

GROUND WATER QUALITY DISCHARGE PERMIT UGW490005
STATEMENT OF BASIS

August 2015

Elberta Valley Ag
Elberta, Utah

Purpose and Prior Permitting

The purpose of this statement of basis is to describe the Elberta Valley AG facilities, ground water quality, and compliance monitoring program. Ground Water Discharge Permit UGW490005 was issued to Elberta Valley AG in September 2005. A subsequent renewal of the permit was issued on August 26, 2010. This will be the second renewal of the permit. UGW490005 is being renewed in accordance with UAC R317-6-6.6.

Description of Facility

Elberta Valley Ag operates a dairy farm and wastewater treatment facility in Utah County, Utah. The dairy is situated on approximately 160 acres of land located 1 mile south of Elberta, Utah, in Section 20, T10S, R1W, and SLBM. As defined by Utah Administrative Code R317-6, a CAFO (concentrated animal feeding operation) dairy uses liquid waste handling systems and has more than the following numbers of confined animals: 1,500 slaughter and feeder cattle; or 1,050 mature dairy cattle, whether milked or dry cows. The dairy design maximum is 5,000 dairy cows. Dairy cows are milked three times a day using machine milkers. Milk is produced and transported from the site for pasteurization and distribution. Raw materials consumed at the site include animal feed and water.

The cows are housed in covered barns with alleyways that are periodically flushed with water. The wastewater from cleaning the alleyways runs through a separator where the solids are removed. The liquid waste is placed in an aerated treatment pond. Manure is a by-product of the dairy operations and the solids are stored in a composting area for use as fertilizer.

The existing dairy started in 1978 as the Butler Stake Welfare Farm and initially had 200 dairy cows. From 1980 to 1993, liquid waste from the dairy was managed using two unlined ponds. In 1993, the dairy expanded to 700 dairy cows and the name was changed to Elberta Dairy. The two wastewater ponds were excavated and converted to a single pond, and two additional ponds were constructed. All three ponds were lined with polypropylene vinyl lining and have a combined storage capacity of 3.9 million gallons.

The current treatment lagoon system consists of five cells. When full, the five cells can contain up to 76.08 million gallons of partially treated "red" water mixed with manure from flushing free stall barns. The daily discharge volume from the treatment pond varies depending on the number of cows milking. Discharge wastewater from treatment pond cells is used for land application. A Comprehensive Nutrient Management Plan (CNMP) has been developed to minimize impact to ground water from farm operations by applying wastewater at the appropriate agronomic uptake rate.

Site Hydrogeology

The dairy site is located in the Goshen Valley, with the East Tintic Mountains on the west and Long Ridge on the east. Goshen Valley is situated within the hydrologic Great Basin, referring to that portion of the Basin and Range Province with no hydraulic drainage to the sea. Sources of surface recharge include streams, irrigation canals, irrigation, precipitation, and ephemeral runoff. Aquifer recharge in the Goshen valley is primarily from subsurface inflow from the consolidated rock of the surrounding mountains. Water Resources Investigation Report 93-4221 (USGS 1994, plate 5) indicates that the Elberta Valley Ag facility is in an aquifer recharge area that eventually discharges to Utah Lake. In this area of the valley, the vertical hydraulic gradient is downward and there are no confining layers to prevent shallow contamination from reaching the principal aquifer.

Ground water occurs under confined and unconfined conditions and generally moves from the recharge areas of the mountain fronts towards the Utah Lake discharge area. South of Elberta, a ground water depression in the unconfined aquifer level has been created by pumping approximately 5,500 acre-ft of ground water per year for agricultural uses.

Surface geologic mapping in the site area shows three Quaternary formations are present: alluvial deposits, Provo Formation, and lake bottom sediments. The finer grained lake bottom sediments are typically clays, silts, and sands. Subsurface sediments observed during drilling and installation of three site monitoring wells were predominantly sands, with a 20 to 30 foot thick section of silty clays near the ground surface.

Ground Water Classification

The Goshen Valley has a history of impacts that have affected ground water quality now measured in valley water supply wells. Seepage from irrigation canals, fertilized and irrigated land, and evaporation ponds have contributed to diminished ground water quality. Waters from the Burgin Mine in the East Tintic Mountains were transported 2 miles in a ditch system to evaporation ponds a mile northeast of the dairy in the 1960s. Background water quality is based on historical data from area irrigation water supply wells prior to original permit issuance and subsequent accelerated sampling of new compliance wells at the dairy. Water supply wells are screened over larger intervals of the basin aquifer(s) and are not always representative of the shallow aquifer. In the general area surrounding Elberta Valley Ag, ground water in the unconfined aquifer underlying the site and beyond is Class III Limited Use Ground Water. Although the total dissolved solids (TDS) concentrations in area wells are less than 3,000 mg/L (Class II), concentrations of contaminants such as nitrate and sulfate in excess of Utah Ground Water Quality Standards precludes its use as drinking water without substantial treatment and therefore make it a Class III ground water. Deeper aquifers are Class II Drinking Water Quality Ground Water.

The network of compliance monitoring wells provides the ability to detect contamination from the permitted facility in the shallow aquifer. The compliance monitoring wells are screened in the shallow aquifer near the treatment ponds. Under the provisions of this permit, ground water contamination in the shallow aquifer would be a reason for the Permittee to take remedial action before deeper aquifers are affected. The dairy has installed three monitoring wells at the site to

determine groundwater flow direction in the shallow aquifer. Following well development and water level measurements, it is determined that MW-1 is down gradient of the treatment pond cells, MW-3 is up gradient of the treatment pond cells, and MW-2 is cross-gradient and is not in an optimal location to detect seepage from the newer treatment pond cells. MW-2 is used to monitor the older dairy wastewater ponds. The Director may require the Permittee to drill additional down gradient wells if MW-2 well location is determined to be ineffective.

At the dairy, monitoring wells have elevated levels of nitrate and Total Dissolved Solids (TDS). Levels of Total Nitrate/Nitrite (as N) 14 to 34 times higher than the Utah Ground Water Quality Standard of 10 mg/L have been detected in wells MW-2 and MW-3. Total Dissolved Solids in these wells are 3 to 5 times higher than the best water quality found in MW-1. These are the highest reported levels of nitrate found in the area. MW-3 is the up gradient well for the facility at this time, but ground water quality has been affected by historical operations of the Elberta Dairy. This well may not represent true background water conditions for the discharge permit. Down gradient well MW-1 is farthest away from existing operations that may have affected ground water and has the best water quality of all the three monitoring wells at the farm site. Because of existing impacts from the old dairy operations, this permit requires that the expanded dairy not cause any further degradation of aquifer quality beyond that existing at time of permit issuance. Corrective action to improve the localized excessive levels of TDS and nitrate in ground water may be required.

Basis of Permit Issuance

The administration of the permit, to assure compliance with ground water protection regulations, is founded on the use of periodic monitoring well sampling to assess potential impacts to ground water quality from the treatment pond discharges. The determination of impacts from past and present day releases to ground water is a major concern for ground water management. Elberta Valley Ag has proposed to continue controlled land application of wastewater, and evaporation, as approaches to reduce impacts to ground water. The Comprehensive Nutrient Management Plan is used to regulate discharge wastewater to agricultural fields at appropriate agronomic rates.

Permit Reference Documents

The following documents are considered part of the ground water quality discharge permit application and will be kept as part of the administrative file.

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| 1) Sampling and Analysis Plan | version August 2010 |
| 2) Nutrient Management Plan | version June 2010 |
| 3) Owner and Operations Manual | version June 2010 |

