

**STATEMENT OF BASIS**  
PacifiCorp Huntington Power Plant  
Renewal of Permit UGW150002  
June 8, 2011

**Facility Description**

The PacifiCorp Huntington Power Plant is a coal-fired steam electric generating facility. The power plant operates the Huntington Research Farm to dispose of non-contact cooling water, boiler blowdown water, treated domestic wastewater and other process wastewaters described in 40 CFR Part 423.11 including cooling tower blowdown, low-volume sources of wastewater and metal cleaning wastewaters. The power plant also operates an active landfill for the disposal of RCRA-exempt combustion wastes, including fly ash, bottom ash, slaker grits, pyrites and scrubber sludge, and manages an older, closed landfill that was used for disposal of these same wastes.

The Huntington Research Farm consists of 255 acres of farmland located southeast of the power plant. Wastewater is stored in a clay-lined evaporation pond throughout the year and is used to irrigate the Research Farm from April through November. Irrigation water is applied at a rate to minimize surface water runoff and infiltration to ground water. Wastewater applied at the Research Farm contains elevated and variable levels of total dissolved solids (TDS), nitrate, and boron. Highest concentrations of these wastewater contaminants measured between 1980 and 2003 were 4,652 mg/l TDS, 29.6 mg/l nitrate, and 14.3 mg/l boron. Land application has been done at the Lower Farm since 1977 and at the Upper Farm since 1983. At some point in the future, salt accumulation in the soil will prevent crop growth and another means of wastewater disposal will need to be used.

From the late 1970s to 2002, PacifiCorp disposed of combustion wastes at a landfill site south of the power plant. Currently, an 8-acre Class IIIb Solid Waste Landfill for industrial wastes is located on top of the old combustion waste landfill. Monitoring since 2000 has indicated that ground water downgradient of this landfill, including some ground water under the Research Farm, may have been contaminated by the old combustion waste landfill.

A new combustion waste landfill is located directly east of the old landfill. Disposal of combustion wastes in the new landfill began in January 2002. The landfill was designed for a 30-year life with a disposal capacity of 430,000 cubic yards per year. Formerly, scrubber sludge was disposed of in a pond constructed on top of the landfill. However, this allowed liquids to seep from the landfill and affect ground and surface water quality. Currently, scrubber sludge is mixed with dry ash in a pug mill before disposal in the landfill, to keep sludge liquids bound up in the ash. PacifiCorp may import dry combustion wastes from other nearby power plants so there is enough dry waste to make a waste product that is not free-draining, for disposal in the landfill.

PacifiCorp has also identified other potential ground water discharge sources at the plant site. These include the coal pile and blending facility, equipment maintenance, waste handling and other activities at the power plant site itself, and two ponds used to hold storm water, sanitary sewer treated effluent, and process wastewater.

## Site Hydrogeology

Bedrock at the plant site is Mancos Shale, which contains large amounts of soluble salts (primarily sodium, chloride, sulfate and bicarbonate) that leach into ground and surface water. Precipitation falling on the site dissolves more soluble minerals from the Mancos Shale the longer it has been in contact with the formation. As a result, ground water quality varies considerably making it difficult or impossible to distinguish between naturally-occurring changes in water quality from changes due to activities and facilities related to the power plant. Most plant facilities are built on alluvium or talus deposited on top of the Mancos Shale. Ground water in the alluvial deposits is generally better quality than ground water in the Mancos Shale. Because of these factors, comparison of ground water quality upgradient and downgradient of various facilities cannot be used to determine compliance with the Ground Water Quality Protection Rules (UAC R317-6).

The Research Farm is located over an alluvial aquifer adjacent to Huntington Creek. This shallow alluvial aquifer is comprised of unconsolidated fluvial deposits of clay, silt, sand and gravel, and ground water occurs at 5 to 45 feet below ground surface. Water levels in monitor wells show that ground water under the Research Farm moves generally from northwest to southeast, parallel to the creek. Ground water velocities in the alluvial aquifer are estimated at 5 to 20 feet per day. Monitor wells near the creek indicate ground water with TDS generally less than 1,000 mg/l that was probably partially recharged from the creek. On the southwest side of the alluvial plain, research farm monitor wells indicate poorer quality ground water with TDS greater than 3,000 mg/l (Class III Limited Use Ground Water), which is probably due to contact with the Mancos Shale exposed on the side of the valley. The drainage that contains both the old and new combustion waste landfills flows onto the alluvial plain at the northwest edge of the Research Farm. Ground and surface water sampling at this point and to the southeast along the edge of the alluvial plain indicates that ground water quality has likely been influenced by discharge of contaminants from the old landfill.

Ground water in the alluvial aquifer under the Research Farm is of limited extent and generally poor quality, except in wells adjacent to Huntington Creek. Monitoring data since the late 1970s shows that land application of wastewater has not significantly affected ground water quality. However, ground water discharging from this aquifer into Huntington Creek has the potential to affect surface water quality in the creek. Because of the poor quality of ground water away from the creek and contamination from the landfill site, wells on the southwest side of the farm and in its central area will not be used for compliance monitoring, but will continue to be monitored for informational purposes and to document the effects of discharge from the landfill and remedial actions. A deterioration of ground water quality in the wells adjacent to Huntington Creek would indicate migration of poor-quality water from under the Research Farm to locations where it would soon discharge into Huntington Creek.

Most other plant facilities that have a potential to affect ground water quality are located on alluvium overlying Mancos Shale. Ground water under these locations is generally located in small, discontinuous zones of saturation perched above the contact between alluvium and shale. Samples from monitor wells completed in these zones have TDS concentrations ranging from approximately 1,000 to 6,000 mg/l.

## **Basis for Permit Issuance**

Ground water monitoring has been conducted at the research farm since the early 1980s, and shall continue under this permit. PacifiCorp has developed criteria to determine when land application at the site is no longer feasible due to soil toxicity or degradation of ground water quality. These criteria are contained in Appendix F of the permit.

As described above, ground water quality at the Research Farm varies naturally depending on whether the site of any particular monitor well is influenced by recharge from Huntington Creek or from flow from the Mancos Shale. The influence of discharges from the combustion waste landfills and possibly from land application of wastewater is superimposed on this natural variation. Ground water under the alluvial plain at the Research Farm site is not used for culinary or drinking water purposes. The main threat that this site poses to beneficial uses of water is discharge of contaminants into Huntington Creek. To evaluate whether PacifiCorp's activities are affecting water quality in Huntington Creek, surface water shall be sampled in Huntington Creek above and below PacifiCorp's facilities. Surface water quality standards must be met at the downstream monitoring point. Ground water protection levels have been established for Research Farm monitor wells adjacent to Huntington Creek based on historic background water quality, and a rise in contaminant concentrations above these levels would represent noncompliance with this permit.

The December 1, 2005 Site Wide Monitoring Program Report concluded that discharges of contaminants from the old combustion waste landfill have affected ground water quality in the alluvial aquifers under the Duck Pond drainage and the Research Farm. As a permit condition, PacifiCorp has constructed drains that intercept ground water in the drainage below the landfills, and convey it to the reservoir used for wastewater application. The contaminated groundwater is diluted by cooling water and other waste streams, and is land applied at the Research Farm using techniques that minimize percolation to ground water. Existing ground water contamination from the landfills will be allowed to dissipate by natural attenuation, which will be observed in monitor wells and surface water. Additional corrective action may be required if monitoring reveals that water quality is not improved.

PacifiCorp has implemented Discharge Minimization Technology at the Research Farm, the combustion waste landfills and facilities around the plant site that could potentially cause a discharge of pollutants to ground water. Land application at the Research Farm will be done according to the plan contained in Appendix F of this permit. The Executive Secretary may require this plan to be modified in the future if land application causes degradation of ground water quality.

Several facilities around the plant site could potentially cause a discharge of pollutants to ground water, and PacifiCorp has recently installed monitor wells for them. These facilities include the main power plant site, the coal storage area, and two wastewater ponds with one containing sanitary wastewater and plant site stormwater (the holding pond), and the other containing plant process water that is applied to the research farm (the evaporation pond). PacifiCorp shall follow the Best Management Practices for these facilities contained in Appendix A of the permit.

Starting in April 2009, monitor well HSW-1 began to exceed permit protection levels. This well is located downgradient from an existing unlined impoundment, Lacey's Lake, used to contain stormwater and several other waste streams. To prevent any further discharge of contaminants from this source, PacifiCorp has chosen to close this impoundment by diverting waste streams to other means of disposal, dredging accumulated solids from the pond and re-grading the site to promote drainage away from the former pond. Closure procedures are listed in Appendix G of this permit. Monitoring of well HSW-1 will continue for this permit term.

## **Basis for Specific Permit Conditions**

### Water Quality Monitoring

Because of the potential for discharge of contaminated ground water to surface water, compliance with surface water standards will be evaluated in field drain outfall H-GFD, the Duck Pond outfall (under UPDES Permit UTR0025607), and at upstream and downstream monitoring points in Huntington Creek (H-1, H-2 and UPL-9). To evaluate any discharge from the alluvial aquifer, these points of compliance will be sampled semi-annually in spring and fall to evaluate conditions under high and low seasonal stages of stream flow. Additional surface water monitoring may be required if there is evidence of contaminant discharge from ground water to surface water.

Ground water monitoring has been done at the Research Farm since the early 1980s. The first set of wells to be installed were not constructed to DWQ standards for monitor wells, and monitoring results from these wells cannot be considered valid. A new set of wells was installed in 1997 and has been sampled semi-annually since then. This monitoring has revealed increasing concentrations of contaminants in some of the wells, probably influenced by discharges from the combustion waste landfills. DWQ's standard approach for ground water monitoring is to establish protection levels, which are concentrations of contaminants that may not be exceeded in monitor wells. By design, protection levels are a fraction of the ground water quality standard to provide an early warning of impending ground water contamination, to allow ample time to verify the data and, if necessary, implement corrective actions. In accordance with Utah's antidegradation policy, protection levels are proportionately set based on the ground water class, with a lower allowable rise in contaminants for higher quality ground water. Protection levels are defined based on background data, assuming that variation in the data has a normal statistical distribution. This assumption cannot be made for background data that shows an increasing trend.

Because of increasing trends of contaminants in several wells at the Research Farm site and the history of over 20 years of land application before valid water quality data was collected, true background concentrations of contaminants cannot be determined from data collected since 1997. The protection level approach commonly used to determine compliance for ground water discharge permits cannot be applied to wells that may have been affected by discharges from the combustion waste landfills or from land application of wastewater. Semiannual monitoring of the existing wells on the southwest side and center of the Research Farm will continue under this permit, along with any other ground and surface water monitoring in the Duck Pond drainage monitoring needed to support

the corrective action plan. This monitoring will be for informational purposes only and ground water protection levels will not be enforced for these wells.

Because of highly variable ground water quality at the site, naturally-occurring degradation of ground water quality in contact with the Mancos Shale, and lack of historical information on background water quality before construction of the power plant facilities, it is not possible to use comparison of upgradient and downgradient ground water quality to demonstrate compliance with the anti-degradation intent of the Ground Water Quality Protection Rules (UAC R317-6). Therefore, protection levels for this permit will be derived for each well using well-specific historical water quality data.

#### Discharge Minimization Technology

Because the power plant is an “existing facility” under UAC R317-6, PacifiCorp shall use Discharge Minimization Technology to protect waters of the state. For the purposes of this permit, this technology will include:

1. Procedures to be used for land application at the Research Farm, including the Wastewater Land Application Plan contained in Appendix D, and the criteria for ending land application contained in Appendix F.
2. Best Management Practices for the old and new combustion waste landfills, and other plant facilities and ponds that could potentially cause a discharge of contaminants to waters of the state contained in Appendix A.
3. The unlined impoundment of Lacey’s Lake will be drained, have settled solids removed from it, and re-graded with clean fill according to the procedures listed in Appendix G.