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**STATEMENT OF BASIS  
for the  
DEEP CREEK DAIRY FARM  
Permit No. UGW230002**

April 2021

**INTRODUCTION**

The Division of Water Quality (DWQ) under the authority of the Utah Ground Water Quality Protection Rules<sup>1</sup>(Ground Water Rules) issues ground water discharge permits to facilities which have a potential to discharge contaminants to ground water<sup>2</sup>. As defined by the Ground Water Rules, such facilities include pits, ponds, and lagoons.<sup>3</sup> The Ground Water Rules are based on an anti-degradation strategy for ground water protection as opposed to non-degradation; therefore, discharge of contaminants to ground water may be allowed provided that current and future beneficial uses of the ground water are not impaired and the other requirements of Rule 317-6-6.4.A are met.<sup>4</sup> Following this strategy, ground water is divided into classes based on its quality<sup>5</sup>; and higher-quality ground water is given greater protection<sup>6</sup> due to the greater potential for beneficial uses. DWQ has developed permit conditions consistent with R317-6 and appropriate to the nature of the mined materials, facility operations, maintenance, best available technology<sup>7</sup> (BAT) and the hydrogeologic and climatic conditions of the site, to ensure that the operation would not contaminate ground water.

**BASIS FOR PERMIT ISSUANCE**

Under Rule 317-6-6.4A, DWQ may issue a ground water discharge permit if:

- 1) The applicant demonstrates that the applicable class TDS limits, ground water quality standards protection levels and permit limits established under R317-6-6.4E will be met;
- 2) The monitoring plan, sampling and reporting requirements are adequate to determine compliance with applicable requirements;
- 3) The applicant is using best available technology to minimize the discharge of any pollutant; and

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1 Utah Admin. Code Rule 317-6

2 [https://deq.utah.gov/ProgramsServices/programs/water/groundwater/docs/2008/08Aug/GWQP\\_PermitInfo.pdf](https://deq.utah.gov/ProgramsServices/programs/water/groundwater/docs/2008/08Aug/GWQP_PermitInfo.pdf)

3 Utah Admin Code Rule 317-6-6.1A

4 Preamble to the Ground Water Quality Protection Regulations of the State of Utah, sec. 2.1, August, 1989

5 Utah Admin. Code Rule 317-6-3

6 Utah Admin. Code Rule 317-6-4

7 Utah Admin. Code Rule 317-6-1(1.3)

- 4) There is no impairment of present and future beneficial uses of ground water.

## **BACKGROUND**

The Deep Creek Dairy Farm operates a dairy with associated manure waste handling facilities. This statement of basis covers the fourth renewal of the ground water discharge permit. The permit was originally issued in 1999, and renewed in 2005, 2010, and 2016.

### **A. DESCRIPTION OF FACILITY**

Deep Creek Dairy is located in the Juab Valley approximately two miles south of the town of Levan. The dairy currently consists of approximately 7000 milking head and 670 heifers and dry cows.

Manure from the dairy operations is flushed from the barns using “borrowed” irrigation water. The slurry is then separated into liquid/solid fractions. The liquid fraction is stored in a waste retention pond. Both the liquid and solid fraction is applied to fields at the appropriate agronomic rate. Solid and liquid wastes from the lagoon system must be disposed of in a manner that does not cause surface or ground water contamination.

### **B. SUBSURFACE CONDITIONS**

The Dairy Farm is located in Juab Valley, approximately 4 miles South of the town of Levan in Juab County. In this vicinity, ground water generally moves from the mountainous recharge areas on the east in a west-northwesterly direction. The aquifer beneath the existing grade at the proposed site consists of unconsolidated and semi-consolidated, poorly sorted alluvial materials; primarily clay, sand and gravel, interbedded with silt and clay. The ground water reservoir in the Juab Valley exceeds 500 feet in thickness through the center of the valley and may be several hundred feet thick under the dairy site. Monitoring wells have been completed in the uppermost water table aquifer at the site.

### **C. BEST AVAILABLE TREATMENT TECHNOLOGY**

The waste disposal system for the farm is designed to receive about 125,000 cubic feet (CF) of wastewater per average month. This includes about 60,000 CF of manure, 56,000 CF of flush and flush recharge water, corresponding to 11.6 gallons per cow per day, 15,000 CF of solids removal by a mechanical separator. Approximately 6,000 CF of net loss will occur from the balance of precipitation on ponds, runoff from facilities into ponds, and evaporation losses from pond surfaces. Water from roofs will flow off the property without manure contact. Approximately 1.2 million CF of wastewater per year is applied to adjacent farmland by the irrigation system on approximately 825 acres. The solids will be sold as compost.

Solids removed by the mechanical separator system are stacked on a concrete slab and allowed to drain into the liquid disposal system. Drained solids are deposited on a 90 X 260 foot graded and bermed area for composting. Runoff from the compost area drains into a settling pond. Operation and maintenance of the composting system must meet the requirements of solid waste rule R315-312. The compost pad is lined with a minimum of six inches of  $1 \times 10^{-6}$  cm/sec or less clay to minimize leachate that may be generated by the compost.

Two settling ponds and the retention pond comprise the lagoons for the dairy. Sizing is based upon Natural Resource Conservation Service (NRCS) pond design software (V2.21) developed by Ohio State University. Wastewater from the separators flows into one of two settling ponds. Each settling pond is of trapezoidal cross section with dimensions of 54-feet wide by 280-feet long by 6-foot normal operating depth with operating volume of 52,632 CF. Each pond has a 5.75-foot high picket fence near the discharge line to help retain and settle solids. The ponds are lined with an 18-inch clay liner of  $1 \times 10^{-7}$  cm/second maximum permeability and are designed to allow less than 1/8 inch per day of seepage with a maximum head of 6 feet. The ponds are also lined in the bottom with a 4-inch concrete slab to protect the clay liner during removal of solids from the ponds. Two settling ponds are operated so that when one is nearly filled with solids, the influent may be transferred to the other basin, allowing the solids in the resting basin to dry and concentrate for removal to the composting area.

An 8-inch pipeline conveys the wastewater effluent from the settling ponds to the retention pond. Inlets to all ponds must have erosion protection for the clay liners. The retention pond is clay lined similarly to the settling ponds. The retention pond is of right triangular shape, estimated to be 2.5 acres in surface area and 21.7 acre-feet in maximum storage volume. The pond is 10-feet deep, including a 1-foot freeboard. The dike is sloped at 3:1 with a 10-foot road at the top, on all sides.

A 4-inch recycling line is used to return treated water to the flush system. A 12-inch pipeline is pumped to withdraw water for irrigation use. Irrigation of wastewater is done at the agronomic rate, in accordance with testing of soils and crop rotation, using an NRCS approved comprehensive nutrient management plan (CNMP). Only wastes from the dairy operations may be treated in the lagoons. Liquids and sludge from the lagoons may only be land-applied according to the approved plan.

Ground water monitoring is required as described below. If the monitoring reveals that ground water contamination has occurred, Deep Creek Dairy will be required to stop the source of contamination, and if necessary, take corrective actions to preserve beneficial uses of the ground water.

Land application of the lagoon liquids and solids must be done at the agronomic uptake rates specified in the NRCS approved CNMP. Application at these rates is determined based on rates of nitrogen uptake by crops and should result in a *de minimis* impact to ground water quality.

The design, operational, and contingency requirements detailed above represent Best Available Technology since the implementation of these requirements will be protective of ground water resources in the area surrounding the facility.

#### D. GROUND WATER MONITORING

The Dairy has two down gradient monitoring wells located along the direction of ground water flow and completed in the uppermost water-bearing zone under the lagoons. Protection levels for the monitoring wells are located in Part I.D.3 of the permit. The permittee must sample the down gradient wells on a semi-annual basis in order to demonstrate that compliance limits are not being exceeded. Analytes to be sampled are in Part I.D.4.f.

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