

October 30, 2012

MEMORANDUM

TO: Clayton Steele
Regional Administrator, Lewiston Regional Office

FROM: Jerry Shaffer
Staff Engineer

SUBJECT: Staff Analysis for Draft Wastewater Reuse Permit M-321-01 (Municipal Wastewater)
Country Homes Mobile Park

1. PURPOSE

The purpose of this memorandum is to satisfy the requirements of IDAPA 58.01.17.400.05, "Recycled Water Rules," for issuing wastewater reuse (WRU) permits. This memorandum addresses draft WRU permit No. M-231-01 for the proposed municipal wastewater reuse system owned and operated by the Country Homes Mobile Park (Country Homes).

2. SUMMARY OF EVENTS

This is a new WRU permit for Country Homes, which is located in Latah County. A WRU permit application, submitted by the owner and received by the regional office on March 1, 2012, indicated Country Homes' intent to initiate operation of the municipal wastewater reuse facility. This draft WRU permit is to allow operation of a municipal wastewater reuse system operated by Country Homes.

Country Homes has been discharging their treated wastewater to a ditch (N46° 42' 19.20" W116° 56' 54.52") that empties into the South Fork of the Palouse River during the spring when they run out of storage space. Country Homes does not possess a National Pollution Discharge Elimination System (NPDES) permit. Country Homes is concerned that they would not be able to comply with the requirements of an Environmental Protection Agency's NPDES permit. This has motivated Country Homes to solicit a WRU permit.

The WRU permit application from Country Homes largely serves as the basis for the terms and conditions contained in the draft WRU permit. As required by the "Recycled Water Rules," the draft WRU 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 WRU permit for Country Homes' municipal wastewater reuse facilities.

3. PROCESS AND SITE DESCRIPTIONS

Country Homes municipal wastewater is treated at the Country Homes wastewater treatment facility. Country Homes' existing wastewater treatment facility consists of a two-cell facultative lagoon with chlorine disinfection between cells 1 and 2, followed by discharge to the South Fork of the Palouse River. With the issuance of this WRU permit, Country Homes will add additional chlorination and a chlorine contact lagoon cell after Cell 2 and prior to discharge to the reuse site. Effluent application will be during the growing season.

The municipal wastewater reuse site proper is located south of the existing mobile home park and consists of an existing grass hay field. Approximately 1.5 acres are considered usable by the owner due to buffer restrictions and slope limitations. The application bases the area of the reuse site on a 300 foot buffer. The proposed permit contains a 200 foot buffer to the mobile homes. If the latter buffer distance is approved, the reuse site area could be increased if needed. In addition, the land slopes steeply to the east and this area could be used at a reduced application rate in order to reduce the possibility of erosion. As mentioned before, the site consists of Timothy grass hay that will be cut and removed twice a year. Soils at the site consist of silt-loams that extend to a depth of over five feet. Seasonal groundwater is located between four to seven feet deep, and the closest aquifer is 120 feet below the ground's surface. Prevailing winds at the site are from west to east and from southwest to northeast.

In order to demonstrate compliance with the conditions of this proposed permit, Country Home will be required to monitor the volume of treated wastewater applied to the hydraulic management unit (MU) and various specified constituents of the treated wastewater. Each year Country Home will also be required to submit an annual report that provides all of the monitoring results as well as a discussion about the results of the monitoring.

4. PERMITTING DISCUSSION

The "Recycle Water Rules" (IDAPA 58.01.17) have established classifications for wastewater effluent based on treatment provided and the level of wastewater disinfection. Each classification has specific effluent requirements and uses. Based on the current "Recycled Water Rules," the uses proposed by Country Homes, irrigation of agriculture hay fields, are allowed for Class C effluent or higher. Class C effluent is required to be oxidized, clarified, and adequately disinfected. Class C water shall meet a median number of total coliform organisms of 23 CFU/100 mL, as determined from the bacteriological results of the last five days for which analyses have been completed. In addition, no single sample shall exceed 230 CFU/100 mL, in any confirmed samples.

The new reuse system at Country Homes will have the following compliance schedules for the following reasons.

4.1 Compliance Schedule for Required Activities – Section 3

All wastewater systems are required to have an operation and maintenance manual, also called a plan of operation, in accordance with IDAPA 58.01.16, "Wastewater Rules." Both the "Wastewater Rules" and the "Recycled Water Rules" contain requirements about the information that should be provided in the plan of operation. DEQ's "Guidance for Reclamation

and Reuse of Municipal and Industrial Wastewater” (*Reuse Guidance*) may also be used as guidance when developing the plan of operation. This *Reuse Guidance* contains a plan of operation checklist that specifies the information that should be included. Compliance Activity No. CA-231-01 requires that the Plan of Operation be developed and submitted within 6 months following permit issuance.

In order to ensure that reuse water is applied to and remains on the permitted site, buffer zones have been established in the permit. These buffer zones for Class C effluent are meant to protect public health and the environment. For further protection, runoff management should be addressed in the plan of operation.

Idaho Wastewater Rules require new lagoons to be seepage tested (IDAPA 58.01.16.493.02.b) prior to being placed in service. This requirement is addressed in Compliance Activity CA-231-03.

Wastewater Collection, treatment and land application systems should be operated by a properly licensed operator. To be properly licensed, an operator should be licensed to the level of the individual wastewater systems (collection, treatment and land application) are classified. This requirement is addressed in Compliance Activity CA-231-07.

4.2 Permit Limits and Conditions – Section 4

Country Homes has chosen not to pursue non-growing season application or grazing of the site.

Hydraulic and nutrient loading to the site will be based on crop requirements due to the lack of data regarding hydraulic flows and wastewater nutrient concentrations for this system. Country Homes has provided a proposed hydraulic application rate to the 1.5 acre site based on estimated wastewater flows, precipitation, and evaporation and seepage losses. DEQ will look at a maximum application rate based on site-specific criteria.

Since there is no measured wastewater flow data for this system, the engineer has estimated daily flows based on 37 household connections and had the owner/operator conduct wetwell drawdown tests to correlate pumped wastewater volumes and pump cycle times to daily flows in order to verify the engineer’s projected flows. The engineer estimates that wastewater flows for this facility at approximately 6,000 gallons per day (2.19 million gallons/year). The engineer through his own hydraulic mass balance, has determined that approximately 1.225 million gallons are lost in the wastewater treatment system through evaporation and seepage, leaving 0.745 million gallons/year to dispose of. The owner proposes to apply this 0.745 million gallons to the 1.5 acre reuse site for an equivalent annual application rate of 18.35 inches of treated wastewater.

In order to ensure that the environment is protected, DEQ will base hydraulic loading rates based on crop uptake at the site. For pasture grass, from the University of Idaho, Kimberly, Idaho website, the seasonal irrigation requirement for pasture near Moscow, Idaho is 623 mm, or 24.53 inches. If a 10% leaching factor is included in this number, as well as an 85% irrigation efficiency for sprinklers, the total allowable loading rate for this site is 31.7 inches, or 1.3 million gallons per year. This application rate exceeds the application rate proposed by Country Homes.

The flow measurement should be calculated daily from effluent pump cycles and durations during the months that they discharge, with the caveat that the lagoons seepage rates are acceptable and could provide enough detail to estimate the wastewater influent flow rates.

Water quality data is also missing and the owner has provided estimated values in the submittal. The engineer's loading estimates are 1.2 pounds BOD/acre/day, 147 pounds total Kjeldahl nitrogen/acre/year, and 42 pounds phosphorus/acre/year. In the end, the analysis will be made based on the capacity of the site to store and treat the constituents coming from the treatment system and not adversely affect local groundwater quality.

Nitrogen Loading: The applicant has submitted no data on Nitrogen concentrations in the effluent, therefore the nitrogen loadings should be based on crop demands for Timothy Hay Grass. From the publication Alberta Agriculture and Rural Development ([http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/agdex12785](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex12785)), the estimated uptake of nitrogen for Timothy Hay Grass is about 35 pounds of nitrogen per ton of hay. A site may be able to produce six tons of hay per year, thus resulting in approximately 210 pounds nitrogen/acre/year removed. Allowing for a 150% of crop requirement application rate to the site, the loading limit to the site would be 315 pounds nitrogen/acre/year. The permit will require sampling the wastewater for nitrogen and recording the amount of hay removed from the site on an annual basis. A discussion on the fate of nitrogen at the site should be included in the annual report. If the applicant would like the nitrogen monitoring to be reduced or the loading rates to the site increased, a mass balance for nitrogen should be done including tissue sampling and analysis of the hay that leaves the site. Note: total nitrogen should be retained on a monthly basis from grab samples during the period that they are discharging.

Phosphorus Loading: The applicant has submitted no data on phosphorus concentrations in the effluent, therefore the phosphorus loadings should be based on crop demands for Timothy Hay Grass. From the publication Alberta Agriculture and Rural Development ([http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/agdex12785](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex12785)), the estimated uptake of phosphorus for Timothy Hay Grass is about four pounds of phosphorus per ton of hay. A site may be able to produce six tons of hay per year, thus resulting in approximately 24 pounds phosphorus/acre/year removed. In the same publication, the amount of Phosphates that the same acre of Timothy Hay Grass can remove is 60 pounds per year. This reference was used because it looks specifically at Timothy Hay Grass in the northern part of the US and southern part of Canada. The permit will require sampling the wastewater for phosphorus and recording the amount of hay removed from the site on an annual basis. A discussion on the fate of phosphorus at the site should be included in the annual report. If the applicant would like the phosphorus monitoring to be reduced or the loading rates to the site increased, a mass balance for phosphorus should be done including tissue sampling of the hay that leaves the site. Monitoring of the total phosphorus in the wastewater shall be reduced to quarterly during periods of discharge (so that would mean grab samples in May and August or something like that). To evaluate plant available phosphorus, the owner will take a soil sample prior to the initial application to the site, a second soil sample at the end of the first application season and a third soil sample at the end of the second application season. This should help DEQ understand, in conjunction with the quarterly total phosphorus effluent data, whether the plants are getting enough phosphorus to remain healthy. Unhealthy plants will not utilize the provided nitrogen, which is our main concern.

The owner should report the yields for each harvest. The owner can use suitable tables to arrive at the nutrient uptake values. We can then assess this uptake with respect to the nutrients applied and verify that the uptake always exceeds the available TN from the applied effluent.

COD Loading: The old standard reuse permit by the State of Idaho limited COD loading to 50 pounds/acre/day. The City of Cottonwood's reuse permit limits the city to 50 pounds/acre/day COD (See 2009-09-09 reuse permit page 8) and they actually apply only about 12 pounds/acre/day (see 2012-01-31 2011 City of Cottonwood Reuse Permit Annual Report, page 8). And while the City of Genesee does not contain a permit limit for COD (see 2009-06-30 City of Genesee Wastewater Reuse Permit), they apply about 18 pounds/ac/day (see 2011-12-29 2011 Genesee Annual Reuse Report), which is much less than 50 pounds/ac/day. Country Homes proposes a BOD loading rate of approximately 1.2 pounds/acre/day, or about 4.8 pounds COD/acre/day. All these rates, including the proposed rate for Country Homes, are far below the standard loading rate so there will be no COD limit in the permit. No COD monitoring will be required in this permit.

Salt Loading: Country Homes contains no industry that would be expected to produce a wastewater stream with high concentrations of sodium or chloride (salts). Country Homes is required to notify the State of any significant changes to their wastewater or amount. As a check, the State does perform an annual inspection and one of the items to check during the inspection would be if the wastewater characteristics have changed in the last year. An additional backup would be the requirement for Country Homes to include any changes to its system in the previous year as noted in their annual report. For this reason, salt limits will not be included in this permit. Non-volatile dissolved solids will not be monitored for in the permit. In order to ensure that there is no salt buildup in the soil, the owner should conduct soil analysis in saturated paste extract.

TDS Loading: Country Homes contains no industry that would be expected to produce a wastewater stream with high concentrations of Total Dissolved Solids (TDS). Country Homes is required to notify the State of any significant changes to their wastewater or amount. As a check, the State does perform an annual inspection and one of the items to check during the inspection would be if the wastewater characteristics have changed in the last year. An additional backup would be the requirement for Country Homes to include any changes to its system in the previous year as noted in their annual report. For this reason, salt limits will not be included in this permit.

Site buffers will be set at the standard size for this reuse permit except that for the buffer distance to occupied dwellings. This buffer shall be reduced to 200 feet due to the use of low angle sprinkler nozzles and nozzles that will produce larger droplets. The owner is also planting a buffer of trees between the application site and mobile homes. The owner will also operate his system to reduce the potential hazard to the health of the residents such as irrigating only when there is no wind, etc. The Plan of Operation should be review and approved by DEQ. Total coliform sampling should still be required on a weekly grab basis.

The permit requires that a pre-application be held with the DEQ one year prior to the expiration date of the permit, if Country Homes anticipates continuation of wastewater reuse. In addition, a permit renewal application should be submitted six months prior to the expiration date of the permit if Country Homes anticipates continuation of wastewater reuse.

4.3 Monitoring and Reporting – Sections 5 & 6

Several assumptions were made on the quality of effluent from the Country Homes wastewater treatment facility and actual data needs to be gathered and analyzed to assess potential impacts to public health and the environment. The permittee is required to submit an annual report that includes 1) all monitoring conducted under the terms of the permit, 2) the hydraulic management unit reporting requirements in Section 6 of the draft permit, 3) the status of compliance activities required by the permit, and 4) an interpretive discussion of the monitoring data with particular respect to any potential environmental impacts. The annual report is due by January 31st of each year, and should address operations conducted from the previous reporting year.

5. RECOMMENDATIONS

Based on review of applicable state rules, staff recommends that DEQ issue draft WRU permit No. M-231-01 for a public review and comment period. Based on the fact that little is known regarding the quality of the effluent from the wastewater treatment plant, this permit is recommended for a 5 year permitting cycle. The draft permit contains terms and conditions required for operation of the reuse system. Monitoring and reporting requirements to evaluate system performance and to determine permit compliance have been specified, and compliance activities have been incorporated into Section 3 of the permit.

References

- Idaho Department of Environmental Quality, September 2007. Guidance for the Reclamation and Reuse of Municipal and Industrial Wastewater. Available online at http://www.deq.idaho.gov/water/permits_forms/permitting/guidance.cfm
- Alberta Agriculture and Rural Development, July 2007. Fertilizer and Nutrient Management of Timothy Hay. Accessed October 30, 2012. [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/agdex12785](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex12785)