STATEMENT OF BASIS

GROUND WATER DISCHARGE PERMIT UGW010008

Circle Four Farms
Milford, Utah

March 2014

Purpose

Circle Four Farm’s groundwater discharge permit, No. UGW010008, is being renewed for a five year permit term. Circle Four Farms operates swine production facilities in Beaver and Iron Counties southwest of Milford, Utah. Manure from each of the swine production facilities is drained into an associated anaerobic lagoon system for treatment and storage. The lagoon systems at the farm sites consist of one primary lagoon and one containment basin for evaporation. The primary lagoons and the containment basins are lined with a 40-mil flexible membrane liner (FML), or clay. Circle Four Farms has also constructed collection basins adjacent to some of the existing lagoon systems. Table 1 below provides a summary of the Circle Four Farms permitted facilities.

Table 1: Summary of Circle Four Farms Ground Water Discharge Permits

<table>
<thead>
<tr>
<th>Permit No.</th>
<th>Complex/County</th>
<th>Facility Type</th>
<th>Farm Nos.</th>
<th>Total Farm Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>UGW010002</td>
<td>Skyline/Beaver</td>
<td>Sow Farms</td>
<td>41101-41108</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nursery Farms</td>
<td>41201-41210</td>
<td></td>
</tr>
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<td></td>
<td></td>
<td>Finisher Farms</td>
<td>41301-41323</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Boar Stud Facility</td>
<td>49170</td>
<td></td>
</tr>
<tr>
<td>UGW010012</td>
<td>Skyline/Beaver</td>
<td>Smithfield BioEnergy Plant</td>
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<td></td>
</tr>
<tr>
<td>UGW010008</td>
<td>Blue Mountain</td>
<td>Finisher Farms</td>
<td>42301-42308</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>/Beaver</td>
<td></td>
<td>42315,42316</td>
<td></td>
</tr>
<tr>
<td>UGW210005</td>
<td>Blue Mountain/Iron</td>
<td>Sow Farms</td>
<td>42100-42108</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nursery Farms</td>
<td>42200-42203</td>
<td></td>
</tr>
</tbody>
</table>

Hydrogeology

The Milford basin lies in southwestern Utah, and comprises a 3,004 km² area in the Basin and Range physiographic province. The mountain ranges adjacent to the basin are bounded by normal faults and have large coalescing alluvial fans extending into the valley. The principal water-yielding aquifer is a basin-fill aquifer. Sediments that make up the basin-fill aquifer are late Tertiary to Quaternary age and consist of multiple discontinuous layers of silt, sand, and gravel separated by less permeable layers of clay and silt. The basin-fill deposits are at least 270 m thick in the basin center and thin toward the margins. The principal water-yielding aquifer is a basin-fill aquifer. Sediments that make up the basin-fill aquifer are late Tertiary to Quaternary age and consist of multiple discontinuous layers of silt, sand, and gravel separated by less permeable layers of clay and silt. The basin-fill deposits are at least 270 m thick in the basin center and thin toward the margins.¹
• Bicarbonate
• Nitrate+ nitrite as N
• Chloride
• Total Dissolved Solids

Field parameters collected for each groundwater sampling event include: pH, specific conductance, and temperature. This list of ground water monitoring parameters may be updated in the most recently revised and approved version of the Circle Four Farms Sampling and Analysis Plan.

Regulatory decisions made as a result of ground water monitoring must take into account the background variability of ground water quality at the sites. Circle Four Farms 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.

**Best Available Technology (BAT)**

The administration of this permit is founded on the use of best available treatment technology, in accordance with the requirements of UAC R317-6-1.3.

These farm sites each have at least one primary lagoon and a containment basin for evaporation. Primary lagoons and containment basins are lined with a 40-mil synthetic high-density polyethylene (HDPE) FML. The coefficient of permeability for 40-mil HDPE is $2.7 \times 10^{-13}$ cm/sec (Haxo and Lahey, 1988). The constructed depth and maximum operating depth of the primary and containment basins at each farm site are included in the construction permits and construction permit applications.

The construction permits require that lagoon systems be properly maintained in a manner to prevent excessive odors. The operation and maintenance of these facilities may require more effort than is outlined in the Natural Resources Conservation Service (NRCS) standards for maintenance of anaerobic lagoons found in the NRCS’s *Agricultural Waste Management Field Handbook*. Additional guidance for the proper maintenance of anaerobic lagoons is available from the Utah State University Extension Service, the American National Standards Institute/American Society of Agricultural Engineers (ANSI/ASAE) Engineering Practice EP403.3 (July 1999) entitled *Design of Anaerobic Lagoons for Animal Waste Management*, and ANSI/ASAE Standard EP379.2 (November 1997) entitled *Control of Manure Odors*. If the guidance in these references is not followed, Circle Four will provide credible documentation supporting any deviation from the guidance contained in the above references.

The lagoon system is sized to accept up to 1.8 cubic feet of volume per live animal weight (LAW) in the primary lagoon for sow and finisher farms (2.3 cubic feet for nursery farms) and provide enough surface area for evaporation of water in the containment basin. The primary lagoons at each farm site are designed to operate as anaerobic waste treatment lagoons in which liquid and solid swine waste flushed from the pits under the animal containment barns is digested primarily by anaerobic bacteria in the treatment volume of the lagoon and sludge accumulates in the underlying sludge volume. These design specifications require the establishment and maintenance of a properly balanced bacterial population, which is realized through the proper operation, and management of the anaerobic lagoons. Proper operation and management of anaerobic lagoons will also optimize volatile solids digestion and prevent excessive sludge build up extending the effective life of the lagoon before sludge removal is required. Only wastes from
limited to:

Circle Four Farms Sampling and Analysis Plan
Anaerobic Lagoon Systems Operation and Maintenance Manual
Spill Prevention and Response Manual
Sludge Disposal and Farm Closure Plan
Nutrient Management Plan for Land Application
Manure Drying Program Plan

Reference:
