STATEMENT OF BASIS

GROUND WATER DISCHARGE PERMIT UGW010008

Smithfield Foods, Inc. – Blue Mountain Complex Farms Beaver County
Milford, Utah

May 2019

Introduction

The Division of Water Quality (DWQ) under the authority of the Utah Ground Water Quality Protection Rules[1] (Ground Water Rules) issues ground water discharge permits to facilities which have a potential to discharge contaminants to ground water[2]. As defined by the Ground Water Rules, such facilities include Agricultural operations.[3] 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.[4] Following this strategy, ground water is divided into classes based on its quality[5]; and higher-quality ground water is given greater protection[6] due to the greater potential for beneficial uses.

Under Rule 317-6, Smithfield Foods, Inc. has requested a ground water discharge permit renewal (Permit) for the Blue Mountain Farm Complex in Beaver County. DWQ has developed permit conditions consistent with R317-6 and appropriate to the nature of the operations, maintenance, best available technology[7] (BAT), and the hydrogeologic and climatic conditions of the site, to insure that the operation would not contaminate ground water.

Basis for Permit Renewal

This Permit is being renewed in accordance with R317-6-6.7. However, a permit may be terminated or a renewal denied if any one of the four items in R317-6-6.8 applies:

A. Noncompliance by the permittee with any condition of the Permit where the permittee has failed to take appropriate action in a timely manner to remedy the Permit violation;

B. The permittee's failure in the application or during the Permit approval process to disclose fully all significant relevant facts at any time;

C. A determination that the permitted facility endangers human health or the environment and can only be regulated to acceptable levels by plan modification or termination; or

D. The permittee requests termination of the Permit.

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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
[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)

Purpose

Smithfield Hog Production's groundwater discharge permit for the Blue Mountain Beaver County Farm Complex (UGW010008) is being renewed for a five-year permit term. Smithfield Hog Production 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 each compacted to at least 90 percent of maximum dry density and lined with at least a 40-mil high density polyethylene (HDPE) flexible membrane liner (FML). Smithfield Hog Production has also constructed collection basins adjacent to some of the existing lagoon systems. Table 1 below provides a summary of the Smithfield Hog Productionpermitted facilities for the Blue Mountain Beaver County Farm Complex.

Table 1: Summary of Smithfield Hog Production Ground Water Discharge Permit

Permit No.	Complex/County	Facility Type	Farm Nos.	Total Farm Sites
UGW010008	Blue Mountain /Beaver	Finisher Farms	42301- 42308 42315, 42316	10

Hydrogeology

The Milford basin lies in southwestern Utah, and comprises a 3,004 km^2 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 (Van der Hoven, 2001).

Ground Water Quality

Ground Water Class and Protection Levels Based on ground water quality data from historical site-specific monitoring wells, the ground water quality beneath farm sites 42301, 42302, 42303, 42304, 42305, 42306, 42307, and 42308 is Class 1A Pristine Ground Water to Class IV saline Ground Water. The ground water quality beneath farm sites 42315 and 42316 is Class II Drinking Water and Class III Limited Use ground water quality. Compliance limits for each farm site are summarized in Appendix I of Permit UGW010008.

As required in Part I.E.5.(c) of the permit, a background monitoring program has been completed by the permittee to collect data for calculating well-specific background ground water quality statistics. This includes background ground water concentrations for total dissolved solids, chloride, bicarbonate, nitrate + nitrite as nitrogen, ammonia as nitrogen, and pH, all of which have been defined for the purposes of determining the applicable protection levels and compliance limits. Most wells have more than a 10-year monitoring history. Compliance limits for all farms were evaluated for this permit issuance.

Class I Protection Levels. In accordance with UAC R317-6-4.2, Class I ground water will be protected to the extent feasible from degradation due to facilities that discharge or would probably discharge to ground water. Class I protection levels are established in accordance with

the following criteria in UAC R317-6-4.2B.

Class II Protection Levels. In accordance with UAC R317-6-4.5, Class II ground water will be protected for use as drinking water or other similar beneficial use with conventional treatment prior to use. Class II protection levels are established in accordance with the following criteria in UAC R317-6-4.5B.

Class III Protection Levels. In accordance with UAC R317-6-4.6, Class III ground water will be protected as a potential source of drinking water after substantial treatment, and as a source of water for industry and agriculture. Class III protection levels are established in accordance with the following criteria in UAC R317-6-4.6B.

Class IV Protection Levels. In accordance with UAC R317-6-4.5, Protection levels for Class IV ground water will be established to protect human health and the environment.

Long term ground water elevation monitoring indicates a steady decline in the water table elevation over the last several years. Some monitoring wells with a small water column purge to dry conditions, which can affect the quality of the water sample.

Compliance Monitoring Program

A ground water monitoring well system has been installed at each of the lagoon systems for the purpose of establishing the ground water gradient at each farm site and to monitor the ground water quality both upgradient and downgradient in the uppermost water-bearing zone under the lagoons. Ground water is sampled and analyzed semi-annually for the term of the permit. The following key leakage parameters were selected for compliance monitoring based on their high concentrations in the process water compared to concentrations in shallow ground water:

- Bicarbonate
- Nitrate+ nitrite as N
- Chloride
- Total Dissolved Solids

In order to more completely identify background analyte concentrations relative to drought conditions or individual sources, Smithfield Hog Production will collect and report additional major ion concentrations for one year (two semi-annual samples) from all wells at two farm locations. The farms requiring this additional water quality sampling are 42301 and 42305. The water quality constituents, including the aforementioned, are as follows:

- Major anions (Sulfate)
- Major cations (Sodium, Potassium, Magnesium, Calcium)

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 Smithfield Hog Production *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. Smithfield Hog Production 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 compacted to a minimum of 90 percent maximum dry density (ASTM D698) and lined with at least a 40-mil synthetic high-density polyethylene (HDPE) FML. The coefficient of permeability for 40-mil HDPE is 2.7×10^{-13} cm/sec (Haxo and Lahey, 1988)[2]. 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 lagoon system is sized to accept up to 1.8 cubic feet of volume per live animal weight (LAW) in the primary lagoon for finisher 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 the hog-raising operations may be treated in the lagoons. The design, operational, and contingency requirements detailed above represent Best Available Technology since the implementation of these requirements is expected to be protective of ground water resources in the area surrounding the facility.

Currently Smithfield Hog Production has 10 farm sites in operation for this permit, and each site has a primary lagoon where manure solids are collected. It may be necessary to remove accumulated solids from the bottom of each primary lagoon at the farm sites so that treatment zones are maintained. Sludge storage volume is engineered for approximately 20 years of accumulation. Sludge accumulation is measured and reported. Smithfield Hog Production has implemented a program to remove the solids from the lagoons and dry the manure on a drying pad constructed near the lagoon. The manure is a nutrient source and the drying of the manure will allow the nutrients to be sold and applied to local cropland at agronomic rates. Drying pad construction will follow the engineering design approved by a licensed Professional Engineer with the Utah Division of Water Quality.

Potential Impacts to Ground Water

Leakage from liners can cause degradation of the ground water at the permitted sites. Potential impacts to ground water can be minimized by employing best available technology and discharge minimization technology for the lagoons. BAT performance monitoring, treatment technology, and compliance monitoring wells are used to ensure that the facility is operated in accordance with design specifications and will also ensure that any early indications of facility problems will be detected.

Liner repairs in the primary or evaporative lagoon have been made at farms 42301 and 42305;

these lagoons previously had FML liners. Based on hydrogeological tests to determine the rate of groundwater velocity in the Blue Mountain Beaver area, improvements in ground water quality measured at downgradient monitoring wells require several years following repairs. These farms are considered compliant even though a monitoring well may have analytical results exceeding a compliance limit for that farm. Statistical trend analysis is used for an appropriate period of time that allows for a natural decrease in elevated target parameters. If no decrease is observed, further Corrective Action may be warranted.

Major Permit Changes

No major changes to Permit UGW010008 have been made for this permit cycle.

Compliance Schedule

There are no outstanding compliance items at the time of this permit issuance for UGW010008.

Permit Application Documents

Applicable Smithfield Hog Production Operations Documents for this permit include but are not limited to:

Anaerobic Lagoon Systems Operation and Maintenance Manual (rev. 2015)

Spill Prevention and Response Manual (rev. 2015)

Sludge Disposal and Farm Closure Plan (rev. 2015)

Nutrient Management Plan for Land Application (rev. 2015)

Smithfield Hog Production Sampling and Analysis Plan (rev. 2015)

Manure Drying Program Plan (rev. 2013)

References:

ASAE, 1999. American National Standards Institute/American Society of Agricultural Engineers (ANSI/ASAE) Engineering Practice EP403.3 Jul99, *Design of Anaerobic Lagoons for Animal Waste Management* pp 6. Retrieved on January 30, 2019 from http://agrienvarchive.ca/bioenergy/download/anaerobic_lagoons_asae_ep403.3.pdf

ASAE, 2012. American National Standards Institute/American Society of Agricultural Engineers (ANSI/ASAE) Engineering Practice EP379.5 APR2012, *Management of Manure Odors* pp 7. Retrieved on January 30, 2019 from https://elibrary.asabe.org/azdez.asp?JID=2&AID=41359&CID=s2000&T=2

Haxo, H.E., and Lahey, T.P., 1988. Transport of Dissolved Organics from Dilute Aqueous Solutions Through Flexible Membrane Liners, Hazardous Waste and Hazardous Materials, 1988, 5, 275-294.

Miller, R. and Major, J., 2013. Lagoon Startup and Maintenance for Optimal Livestock Waste Treatment. Utah State Cooperative Extension: Logan, UT. Retrieved on January 30, 2019 from https://extension.usu.edu/agwastemanagement/ou-files/pdfs/Lagoon_Startup_and_Maintenance_2013.pdf

NRCS, 2009. Chapter 13 Operation, Maintenance, and Safety In L. Owens, S. Self, W. Pierce (Eds.), *Part 651 Agricultural Waste Management Field Handbook* (pp. 57). Washington D.C.. Retrieved on January 30, 2019 from https://www.wcc.nrcs.usda.gov/ftpref/wntsc/AWM/handbook/ch13.pdf

Van der Hoven, S.J. 2001. Determination of Groundwater Transport Rates, Annual Recharge, and Sources of Microbial Contamination in the Milford Basin, Utah. Department of Geography-Geology, Illinois State University

DWQ-2019-001900