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December 31, 2003

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Stop P1-137
Washington, DC 20555-0001

Ladies and Gentlemen: ULNRC-04932

DOCKET NUMBER 50-483
CALLAWAY PLANT
UNION ELECTRIC COMPANY
NPDES PERMIT PROPOSED CHANGE
CONCERNING THE SCHEDULE OF
COMPLIANCE FOR GROUNDWATER MONITORING

Please find enclosed a proposed change for the Callaway Plant NPDES Permit. This proposal is submitted in accordance with Callaway Plant Operating License NPF-30, Appendix B, Section 3.2.

Very truly yours,

Keith D. Young

Keith D. Young

PMB/mlo
Attachment

IE25

cc: U. S. Nuclear Regulatory Commission (Original and 1 copy)
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ATTACHMENT 1

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December 23, 2003

Philip A. Schroeder
Chief, Permit Section
Water Pollution Control Program
205 Jefferson Street
P.O. Box 176
Jefferson City, MO 65102-0176

Dear Mr. Schroeder:

Subject: Callaway Plant NPDES Permit No. MO-00980001
Schedule of Compliance

The Callaway Plant NPDES Permit, issued on October 3, 2003 contains a Schedule of Compliance requiring either the installation of groundwater monitoring wells near the reactor building or a demonstration that such wells are not needed. The compliance deadline is December 30th.

Callaway Plant staff reviewed this requirement and has concluded that installation of groundwater wells and routine monitoring for radiological contaminants is not justified. Therefore we are providing the attached demonstration, which explains the basis for this conclusion and summarizes our reasoning in support of it.

We would be happy to meet with you or your staff to respond to questions or expand upon the points presented. At your request, an on-site meeting could be arranged to include participation by key Callaway Plant technical staff most familiar with relevant design & construction features, operational procedures, and NRC license requirements. Please call if you have any questions, or would like to arrange for such a meeting.

Sincerely,

Michael F. Bollinger

Michael F. Bollinger
Consulting Environmental Scientist
Ameren Services

Cc: C. A. Riggs

Bcc: P. M. Bell
J. C. Pozzo
File: WQ-3.1.1

Elimination of Groundwater Monitoring Requirements
Callaway Plant NPDES Permit MO-0098001

Background

Callaway Plant has monitored groundwater for radiological contamination, for over twenty years, since issuance of the original NPDES operating permit which included the Radiological Environmental Monitoring Plan. Groundwater monitoring was just one component of this detailed plan; the 'REMP' specified various environmental media, critical analytical parameters, and sampling locations & frequencies.

While some changes were made to the radiological monitoring provisions listed in the permit's Special Conditions as it underwent renewal (typically every five years) - until the permit was recently reissued, it continued to require groundwater monitoring from three specific locations; two wells installed by Union Electric before operations commenced (Test wells F05 and F15) and the potable water supply in the City of Portland (also a groundwater source). Special Condition 4 b of the prior permit required quarterly sampling of these locations with analysis of tritium and gamma isotopes.

In our last reapplication, submitted in October 2000, we requested deletion of this requirement, based on four primary points. First, we described the very low permeability of the site geology as documented in the Plant's Environmental Report, which was compiled for the Nuclear Regulatory Commission (NRC) during the Operating Licensing Stage. Second, we explained that both the specified wells and the Portland water supply were quite remote from all of the Plant's facilities which contain radiological fuel and byproducts. Based on these two points, we concluded that this monitoring provided no real measure of benefit regarding possible corrective actions in response to an unauthorized release, due to the very long travel times (between such hypothetical releases to groundwater and their identification via this monitoring program). Third, we reported on a review of the analytical results from 17+ years of monitoring conducted to date at that time, and the lack of any evidence of long term trends or other water quality concerns. And finally, we assured DNR that radiological releases to the environment which might contact groundwater would not be allowed to persist long enough to result in travel of a contaminant plume any significant distance, due to various controls in place in our NRC license.

Schedule of Compliance in our Current Permit

This request to remove this special condition was tentatively accepted, as the groundwater monitoring conditions were deleted from our current permit as issued on October 3, 2003. Still, a final decision was deferred pending the submittal of additional information in support of our position.

Page 11 of 16 of the new permit, includes a new item "C. Schedule of Compliance" which reads:

> "By December 30, 2003 Ameren UE must either install adequate groundwater monitoring wells near reactor building or demonstrate to Missouri Department of Natural Resources that such wells are not needed."

This document is provided in response to this Schedule of Compliance.

Additional Justification

We maintain that replacement wells are not necessary and that radiological groundwater monitoring is not supported by either the design or operations at Callaway Plant and offer the following information for your consideration.

Virtually any plausible release of radiological contaminants or byproducts from nuclear power plants like Callaway Plant would be assessed as part of the NRC's mandated Final Safety Analysis (FSAR) report. The findings of such evaluations and the conclusions and the guidelines which result are incorporated into the FSAR, which effectively becomes part of the license conditions.

Callaway Plant's FSAR Section 2.4.13.3 evaluated all likely scenarios where significant quantities of radioactive materials are released into the ground water environment such as accidental releases. Radioactive liquids from the plant are postulated to enter the ground water as a result of the accidental rupture of specific tanks containing liquid radwaste. The speed with which the released water enters ground water in the fill area is conservative as noted in the FSAR. It also assumes that water released to the fill area does not immediately enter this perched ground water and disperse uniformly throughout the fill.

The effects of accidental contamination were examined in the nearest down gradient ground water well (23). The effects of hydrodynamic dispersion, fluid convection, cation exchange, and radioactive decay were included in the analysis. Table 2.4-31 of the Safety Analysis Report shows that the peak H-3 and Sr-90 concentrations computed at well 23 were more than two orders of magnitude lower than the "Maximum Permissible Concentration" (MPC) limits for unrestricted areas.

If radioactive leakage to the environment were to occur as described in the cases evaluated in FSAR Section 2.4.13.3 it would not be allowed to contact the ground long enough to begin seepage to a well. Inventory in tanks containing radioactive water such as the Refueling Water Storage Tank (RWST) is monitored continuously by the plant computer system, with alarms to the plant Control Room if level drops below 95 percent. Additionally, reactor operators review logs which include the level of the RWST each shift. The spent resin storage tank (primary) and the boron recycle holdup tank inventories and levels are monitored in the Radwaste Control Room by RW technicians each shift. Cases such as these were evaluated in the FSAR, other less plausible scenarios were not, based on Callaway Plant's robust (i.e. conservative, safety oriented) design. For example, there are no pipes transporting radioactive water underground. All piping transporting radioactive water is contained within buildings. Water is transported to the Radwaste building via an underground tunnel, which includes a Hot Pipe chase.

Monitoring Alternative

One possible option would be to monitor existing wells, near the reactor building which were installed into the porous fill. In reports previously submitted to DNR we described a groundwater assessment study for placement of monitoring wells to monitor a subsurface fuel oil release at Callaway Plant in 1984. An oil recovery system was subsequently installed and functioned by drawing down the elevation of the perched groundwater within the fill, with pump out of collected materials and transfer to the

Plant's oil water separator. Approximately one year ago that system was shut down, following (calculated) recovery of most of the lost product. The water level within the fill is now maintained intermittently with some swings in elevation. As a result, these wells may not provide a valid indication of potential contamination at various locations within the fill area due to various barriers and obstacles formed by foundations and other structures located below grade.

Routine groundwater monitoring for radiological contamination at these or other, new wells is not feasible because, should a leak or spill occur, it is not possible to predict where it might happen. Any wells that we drill at this time may be in a poor position to monitor the consequences of the event.

We believe that groundwater monitoring, if desired by DNR, should only be required in response to an event which places groundwater quality at risk – such as spill or accidental release. Such an approach would insure that the monitoring wells would be installed at locations and depths appropriate to assess and respond to the conditions which created the hazard. In the event that permit conditions are revised to incorporate this concept, they could specify a threshold release volume (for example 500 gallons) which could be tracked using existing inventory controls on critical equipment.

In our opinion this approach would be much better than the alternative of routine monitoring of groundwater, at arbitrary locations, absent any real anticipated risk.

Attachments

Key referenced sections of Callaway Plant's FSAR have been included for your reference.

2.4-57 Rev. OL-13
5/03

2.4.13.3 Accident Effects

2.4.13.3.1 Introduction

Radioactive liquids from the plant are postulated to enter the ground water as a result of the accidental rupture of specific tanks containing liquid radwaste. The effects of this accidental contamination have been examined at the nearest groundwater discharge locations: streams and local wells.

The three tanks postulated to rupture will contain the highest curie inventory of the radioisotopes with relatively long half-lives that are of concern to human health: strontium 90 (Sr-90), cesium-137 (Cs-137), cobalt-60 (Co-60), and tritium (H-3). These tanks are as follows:
a. The spent resin storage tank (primary);
b. The boron recycle holdup tank (A or B); and
c. The refueling water storage tank.

The first two tanks are located in the radwaste building, while the refueling water storage tank is located between the radwaste building and the turbine-reactor complex. Highest curie contents for Sr-90, Cs-137, and Co-60 are expected in the spent resin storage tank (primary). The highest concentration of H-3 is expected in the boron recycle holdup tank (A or B), and the greatest curie content of H-3 is expected in the refueling water storage tank. In the accident analysis, we have postulated the ruptures of each of these three tanks have been postulated as separate, isolated events. Details of the tanks and their curie content for important radionuclides are given in Table 2.4-28.

Once a tank ruptures, the liquid contents are assumed to merge immediately with the ground water. To be conservative, the water table at the plant is assumed to be 5 feet below plant grade, at elevation 835 feet. The base of the spent resin storage tank and the boron recycle holdup tank is at elevation 812 feet, approximately at the contact of the glacial till layer with the underlying Graydon chert conglomerate. The liquid contents of each of these two tanks are postulated to flow down-gradient in the ground water within the Graydon chert conglomerate and possibly within the underlying Burlington and Bushberg Formations.

The base of the refueling water storage tank is at approximately elevation 835 feet. Therefore, the liquid radwaste from that tank would seep directly into the granular structural fill. The conservative assumption made in this analysis is that the contents of this tank would percolate rapidly through the granular structural fill to the Graydon chert conglomerate, and would move down-gradient in that unit.

The nearest surface-water bodies that can be affected by accidental releases at the plant are a tributary to Mud Creek and a tributary to Logan Creek. Piezometric level data obtained at the site indicate that in the Graydon chert conglomerate the predominant direction of ground-water flow is approximately S80 W. However, there is some indication of a possible gradient on the northeast side of the plant site toward the northeast. As a result, it is conservatively assumed that contaminant transport in the ground water could occur in either direction. Flow toward the southwest is assumed to discharge at elevation 770 feet in one of the tributaries to Mud Creek at a point closest to the radwaste tanks (4,500 feet). Flow toward the northeast is assumed to discharge at elevation 770 feet into one of the tributaries to Logan Creek at a point closest to the radwaste tanks (4,400 feet).

The nearest down-gradient well is Well 23 (Figure 2.4-23), located approximately 8,700 feet S83°W from the radwaste tanks. In the analysis, the ground-water flow path is assumed to extend directly from the tanks to the well.

The results of the analysis show that, with the exception of H-3 and Sr-90 concentrations, ground water contaminated by accidental radioactive releases at the plant site will have radionuclide concentrations below the maximum permissible concentrations (MPC) of 10 CFR 20, Appendix B, for unrestricted areas by the time the contaminated ground water reaches the nearest stream tributaries. The dilution capability of these streams is shown to reduce the concentration of these two radionuclides to below the MPC limits before their confluences with the respective main streams. Computed concentrations at Well 23 were below the MPC limits for unrestricted areas. The effects of hydrodynamic dispersion, fluid convection, and radionuclide decay were included in the analysis. In addition, for the cases of Sr, Co, and Cs, cation exchange hold-back was included.

2.4-67 Rev. OL-13
5/03
2.4.13.5 Design Bases for Subsurface Hydrostatic Loadings

Piezometer readings indicate that the normal water table will range from 10 to 30 feet below the ground surface at the plant site depending on the topography and local hydraulic gradient (Figure 2.4-19). There will be some natural fluctuation in the ground water levels due to climatic conditions. At the plant site, the ground water surface is in the glacial deposits overlying the Graydon chert conglomerate.

Design for full hydrostatic loading should include all substructures below elevation 840 feet. Granular fill and backfill surrounds and underlies the plant substructures. The highly permeable granular fill and backfill could become saturated with water to an elevation of about 840 feet due to infiltration from surface runoff. As the fill and backfill is much more permeable than the surrounding clays and Graydon chert conglomerate, the fill will act as an artificial sump. Ground water in the sump at an elevation above the natural hydraulic gradient will slowly drain into the natural ground water to reestablish the hydraulic gradient over extremely long periods of time, as discussed in Section 2.4.13.3. No wells are proposed for safety-related structures.

Due to the very low permeabilities of the earth materials excavated, no special dewatering techniques were required.

No permanent underdrain or ground water dewatering systems are installed or planned at the site.