February 8, 2012

M E M O R A N D U M

TO: Bill Allred
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FROM: Jennifer Wester, P.E.
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SUBJECT: Staff Analysis for Draft Reuse Permit LA-000048-04 (Municipal Recycled Water)
City of Richfield

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 permit LA-000048-04, for the Municipal treatment and reuse system owned and operated by City of Richfield. City of Richfield's treatment and reuse system is currently permitted under the terms of reuse permit LA-000048-03.

2. SUMMARY OF EVENTS

The Department of Environmental Quality (DEQ) issued permit LA-000048-03 to City of Richfield on June 27, 2008. The permit is for continued operation of the recycled water treatment and reuse system serving City of Richfield. These facilities are located in Township 4S, Range 19E, Section 26, approximately ¼ mile southwest of the city of Richfield, Idaho. The purpose of the current draft permit is to replace permit LA-000048-03, which will expire on June 27, 2013.

A permit renewal application from City of Richfield was received on May 4, 2010, 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 City of Richfield's wastewater reuse facilities.

3. PROCESS AND SITE DESCRIPTIONS

The site and treatment processes discussed in the staff analysis for City of Richfield'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-000048-03, dated May 15, 2008.

Wastewater from the City of Richfield is collected via gravity to a lift station which pumps through a Parshall flume flow meter into the first of two treatment and storage lagoons. Lagoon #1 is a 1.0-million gallon (MG) bentonite-lined lagoon with both submerged and surface aerators. Following treatment in Lagoon #1, wastewater is gravity fed to Lagoon #2, a 0.9-MG bentonite-lined facultative polishing lagoon. Following treatment, the effluent is disinfected with chlorine gas prior to discharge to either the reuse site (currently a 3.5-acre field irrigated by a gated pipe flood irrigation system) or to the Little Wood River (in accordance with NPDES permit number ID-002121-1, for non-growing season discharge only). The permittee has been in

operation since 1974.

The current irrigation site consists of a single management unit covering 3.5 acres. The permittee uses flood irrigation through a gated pipe system to apply recycled water to the site. Due to hydraulic overloading of this unit in recent years, the permittee has proposed to add a second unit of 4.95 acres, bringing the total area to 8.45 acres.

4. 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 are not addressed in this document. Changes made to update language and regulatory references are also not addressed in this document.

4.1. Section D. Facility Information

"Type of Facility" and "Soils on Site" have been removed to simplify the permit.

4.2. Section E. Compliance Schedule for Required Activities

Table 1 summarizes the compliance activities of the current permit, LA-000048-03, proposed activities for LA-000048-04 are described individually below the table.

Table 1: LA-000048-03 Compliance Activity Status Summary

Activity Number	Due Date	Description	Status
CA-048-01	Prior to addition of acreage	Updated Plan of Operation	Received 5/4/2010 with CA-048-02
CA-048-02	Prior to application of WW to new acreage	Permit modification request	Received 5/4/2010
CA-048-03	June 27, 2009	Disinfection Management Plan	Submitted and approved although DEQ unable to locate copy. Replacement copy submitted by City and approved 2/17/2012.
CA-048-04	June 27, 2009	Runoff Management Plan	Submitted and approved although DEQ unable to locate copy. Replacement copy submitted by City and approved 2/17/2012.
CA-048-05	December 26, 2008	Supplemental irrigation access documentation	Submitted December 2008 and activity complete.
CA-048-06	December 26, 2012	Application for permit renewal	Not needed with issuance of draft permit LA-000048-04.

CA-048-01 Plan of Operation Addendum: Recycled water permits typically include a requirement to update the facility Plan of Operation (or O&M Manual). An updated plan was received on 5/4/2010 with the permit modification and is currently under review. From a spot check of the submitted plan the

Quality Assurance (QA) portions (Sections 7 and 8) need to be revised to reflect the current monitoring requirements and include the regulatory holding times for all monitoring parameters (as discussed further in Section 4.4 below). The addendum must include the new acreage of MU-004802. For the full text of the activity, see Section E of the draft permit.

CA-048-02 Seepage Testing: From information supplied in the application materials, the lagoons were seepage tested in March and April 2004. Results of these tests were approved by DEQ in a letter dated August 24, 2004. The current Wastewater Rules (IDAPA 58.01.16) require that municipal wastewater treatment and storage lagoons be tested every ten (10) years, therefore this compliance activity would require testing to be complete by August 24, 2014. For the full text of the activity, see Section E of the draft permit.

CA-048-03 Waste Solids Management Plan: From discussions with the permittee, the City plans to dredge solids from the lagoons and would like to land apply them at the site. DEQ requires that biosolids materials be applied in accordance with an approved Waste Solids Management Plan. This compliance activity would therefore require submission of a Plan to DEQ for review and approval prior to land applying any waste solids to the site. For the full text of the activity, see Section E of the draft permit.

CA-048-04 Application for Permit Renewal: Per Subsection 300.01 of the Recycled Water Rules (IDAPA 58.01.17), any facility that intends to continue to operate as a reuse facility must have a permit issued by DEQ. Subsection 400.01 requires that a permit application be submitted to DEQ at least one hundred and eighty (180) days prior to the expiration of the facility's current permit. This compliance activity is proposed for inclusion in the attached draft permit so that this important deadline is not missed. For the full text, see Section E of the draft permit.

4.3. Section F. Permit Limits and Conditions

"Application Site Area" has been modified to include the proposed acreage for a total of 8.45 acres.

"Growing Season Hydraulic Loading Rate" has been changed to include field-specific irrigation water requirement (IWR) values for an alfalfa crop. The values are based off precipitation deficit (P_{def}) data from the ETIdaho website (http://www.kimberly.uidaho.edu/ETIdaho/) for the Richfield station (NWS – 107673). Table 2 shows the data and formulation of the permit limits with the equations used at each step described below.

Table 2: IWR Development Data

Month	P_{def} (mm/day)	P_{def}[1] (in/month)	IWR[2] (in/month)	MG/acre[3]	Field 1 IWR[4] (MG)	Field 2 IWR[4] (MG)
January	-0.44	-0.537	-0.826	-0.022	---	---
February	-0.04	-0.044	-0.068	-0.002	---	---
March	0.12	0.146	0.225	0.006	---	---
April	1.17	1.382	2.126	0.058	0.202	0.286
May	4.49	5.480	8.431	0.229	0.801	1.133
June	5.96	7.039	10.830	0.294	1.029	1.456
July	5.92	7.225	11.116	0.302	1.056	1.494
August	4.97	6.066	9.332	0.253	0.887	1.254
September	4.43	5.232	8.050	0.219	0.765	1.082
October	1.94	2.368	3.643	0.099	0.346	0.490
November	-0.41	-0.484	-0.745	-0.020	---	---
December	-0.54	-0.659	-1.014	-0.028	---	---

GS Total	28.88	34.79	53.53	1.45	5.087	7.195

[1] $P_{def}\left(\frac{in}{month}\right) = \frac{P_{def}\left(\frac{mm}{day}\right) * \frac{\#\ days}{month}}{25.4\frac{mm}{in}}$

[2] $IWR = \frac{P_{def}}{e_i}$ where e_i is the irrigation efficiency (65%, or 0.65, for furrow irrigation)

[3] $\frac{MG}{acre} = \frac{IWR * 27154\frac{gallon}{inch}}{1000000\frac{gallons}{MG}}$

[4] Individual field volumes calculated by multiplying $\frac{MG}{acre}$ by the number of acres in the field.

"Livestock Grazing" has been modified to read "No grazing allowed without an approved Grazing Management Plan."

"Maximum Nitrogen Loading Rate" and "Maximum Phosphorus Loading Rage" have been retained at "150% of Typical Crop Uptake" in order for the permittee to show compliance with these limits. In 2005, the permittee appears to have calculated a nitrogen loading limit of 338 lbs/acre which has been used as the limit every year since. The intent of retaining these limits is to have the permittee calculate the loading rates in accordance with the current procedure. Typical Crop Uptake, for the purposes of the permit has been defined as "the median constituent crop uptake from the three (3) most recent years the crop has been grown." Using a median historical value allows for variances in uptake from year to year, by using the middle value rather than the highest or lowest values which may over- or under-estimate actual crop uptake by a significant margin. For the purposes of this permit and the data required for reporting, the permittee should calculate and report the current year uptake as well as the median value used to determine permit compliance. Table 3 gives an example of how the median is determined and used in the context of determining permit compliance.

Table 3: Example Calculation for Typical Crop Uptake

Year	Crop Nutrient Uptake (lbs/acre)	Typical Crop Uptake (Median) Value (lbs/acre)	Permit Limit (150% Typical Crop Uptake, lbs/acre)
1	274	---	
2	270	---	
3	285	274[1]	411
4	195	270[2]	405

[1] This value compares Years 1 through 3
[2] This value compares Years 2 through 4

"Buffer Zones" has been updated to show the buffer zone of 35 feet for irrigation ditches/canals and permanent/intermittent surface water.

"Fencing and Posting" has been updated to read "Signs shall be posted and maintained every 500 ft and at each corner of the outer perimeter of the buffer zones of the reuse sites which read 'Warning: Recycled Water – Do Not Enter' or equivalent in both English and Spanish. Woven pasture fence or equivalent is required."

4.4. Section G. Monitoring Requirements

A note has been added to this section that states "Crop tissue sampling shall be performed for each cutting or harvest of the selected crop. The harvested portion of the crop shall be composited to yield one (1) sample for each cutting or harvest." Crop tissue samples are collected to show how much of the supplied nutrients that particular cutting has utilized. If a crop is harvested more than once, a sample is

required for each harvest.

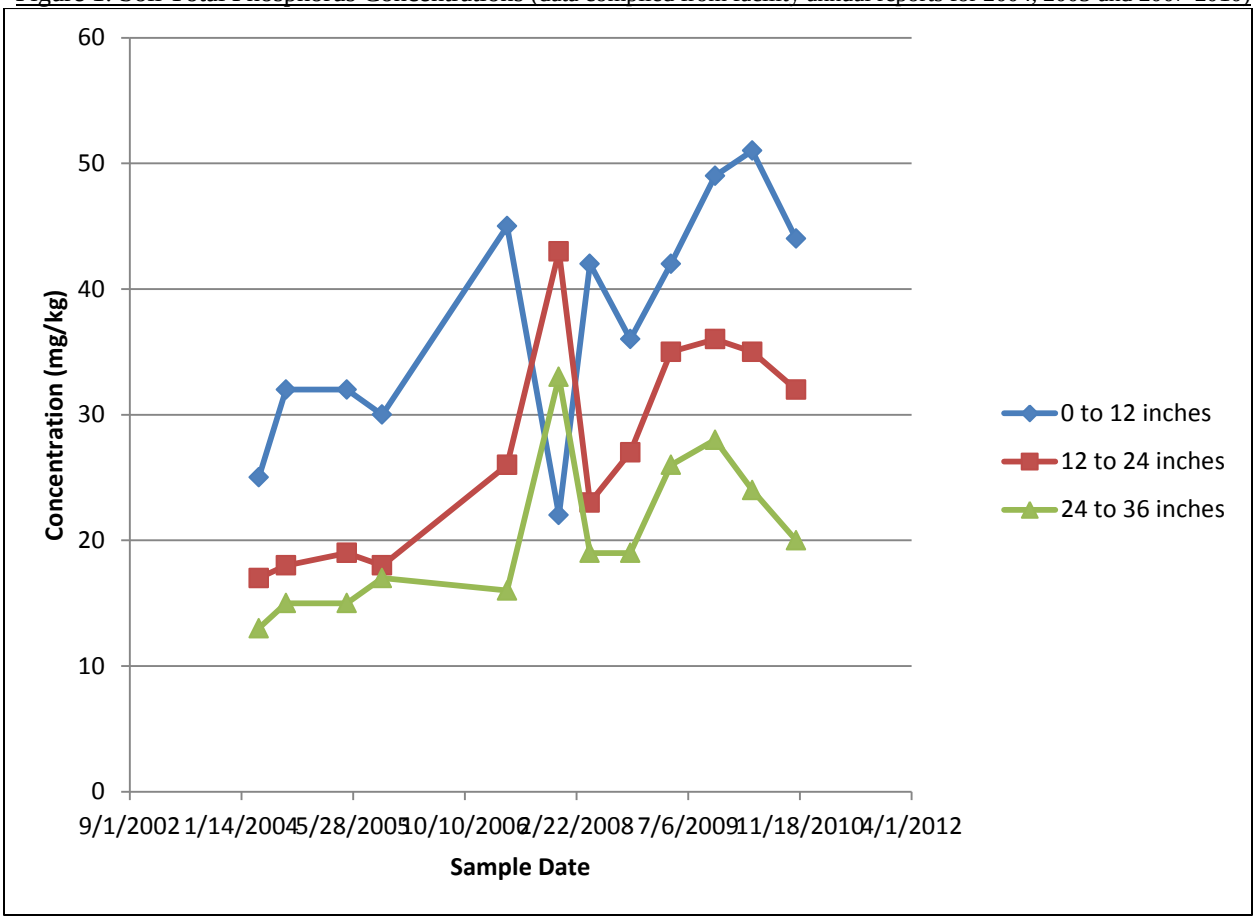
The Facility Monitoring Table has been updated to include the serial numbers for the applicable monitoring points and similar items have been grouped together to simplify the table.

A single grab sample of supplemental irrigation (canal) water has been added to the Facility Monitoring Table. This sample is required prior to the first time the permittee irrigates the reuse site with canal water and is to be analyzed for total nitrogen, total phosphorus, chemical oxygen demand (COD), and total suspended solids (TSS).

Total dissolved solids (TDS) and volatile dissolved solids (VDS) have been removed from the parameters list for the monthly wastewater grab sample. TSS has been added to this list in order to gather additional data. Data from 2008 through 2010 indicate a sharp increase in site loading of TSS, while TDS loading has remained fairly constant and VDS loading has been inconsistent over the same period. Additional TSS monitoring is proposed to show if the recent upswing is part of a larger trend or an isolated incident.

The soil sampling frequency has been modified to read “Annually (April and November)” to accurately reflect current practices and guarantee that sufficient data is available to evaluate impacts to soil nutrient concentrations. As part of this, a single set of samples has been added for the proposed site that will serve as the background concentrations for the site. These samples are proposed to be required prior to application of reuse water to MU-004802. No DTPA samples are proposed for iron or manganese. The requirement to monitor soil samples for plant-available phosphorus has been retained due to increasing concentrations of total phosphorus measured in the site soils (see Figure 1 below). The permittee appears to have monitored total rather than plant-available phosphorus and for the proposed permit cycle, needs to ensure that required monitoring samples are analyzed for the correct parameters by the contract laboratory.

Figure 1: Soil Total Phosphorus Concentrations (data compiled from facility annual reports for 2004, 2005 and 2007-2010)



In looking through the permittee's submitted annual report data for the last few years, it was noted that monitoring samples were frequently submitted to the laboratory for analysis on the day following the sampling event. While this is acceptable for analyses such as nitrate and metals, it is not acceptable for biological samples such as the bacteria monitoring required by recycled water permits to demonstrate compliance with disinfection criteria. The holding time for total coliform is no longer than six hours for wastewater samples. Samples must be submitted to the laboratory as soon as possible following collection in order to ensure that the test is begun within the required time frame. Samples analyzed after the holding time has expired may show false positives from excessive growth during transport and storage or false negatives due to die-off of the organisms. Both situations do not accurately represent conditions at the facility. In order to show compliance with the holding time for coliform bacteria, the draft permit requires that the completed chain of custody forms (showing both collection and laboratory receipt times) be submitted with the annual report.

TSS has been added to the proposed annual report loading calculation requirements for the reasons described above.

The table includes a proposed requirement for flow measurement (meter) calibration documentation to be supplied to DEQ annually in the annual report.

4.5. Appendix 1. Environmental Monitoring Serial Numbers

MU-004802 and SU-004802 have been added to the tables of Hydraulic Management Units and Soil Monitoring Units, respectively.

SW-004801 has been added as a Supplemental Irrigation Sampling Point at the irrigation canal diversion.

LG-004801 and LG-004802 have been added to describe Lagoon #1 and Lagoon #2, respectively.

FM-004801 and FM-004802 have been added to describe the flow meters on the reuse water and supplemental irrigation water, respectively.

4.6. Appendix 2. Site Maps

This section has been modified to include a vicinity map for the City of Richfield (Figure 1) as well as a site map (Figure 2) that includes the proposed acreage.

5. RECOMMENDATIONS

Based on review of applicable state rules, staff recommends that DEQ issue draft reuse permit LA-000048-04 for a 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 F. Monitoring and reporting requirements to evaluate system performance and to determine permit compliance have been specified in Sections G and H, and compliance activities have been incorporated into Section E of the permit.

TRIM Record 2011AGH1310