 4. The specific recharge areas and water flow paths through which water flows to McEvoy Spring and other springs similar to McEvoy Spring are currently unknown. However, groundwater monitoring results suggest that the water table slope and flow gradient generally follow the topographical gradient of the ground surface.
- 5. Operation of the Hall-Wentland Recharge System or a modified version of this system may prove to be an effective method for replenishing upgradient groundwater flows and sustaining seasonal discharge from McEvoy Spring.
- Sustaining year-round streamflows in the streams and ditches within the Walla Walla River Irrigation District may prove to be an effective method for replenishing upgradient groundwater flows and sustaining seasonal discharge from McEvoy Spring (and other springs similar to McEvoy Spring).
- Developing new recharge systems and/or retrofitting bulges within the Walla Walla River Irrigation District may prove to be an effective method for replenishing upgradient groundwater flows and sustaining seasonal discharge from McEvoy Spring (and other springs similar to McEvoy Spring.
- Decreasing pumping of groundwater from the shallow gravel aquifer upgradient from McEvoy Spring may prove to be an effective method for sustaining seasonal discharge from McEvoy Spring (and other springs similar to McEvoy Spring)

### 4.4 Strategic Path

To accomplish the stated goal of long-term, seasonal replenishment of McEvoy Spring, Fountainhead recommends an iterative, adaptive process featuring four main steps:

- Step One. Measure the location and timing of current water flow paths
- Step Two. <u>Communicate</u> monitoring results and cultivate the engagement of water users
- Step Three. Establish increasingly clear <u>goals</u> regarding desirable water flow paths
- Step Four. Experiment with systems that can potentially improve water flow paths

### 4.4.1 Measure Current Water Flow Paths

Over the past five-to-six years, the Walla Walla Basin Watershed Council has developed an extensive monitoring system to measure streamflows, groundwater table levels, and spring discharges throughout the alluvial fan associated with the Walla Walla River and Little Walla Walla River system. McEvoy Spring and McEvoy Spring Branch have been included in this monitoring program. Results of these monitoring efforts have been addressed in independent reports that should be consulted for details in this regard. This basic hydrological information provides an excellent foundation upon which to develop a long-term program for adaptive management of water flowing through the Walla Walla River and Little Walla Walla River system – and it should be continued into the future to inform future water management decisions and to evaluate the effects of water management activities.

The Walla Walla Basin Watershed Council has clearly demonstrated its capacity to lead this effort on both sides of the Oregon-Washington state line. Possible organizations potentially suited to add value to this effort include: Walla Walla County Conservation District (WWCCD); Walla Walla Water Management Initiative (WMI); Native Creek Society; Tri-State Steelheaders; McEvoy Spring Branch Restoration Group (an informal group of landowners currently restoring McEvoy Spring Branch); and individuals, such as Tom Page or AJ Wentland. The United States Geological Survey (USGS) and professional hydrogeologists and water resource engineers may also be able to add value to this effort.

### 4.4.2 Communicate Monitoring Results and Cultivate Water User Engagement

As more water flow information is collected, it will become increasingly important to convert raw data into useful information that can guide on-the-ground water management activities. It will become equally important to publicize the results in a manner that increases public awareness and facilitates public engagement in decisionmaking and improved water management actions. As more citizens become able and accustomed to accessing information via the Internet, this medium will undoubtedly be the preferred way to provide members of the general public with open and direct access to historical and current hydrological information.

Recent efforts have been made to provide a central link to the large and increasing volume of hydrological and ecological data associated with the Walla Walla Basin. The EKO-System program created by Paladin Data Systems in the context of the Bi-State Habitat Conservation Plan is probably the most notable and recent. Unfortunately, there have been various barriers to participation in the Paladin program. At this writing, the system has not been robustly adopted as the primary gateway to ecological information pertaining to the Walla Walla Basin.

In the context of current projects related to the Hydro North groundwater/spring monitoring program and the Walla Walla Water Management Initiative, the Walla Walla Basin Watershed Council and other parties are revisiting the universe of existing data and current data streams. In light of almost certain advancement in the realm of information-based decision-making, this area is worthy of substantial focus and investment.

Walla Walla Basin Watershed Council, Tri-State Steelheaders, the Confederated Tribes of the Umatilla Indian Reservation, state and federal water and fisheries agencies (OWRD, ODFW, WDOE, and WDFW), Walla Walla County Conservation District, the three local county governments (Umatilla, Walla Walla and Columbia Counties), Walla Walla Water Management Initiative (WMI), Native Creek Society, McEvoy Spring Branch Restoration Group (an informal group of landowners currently restoring McEvoy Spring Branch), and individuals, such as Tom Page have all demonstrated capacity to contribute to this effort. The United States Geological Survey (USGS) and professional hydrogeologists and water resource engineers may also be able to add value to this effort.

#### 4.4.3 Establish Increasingly Clear Goals Regarding Desirable Water Flow Paths

As more water flow information is collected, it will become increasingly important to convert these raw data into useful information that can guide on-the-ground water management activities. It will become equally important to publicize the results in a manner that increases public awareness and facilitates public engagement in decisionmaking and improved water management actions.

Ultimately, the members of the Walla Walla watershed community should develop clearly identified management points (specific groundwater wells and springs that will be used to indicate hydrological performance) and clearly stated goals regarding the desirable hydrological performance at each of these management points. These performance goals will likely be based on known or estimated historical performance, balanced with other current demands on the hydrologic system.

An example would be to identify McEvoy Spring as a hydrological monitoring point, and to establish the following as a working goal for the desired performance of McEvoy Spring:

#### Performance Goal for McEvoy Spring

The flow of water is managed upgradient from McEvoy Spring such that discharge from McEvoy Spring fluctuates from a minimum of 3 cfs during the summer-fall season to 6 cfs during the winter-spring season.

Similar goals should be identified for all the springs of social, ecological and/or economic importance in the Walla Walla River system – and adaptively refined over time. In time, it may become possible to correlate spring discharges to groundwater table elevations, such that multiple (and somewhat problematic) surface flow measurements can be replaced with groundwater table elevation measurements in dedicated monitoring wells.

#### 4.4.4 Experiment with Systems to Improve Water Flow Paths

As citizens become more aware of how water is flowing – and how we desire for water to flow – the remaining step will be to learn the most effective ways to control the flow of water to generate the desired results. This should include experimentation with a variety of water management techniques, including the following systems.

#### 4.4.4.1 Operate Hall-Wentland Recharge Project Through Limited License Period

At a meeting of interested stakeholders on January 19, 2007, the participants discussed and unanimously agreed that continuing operation of the Hall-Wentland Recharge Project – at least through the duration of the Limited License with Oregon Water Resources Department – would continue to yield desired value on the investments made to date. Participants also noted that continuing the project will also demonstrate due diligence in the pursuit of innovative solutions to local water management challenges.

The participants agreed that operation of the Hall-Wentland Recharge System – or a modified version of this system – may prove to be an effective method for replenishing upgradient groundwater flows and sustaining seasonal discharge from McEvoy Spring. They also agreed that, in the long-term, operation of the Hall-Wentland Recharge Project might be terminated in favor of other methods of groundwater management. However, results of continued project activities were required to evaluate the value of ongoing recharge activities at this particular location.

A strategy for short-term implementation of the Hall-Wentland Recharge Project was presented in Section 3 of this document.

Figure 4-1 illustrates an alternative for continuing operation of the Hall-Wentland Recharge Project in the same manner that has been conducted for the past two years.

Figure 4-2 illustrates an alternative for enhancing operation of the Hall-Wentland Recharge Project by diverting streamflow from the Walla Walla River in order to supplement streamflow in the East Prong Little Walla Walla River, so that this additional flow can be diverted into Wells Ditch and applied to the recharge site.

Figure 4-3 illustrates another alternative for enhancing operation of the Hall-Wentland Recharge Project by reconfiguring Wells Ditch to flow primarily to the Hall-Wentland recharge site, and then flowing into a gravity-fed pipeline to serve the downgradient reach currently served by Wells Ditch. This reconfiguration would improve positive control of water to the downstream end of Wells Ditch in a manner that would path surplus water into the shallow gravel aquifer rather than the existing outfall to Walsh Creek.

#### 4.4.4.2 Evaluate Effects of Sustaining Year-Round Flow in Streams/Ditches within WWRID

Sustaining year-round streamflows in the streams and ditches within the Walla Walla River Irrigation District may also prove to be an effective method for replenishing upgradient groundwater flows and sustaining seasonal discharge from McEvoy Spring (and other springs similar to McEvoy Spring). This water management strategy is illustrated in Figure 4-4.

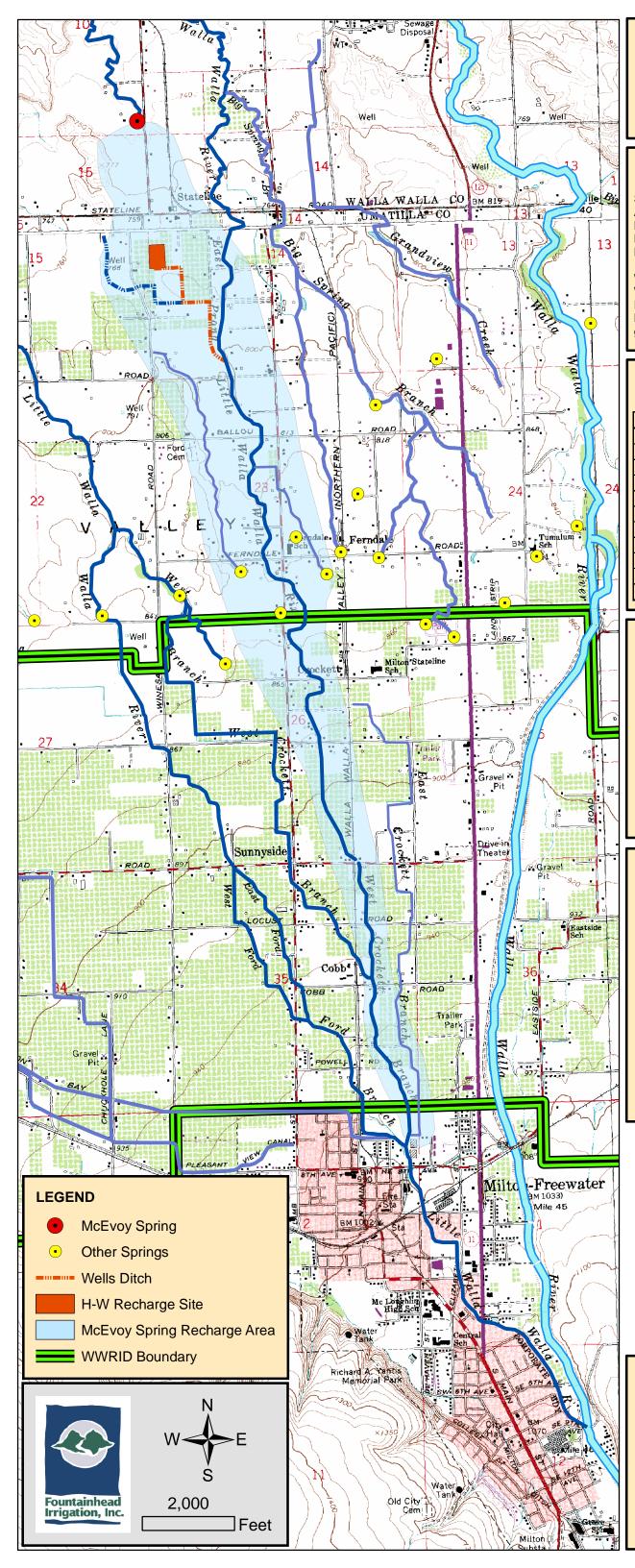
#### 4.4.4.3 Evaluate Effects of Retrofitting Bulges within WWRID to Recharge Groundwater

Developing new recharge systems and/or retrofitting bulges within the Walla Walla River Irrigation District may prove to be an effective method for replenishing upgradient groundwater flows and sustaining seasonal discharge from McEvoy Spring (and other springs similar to McEvoy Spring). This water management strategy is illustrated in Figure 4-5.

With support from the Walla Walla Watershed Alliance, Walla Walla Basin Watershed Council, and Walla Walla River Irrigation District, Fountainhead recently initiated an experimental project of this nature. However, early in this project, it became apparent that the timing was not conducive to successful implementation of this experiment. So the project was cancelled in lieu of better timing.

#### 4.4.4.4 Investigate Potential Ways to Decreasing Groundwater Pumping in M-F Vicinity

Decreasing pumping of groundwater from the shallow gravel aquifer upgradient from McEvoy Spring may prove to be an effective method for sustaining seasonal discharge from McEvoy Spring (and other springs similar to McEvoy Spring). This water management strategy is illustrated in Figure 4-6.



Discharge from McEvoy Spring fluctuates from 3 cfs (minimum) during summer-fall to 6 cfs during winter-spring (3,260 acre-feet).

# **MANAGEMENT STRATEGY**

SPONSOR/ADMINISTRATOR guides team activities AUTHORITY grants permission to LIMITED LICENSEE HYDRO MONITOR monitors flow of water through system HYDRO MONITOR provides flow data to HYDRO EVALUATOR HYDRO EVALUATOR directs actions of WATER MANAGER

WATER MANAGER diverts water from the East Prong Little Walla Walla River, conveys water via Wells Ditch to the Hall-Wentland Recharge Site, and applies it to land parcels owned by LANDOWNERS to augment water flow in the shallow gravel groundwater aquifer.

# **POTENTIAL PARTNERS**

CONTRIBUTOR	POTENTIAL PARTNERS
Champion/Catalyst	Tom Page
Sponsor/Administrator	WW Basin Watershed Council
Funder	WA Dept of Ecology and OWEB
Landowners	Gordon Hall and Loren Wentland
Land Lease Holder	WWBWC or WWCCD
Authority	Oregon Water Resources Dept.
Limited Licensee	WW River Irrigation District
Hydrological Evaluator	WWBWC, WWCCD or Contractor
Hydrological Monitor	WWBWC, WWCCD or Contractor
Water Manager	AJ Wentland, Tom Page or WWBWC
Risk Underwriters	TBD by Risk Holders

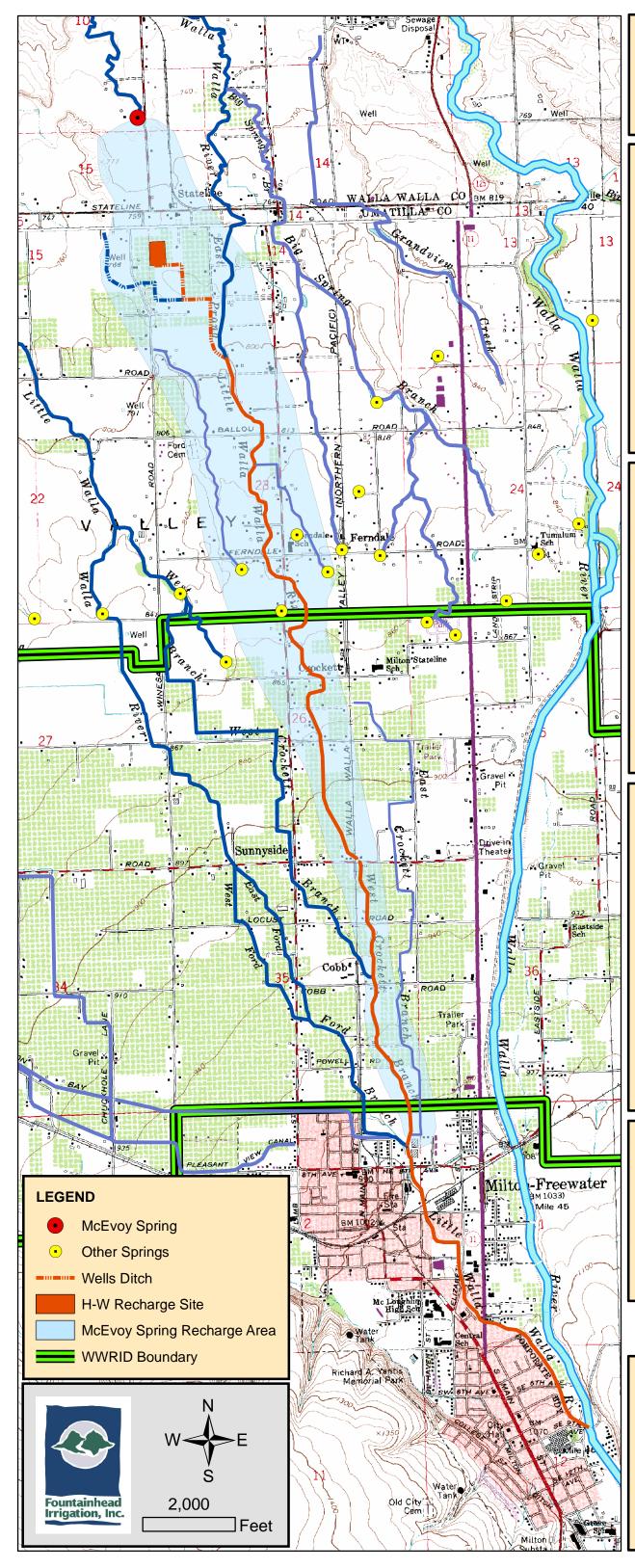
# **REQUIRED FUNDING**

CONTRIBUTOR	REQ'D FUNDING
Champion/Catalyst	TBD
Sponsor/Administrator	TBD
Landowners	TBD
Land Lease Holder	TBD
Limited Licensee	TBD
Hydrological Evaluator	TBD
Hydrological Monitor	TBD
Water Manager	TBD

# STRATEGIC PATH

- 1. Champion/Catalyst identify new Sponsor/Administrator
- 2. Champion and new Sponsor secure other partners
- 3. Project partners estimate required funding by task
- 4. Sponsor/Administrator assemble budget estimates
- 5. Sponsor/Administrator and Champion identify funders
- 6. Sponsor/Administrator negotiate contracts
- 7. Project partners implement project

### FIGURE 4-1 ALTERNATIVE 1 Continue Operating Hall-Wentland SAR Site



Discharge from McEvoy Spring fluctuates from 3 cfs (minimum) during summer-fall to 6 cfs during winter-spring (3,260 acre-feet).

## **MANAGEMENT STRATEGY**

SPONSOR/ADMINISTRATOR guides team activities AUTHORITY grants permission to LIMITED LICENSEE HYDRO MONITOR monitors flow of water through system HYDRO MONITOR provides flow data to HYDRO EVALUATOR HYDRO EVALUATOR calls for water from LIMITED LICENSEE LIMITED LICENSEE directs actions of DIVERTER WWRID LIMITED LICENSEE directs actions of CONVEYOR WWRID HYDRO EVALUATOR directs actions of CONVEYOR non-WWRID HYDRO EVALUATOR directs actions of WATER MANAGER

DIVERTER WWRID diverts water from WW River to Little WW River CONVEYOR WWRID conveys water through WWRID CONVEYOR non-WWRID conveys water WWRID to Wells Ditch

WATER MANAGER diverts water from the East Prong Little Walla Walla River, conveys water via Wells Ditch to the Hall-Wentland Recharge Site, and applies it to land parcels owned by LANDOWNERS to augment water flow in the shallow gravel groundwater aquifer.

### **POTENTIAL PARTNERS**

CONTRIBUTOR	POTENTIAL PARTNERS
Champion/Catalyst	Tom Page
Sponsor/Administrator	WW Basin Watershed Council
Funder	WA Dept of Ecology and OWEB
Landowners	Gordon Hall and Loren Wentland
Land Lease Holder	WWBWC or WWCCD
Authority	Oregon Water Resources Dept.
Limited Licensee	WW River Irrigation District
Hydrological Evaluator	WWBWC, WWCCD or Contractor
Hydrological Monitor	WWBWC, WWCCD or Contractor
Hydraulic Contractor	WWBWC, WWCCD or Contractor
Diverter WWRID	WW River Irrigation District
Conveyor WWRID	WW River Irrigation District
Conveyor non-WWRID	WWBWC, WWCCD or Contractor
Water Manager	AJ Wentland, Tom Page or WWBWC
Risk Underwriters	TBD by Risk Holders

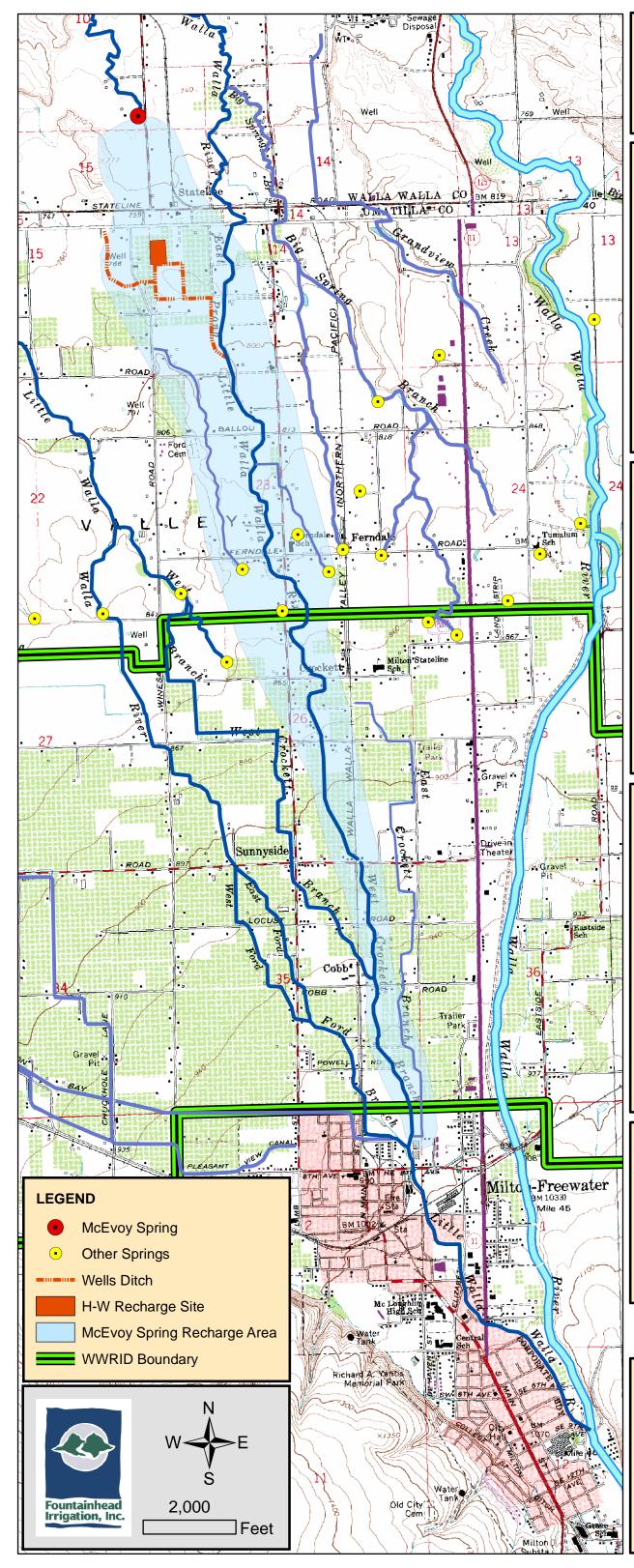
# **REQUIRED FUNDING**

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Champion/Catalyst	TBD
Sponsor/Administrator	TBD
Funder	TBD
Landowners	TBD
Land Lease Holder	TBD
Authority	TBD
Limited Licensee	TBD
Hydrological Evaluator	TBD
Hydrological Monitor	TBD
Hydraulic Contractor	TBD
Diverter WWRID	TBD
Conveyor WWRID	TBD
Conveyor non-WWRID	TBD
Water Manager	TBD
Risk Underwriters	TBD

# STRATEGIC PATH

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- 5. Sponsor/Administrator and Champion identify funders
- 6. Sponsor/Administrator negotiate contracts
- 7. Project partners implement project

### FIGURE 4-2 ALTERNATIVE 2 Increase Flow to Hall-Wentland SAR Site



Discharge from McEvoy Spring fluctuates from 3 cfs (minimum) during summer-fall to 6 cfs during winter-spring (3,260 acre-feet).

# **MANAGEMENT STRATEGY**

SPONSOR/ADMINISTRATOR guides team activities AUTHORITY grants permission to LIMITED LICENSEE HYDRO MONITOR monitors flow of water through system HYDRO MONITOR provides flow data to HYDRO EVALUATOR HYDRO EVALUATOR directs HYDRAULIC CONTRACTOR actions HYDRO EVALUATOR directs WATER MANAGER actions

HYDRAULIC CONTRACTOR reconfigures lower Wells Ditch so all water flows to Hall-Wentland pond/bulge and only flows downstream on-demand via pressurized pipe.

WATER MANAGER diverts water from the East Prong Little Walla Walla River, conveys water via Wells Ditch to new pond/bulge at Hall-Wentland Recharge Site. Water delivered to downgradient Wells Ditch users on-demand via pressurized pipe. Surplus water routed to recharge groundwater via current spreading method and/or vertical or horizontal well(s).

Can be combined with Alternative 2 (increased flow to HW site).

# POTENTIAL PARTNERS

POTENTIAL PARTNERS
Tom Page
WW Basin Watershed Council
WA Dept of Ecology and OWEB
Gordon Hall and Loren Wentland
WWBWC or WWCCD
Oregon Water Resources Dept.
WW River Irrigation District
WWBWC, WWCCD or Contractor
WWBWC, WWCCD or Contractor
WWBWC, WWCCD or Contractor
AJ Wentland, Tom Page or WWBWC
TBD by Risk Holders

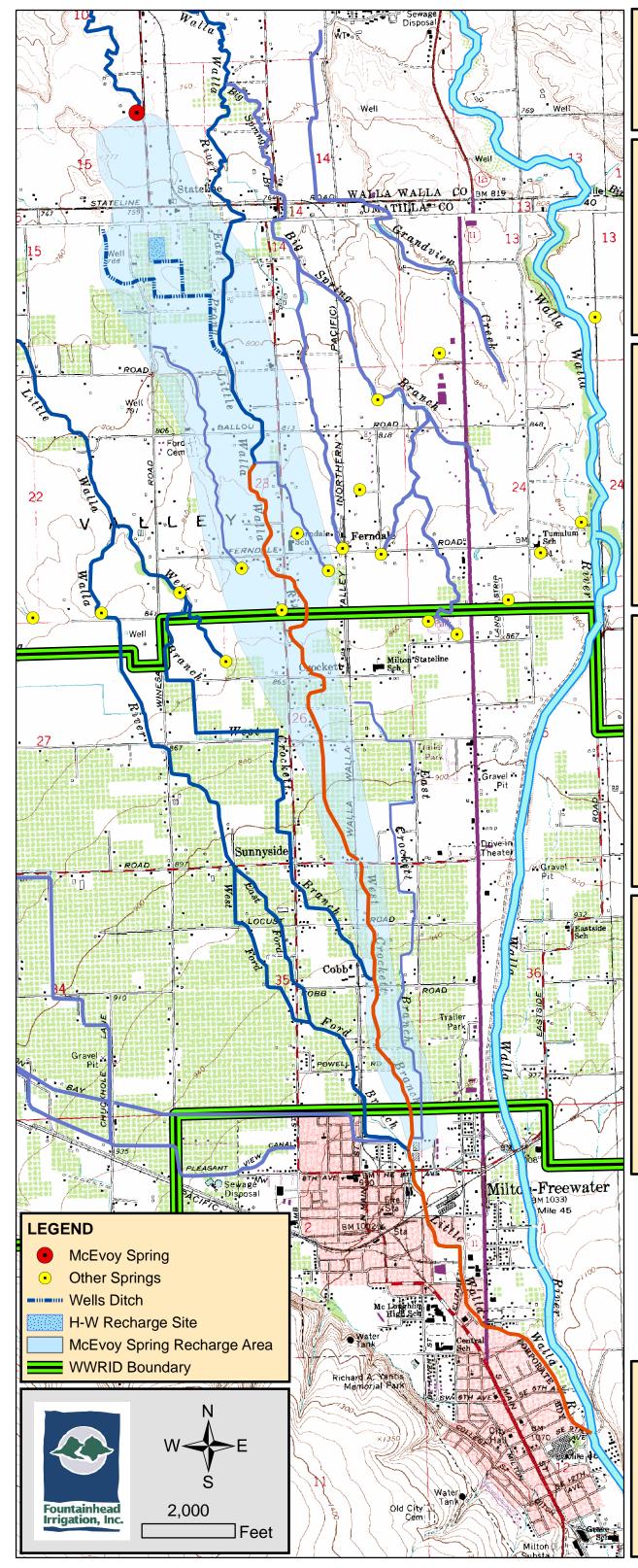
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Champion/Catalyst	TBD
Sponsor/Administrator	TBD
Funder	TBD
Landowners	TBD
Land Lease Holder	TBD
Authority	TBD
Limited Licensee	TBD
Hydrological Evaluator	TBD
Hydrological Monitor	TBD
Hydraulic Contractor	TBD
Water Manager	TBD
Risk Underwriters	TBD

## STRATEGIC PATH

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### FIGURE 4-3 ALTERNATIVE 3 Reconfigure Lower Wells Ditch System



Discharge from McEvoy Spring fluctuates from 3 cfs (minimum) during summer-fall to 6 cfs during winter-spring (3,260 acre-feet).

# **MANAGEMENT STRATEGY**

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DIVERTER WWRID diverts water from WW River to Little WW River CONVEYOR WWRID conveys water through WWRID

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Champion/Catalyst	Tom Page
Sponsor/Administrator	WWRID or WWBWC
Funder	WA Dept of Ecology and OWEB
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Limited Licensee	WW River Irrigation District
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Risk Underwriters	TBD by Risk Holders

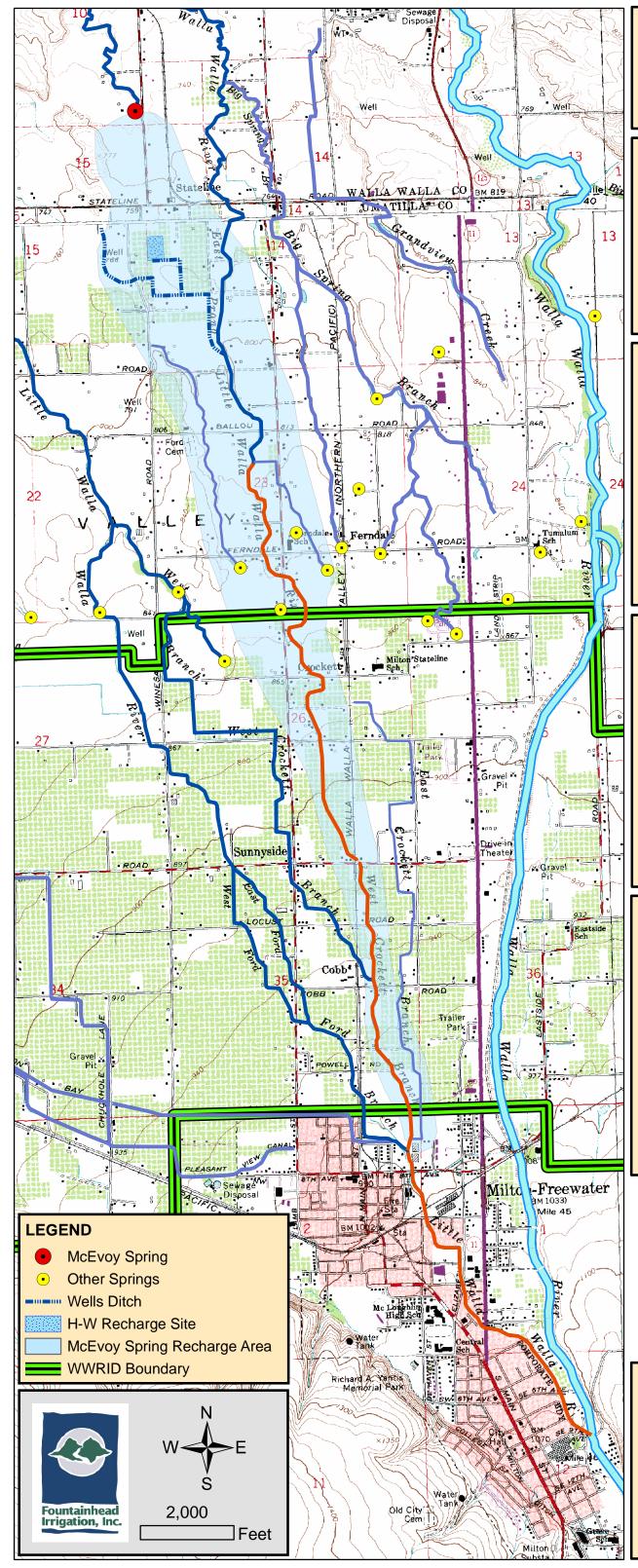
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CONTRIBUTOR	REQ'D FUNDING
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Funder	TBD
Authority	TBD
Limited Licensee	TBD
Hydrological Evaluator	TBD
Hydrological Monitor	TBD
Diverter WWRID	TBD
Conveyor WWRID	TBD
Risk Underwriters	TBD

# STRATEGIC PATH

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- 5. Sponsor/Administrator and Champion identify funders
- 6. Sponsor/Administrator negotiate contracts
- 7. Project partners implement project

### FIGURE 4-4 ALTERNATIVE 4 Sustain Year-Round Flow in Streams & WWRID Ditches



Discharge from McEvoy Spring fluctuates from 3 cfs (minimum) during summer-fall to 6 cfs during winter-spring (3,260 acre-feet).

# **MANAGEMENT STRATEGY**

SPONSOR/ADMINISTRATOR guides team activities AUTHORITY grants permission to LIMITED LICENSEE HYDRO MONITOR monitors flow of water through system HYDRO MONITOR provides flow data to HYDRO EVALUATOR HYDRO EVALUATOR calls for water from LIMITED LICENSEE LIMITED LICENSEE directs actions of DIVERTER WWRID LIMITED LICENSEE directs actions of CONVEYOR WWRID

DIVERTER WWRID diverts water from WW River to Little WW River CONVEYOR WWRID conveys water through WWRID

# **POTENTIAL PARTNERS**

CONTRIBUTOR	POTENTIAL PARTNERS
Champion/Catalyst	Tom Page
Sponsor/Administrator	WWRID or WWBWC
Funder	WA Dept of Ecology and OWEB
Authority	Oregon Water Resources Dept.
Limited Licensee	WW River Irrigation District
Hydrological Evaluator	WWRID or WWBWC
Hydrological Monitor	WWRID or WWBWC
Diverter WWRID	WW River Irrigation District
Conveyor WWRID	WW River Irrigation District
Risk Underwriters	TBD by Risk Holders

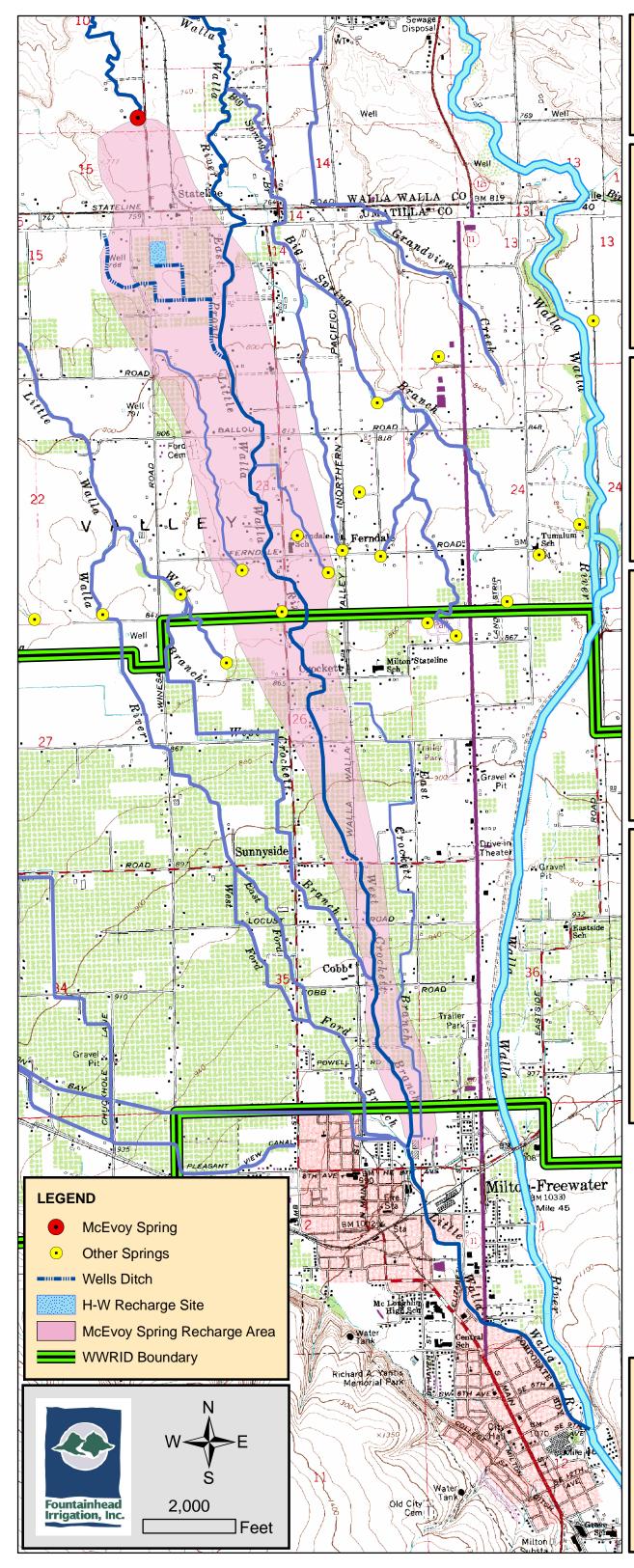
# **REQUIRED FUNDING**

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Sponsor/Administrator	TBD
Funder	TBD
Authority	TBD
Limited Licensee	TBD
Hydrological Evaluator	TBD
Hydrological Monitor	TBD
Diverter WWRID	TBD
Conveyor WWRID	TBD
Risk Underwriters	TBD

# STRATEGIC PATH

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- 5. Sponsor/Administrator and Champion identify funders
- 6. Sponsor/Administrator negotiate contracts
- 7. Project partners implement project

### FIGURE 4-5 ALTERNATIVE 5 Retrofit WWRID Bulges to Recharge Groundwater



Discharge from McEvoy Spring fluctuates from 3 cfs (minimum) during summer-fall to 6 cfs during winter-spring (3,260 acre-feet).

# **MANAGEMENT STRATEGY**

SPONSOR/ADMINISTRATOR guides team activities HYDRO MONITOR assembles data regarding well pumping HYDRO EVALUATOR identifies wells with greatest effect on spring HYDRO EVALUATOR communicates with well owners and users HYDRO EVALUATOR identifies ways to reduce well pumping HYDRO EVALUATOR prioritizes conservation opportunities AUTHORITY grants permissions to implement conservation practices OWNERS and/or HYDRO CONTRACTOR(s) implement practices

# **POTENTIAL PARTNERS**

CONTRIBUTORS	POTENTIAL PARTNERS
Champion/Catalyst	WW Basin Watershed Council
Sponsor/Administrator	WW Basin Watershed Council
Hydrological Evaluator	WWBWC and/or Contractor
Hydrological Monitor	WWBWC and/or Contractor
Hydrological Contractor	WWBWC and/or Contractor
Well Owners/Users	TBD based on hydrological study
Authority	Oregon Water Resources Dept.

# **REQUIRED FUNDING**

CONTRIBUTORS	REQ'D FUNDING
Champion/Catalyst	TBD
Sponsor/Administrator	TBD
Hydrological Evaluator	TBD
Hydrological Monitor	TBD
Hydrological Contractor	TBD
Well Owners/Users	TBD
Authority	TBD

# STRATEGIC PATH

- 1. Champion/Catalyst identify Sponsor/Administrator
- 2. Champion and Sponsor secure required partners
- 3. Project partners estimate required funding by task
- 4. Sponsor/Administrator assemble budget estimates
- 5. Sponsor/Administrator and Champion identify funders
- 6. Sponsor/Administrator negotiate contracts
- 7. Project partners implement project

### FIGURE 4-6 ALTERNATIVE 6 Decrease Upgradient Groundwater Pumping

### 5.0 Bibliography

The following documents are most closely associated with the Hall-Wentland Recharge Project and this Long-Term Implementation Strategy:

- 1. Lindsey, Kevin, Results of the First Season of Shallow Aquifer Recharge Testing, June 2006.
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- 3. Newcomb, R.C. *Geology and Groundwater Resources of the Walla Walla River Basin*. Water Supply Bulletin #21. Washington Department of Conservation, Division of Water Resources, 1965.
- 4. Piper, A.M., T.W. Robinson, and H.E. Thomas. *Groundwater in the Walla Walla Basin, OR-WA-Part I.* Department of the Interior, United States Geological Survey, 1933.
- 5. Piper, A.M., T.W. Robinson, and H.E. Thomas. *Groundwater in the Walla Walla Basin, OR-WA-Part II.* Department of the Interior, United States Geological Survey, 1933.
- 6. Bower, Robert, *Hudson Bay Aquifer Recharge Project Annual Report 2004*, Hudson Bay District Improvement Company and Walla Walla Basin Watershed Council, 2004.
- 7. Warinner, John, et al., Shallow Aquifer Recharge Strategy for Restoring and Seasonally Recharging Shallow Gravel Aquifer(s) and Spring-Fed Streams of the Walla Walla Watershed, June 2006.

People desiring a comprehensive list of documents related to this subject should refer to lists compiled by Bob Bower (Walla Walla Basin Watershed Council), Tom Darnell (Oregon State University Extension), and/or HDR-EES (in association with the WRIA 32 Watershed Plan, Bi-State Habitat Conservation Plan, and Subbasin Plan).



### LONG-TERM IMPLEMENTATION STRATEGY

WALLA WALLA COUNTY WATERSHED PLANNING DEPT. GRANT No. G0600312

> FOUNTAINHEAD JUNE 2007

FOR MORE INFORMATION

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