

GROUND WATER QUALITY DISCHARGE PERMIT UGW410002

STATEMENT OF BASIS

Utah Department of Transportation – I-70 Bridge Deck Hydro-demolition
Temporary Evaporation Pond
Sevier County, UT

March 2018

Introduction

The Division of Water Quality (DWQ) under the authority of the Utah Ground Water Quality Protection Rules¹ (Ground Water Rules) issues ground water discharge permits to facilities which have a potential to discharge contaminants to ground water². As defined by the Ground Water Rules, such facilities include lined ponds.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 quality⁵; and higher-quality ground water is given greater protection⁶ due to the greater potential for beneficial uses.

DWQ has developed permit conditions consistent with R317-6 and appropriate to the nature of the stored material, facility operations, maintenance, best available technology⁷ (BAT) and the hydrogeologic and climatic conditions of the site, to ensure that the operation would not contaminate ground water.

Basis for Permit Issuance

Under Rule 317-6-6.4A, DWQ may issue a ground water discharge permit if:

- 1) The applicant demonstrates that the applicable class TDS limits, ground water quality standards protection levels and permit limits established under R317-6-6.4E will be met;
- 2) The monitoring plan, sampling and reporting requirements are adequate to determine compliance with applicable requirements;
- 3) The applicant is using best available technology to minimize the discharge of any pollutant; and
- 4) There is no impairment of present and future beneficial uses of ground water.

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

The Utah Department of Transportation (UDOT) is constructing a temporary evaporation pond in Sevier County, Utah between the cities of Joseph and Sevier on Interstate 70 (I-70) at approximately Mile Post 24.4. The Project entails the use of hydro-demolition equipment and methods to remove concrete from the decks of 14 bridges along I-70 between Mile Post 7 to Mile Post 21. The resulting solution from the hydrodemolition process will be stored for evaporation in an above ground, lined pond with an operating volume of approximately 12.8 acre-feet. The proposed evaporation pond will be located on land owned by the UDOT.

Ground Water Discharge Permit UGW410002 will be issued to authorize the construction of the temporary evaporation pond. UDOT is the owner of the bridge deck hydrodemolition project and the temporary evaporation pond.

New Facilities

The following new facility will be regulated under this Permit including the associated Best Available Technology (BAT) and requirements for monitoring: Temporary Evaporation Pond.

The pond footprint area is approximately two acres. Process water deposited in the pond will be generated from the bridge locations and will contain a high concentration of total dissolved solids (TDS). The pond basin will be constructed using a combination of excavation into the ground surface and the construction of elevated berms. The pond has been designed to the eight feet deep with two feet of additional freeboard. The pond is projected to be in use for up to 3 years, with water added to the pond primarily during the construction seasons (summers) during the first two years. Once the water in the pond has evaporated, the sludge, solids and liner system will be disposed of at a landfill.

The evaporation pond will be constructed with a composite liner system consisting of a 60-mil high density polyethylene (HDPE) primary (upper) liner and a 60-mil HDPE secondary (lower) liner. The liners will be separated by a geonet geomembrane layer drainage gap between the primary and secondary HDPE liners to route leakage to a pond leak collection pit constructed at the center low-point of the pond. Accumulated water in the collection pit will drain to a leak detection sump located outside of the pond.

The temporary evaporation pond will have a leak collection and recovery sump (LCRS) system. A pump will be installed in the leak detection sump, and leakage water will be pumped back to the pond if more than one foot of fluid head is observed above the secondary liner elevation. The pond is designed as a zero-discharge system; the leak detection sump and pump are designed to capture and return the maximum calculated leakage flow rate back to the surface of the evaporation pond.

Due to the relatively short term duration of this project (proposed three year schedule), groundwater monitoring well installation and monitoring is not require unless a BAT failure indicates a potential discharge to the subsurface; in which case groundwater monitoring wells, compliance monitoring, and remedial action may be required. The LCRS will be the primary compliance point.

BAT Performance Monitoring

Best available technology monitoring will include minimum vertical freeboard and maximum allowable leakage rate monitoring. These performance standards are based on the precedence of previous ground water discharge permits and *Action Leakage Rates For Leak Detection Systems* (USEPA, Office of Solid Waste, January 1992).

Minimum Vertical Freeboard. A minimum of 24 inches of vertical freeboard shall be maintained to ensure total containment of hydrodemolition process liquids.

Maximum Allowable Leakage Rate. The LCRS is the primary compliance monitoring point because it is the early warning system that demonstrates protection of ground water quality. Based on a pond area of approximately 2 acres, the calculated maximum allowable leakage rate through the primary HDPE liner is 0.8 gallons per minute (1,152 gallons per day).

The pond elevation rate will also be recorded on a daily basis. A drop in the pond elevation that exceeds the calculated pond evaporation rate (determined during liner testing following installation) will also indicate an exceedance of the maximum allowable leakage rate.

Maximum Allowable Head. Based on EPA guidance for BAT performance monitoring, the maximum allowable hydraulic head imposed on the secondary HDPE liner (measured in the leak detection sump) will be one foot of fluid head above the secondary liner in the leak collection pit (minimum 15 feet below top of berm). Fluids collected in the leak detection sump will be pumped back to the temporary evaporation pond to ensure that less than one foot of hydraulic head above the secondary liner in the leak collection pit is maintained.

As long as the LCRS complies with the BAT performance standards of the permit, the facility is compliant. In the event that the LCRS has flows or fluid head that exceed the BAT performance standards of the permit, a BAT failure exists and the permittee will be required to regain BAT by a number of solutions including identifying and repairing the BAT failure, such as a liner leak, or conducting groundwater compliance monitoring to demonstrate that ground water quality is protected despite the exceedance of BAT performance standards.

Potential Impacts to Ground Water

Potential impacts to ground water will be minimized by employing best available technology for the temporary evaporation pond. The Division of Water Quality will provide periodic onsite inspections during construction and operation of the facilities described above. The pond will be monitored and inspected daily to assess conditions and identify any problems that may result in a groundwater discharge. Additionally, a video system will be installed to view the pond and gauges at any time.

Geologic Description

Regional. The temporary evaporation pond is situated in the Sevier Valley in the transition zone between the Basin and Range and Colorado Plateau physiographic provinces of Utah. The mountains that surround the basin of the Sevier Valley are composed of deformed, thick sequences of primarily marine sediments deposited east of the Sevier orogenic belt from the Jurassic to Cretaceous time followed by clastic marine deposits, thick units of limestone and volcanic rocks (Utah DNR Technical Publication No. 103, 1995).

The Central Sevier Valley is a graben formed by normal faulting of a synclinal trough. The two main faults are the Sevier on the east and the Elsinore on the west. The basins in the valley are alluvial filled with constrictions generally formed by Tertiary volcanics at each end of the basin. A geologic map of the Project shows alluvial valley deposits classified at "Qa2." These deposits are defined as unconsolidated clay, silt, sand and gravel recently deposited parallel to localized stream valleys and/or spread more regionally onto alluvial flats of larger river valleys with sandy sediment generally more dominant than gravelly sediment.

The soil type at the facility is characterized primarily as "Hiko Peak, south-Annabella complex, 5 to 30 percent slopes." A typical soil profile includes an A horizon from 0 to 9 inches with very gravelly loam, a Bk horizon from 9 to 33 inches of very gravelly sandy loam, and a C horizon from 33 to 60 inches with very gravelly sandy loam.

Surface Water The nearest surface water to the proposed evaporation pond is Sevier Valley Canal located approximately 1,500 feet south-southeast of the pond. The elevation of the evaporation pond site is approximately 5,575 feet MSL, and the elevation of the Canal is approximately 5,480 feet MSL. The Sevier River is located approximately 2,000 feet to the south-southeast with an approximately elevation of 5,475 feet MSL.

Hydrogeology

The Project site is located within the Sevier-Sigurd basin. The principal regional groundwater system is comprised of unconsolidated basin-fill deposits where groundwater is under both unconfined and confined conditions. This system is interconnected with multiple layers consisting mainly of interbedded clay, silt, sand, and gravel. The proposed evaporation pond is located in an unconfined recharge zone of the Sevier-Sigurd basin composed primarily of coarse-grained sand and gravel deposits (Utah DNR Technical Publication No. 103, 1995). Recharge in the groundwater system occurs by infiltration of precipitation, seepage from canals, the Sevier River, other perennial and ephemeral streams, irrigated fields, and by inflow from consolidated rock.

No site-specific groundwater depth or quality data are available. The "Utah State Water Plan – Sevier River Basin" (Utah DNR 1999) describes water quality in the basin as "good-fair" decreasing in quality from south to north. Groundwater northwest of Monroe showed a TDS concentration of 425 milligrams per liter (mg/L). Another sample collection in the Project area reported a TDS concentration of 330 mg/L and a depth to groundwater generally between 30 to 40 feet below ground surface (Utah DNR Technical Publication No. 103, 1995).

The nearest downgradient groundwater water right appears to be located approximately 1,550 feet south-southeast of the evaporation pond (Water Right 63-64). A private water supply well was installed in 1940 to a depth of 81 feet and provides up to 0.015 cubic feet per second (cfs) of water for domestic, irrigation, and livestock use.

Ground Water Quality

Ground Water Classification. In accordance with UAC R317-6-3.5 and ground water quality information provided in the permit application, groundwater in the proposed evaporation pond area is classified as Class IA Drinking Water Quality Ground Water.

Class IA Protection Levels. It is not anticipated that groundwater monitoring will be required for this Project, but if it is determined at a later time to be necessary, Class IA protection levels will be established. In accordance with UAC R317-6-4.2, Class IA ground water will be protected for use as drinking water or other similar beneficial use with conventional treatment prior to use. Class IA protection levels are established in accordance with the following criteria in UAC R317-6-4.2B:

- a. Total dissolved solids (TDS) may not exceed the greater of 1.25 times the background concentration or the background plus two standard deviations.
- b. When a contaminant is not present in a detectable amount as a background concentration, the concentration of the pollutant may not exceed the greater of 0.1 times the ground water quality standard value, or the limit of detection.
- c. When a contaminant is present in a detectable amount as a background concentration, the concentration of the pollutant may not exceed the greater of 1.25 times the background concentration, 0.25 times the ground water quality standard, or background plus two standard deviations; however, in no case will the concentration of a pollutant be allowed to exceed the ground water quality standard.

COMPLIANCE SCHEDULE

- BAT Performance Monitoring. The evaporation pond will be visually inspected on-site on a daily basis during the construction season (April through October) and weekly (minimum) when no construction activity is occurring (November through March).
 - A. In-person daily (construction season) or weekly (non-construction season) inspections will record the following information:
 1. Name of Inspector
 2. Date and Time of inspection
 3. Weather conditions (e.g. sunny, warm, rainy) including temperature and any significant rainfall in the last seven days
 4. Nature of inspection (routine or repair inspections)

5. Condition of liner and location of any breaches in the liner noted on a site plan
6. Any repair action taken
7. Water level in pond
8. Water level in leak collection sump (elevation of secondary/lower liner of leak collection pit and depth of leak detection sump must be known). Water level must be less than one foot above secondary liner in leak collection pit.
9. Indication if pumping in necessary
10. Volume of water pumped. Pump rate should be less than 1,152 gallons per day to maintain one foot of hydraulic head above secondary pond liner in leak collection pit.
11. Changes in operation procedures
12. Signature of inspector

B. Remote daily (video) inspections will record the following information:

1. Name of Inspector
2. Date and Time of inspection
3. Weather conditions (e.g. sunny, warm, rainy) including temperature and any significant rainfall in the last seven days
4. Nature of inspection (routine or repair inspections)
5. Condition of liner and location of any breaches in the liner noted on a site plan
6. Water level in pond.

C. Any BAT failure will be reported to DWQ within 24 hours and addressed immediately. A summary and compilation of all inspection reports and any corrective actions will be sent to DWQ on a quarterly basis.

- Final Closure Plan. The project is anticipated to be completed in three years. When the permittee discontinues its operations at the facility, the permittee shall notify the Director of such a decision and submit a Final Closure Plan within 180 days prior to the closure of the facility.

Permit Application 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.

1. UDOT I-70 Bridge Deck Hydro-demolition Ground Water Discharge Permit Application Supporting Documents, prepared and submitted by UDOT, January 04, 2018 (revised March 9, 2018).