

May 9, 2012

## **MEMORANDUM**

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SUBJECT: Staff Analysis for Draft Reuse Permit WRU M-0196-02 (Municipal Wastewater)  
Garden Valley School District #71 (Boise)

### **1. PURPOSE**

The purpose of this memorandum is to satisfy the requirements of the *Recycled Water Rules*, IDAPA 58.01.17.400.05, for issuing reuse permits. This memorandum addresses draft reuse permit WRU M-0196-02, for the municipal treatment and reuse system owned and operated by Garden Valley School District #71. Garden Valley School District #71's treatment and reuse system is currently permitted under the terms of reuse permit LA-000196-01.

### **2. SUMMARY OF EVENTS**

The Department of Environmental Quality (DEQ) issued permit LA-000196-01 to Garden Valley School District #71 on April 6, 2007. The permit is for continued operation of the recycled water treatment and reuse system serving Garden Valley School District #71. These facilities are located just west of Garden Valley approximately ½ mile southwest of the Banks-Lowman Highway. The purpose of the current draft permit is to renew permit LA-000196-01, which will expire on April 6, 2012.

A permit renewal application from Garden Valley School District #71 was received on September 13, 2011, and largely serves as the basis for the terms and conditions contained in the draft permit. As required by the *Recycled Water Rules*, the draft permit will be presented for a public comment period. After the comment period has closed, DEQ will provide written responses to all relevant comments and prepare a final permit for Garden Valley School District #71's wastewater reuse facilities.

### **3. PROCESS AND SITE DESCRIPTIONS**

The site and treatment processes discussed in the staff analysis for Garden Valley School District #71's previous permit have not changed since that time. For complete discussions regarding these items, refer to the staff analysis for the draft version of reuse permit LA-000196-01, dated February 1, 2007.

Process Description: The treatment system for the Garden Valley School District consists of the following major unit processes: a 6,000-gallon equalization tank for distribution of flows collected from the schools, dual-train sequencing batch reactor (SBR) tanks (6,000 gallons each, in parallel) for primary and secondary treatment, effluent is then passed to the 3,000-gallon equalization tank where coagulant is injected before passing through the sand filter and dual-train ultraviolet (UV) disinfection. The current regulations require Class B effluent to have a total chlorine residual of no less than 1 mg/L, so the system adds hypochlorite to the effluent downstream

of the UV and prior to entering the 3,000-gallon disinfection tank. The treated effluent passes through another 3,000-gallon dosing tank prior to storage in a 1.3-million gallon (MG) lagoon until the start of the growing season when it is used to irrigate the site. Biosolids generated by the SBR system are either recycled back to the SBR inlet or collected in the 6,000-gallon aerated sludge tank for eventual off-site disposal.

Site Description: The reuse site is currently one hydraulic management unit (HMU) comprised of the football field and all associated turf grass. The draft permit, as discussed below, includes one additional HMU (the soccer field to the north) as an emergency backup in the event that irrigation cannot take place on the football field or the irrigation volume exceeds the football field capacity.

#### **4. GROUND WATER DISCUSSION**

Wastewater effluent from the Garden Valley School is treated and disinfected, and then discharged to a lagoon. It is stored during the non-growing season and used to irrigate the school's football field during the growing season, which the permit defines as May 1 through October 31. Snow and wet conditions can last into the late spring in the area, and ground water levels are shallow during this time. The Staff Analysis issued with the original permit, dated February 1, 2007, includes a discussion of ground water levels and states that "based on the high ground water levels experienced at the site in the spring, staff recommends that land application of wastewater be limited to May 1 through October 31 of each year." (DEQ, 2007)

DEQ has determined that more must be done to ensure that ground water is being protected. A geotechnical investigation conducted at the site prior to construction of the school found that ground water levels in several wells were shallower than three (3) feet below ground surface (bgs) for several months in the spring, with ground water up to 0.7 feet above ground surface in one well. This data was collected from February 7, 2001 to June 29, 2001 in monitoring wells that were installed in the test pits dug as part of the geotechnical investigation. (Kleinfelder, Inc., 2001) This data is included as an appendix to this memorandum, as well as a map showing the locations of these wells.

When ground water is shallower than three feet bgs, the water is within the root zone of the plants. The permit limits for the hydraulic loading rate of wastewater are intended in part to keep the treated effluent from leaching below the root zone. Therefore the potential for applied wastewater to directly mix with the ground water is increased when the ground water level is shallower than three feet in the vicinity of a wastewater land application site.

DEQ proposes that the permittee be required to install a minimum of three monitoring wells, one up-gradient and two down-gradient of the application site. These wells will be used to monitor ground water depth and quality. Additionally, the permit would require that the monitoring results from these wells be submitted with the application for permit renewal in the next permit cycle. The data will be used to determine if any further restrictions on the application period are needed, such as limiting the application season to months when ground water is below a certain level. And finally, as an additional protection of ground water, in particular with respect to nitrate and phosphorus, DEQ proposes that the permittee be required to contract with the services of a qualified professional to receive a recommendation for the fertilizer needs of the land application site.

#### **5. PERMITTING DISCUSSION**

The following sections outline changes made to the terms of the draft renewal permit, based on changes requested by the permittee, evaluations of past performance with previous permit requirements, and/or updates required by changes to the *Recycled Water Rules* or any other applicable regulatory standards. Terms and conditions that are unchanged from the previous permit and remain applicable to the facility in the new format are not addressed in this document. Changes made to update language and regulatory references are also not addressed in this document.

5.1. Section 3. Compliance Schedule for Required Activities

CA-196-01, Updated Plan of Operation: This activity is intended to update the facility Plan of Operation (PO) to reflect current equipment and operational needs. The plan is to include day-to-day operational procedures as well as a Quality Assurance Plan (QAP) for required monitoring, Waste Solids Management Plan for handling and disposal of generated waste solids, Odor Management Plan for response procedures in case of an odor complaint, and other applicable items as described in the Plan of Operation checklist referenced in the condition. The PO is also to include a description of the process used by the permittee to calculate the irrigation rate. It is proposed that the updated PO be submitted within twelve (12) months of permit issuance.

CA-196-02, Fertilizer Needs Determination: This activity would require that the permittee acquire recommendations for the fertilizer requirements of the football field. These recommendations would come from a qualified professional, and would be based on site soil data. The fertilizer recommendations would be used henceforth when determining how much fertilizer application is necessary. The quantity of fertilizer applied would be in addition to the nitrogen and phosphorus applied with the wastewater. It is proposed that the fertilizer recommendation be required to be acquired before the 2013 application season.

CA-196-03, Monitoring Wells: This activity would require the installation of one up-gradient and two down-gradient monitoring wells. This condition has three required activities.

By April 30, 2014, the permit would require the permittee to submit to DEQ a document with the proposed locations of the wells, and a discussion and description of the proposed well construction and installation procedures. The permittee can choose to install these shallow wells themselves, or retain the services of a professional well driller.

The condition would require that the monitoring wells be installed by July 31, 2014. Within 30 days of installation, the permittee would be required to notify DEQ that the wells were installed, include a description of the well construction, and submit a map showing the exact locations of the wells.

A section for ground water monitoring must be added to the Quality Assurance Plan required by CA-196-01, Updated Plan of Operation. The proposed permit would require that this plan be submitted to DEQ by October 31, 2014.

CA-196-04, Permit Renewal and Groundwater Data Evaluation: An application for permit renewal is required to be submitted to DEQ 180 days prior to permit expiration. The proposed permit would require that an evaluation of all collected ground water data be included in the permit renewal application. For the full text of the condition, see the attached draft permit.

5.2. Section 4. Permit Limits and Conditions

Section 4.2 "Growing Season Hydraulic Loading" has been modified to include monthly values calculated from data supplied by the University of Idaho on their ETIdaho website (<http://www.kimberly.uidaho.edu/ETIdaho/>) for the Garden Valley RS station with an irrigation efficiency of 80%.

A note has been added to Section 4.2 that states "Recycled water shall be applied only during periods of non-use by the public. Daily irrigation shall not begin until after all school activities have ceased and shall be given time to sufficiently dry prior to commencement of the next day's activities. In addition,

recycled water shall not be applied when the ground is frozen or when there is snow or standing water on the field. Permittee shall record daily visual observations of field conditions including areas of ponding, ice, unusual circumstances, etc. as necessary when irrigating.”

Section 4.3 “Constituent Loading Limits” nitrogen loading limit has been removed since at the maximum potential concentration of 30 mg/L (the concentration-based limit from the previous permit which has also been removed as discussed below), the maximum nitrogen application to the football field would be around 18 pounds per acre (lbs/acre) which is less than the fertilizer requirements for turf grass. In addition, an uptake-based limit is not appropriate unless tissue samples are also required which is not applicable to turf grass “crops”.

The Total Nitrogen concentration limit in wastewater treatment plant effluent has been removed. Effluent is stored for up to 6 months in the storage lagoon before being used for irrigation, during which time the concentration of Total Nitrogen in the water will have changed as a result of factors such as dilution from precipitation events and denitrification. The quantity of nitrogen applied to the land is the environmental concern, and therefore a concentration limit of Total Nitrogen in treatment plant effluent is not applicable.

The Total Phosphorus concentration limit has been removed. Proper operation of the treatment system should produce effluent with a phosphorus concentration that is beneficial for the selected crop. Total Phosphorus will be monitored monthly in the wastewater treatment plant effluent, and monthly in the pond effluent during the growing season.

The concentration limits for Biological Oxygen Demand (BOD<sub>5</sub>) and Total Suspended Solids (TSS) have also been removed. TSS will be qualitatively assessed based on turbidity monitoring, and will no longer be monitored individually in the influent or effluent. BOD<sub>5</sub> limits were also removed, and therefore the influent monitoring requirement was removed. The last permit cycle did not indicate any difficulties with BOD<sub>5</sub> treatment, so a limit did not appear necessary, but effluent BOD<sub>5</sub> will continue to be monitored on a monthly basis to track treatment plant performance.

In Section 4.5, no requirement for seepage testing of the lagoons has been explicitly included. Testing was completed in July 2009 with approval on August 5, 2009. In accordance with the Wastewater Rules (IDAPA 58.01.16.493.02.c), testing will be required again in July 2019. Reuse permits can be administratively extended for a term of up to ten (10) years; therefore seepage testing may need to be addressed.

Section 4.5 “Disinfection” has been modified to indicate that the chlorine residual maintained is total rather than free chlorine.

Section 4.5 “Turbidity” requirements have been modified to read “The daily arithmetic mean of all daily measurements shall not exceed five (5) Nephelometric Turbidity Units (NTU) and turbidity shall not exceed ten (10) NTU at any time (IDAPA 58.01.17.601.02.b.i). The turbidity standard shall be met prior to disinfection.” This change reflects changes in the requirements for Class B recycled water in the latest rulemaking. The previous permit limits were 2 NTU and 5 NTU, respectively. The design maximum turbidity for the system’s UV equipment is 5 NTU, but because the facility also chlorinates the effluent to the level required for Class B recycled water, the effluent will be adequately disinfected for the allowed use. Although the turbidity limit in the draft permit has been raised to match the rule requirement, it is recommended that the facility strive to keep turbidity below 5 NTU because of the added protection of public health that the UV equipment provides.

5.3. Section 5. Monitoring Requirements

Monitoring requirements and serial numbers have been grouped according to sample media in the new permit format.

The two acre emergency land application site, MU-019603, was removed from the list of permitted management units since the 1.5 acre soccer field, MU-196-02, is already listed as for emergency use only. It is intended that the draft permit include the area currently used as well as some allowance for growth during the next permit cycle. Advanced notification to DEQ for authorization is required before irrigation to MU-196-02 will be allowed. The corresponding soil management unit (SU-019603) has also been removed.

All wastewater TSS (both influent and effluent) and influent BOD<sub>5</sub> monitoring has been removed due to low average values and acceptable removal efficiencies (>90%). Effluent BOD<sub>5</sub> monitoring has been retained on a monthly basis to correspond with other monthly samples and to provide a check of system operation. The influent sampling point, WW-019601, has been removed.

Bacteria sampling of the lagoon effluent prior to irrigation (WW-019604) has been removed. The new permit includes the Class B bacteria sampling frequency requirement of daily when discharging (either to the pond or football field) and the median of the last five (5) days' samples is required to be less than 2.2 CFU/100 mL with no single sample greater than 23 CFU/100 mL (the single-sample maximum). Compliance with this requirement throughout the year will adequately demonstrate that the lagoon is properly disinfected prior to irrigation.

The total coliform sampling frequency under LA-000196-01 has been weekly. The *Recycled Water Rules* currently require daily sampling for Class B treatment systems unless there is a reason for a decreased frequency, such as a demonstrated disinfection efficiency and reliability. The permittee has a total of five exceedances of the single-sample maximum limit between 2007 and 2011 with no exceedances of the median limit of 2.2 CFU/100 mL, therefore the proposed sample frequency in the draft permit is twice per week. Under the proposed draft, if a sample exceeds the single-sample maximum, the sampling frequency will increase to daily for five (5) days to show that the event is either an isolated incident or that corrective action has eliminated the problem.

Monthly sampling for nutrients in the discharge from the lagoon is required during the growing season in order to calculate the nutrient loading rates to the reuse site. Monthly samples of the wastewater treatment plant effluent prior to discharge to the pond will continue to be taken to track the treatment and operation of the system.

Calculation of the Irrigation Water Requirement (IWR) by the permittee has been removed since the calculated GS Hydraulic Loading Rate in Section F incorporates this information.

The biosolids reporting requirement has been removed since the facility does not treat or dispose of the SBR system biosolids onsite. The material is removed by Goff's Plumbing, Inc. of Emmett, Idaho.

Ground water monitoring requirements have been added and will become effective following installation of the monitoring wells. This includes a requirement to measure the static water level in the monitoring wells monthly during the growing season and that ground water samples be collected and analyzed three times per year, in April, July and October. The constituents required to be monitored are nitrate+nitrite nitrogen, total Kjeldahl nitrogen, total dissolved solids, total phosphorus, dissolved oxygen, pH, temperature, specific conductivity, and static water level.

5.4. Section 6. Reporting Requirements

The table in Section 6.1.2.5 lists the required reporting parameters for each management unit.

5.5. Section 10. Site Maps

The site maps have been updated to better show the site and vicinity.

Although the facility map shows a total of three lagoons, the two northern lagoons are used for fire flow storage and do not contain wastewater. They are therefore not included under the draft permit.

**6. RECOMMENDATION**

Based on review of applicable state rules, staff recommends that DEQ issue draft reuse permit WRU M-0196-02 for a 30-day public review and comment period. The draft permit contains effluent quality requirements for the recycled water treatment system, as well as terms and conditions required for operation of the reuse system in Section 4. Monitoring and reporting requirements to evaluate system performance and to determine permit compliance have been specified in Sections 5 and 6, and compliance activities have been incorporated into Section 3 of the permit.

**7. REFERENCES**

Kleinfelder, Inc., 2001. Geotechnical Investigation, Proposed New Garden Valley School (P-12), Garden Valley, Idaho. August 21, 2001.

DEQ, 2007. Department of Environmental Quality, Staff Analysis for Garden Valley School District No. 71, Draft Wastewater Reuse Permit LA-000196-01 (Municipal Wastewater). February 1, 2007.

TRIM Record 2011AGH1205

**Attachment: Spring Ground Water Levels**

Monthly measurements of ground water levels were collected during a geotechnical investigation conducted in 2001, prior to construction of the Garden Valley School and associated facilities. The data presented below, in feet below ground surface, was collected from monitoring wells that were installed in test pits.

Ground water flows toward the river, which is to the south and southwest of the site. Therefore, TP-8 through TP-13 are up-gradient of the application site, and TP-4 through TP-7 are down-gradient.

Table 1: Ground water level data, in feet below ground surface, collected from monitoring wells at the Garden Valley School site

	2/7/2001	3/7/2001	4/5/2001	5/10/2001	6/6/2001	6/29/2001
TP-4	-9.79	-9.69	-2.29	-1.77	-3.26	-4.81
TP-5	-7.16	-7.17	-6.03	-5.29	-6.8	-7.21
TP-6	-4.23	-3.46	-0.11	-0.61	-1.73	-2.48
TP-7	-5.04	-4.98	-3.26	-3.17	-4.18	-5.82
TP-8			-3.21	-4.16	-4.97	-5.24
TP-10	-0.41	-0.33	0.7	0.64	0.37	-0.24
TP-11	-4.46	-2.76	-2.66	-3.78	-4.36	-4.84
TP-13	-7.76	-5.51	-3.67	-4.31	-5.07	-5.3

Figure 1: Plot of the ground water level data presented in Table 1.

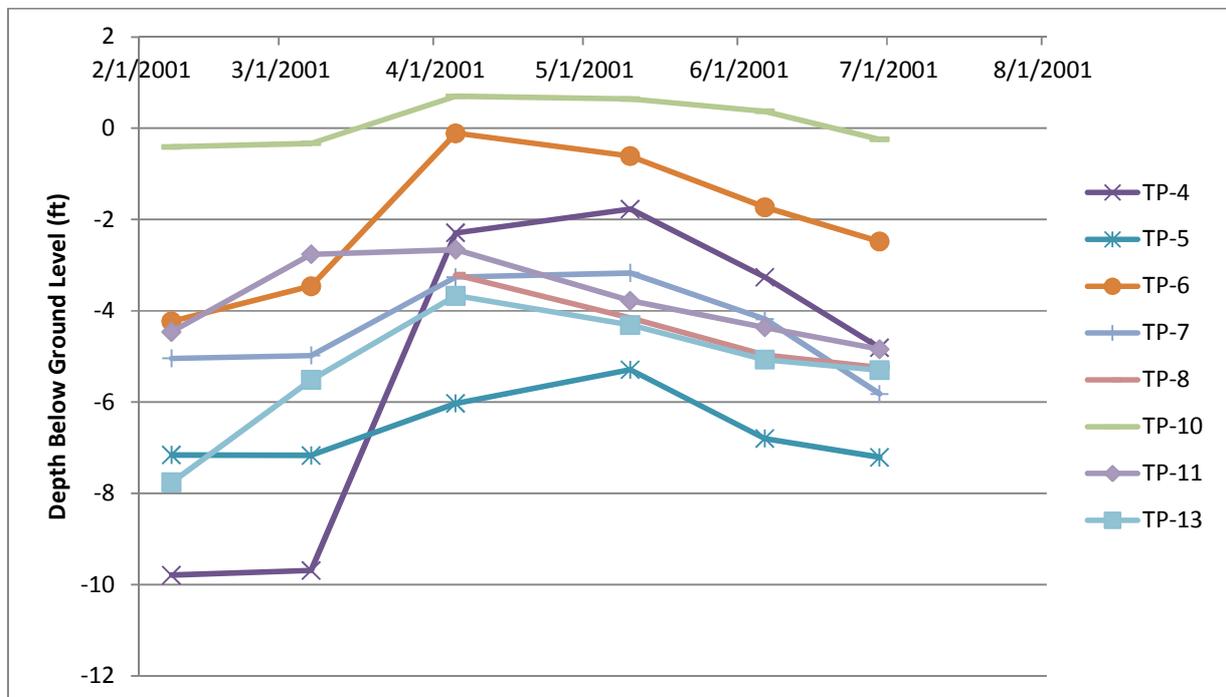


Figure 2: Map of Test Pit and Monitoring Well Locations

