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## **STATEMENT OF BASIS**

### **DUTCH COWBOY DAIRY Ground Water Quality Discharge Permit UGW210006**

November 2016

#### **INTRODUCTION**

The purpose of this statement of basis is to describe the Dutch Cowboy Dairy facilities, ground water quality, and compliance monitoring program. Ground Water Discharge Permit UGW210006 was originally issued to the Dutch Cowboy Dairy in November 2000. Subsequent renewals of the permit were issued in June 2006 and August 2011. This represents the third renewal of the permit. The dairy site is located above shallow Class IA Pristine ground water.

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

The dairy is located in the Buckhorn Flats area of the Parowan Valley in northeastern Iron County, Utah seven miles north of the Interstate Highway I-15 Paragonah Exit 82, and adjacent to the west side of the I-15 frontage road. The dairy is designed to support up to 3,750 milking cows when at full capacity as shown on the approved construction permit drawings.

Manure from the dairy operations is flushed from the barns and then separated into liquid/solid fractions. The liquid fraction is stored in a waste lagoon and land applied at agronomic rates. The solid fraction is 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.

#### **B. SUBSURFACE CONDITIONS**

The dairy is located in the Buckhorn Flats area of the Parowan Valley, north of Cedar City in Iron 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 dairy consists of unconsolidated and semi-consolidated, poorly sorted alluvial materials; primarily clay, sand and gravel, interbedded with silt and clay. Monitoring wells have been completed in the uppermost water table aquifer at the site.

#### **C. BACKGROUND WATER QUALITY, GROUND WATER CLASSIFICATION AND PROTECTION LEVELS**

Based on ground water quality data submitted by the permittee from wells downgradient of the wastewater lagoons, ground water quality at the dairy site is Class IA Pristine. Background ground water quality for total dissolved solids (TDS), chloride, and nitrate were calculated from monitoring wells located downgradient of the wastewater lagoon locations prior to their construction. Those data exhibited TDS concentrations ranging from 155 to 360 milligrams per liter (mg/L) with a mean of 204 mg/L. Chloride concentrations ranged from 15 to 38 mg/L with a mean of 26 mg/L. Concentrations of nitrate + nitrite as N and ammonia as N were routinely reported below method detection limits.

Ground water protection levels have been established in accordance with UAC R317-6-4 for the parameters listed below in Table 1:

Table 1: Ground Water Protection Levels (all values in mg/L)

Parameter	Protection Level
Nitrate + Nitrite	2.5
Total Dissolved Solids	289
Chloride	62.5
Ammonia	7.5

The permittee is required to 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 is not allowed to 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.

#### D. BEST AVAILABLE TREATMENT TECHNOLOGY

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

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

Sediment basins are used to separate manure solids from the waste water stream. A main 5-

foot deep by 296-foot long concrete channel conveys wastewater from the end of the 30-inch pipe discharge mentioned above, to the first wastewater pond. However, laterally from this main conveyance channel are four dual chambered channels. The main flow of wastewater may be diverted to or by-pass the lateral channels by means of board gates inserted into slots formed in the concrete channels. Each chamber of these channels is 12-foot wide by 4-foot deep. Solids are 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 are 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 are flushed with recycled water. Pop-up pneumatic valves control the flushing of the various lanes. This flush water is 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. The wastewater is then discharged to the pipeline system. The northern and southern wastewater piping systems are basically symmetrical. Drainage from the center lane is transferred from the collection box to a 24-inch discharge line, which connects to the 30-inch outfall line from the northern corral flush lanes.

This water is supplied from wastewater collected at the wastewater pond. Recycled water is pumped 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 fields for nutrient supply and irrigation.

The ponds 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 is furnished from a well on the property flowing to two 30,000 gallon steel fresh water supply system tanks. The water supply for the barn and the holding area cow wash is pressurized by pumps 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 is isolated from the wastewater system. Tank overflow discharges by piping to the wastewater pipe system.

A storm water control berm is constructed on the western side of the corrals area to prevent run-on from storm events. The other borders of the corrals are 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.

Only waste from the dairy operations is treated in the lagoons.

Ground water monitoring is 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.

E. 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 under the lagoons. Ground water is sampled and analyzed semi annually for nitrate + nitrite, ammonia, pH, chloride, bicarbonate, and total dissolved solids for the term of the permit.

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