

October 12, 2012

MEMORANDUM

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FROM: Jerimiah Fenton, E.I.T. JF
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SUBJECT: Staff Analysis for Draft Municipal Wastewater Reuse Permit M-021-03 (formerly LA-000021-02) for the City of Carey

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 wastewater reuse permits (WRPs). This memorandum addresses draft WRP No. M-021-03 for the municipal wastewater treatment and reuse system owned and operated by the City of Carey. The City of Carey's treatment and reuse system is currently permitted under the terms of WRP No. LA-000021-02.

2. SUMMARY OF EVENTS

The Department of Environmental Quality (DEQ) issued Permit No. LA-000021-02 to the City of Carey on April 13, 2004. The permit is for continued operation of the wastewater treatment and reuse system serving the City of Carey. The City's wastewater facilities are located approximately one mile south of the City of Carey on the east side of State Highway 93 near the junction of Griffin Loop Road in Blaine County. The purpose of the draft WRP (M-021-03) is to renew Permit No. LA-000021-02, which expired on April 13, 2009.

A permit renewal application from the City of Carey was received on October 2, 2008, which DEQ determined to be complete on December 3, 2008. The permit renewal application largely serves as the basis for the terms and conditions contained in the draft permit (M-021-03). As required by the *Recycled Water Rules* IDAPA 58.01.17.400.07b, 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 the City of Carey wastewater reuse facility.

3. PROCESS AND SITE DESCRIPTIONS

The City of Carey treatment system was constructed in the mid 1980's and originally treated a combination of industrial (milk processing plant discharge) and municipal wastewater. Since 1994 the treatment works has treated only municipal wastewater.

The City of Carey currently has a National Discharge Elimination System (NPDES) permit issued by the EPA that allows the City to discharge effluent to the Little Wood River from September 1st through April 30th. The current City of Carey NPDES permit expired April 30, 2009. The City of Carey is currently applying for a renewal of the NPDES permit.

During the winter, wastewater that is not discharged to the Little Wood River is stored in a lagoon and applied to the City's wastewater reuse site during the following growing season (March 1st through October 31st). The City of Carey discharges approximately 4.5 million gallons annually (MGA) of wastewater to their reuse site.

3.1 Process Description

The City of Carey's wastewater treatment system consists of a gravity flow sewer main to a lift station located at the plant. Influent is pumped to the first aeration lagoon (Cell 1) and gravity flows to the second aeration lagoon (Cell 2). Wastewater then gravity flows to a settling/storage lagoon (Cell 3). Downstream of Cell 3, chlorine is injected into the wastewater before gravity flowing to the chlorine contact cell (Cell 4).

From the chlorine contact cell, wastewater flows to the pump house where it may be distributed to:

- The sand filter cell with discharge to the Little Wood River per City of Carey's NPDES (National Pollutant Discharge Elimination System) permit, or
- The recycled water site per City of Carey's wastewater reuse permit (LA-000021-02)

The 140-acre wastewater reuse site is owned and operated by a local farmer under an agreement with the City of Carey. Only 62 acres of the 140-acre farm are currently being utilized for land application of wastewater. The irrigation system at the wastewater reuse site includes a center pivot, hand lines, and a wheel line. Part of the wastewater reuse site is located in the 100-year flood plain and the Little Wood River crosses the site.

The City of Carey would like to add an additional 4.5 acres to the reuse site. This additional acreage is located to the northwest of the treatment works and is owned and farmed by the same farmer as the existing recycled wastewater site. The new acreage will have pivot irrigation and will be described as Hydraulic Management Unit MU-021-02 in the draft permit (M-021-03).

During the current permit cycle (LA-000021-02), the permittee has normally applied wastewater to the site for one week in the spring and one week in the fall. The 2011 reporting year indicated the City applied 4.07 million gallons (MG) of wastewater and 60.72 MG of supplemental irrigation water for a total of 64.79 MG (38.49 inches/acre). The crop type during the 2011 reporting year was alfalfa with a calculated Irrigation Water Requirement (IWR) of 35.15 inches/acre.

3.2 Site Soils

The recycled water site is located on soils primarily known as Bringmee Loam and Carey Lake Loam. These soils are well drained with moderately slow permeability and high available water capacity,

suitable for a recycled water application site. Soil samples were taken twice during the current permit (LA-000021-02) in May of 2005 and October of 2008. Soil analysis performed during the current wastewater reuse permit indicates that the application of wastewater does not appear to be impacting the soils at the site.

3.3 Surface Water

The Little Wood River runs next to the City of Carey's wastewater treatment facility and crosses the wastewater reuse site. The Little Wood River acts as a flood channel for storm water control. The Little Wood Irrigation District discharges water from the Little Wood Reservoir into the Little Wood River to manage spring run-off. Otherwise, water is discharged into the Irrigation District canal system and the Little Wood River is dry. During periods of water flowing in the Little Wood River through the wastewater reuse site, the 100 feet buffer distance between areas of recycled water and the surface water must be maintained.

3.4 Groundwater

Groundwater is located approximately 96 feet below ground surface and flows in a southeast direction. During the current permit (LA-000021-02), the hydraulic and constituent loading rates applied to the reuse site were below permit limits and conditions. The previous two versions of the wastewater reuse permits for the City of Carey (LA-000021-01 and LA-000021-02) did not require groundwater monitoring. The City of Carey's existing municipal wells are up-gradient and more than 1,000 feet from the recycled water site.

4. **PERMITTING DISCUSSION**

The following sections outline the staff recommended changes to be made to the terms of the current wastewater reuse permit. The recommended changes are based on requests made by the City of Carey, items completed as required in Permit No. LA-000021-02, evaluations of past performance with previous permit requirements, reviews of the City of Carey's annual reports, 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.

4.1 Section E: Compliance Schedule for Required Activities

The following section discusses the activities conducted by the permittee with regard to the compliance activity schedule listed in Section E of the current wastewater reuse permit (LA-000021-02). This section also includes any recommendations for compliance activities to be included in Section 2 of the draft permit (M-021-03). Table 1 on the next page lists the Compliance Activities that were required by the current permit (LA-000021-02). The City of Carey has completed all four of the compliance activities required by the current permit.

Table 1: Current Permit (LA-000021-02) Compliance Activity Schedule

Compliance No.	Description	Due Date	Status
CA-021-01	O&M Manual	April 2005	Completed
CA-021-02	Seepage Rate Testing	July 2005	Completed
CA-021-03	Disinfection Demonstration	July 2004	Completed
	Revised Land Application Acreage	July 2004	Completed
CA-021-04	Wastewater Flow Meter	April 2005	Completed

CA-021-01 O&M Manual (LA-000021-02): This compliance activity required that the Plan of Operation (O&M Manual) for the wastewater land application facilities be updated and submitted to DEQ for review and approval within one (1) year after permit issuance (April 13, 2005). The City of Carey submitted an updated O&M Manual on January 18, 2008, over two years past the original due date for the compliance activity. The O&M Manual was reviewed and approved by DEQ.

Compliance Activity No. CA-021-01 in the draft permit (M-021-03) requires the submission of an updated Plan of Operation (PO) to DEQ for review and approval, due within six (6) months after permit issuance and prior to application of wastewater. The updated PO shall include a Quality Assurance Project Plan (QAPP) and a Nuisance Odor Management Plan. The QAPP will help ensure that the City of Carey consistently conducts accurate monitoring activities in compliance with all monitoring requirements listed in the draft permit. The QAPP shall cover field activities, laboratory analytical methods, data verification and validation, data storage, data retrieval, data assessment, and monitoring program evaluation and improvement. The Nuisance Odor Management Plan shall include specific design considerations, operation and maintenance procedures, and management practices to be employed to minimize the potential for or limit odors. The Nuisance Odor Management Plan shall also include procedures to respond to an odor incident if one occurs.

CA-021-02 Seepage Rate Testing (LA-000021-02): This compliance activity required the City of Carey to conduct seepage rate tests in accordance with a DEQ approved seepage test plan for Cell 1 (1st aeration lagoon), Cell 2 (2nd aeration lagoon), Cell 3 (settling/storage lagoon), and Cell 4 (chlorine contact cell). The permittee was to submit a seepage testing plan to DEQ for review and approval within six months of permit issuance (by October 13, 2004). Within one (1) year after DEQ approval of the seepage testing plan, the permittee was to complete the seepage rate tests and submit the results to DEQ for review and approval. DEQ reviewed and approved the City's seepage rate testing procedure and DEQ received the City of Carey seepage testing results for all four wastewater lagoons on October 24, 2005. All four lagoons had seepage rates less than the allowable 0.125 inches per day specified in the current permit (LA-000021-02). DEQ approved the seepage rate test results on October 28, 2005.

The *Wastewater Rules* currently require all municipal wastewater lagoons to be seepage tested once every ten years (refer to IDAPA 58.01.16.493.02). The City's lagoons will require seepage testing again in 2015. Compliance Activity No. CA-021-02 of the draft permit (M-021-03) requires lagoons to be seepage tested using an approved DEQ testing procedure and that the results be submitted to DEQ for review and approval by November 1, 2015.

CA-021-03 Disinfection Demonstration and Revised Land Application Acreage (LA-000021-02): This compliance activity required the City of Carey to demonstrate that the liquid chlorination system had the ability to consistently meet the 23 total coliform/ 100 mL disinfection level (Class C Disinfected Wastewater) as outlined in Section F: Permit Limits and Conditions. Within three (3) months of permit issuance (by July 13, 2004) the City of Carey was required to collect and analyze daily grab samples of chlorinated wastewater effluent (maximum frequency of once per day) until three (3) consecutive analyses showed a total coliform level of 23/100 mL or less. It appears that the City's new wastewater disinfection system consistently achieves the total coliform limit of 23/100 mL. During the current permit (LA-000021-02), the coliform levels have been consistently below 23/100mL. The wastewater monitoring results listed in the 2011 annual report show that the wastewater coliform levels were all less than 23/100mL during land application. However, there is no record of the permittee submitting documentation of the disinfection demonstration.

This compliance activity also required the City of Carey to determine the acreage to be utilized for wastewater land application while meeting the buffer zone requirements and disinfection levels as outlined in Section F: Permit Limits and Conditions of the current permit. Within three months of permit issuance (by July 13, 2004), the City of Carey was required to submit for DEQ review and approval, a site plan identifying the proposed wastewater land application acreage and a short report describing how the acreage was determined and how buffer zone requirements would be met. The acreage and buffer zone information for the City of Carey's wastewater land application facility was addressed in the City of Carey's Wastewater Reuse Permit Renewal Application. The permit renewal application was submitted October 2, 2008, over four years past the original due date required by the compliance activity.

CA-021-04 Wastewater Flow Meter (LA-000021-02): This compliance activity required the City of Carey to submit plans and specifications for DEQ review and approval for the installation of a flow meter to measure the flow of wastewater to the land application site within six (6) months of the permit issuance (October 13, 2004). Within one (1) year after permit issuance, the City of Carey was required to complete installation of the wastewater flow meter. The City installed a new propeller (McCrometer) flow meter in the fall of 2004 to measure the volume of wastewater applied to the reuse site.

New Compliance Activities: Compliance Activity No. CA-021-03 of the draft permit (M-021-03) requires the submission of a Waste Solids Management Plan prior to any waste solids application. The plan shall describe how waste solids generated at the facility will be handled and disposed. This plan is necessary if the City of Carey ever desires to remove accumulated solids from their wastewater lagoons.

Compliance Activity No. CA-021-04 of the draft permit (M-021-03) requires the permittee to

meet with DEQ one year (1) prior to permit expiration to discuss the preparation of a permit renewal application. The compliance activity also requires submission of the permit renewal application six (6) months prior to permit expiration. This compliance activity was included to be consistent with other recently issued reuse permits.

Table 2 below summarizes the proposed compliance activity schedule for the draft permit (M-021-03):

Table 2: Draft Permit (M-021-03) Compliance Activity Schedule

Compliance No.	Description	Due Date
CA-021-01	Updated Plan of Operation	Six (6) after permit issuance
CA-021-02	Seepage Testing	November 2015
CA-021-03	Waste Solids Management Plan	Prior to solids application
CA-021-04	Permit Renewal Meeting	One (1) year prior to permit expiration
	Permit Renewal Application	Six (6) months prior to permit expiration

4.2 Section F. Permit Limits and Conditions

The general formatting of the draft permit (M-021-03) has changed and may affect the location of some permit limits and conditions. Permit Limits and Conditions will be listed under Section 3 of the draft permit (M-021-03).

The following limits and conditions were changed in the draft permit (M-021-03):

1. A new monitoring unit (MU-021-02) has been added to the land application site (Section 3.1). The new 4.5 acre monitoring unit is adjacent to the current land application site (MU-021-01). This acreage will be irrigated using a short, sweeper pivot. The total land application site acreage will be 66.5 acres.
2. The current permit (LA-000021-02) states that the maximum growing season hydraulic loading rate shall be no greater than the Irrigation Water Requirement (IWR). Section 3.2 of the draft permit (M-021-03) now states that the growing season hydraulic loading rate limit is “substantially at the irrigation water requirement.” This was changed to allow some flexibility of the hydraulic loading rate limit and to be consistent with other permits.
3. The current permit (LA-000021-02) states that the maximum COD loading rate limit is

50 lbs/acre/day. Review of the annual reports for the current permit showed that the average COD loading rate from 2005 to 2011 was less than 0.30 lbs/acre/day. Since the City's wastewater has shown a long trend of low COD concentrations, the draft permit (M-021-03) no longer lists a COD loading rate limit (Section 3.3).

4. Section 3.5 of the draft permit (M-021-03) includes a requirement to calibrate all flow measurement devices used to measure all wastewater and supplemental irrigation water applied to the wastewater reuse site. This requirement was included to provide accurate hydraulic loading rate estimations and to be consistent with other permits.

4.3 Section G. Monitoring Requirements

The general formatting of the draft permit has changed and may affect the location of some permit monitoring requirements. Monitoring requirements are now listed under Section 4 of the draft permit (M-021-03), while reporting requirements are listed under Section 5.

The following monitoring and reporting requirements were changed in the draft permit:

1. As mentioned earlier in item 3 of Section 4.2, the City's wastewater has had very low concentrations of COD during the term of the current permit (LA-000021-02). For this reason, the COD loading rate monitoring requirements have been removed from the draft permit (M-021-03).
2. The current permit (LA-000021-02) requires the reporting of crop nutrient uptake from crop tissue analysis or from standard tables for crop type and yield. The draft permit (M-021-03) now requires plant tissue monitoring for each harvest. The City is required to report crop yield in customary harvested units, moisture content (%), ash (%), total Kjeldahl nitrogen (%), and total nitrogen as nitrate and nitrite (NO₃-N + NO₂-N (ppm)).

5. **RECOMMENDATIONS**

Based on review of applicable state rules, staff recommends that DEQ issue the City of Carey draft Wastewater Reuse Permit M-021-03 for a public review and comment period. The draft permit contains effluent quality requirements for the wastewater treatment system, hydraulic and constituent loading limits, and terms and conditions required for operation of the reuse system. Compliance activities have been incorporated into Section 2 of the draft permit. Monitoring and reporting requirements to evaluate system performance and to determine permit compliance have been specified in Section 4 and Section 5 of the draft permit. Monitoring and reporting requirements have been included to demonstrate compliance with the permit conditions, and demonstrate protection of human health and the environment with respect to operation of the facility.