INTRODUCTION

This statement of basis is for the second renewal of the ground water quality discharge permit for the Dutch Cowboy Dairy. The dairy is located in the Buckhorn Flats area of the Parowan Valley in northeastern Iron County, seven miles north of the Interstate Highway I-15 Paragonah Exit 82, and adjacent to the west side of the I-15 frontage road.

DESCRIPTION OF FACILITY

The dairy is designed to support up to 3,750 milking cows and will be constructed in two phases. Each phase of construction will support half of the animals, or 1,875 cows, as shown on the approved construction permit drawings. Manure from the dairy operations will be flushed from the barns and will then be separated into liquid/solid fractions. The liquid fraction will be stored in a wastewater retention lagoon and will be land applied at agronomic rates. The solid fraction will be composted and used on available land or sold to farmers for offsite use. Wastes from the lagoon system must be disposed of in a manner that does not cause surface or ground water contamination.

SUBSURFACE CONDITIONS

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 dairy site is located near the ground water recharge area of the alluvial aquifer. In this vicinity, ground water generally moves from the mountainous recharge areas on the east in a west-northwesterly direction towards the ground water discharge area of the Little Salt Lake.

BACKGROUND WATER QUALITY AND GROUND WATER CLASS

Based on ground water quality data submitted by the permittee from site monitoring wells, ground water quality at the dairy site is Class IA Pristine. At the time of permit issuance, background ground water quality data for total dissolved solids (TDS), chloride, and nitrate were available from monitoring wells located downgradient of the wastewater lagoons. These data show TDS concentrations range from 155 to 360 milligrams per liter (mg/L) with a mean of 205 mg/L. Chloride concentrations range from 15 to 38 mg/L with a mean of 26 mg/L. Concentrations of nitrate + nitrite as N and ammonia as N are routinely reported below method detection limits.
PROTECTION LEVELS

Based on ground water quality data submitted from wells downgradient of the wastewater lagoons, ground water protection levels have been established in accordance with UAC R317-6-4 for the parameters listed below in Table 1.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Ground Water Quality Standard (mg/L)</th>
<th>Protection Level (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrate + Nitrite as N</td>
<td>10</td>
<td>2.5&lt;sup&gt;(a)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Total Dissolved Solids</td>
<td>Background-based</td>
<td>289&lt;sup&gt;(b)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Chloride</td>
<td>250&lt;sup&gt;(c)&lt;/sup&gt;</td>
<td>62.5&lt;sup&gt;(a)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Ammonia as N</td>
<td>30&lt;sup&gt;(d)&lt;/sup&gt;</td>
<td>7.5&lt;sup&gt;(a)&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

(a) Based on 0.25 times the Utah ground water quality standard.
(b) Based on the mean background concentration plus two standard deviations.
(c) Standard used is EPA secondary drinking water standard of 250 mg/l.
(d) Standard used is EPA lifetime health advisory of 30 mg/l.

The permittee shall operate the facility such that the ground water protection levels are not exceeded at the designated compliance monitoring points. The administrative rules for ground water quality protection (UAC R317-6) also contain standards for contaminants such as metals, pesticides and volatile organic compounds. Accordingly, the permittee must not discharge these or any other contaminants which could impair beneficial uses of the ground water, even though the permit does not require monitoring for them.

BEST AVAILABLE TREATMENT TECHNOLOGY

Concrete lined corral lanes and milking parlor floors will be water flushed to remove manure. The parlor floors will be flushed with fresh water, while the feed lanes will be flushed with recycled water from previous flushing. The carousel milking room floor will be hose-flushed into small concrete channels. The flow will then be piped to the main wastewater collection system.

Fresh water will be used to flush the barns. Flush water will primarily flow from floor pop-up valves and fresh water cow wash down nozzles in the milk parlor holding (waiting) area of the barn. Thence, flow over the floor surface into a barn width long grated channel on the west end of the barn. Discharge from the box will be into a 24-inch diameter pipeline north to connect to the corral drainage pipeline. Thence, flow will be westerly past all the corrals, then turning south via a 27-inch diameter line to a junction manhole. Thence, the flow will be easterly in a 30-inch diameter line into the open channel diversion structure for manure solids separation, then into the primary wastewater lagoon.

Both wastewater lagoons have been constructed with composite liner systems comprised of a low-permeability soil underliner overlain with a synthetic flexible membrane primary liner, in accordance with the previously approved Construction Permits.
The sediment basins will be used to separate manure solids from the waste water stream. A main 5-foot deep by 296-foot long concrete channel will convey wastewater from the end of the 30-inch pipe discharge mentioned above, to the first wastewater lagoon.

However, laterally from this main conveyance channel will be four dual chambered channels. The main flow of wastewater maybe diverted to or to by-pass the lateral channels by means of concrete slotted board gates. Each chamber of these channels is 12-foot wide by 4-foot deep. Solids will be removed by scooping the settled solids from the bottom of these lateral channels and stacking it on the 6-inch thick by 12-foot wide slabs on each side, running full length along the dual chambered channels. These slabs will be sloped to return liquid flow back into the sediment channels.

The corral flush lanes adjacent to the feed supply lanes and the center cow traffic lane bisecting the corral system will be flushed by recycled water. Pop-up pneumatic valves will also be used to control the flushing of the various lanes. This flush water will flow and be collected at the end of each north and south flowing feed flush lane and at the western end of the center traffic lane into grated boxes. Thence, the wastewater will be discharged to the pipeline system. The northern and southern wastewater piping systems are basically symmetrical. Drainage from the center lane will be transferred from the collection box to a 24-inch discharge line, then connect to the 30-inch outfall line from the northern corral flush lanes.

This water will be supplied from wastewater collected at the wastewater lagoons. Recycled water will be pumped from by a floating water pump in the lagoons by a 15-inch pipeline into the recycle water supply piping system. The wastewater may also be switched by valves to another pipeline, using this same pump, to the owner’s fields for nutrient supply and irrigation.

The size of the two lagoons is based on the normal flushing, shower/sprinkler and general cleaning use of 12.3 gallons per day per cow milked. If this rate is exceeded the storage duration available will be reduced. The working lagoon volume is estimated to be 13,228,829 gallons each. Transfer of wastewater to the second lagoon is designed to be by means of a pump. The lagoons are sized to contain all normal operational flow with the controlled introduction of fresh flush water at the above rate, for a period of roughly 240 days, average precipitation runoff and the storm event of 25-year frequency with the duration of 24-hours.

The fresh water supply will be furnished from a well on the property flowing to a two 30,000 gallon each steel water tank fresh water supply system. The water supply for the barn and the holding area cow wash is pressurized by pumps in located in a pump house near the tanks. Pop-up flush valves are separately pressurized by the elevation difference of the western tank to the pop-ups. This system will be isolated from the wastewater system. Tank overflow will discharge by piping to the wastewater pipe system. A storm water control berm will be constructed on the western side of the corrals area to prevent run-on from storm events. The other borders of the corrals will be protected from run-on by built-up roads.
The primary goal of this system is to prevent pollution, recycle water and reduce wastewater pollutants and odors, and obtain values from captured nutrients. The wastewater system must be operated and maintained in a manner to prevent excessive odors. Odor control from the lagoons will primarily be by means of the aerator system. The operation and maintenance of these facilities may require more effort than is outlined in the U.S. Natural Resource Conservation Service (NRCS) standards.

Only wastes from the dairy operations may be treated in the lagoons. Disposal of the manure and wastewater will be in compliance with the approved Comprehensive Nutrient Management Plan (CNMP) as required by the Concentrated Animal Feeding Operation (CAFO) permit, to be issued for this facility. Land application of the lagoon liquids and solids will be done at the agronomic uptake rates in accordance with testing of soils, wastewater, and current crops, using the approved CNMP. Application at these rates will be determined based on rates of nitrogen uptake by crops and should result in a de minimis impact to ground water quality.

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

GROUND WATER MONITORING

The dairy has four down-gradient monitoring wells located along the presumed direction of ground water flow and completed in the uppermost water-bearing zone beneath the lagoons. Ground water will be sampled and analyzed semi-annually for nitrate + nitrite as N, ammonia as N, pH, chloride, bicarbonate, and total dissolved solids for the term of the permit.

Regulatory decisions made as a result of ground water monitoring must take into account the background variability of ground water quality at the dairy site. Dutch Cowboy Dairy will not be required to take corrective action if it can be verified that changes in ground water quality are a result of other factors not related to their operations.