

May 20, 2011

MEMORANDUM

TO: Erick Neher; DEQ Idaho Falls Regional Office Administrator.
Greg Eager, PE; DEQ Idaho Falls Regional Office Engineering Manager.

FROM: C. Mazzone; DEQ Idaho Falls Regional Office Staff Engineer.

SUBJECT: Permit renewal staff analysis: Last Chance/Ponds Lodge wastewater treatment and reuse facility; permit number LA-000058-03

1.0 Purpose

The purpose of this memorandum is to satisfy the requirements of IDAPA 58.01.17.400.05 *Application Processing Procedure – Contents of the Staff Analysis* for issuing wastewater reuse permits. Specifically, this staff analysis shall briefly state the principal facts and the significant questions considered in preparing the permit conditions, and a summary of the basis for the conditions with references to applicable requirements and supporting materials.

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2.0 Process Description

Fremont County owns and operates a municipal wastewater treatment facility that serves the Last Chance and Ponds Lodge areas of Island Park. The wastewater is collected with gravity flow and lift stations. Treatment is provided to a secondary level by two aerated lagoons (@ 1.08 million gallons) and is then polished and stored in a third lagoon (6.8 million gallons). Lagoons have ten feet of working depth and three feet of freeboard. The lagoon effluent is chlorine gas disinfected in a contact chamber, then land applied by two methods of land application:

1. growing season effluent is pumped to two center pivots irrigating 23.1 acres of native grasses in clear cut areas. Maximum permitted flow is 11.3 million gallons per year (18 acre*inches/acre).
2. Non-growing season artificial snow application (effluent converted to snow) is applied to 14.9 acres (distinct from the growing season acreage). Approximately 20 to 25 percent of the wastewater volume is lost and approximately 30 percent of the ammonia is stripped due to sublimation. The native grasses and soil add additional treatment to the wastewater effluent. Permitted flow is 10.0 million gallons per year (7.5 million gallons after sublimation, equal to 18.5 acre*inches per acre).

3.0 Summary of Events

The Last Chance wastewater treatment facility was constructed in 1987 and 1988. Annual inflow volume at that time was estimated at 5 million gallons.

The facility was issued its initial land application permit (LA-000058) on August 20, 1990. The permit limited wastewater application to 9.5 million gallons per year to 24 acres (14.6 inches per year).

A November 1990 inspection by the DEQ found the facility compliant and recommended minor modifications.

The permit was modified on September 27, 1996 to allow land application of 11.3 million gallons annually to 23.1 acres (18.01 acre*inches). The modification resulted from the use of end guns on the pivot sprinklers to utilize the entire 23.1 acre application site. Minor monitoring requirements were also changed.

A July 2000 inspection by DEQ found the facility to be in good working order.

The permit was renewed on September 1, 2004 (LA-000058-02), and included non growing season artificial snow application to a new 14.9 acre hydraulic management unit. Snow application hydraulic loading was limited to 10 million gallons per non growing season.

The permit renewal application was received by the DEQ in April 2009.

4.0 Discussion

4.1 Site Characterization

The site is located on Targhee National Forest land, owned by the United States Department of Agriculture Forest Service. Land use by Fremont County is granted with a special use permit for 162 acres and includes sewage collection, treatment and disposal. The special use permit term is 20 years, and expires December 1, 2017.

Vegetation consists of native grasses.

4.2 Climate

The facility is 6,240 feet in altitude, and is characterized by (data according to the Western Regional Climate Center, Island Park station):

- 35 inches per year annual evaporation;
- 211 inches per year average snowfall;
- 45 frost free days per year;
- 28.78 inches of average annual precipitation;

- 2.4 inches of precipitation for the 25 year, 24 hour event frequency; one inch of precipitation for the 5 year, 6 hour event frequency;
- winds are primarily from the south or southwest, with approximately 50% of the time from the south. Average winds are 6 to 12 mph.

Average total precipitation (inches)

Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
3.80	2.93	2.50	2.03	2.49	2.74	1.26	1.45	1.52	1.90	2.56	3.60	28.78

4.3 Soils

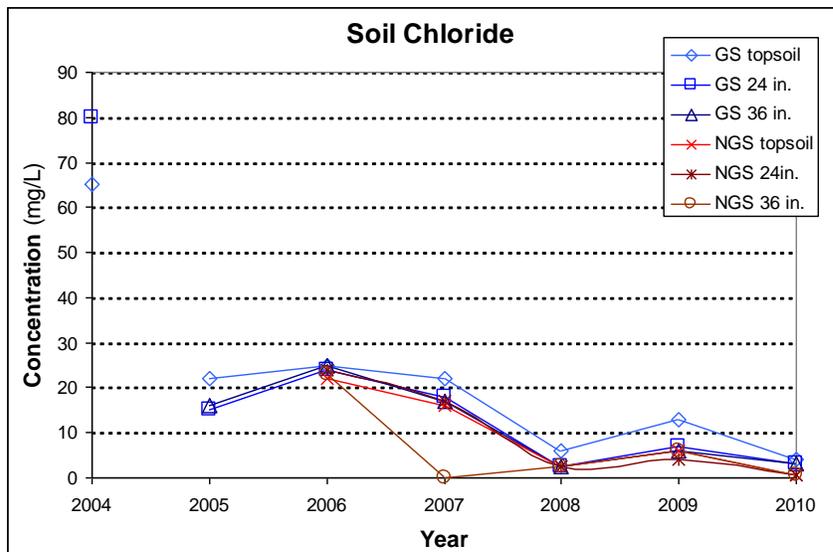
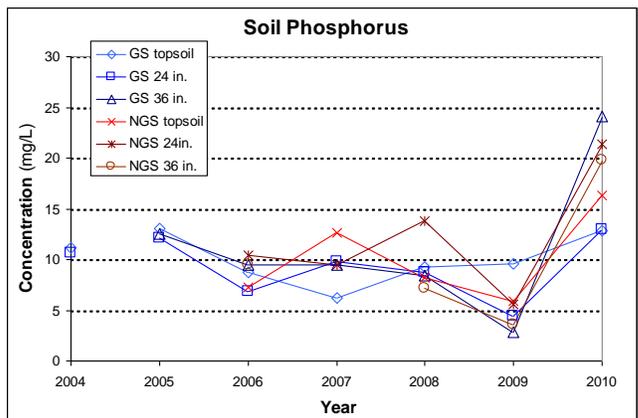
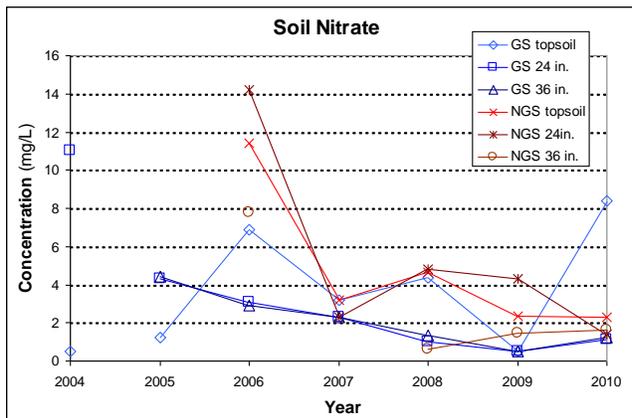
Soils are deep river alluviums and gravelly loam overlaying sand and gravel. Two soil units have been identified for the site:

- Unit 1720 - Flatstone, Fitzwill and Koffgo
- Unit 1000 – Island Park, Potr mound and Spliten

Test pits dug in the land application area indicate 3 to 6 feet of silt loam overlying silt with rock material. The soils are classified as sandy/loam to loam/silt (37-42% sand, 40 – 48% loam /silt, 11-17% clay). Available water holding capacity of silt loams are estimated at 2.44 inches per foot.

Monitoring Results

The last five years' soil monitoring data shows no levels of concern for either the growing season or non growing season acreage. Nitrate, phosphorus and chloride are charted below.

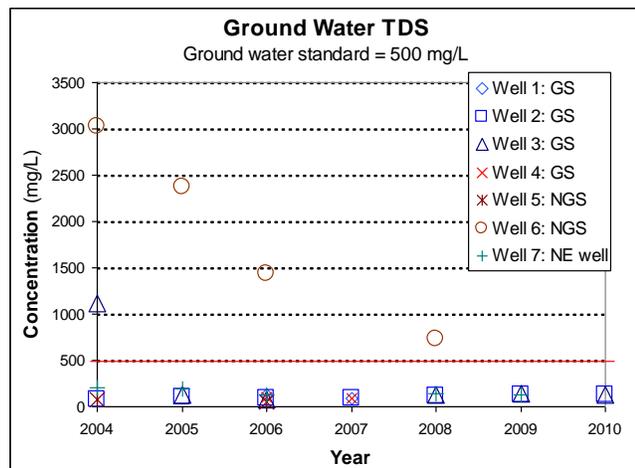
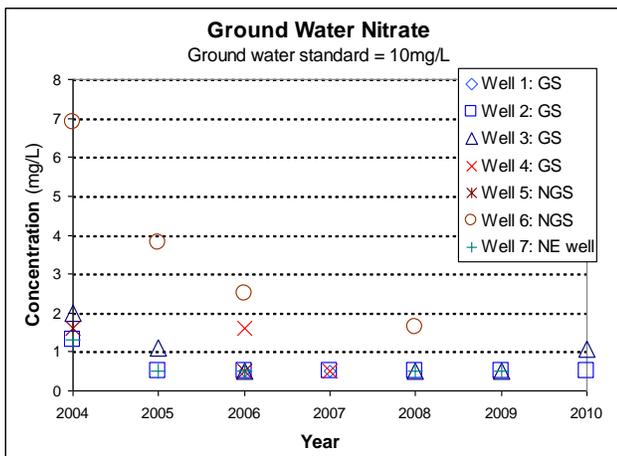
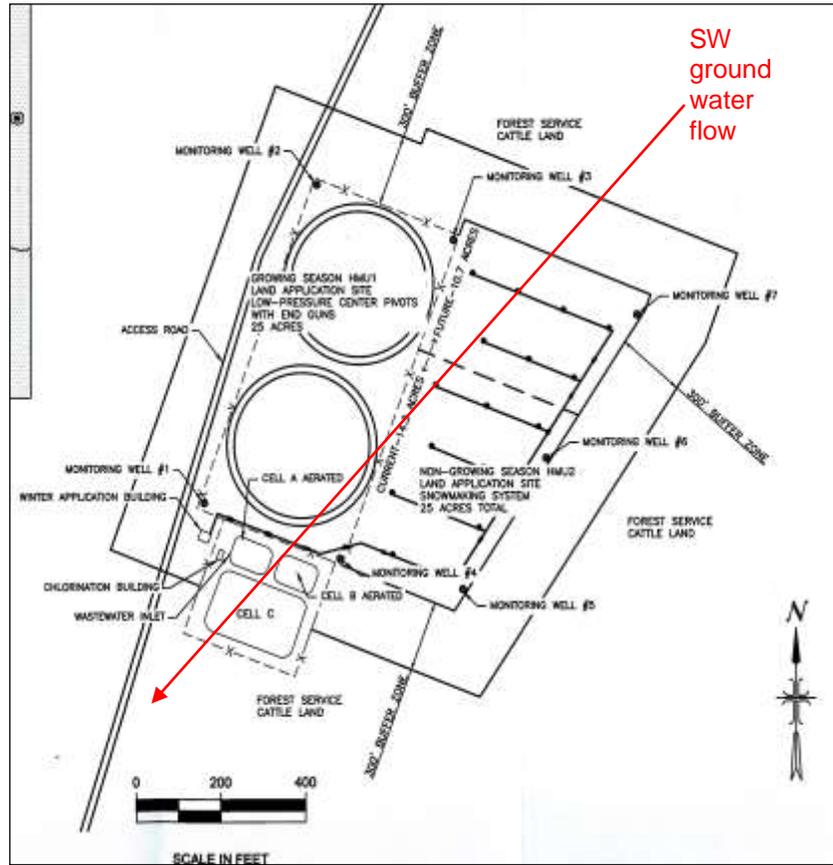


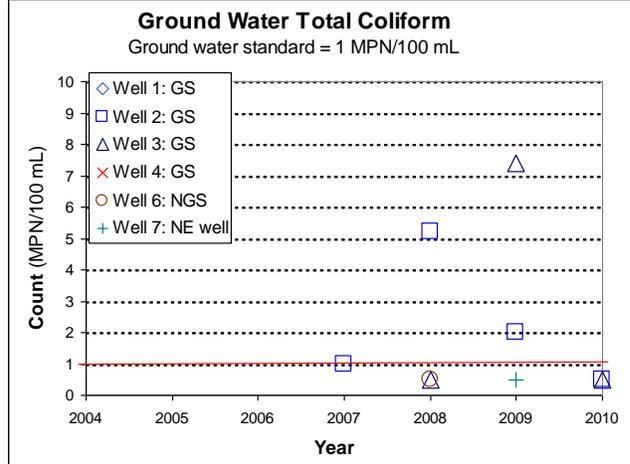
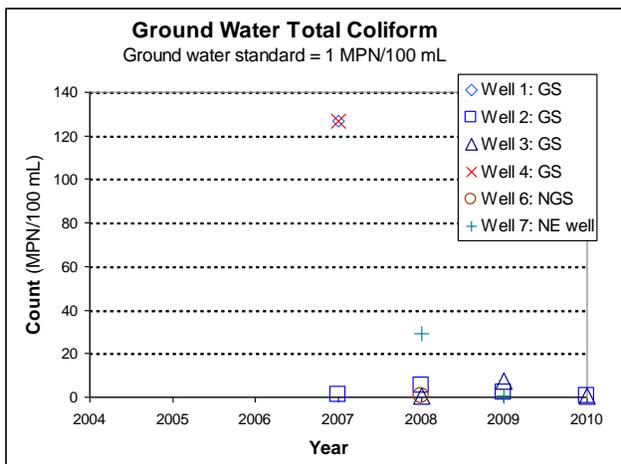
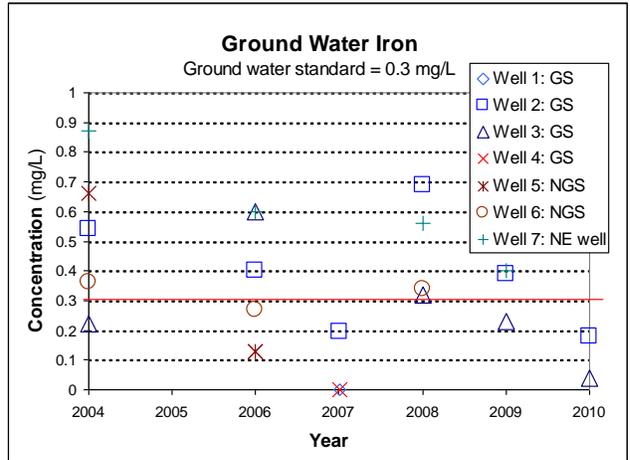
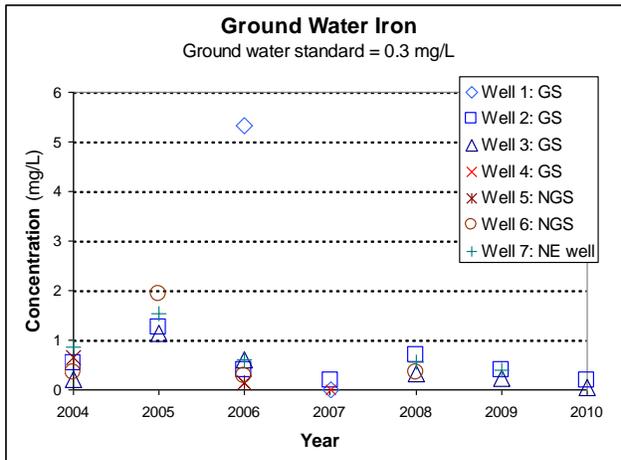
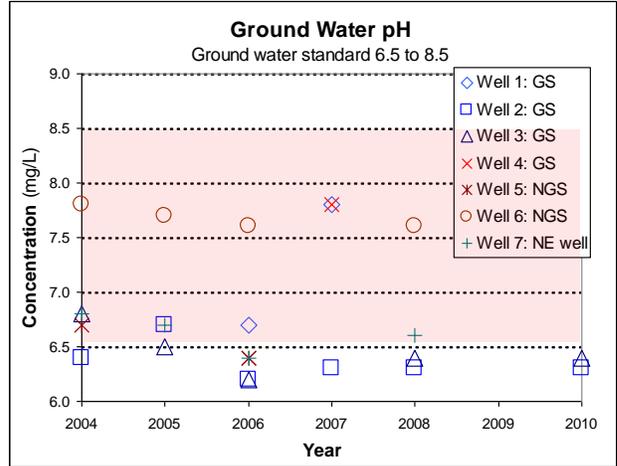
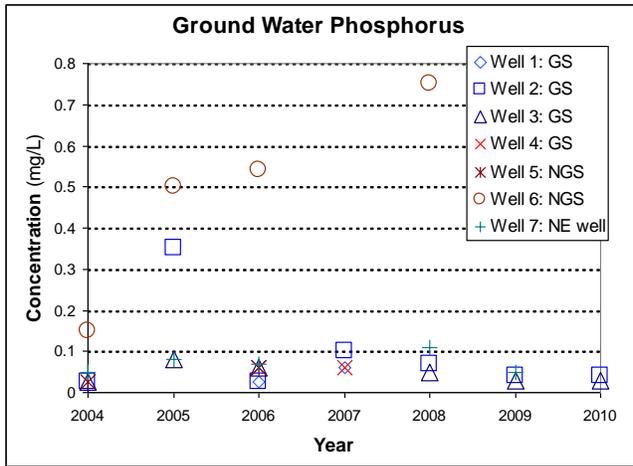
4.4 Ground Water

The depth to ground water is 40 to 60 feet. Transmissivity is approximately 130 ft²/min. The ground water gradient was determined from the monitoring wells to be 0.003 ft/ft flowing in a southwest direction towards the Henry's Fork River.

The following items were evident in reviewing the 2004 thru 2010 monitoring results.

1. Dry wells:
 - a. Wells 1 and 4 were dry for 5 of the last 7 years (7 of the last 9 sampling events).
 - b. Well 5 was dry for 4½ of the last 7 years (5 of the last 9 sampling events).
2. Well 6 appears to have construction issues based on the monitoring results, specifically nitrate, TDS, and phosphorus. The results may be due to improper well sealing; however, the well appears to be improving with time.
3. Wells 2 & 3 appear to have pH issues: both have historically dipped below the 6.5 secondary ground water quality standard.
4. There have been coliform exceedances in ground water due to chlorine disinfection equipment malfunctions. Further, the use of drinking water sampling bottles resulted in residual chlorine removal and therefore coliform growth after sample collection and prior to lab analysis. Both of these issues have been resolved.
5. Wells 2 and 3 have low pH and high iron, which may reflect chemically reducing environments due to soil saturation.





4.5 Surface Water

There is no surface water within ¼ mile of the land application sites. The Henrys Fork of the Snake River is approximately 0.83 miles from the site.

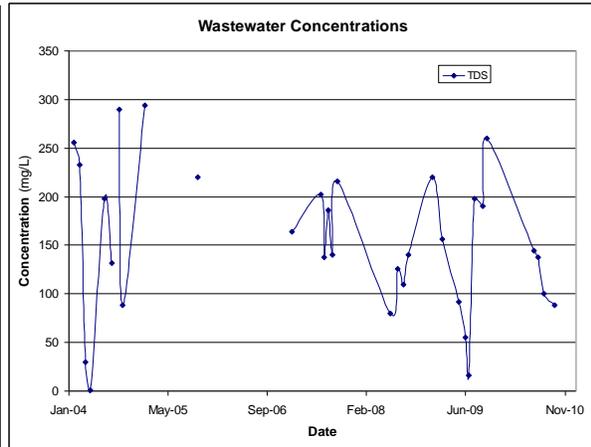
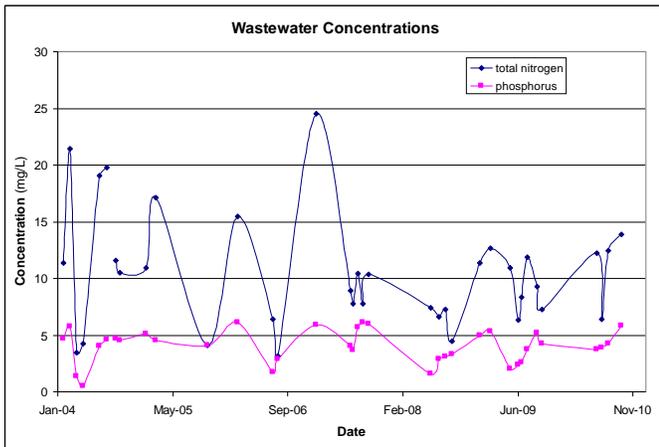
4.6 Site Loading

4.6.1 Loading Rates – General

Loading rates at the facility are all within acceptable ranges.

4.6.2 Wastewater Characterization

Wastewater constituent concentrations are acceptable, with the exception of some high coliform concentrations due to disinfection equipment malfunctions.

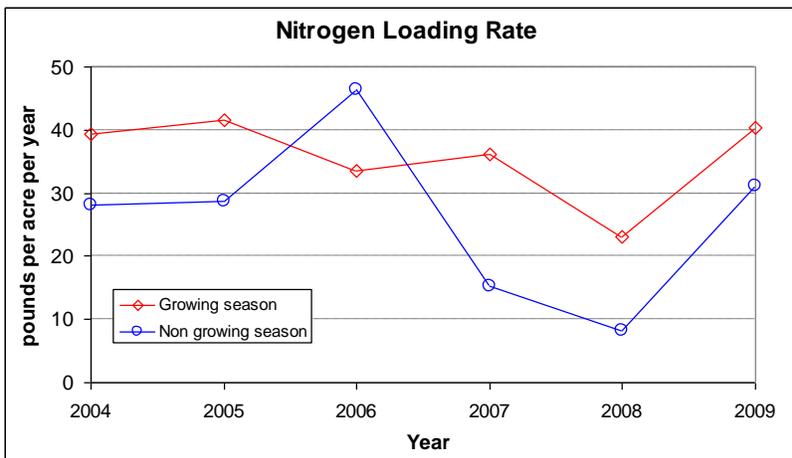


4.6.3 Nitrogen

Nitrogen loading at the facility is acceptable and considered low enough to be incorporated into grass tissue.

4.6.4 Total Dissolved Solids

Based on ground water concentrations, TDS loading at the facility is not a concern.

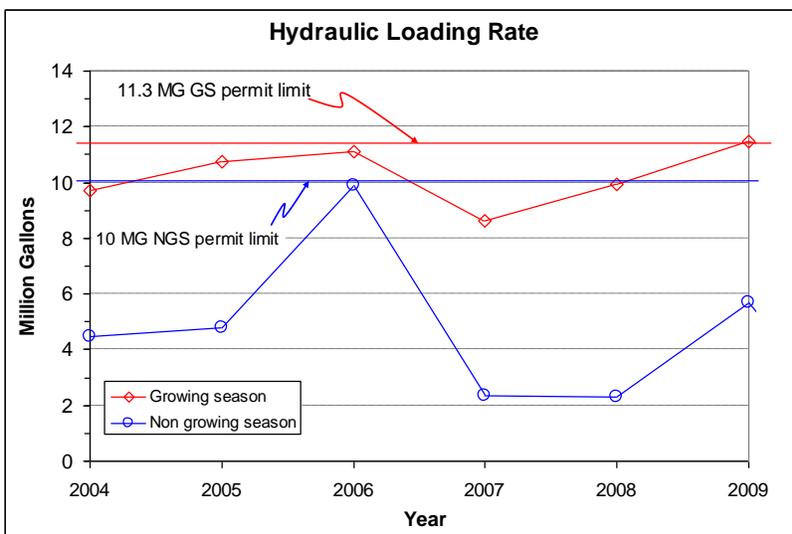


4.6.5 Hydraulic Loading

Hydraulic loading at the facility is within permitted rates, with the exception of a minor over application in 2009 during the growing season.

4.6.6 Chemical Oxygen Demand

Growing season and non growing season COD loading has been determined through facility monitoring to be well below the 50 pounds per acre per day concern level. Consequently, COD monitoring was removed as a permit requirement during the last permit renewal.



4.7 Site Management

4.7.1 Buffer Zones

The buffer zones are based on a total coliform disinfecting level of 23 organisms per 100 milliliters. The treatment lagoons and irrigated land site are fenced and signed for protection from the public. The wintertime artificial snow application site is not fenced, is remote, and has limited public access; therefore, warning signs are posted approximately every 500 feet at a level that can be seen to detour snowmobile traffic.

4.7.2 Crop Management

The crops irrigated at Last Chance are native grasses. The grasses are not mowed or harvested.

4.7.3 Lagoons

Lagoon	Description	Volume (gallons)
Cell A	Aerated	1,080,000
Cell B	Aerated	1,080,000
Cell C	Facultative / storage	8,960,000
Total		11,120,000

Sludge Depths

Sludge depth monitoring and action depths should be part of the Waste Solids Management Plan.

Seepage Tests

All lagoons must be seepage tested every ten years to determine liner integrity and meet the IDAPA 58.01.16 *Wastewater Rules, Section 493 Facility and Design Standards for Municipal Wastewater Treatment or Disposal Facilities - Wastewater Lagoons*. Last Chance completed seepage testing in 2007; the next seepage test results must be submitted to the DEQ by autumn 2017.

4.7.4 Nuisance Plan

A nuisance odor plan is not required of Last Chance given the remote location and lack of odor complaints.

4.8 Compliance Activities

Status of Current Compliance Activities

The previous permit had three compliance activities.

1. Activity 1 required an updated Operations and Maintenance Manual (O&M manual). The manual was approved by the DEQ on March 28, 2005.
2. Activity 2 required irrigation schedules be reviewed by a qualified professional and incorporated into the O&M manual. The schedules have not been submitted to the DEQ.
3. Activity 3 required seepage rate testing on the treatment lagoons. The results were approved by the DEQ in 2007.

Recommended Compliance Activities for the Renewed Permit

There are two compliance activities on the draft permit.

1. Activity 1 requires an Operation & Maintenance Manual update.
2. Activity 2 requires an irrigation schedule be submitted to the DEQ, incorporated into the O&M Manual, and followed as practicably as possible.

5.0 Conclusions and Recommendations

The DEQ concludes the Last Chance / Ponds Lodge facility is in compliance with the current permit, and recommends the draft permit monitoring and reporting to continue evaluating system performance and permit compliance.

6.0 Recommendation for Processing the Permit

Staff recommends that the attached draft reuse permit be issued. The permit specifies loading limits and establishes monitoring requirements to help protect public health and the environment.

7.0 References

Idaho DEQ Guidance for Reclamation and Reuse of Municipal and Industrial Wastewater: http://www.deq.idaho.gov/water/permits_forms/permitting/guidance.cfm

Idaho DEQ – “Memorandum – Staff Analysis of the Fremont County Idaho, Last Chance/Ponds Lodge Wastewater Land Application Permit Request, LA-000058-02”, May 19, 2004.

R.G. Allen and C.E. Brockway – "Estimating Consumptive Irrigation Requirements for Crops in Idaho" University of Idaho, August, 1983.

USDA – “Soil Survey of Fremont County, Idaho”, United States Department of Agriculture, Soil Conservation Service, March 1993.

USEPA – “Process Design Manual – Land Treatment of Municipal Wastewater Effluents”, United States Environmental Protection Agency, September 2006, EPA document No. EPA/625/R-06/016.

Western Regional Climate Center, <http://www.wrcc.dri.edu/wrccmssn.html>