INTRODUCTION

Dugway Proving Ground is renewing its ground water discharge permit for the English Village domestic wastewater lagoons. The original permit was issued on March 1, 1994 to cover the operation of a wastewater treatment facility at English Village. The facility consists of a three-cell aerated lagoon for treatment of domestic wastewater. In 2006, Dugway Proving Ground constructed a system to remove dissolved arsenic from its culinary water supply and the permit was modified to allow for wastes from that treatment system to be disposed in the lagoon.

A. DESCRIPTION OF FACILITY

The facility is a three-cell aerated lagoon for treatment of wastewater from the English Village Community on Dugway Proving Ground, Tooele County, Utah. The lagoon cells cover a surface area of about 13 acres with a maximum operating capacity of 2,178,000 cubic feet of volume. The lagoons are lined with 36-mil Hypalon liner. The facility only receives domestic wastewater. Effluent is discharged to an existing wetland area that received treated wastewater from the previously used lagoons that have been taken out of service. The wetland area, as a part of the existing facilities, is not included as part of facilities covered by this permit. The permit does not authorize discharge of pretreated or untreated industrial, commercial or agricultural wastes to the lagoons, other than waste from removal of dissolved arsenic from English Village’s culinary water supply. Under laboratory conditions, ferrihydrite-arsenic filter cakes in equilibrium with water produced arsenic concentrations below 50 micrograms per liter (µg/l). Arsenic concentrations in Dugway’s untreated culinary water range from 9 to 21 µg/l. Expected volumes of backwash from the arsenic treatment system, when diluted by other inflow into the lagoon, should not significantly increase arsenic content of the lagoon water.

B. SUBSURFACE CONDITIONS

Groundwater in the English Village area moves to the northeast toward the axis of Skull Valley. The water table has a gentle northward tilt with a gradient of 1 foot per 1000 feet. The nearby old lagoons that have been decommissioned may have influenced the
configuration of the water table surface. Depths to ground water when measured in September, 2008 ranged from 193 to 214 feet below ground surface. The shallowest depth of the ground water is expected to be 175 feet below ground surface.

The soil types beneath the existing grade at the site are fine to very fine sands, silty sands and silts with some interstratified coarse sands and gravels of the Quaternary Lake Bonneville deposits. The regional aquifer at the site is contained in pre-Lake Bonneville alluvial sand and gravel. The overlying Lake Bonneville lacustrine deposits protect the deeper aquifer somewhat from contamination introduced at or near the surface.

C. BACKGROUND WATER QUALITY AND PROTECTION LEVELS

Background ground water quality and protection levels are summarized in Table 1 of the permit.

D. GROUND WATER CLASSIFICATION

Based on samples from upgradient monitoring well, ground water in the vicinity of the site is probably Class II.

E. BEST AVAILABLE TREATMENT TECHNOLOGY

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. Construction standards of the lagoons are covered under the construction permit issued on March 1, 1994. The three-cell aerated lagoon cover a surface area of 13 acres with a maximum operation depth of 6.25 feet. The lagoon system is sized to accept up to 2,178,000 cubic feet of volume. The permit does not allow treatment of pre-treated or untreated industrial, commercial or agricultural wastes in the lagoon system, except for waste from arsenic removal treatment of Dugway’s culinary water supply. The lagoons are lined with a 36-mil Hypalon synthetic liner, provided a performing seepage rate no greater than 1/8 inch per day. The effluent is discharged to an existing wetland that previously received effluent from the old lagoons that have been taken out of service.

As a condition of the permit, Dugway Proving Ground has been required to develop a contingency plan for remediating any ground water contamination that may occur. In addition, ground water monitoring will be required as described in the permit. If the monitoring reveals that ground water contamination has occurred, Dugway Proving Ground will be required to stop the source of contamination, and if necessary, take corrective actions to preserve beneficial uses of the ground water.

Because waste from the arsenic treatment system is primarily a solid precipitate, any disposal of sludge from the lagoon must follow applicable state and federal law.
F. WATER QUALITY MONITORING

The lagoon system has one upgradient and two downgradient monitor wells located along the presumed direction of ground water flow at the centerline of the lagoons, and completed in the uppermost water-bearing zone under the lagoons. The downgradient well EV-MW05, will be used to monitor compliance. Ground water will be sampled and analyzed semi-annually for nitrate, pH, dissolved arsenic and total dissolved solids.

The English Village Ground Water Discharge Permit limits the lagoons only to the receipt of domestic wastewater and wastes from removal of dissolved arsenic from English Village’s culinary water supply. In the past, domestic and industrial wastes were discharged in the collection system resulting in volatile organic compounds (VOCs) such as acetone, carbon disulfide, methylene chloride, naphthalene and phenols being present in the nearby abandoned lagoons. To ensure that industrial waste is not disposed undetected in the collection system and new lagoons, and to provide early warning of discharge of VOCs, the final lagoon cell will be sampled and monitored for presence of VOCs.

A gas chromatograph mass spectrometer (GC-MS), Method 8260 or best available GC-MS method, is selected to detect the presence and concentration of VOCs listed in part I. D. of the permit. Samples for GC-MS analysis will be taken every other year to detect the presence of VOCs from industrial waste. If any volatile organic compounds are detected and confirmed in subsequent sampling, Dugway Proving Grounds will develop a plan to prevent those particular compounds from being discharged into the lagoon.

If the results of these compliance sampling and detection indicate that any of the protection levels have been exceeded in well EV-MW05, or if VOCs are detected in the lagoon water, sampling of regularly-monitored parameters in all three monitor wells, or of all VOCs listed in Part I.D will be required on a monthly basis until the English Village wastewater treatment facility is brought into compliance, or until notification by the Executive Secretary that a regular monitoring schedule may be followed.

To date, sampling for arsenic in the site’s monitor wells has revealed that the two upgradient wells have significantly higher arsenic concentrations than the downgradient well, which is used to determine compliance with this permit. All three wells shall be monitored quarterly for dissolved arsenic for one year, to help establish natural variability in the background concentration. Protection levels for arsenic shall be established based on data from the downgradient well EVW-MW05. All three wells shall also be monitored for major ions quarterly for one year. In the event that protection levels at the downgradient well are exceeded, comparison of the proportions of these major ions in all three wells will help to determine whether the elevated arsenic levels in the downgradient well are the result of migration of ground water with a higher arsenic content from an upgradient source.