

## **CITY WATER, LIGHT AND POWER CCR SURFACE IMPOUNDMENT LOCATION RESTRICTIONS**

The following information provides an evaluation of the CCR locations standards with respect to closure or retrofitting the CCR surface impoundments.

The locations restrictions consist of:

1. Placement Above the Uppermost Aquifer (§257.60)
2. Wetlands (§257.61)
3. Fault Areas (§257.62)
4. Seismic Impact Zones (§257.63)
5. Unstable Areas (§257.64)

Documentation showing compliance with the location standards must be placed in the operational record by October 17, 2018. If compliance cannot be certified, closure requirements of §257.101(b)(1) will apply. Each restriction is discussed separately below. The Lakeside and Dallman ash ponds are both considered CCR impoundments.

### Placement Above the Uppermost Aquifer

The impoundments must be constructed with a base that is located no less than 5 feet above the upper limit of the uppermost aquifer, or must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to fluctuations in the groundwater elevations. If the demonstration cannot be made by the aforementioned date, the facility must cease accepting the CCR and begin closure activities pursuant to §257.101(b)(1).

Definitions of relevant terms in the paragraph above include (from §257.53):

*“Aquifer means a geologic formation, group of formations, or portion of a formation capable of yielding usable quantities of groundwater to wells or springs.”*

*“Uppermost Aquifer means the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility’s property boundary. Upper limit is measured at a point nearest to the natural ground surface to which the aquifer rises during the wet season.”*

It is debatable whether the deposits beneath the ash ponds are capable of yielding “usable” quantities of groundwater as the term is vague. Therefore, since the term “aquifer” is part of “uppermost aquifer,” it can also be debatable if the unconsolidated deposits overlying the bedrock but beneath the ash ponds constitute an uppermost aquifer.

There are fine-grained sediments (silty clay/clayey silt) present beneath the ponds that do have confining hydraulic properties. However, there are also sand/sandy deposits that are water-bearing with potentiometric surfaces within 5 feet of the bottom of the ponds.

Documents from Hanson Engineers (1987) indicate the base of the Lakeside ash pond is approximately 535 feet above mean sea level (msl). Design drawings from Burns & McDonnell (1976) show the base of the Dallman ash pond to be approximately 533 feet above msl, with some variability. The potentiometric surfaces along the perimeter of the impoundments are largely above those elevations with the exception of the wells adjacent to (north and west) the Dallman ash pond. However, because the water level in the pond is approximately 548 feet above msl, an outward hydraulic gradient is present which fully saturates the soils beneath the impoundment. There is a direct hydraulic connection with the water table.

The term “uppermost aquifer” is contained in the RCRA Subtitle D regulations that were used when creating the CCR regulations. Additionally, the “uppermost aquifer” was incorporated into the 35 Illinois Administrative Code (IAC) Part 814, Subpart C regulations, which apply to the FGDS onsite landfill. The uppermost aquifer at the landfill site does include the water-bearing deposits beneath the landfill, which also extend beneath and adjacent to the ash ponds.

Based on the potentiometric surfaces and the bottom elevations of the Dallman and Lakeside ash ponds, it is likely the ponds would be found not to meet the location standard of §257.60. Therefore, either retrofit or closure must be implemented pursuant to §257.101(b)(1).

#### Wetlands

The applicable units must not be located in wetlands. The existing and potential applicable units are listed on the wetland inventory map as a wetland. Clarification with the U.S. Fish and Wildlife Service and the U.S. Army Corps of Engineers (USACE) should adequately address any issues. It is Andrews’ experience that no USACE permit will be necessary for any of the operational ponds (CCR or process) and that the wetlands can be disturbed or removed.

#### Fault Areas

The applicable surface impoundments must not be located within 200 feet of the outermost damage zone of a fault that has had displacement in Holocene time unless the owner or operator demonstrates that an alternative setback distance of less than 200 feet will prevent damage to the structural integrity of the CCR unit.

The fault areas for the FGDS landfill were identified as part of the initial Significant Modification Application (Log No. 1995-243-LFM). The study area incorporates that of the surface impoundments. There are no fault areas in the vicinity of the surface impoundments.

#### Seismic Impact Zones

The applicable units must not be located in seismic impact zones unless the owner or operator demonstrates that all structural components including liners, leachate collection and removal systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site.

The seismic impact zones were evaluated as part of the initial Significant Modification Application (Log No. 1995-243-LFM) to Unit 2 of the FGDS landfill, including evaluation of the slope and mass stability. The study area includes the location of the impoundments. The ponds are not located within a seismic impact zone that would pose a threat to the structural integrity of the impoundments.

### Unstable Areas

The applicable units must not be located in an unstable area unless it can be demonstrated that recognized and generally accepted good engineering practices have been incorporated into the design of the CCR units to ensure that the integrity of the structural components of the CCR unit will not be disrupted.

Unstable area means a location that is susceptible to natural or human-induced events or forces capable of impairing the integrity of some or all of the structural components responsible for preventing releases from the CCR unit. The preamble implies these issues will specifically relate to foundation conditions resulting in mass movement of soils, or karst terrains where bedrock is involved.

The hazard potential classification assessment with oversight from the Illinois Department of Natural Resources, and structural integrity assessments, did not indicate any unstable areas in the immediate surface impoundment area. Geotechnical analyses were conducted for both the Lakeside and Dallman ponds, and for the FGDS landfill as part of the permitting process. As provided in the differing reports, the soil characteristics were adequate to support the structures designed for the Lakeside and Dallman ash ponds.

### COMPLIANCE

Of the five location requirements, four appear to comply with the specific rules. However, unlined ponds are placed directly above and within 5 feet of the high water table for the uppermost aquifer. Either it must be demonstrated that there will not be intermittent, reoccurring or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer, or cessation of disposal and closure must begin.

Hydraulic separation can be shown by retrofitting the ponds. A composite liner consisting of a two-foot (minimum) low hydraulic conductivity ( $< 1.0 \times 10^{-7}$  cm/sec) clayey material overlain by a minimum 30 mil geomembrane (or equivalent) will be adequate to demonstrate hydraulic separation. Part or all of the impoundments can be retrofitted to meet the location requirement.