

Gepford, Heather

From: Ruben Hamilton
Sent: Monday, March 10, 2008 12:27 PM
To: Brian Bonser; Wade Loo
Cc: Adam Nielsen; George Kuzo; Heather Gepford; Jeff Griffis; Ruben Hamilton
Subject: McGuire Groundwater Followup.
Attachments: McGuire Groundwater.doc

The attached is the result of my followup on the two voluntary reports regarding ground water at McGuire.
(Approximately 3 pages)

Thanks,
Ruben

J-96

McGuire Groundwater

McGuire site has a system of holding ponds that hold up liquid effluents prior to their release into the Catawba River. These ponds have no radiological function but serve to allow for treating the water for oil and grease, foaming and possibly, for pH adjustment so that the plant can meet its NPDES permit requirements. The water is monitored for radiological release prior to its introduction to the ponds. The existence of these ponds is necessitated by the plants reliance on a conventional water treatment plant.

The series of ponds consists of a settling pond, two bentonite clay lined holding ponds and a concrete lined final holding pond. The clay lined holding ponds are also referred to as mixing ponds. Releases can be made from any of the holding ponds. When further treatment is required before release it is done in the final holding pond.

The CO2 building houses several valves and a side-stream sampling system that monitors the release sample flow for pH. The flow from this system was formerly routed to one of two valve pits which were thought to drain back to the final holding pond. The outboard valve pit does drain to the final holding pond but the inboard pit drains to a six- inch carbon steel pipe that discharges to a ditch that leads down through the woods to the river. The sample flow is now directed into a large plastic basin, which is pumped back to one of the two clay lined holding ponds using a float switch controlled submersible sump pump. A level switch interlock has been installed that secures the release in the event of excessive level in the collector basin that would result if the sump pump failed.

When I walked down the system on 3/3/08, the system was currently configured as described above with the exception being that the concrete lined final holding pond is not being used and has been pumped back to one of the other holding ponds. It contains a few inches of rainwater and a considerable amount of dirt or sludge.

On 2/4/08 at 11:44 a.m. a voluntary notification was made to the NRC pursuant to 10CFR50.72b2(XI). The basis for this notification is the notification of an offsite agency. The North Carolina department of Natural Resources was notified that there was a potential release to the environment through the final holding pond. A chronology of the events leading up to this notification follows.

1/28/08: Water transfer from Mix pond 'B' to the final holding pond was initiated to allow treatment to resolve a foaming issue.

1/29/08 @ 16:20: The gravity drain to the final holding pond was secured. The final holding pond was placed in recirculation as part of the treatment plan to resolve the foaming issue. The final holding pond contained approximately 800,000 gallons of water.

2/1/08 @ 10:20: Final holding pond recirculation was secured. The level was indicated at approximately 750,000 gallons. Based on the reduction in inventory, Chemistry suspected a leak in the recirculation piping. There was no indication of an uncontrolled discharge at the outfall. The recirculation pumps were secured and valves closed. A piece of tape on the wall of the final holding pond marked the water level to allow determination of further decrease in level.

2/3/08 @ 09:30: Chemistry verified the final holding pond level to be at 660,000 gallons indicating further loss of inventory. Chemistry sampled the final holding pond and initiated a corrective action document (PIP M-08-00585). They then began pumping the final holding pond to the 'B' mixing pond. Chemistry looked around the final holding pond to identify any spill sites and identified none. No water was seen coming from the ground as a result of this event.

2/4/08 @09:00: Final holding pond level was at 430,000 gallons. The pumping from the final holding pond to the 'B' mixing pond was secured. The 'A' mixing pond was sampled and its discharge to the river was started. Chemistry made a decision to monitor the level of the final holding pond and if the level was still dropping then secure the discharge on 2/5/08 and pump the remainder of the final holding ponds contents to the in-service mixing pond.

2/4/08 @ 11:00: Sampling of monitoring wells in vicinity of the holding ponds was requested to identify the ground water impacts below the pond. The wells following wells were sampled: 82, 84, 84R, 103 and 103R. The 'R' designation indicates that the well reaches to bedrock up to 100 feet deep while those without the designation are typically 20 feet deep.

2/4/08 @ 16:00: The level in the final holding pond is unchanged from the 09:00 level and remains at 430,000 gallons. Pumping of the final holding ponds contents to 'B' mix pond commenced. The calculated volume lost from the final holding pond was conservatively estimated at 140,000 gallons.

The total liquid activity released was documented in a liquid waste release (LWR #2008014). The unplanned activity was evaluated against off-site dose limits using current ODCM methodology. The licensee determined that the total activity released was insignificant and the calculated total body dose resulting ($5.39E-5$ mRem) is less than one tenth of a percent of the limit ($<0.10\%$) of the dose limits specified in the CFR. A separate calculation performed by an NRC inspector determined that if an individual were to use the water released from the pond as his sole source of water for consumption for a year that the individual would receive less than 0.5 mRem total body dose. The water was determined to be well below both EPA and NRC limits.

The final holding pond was subsequently drained and the sludge in the bottom was sampled on 2/6/08 and analysed. The results identified the presence of Pb-214 and K-40 [natural products] as well as Co-60 @ $2.239E-7$ $\mu\text{Ci/ml}$, Cs-137 @ $1.894E-6$ $\mu\text{Ci/ml}$ and H-3 @ $9.257 E-6$ $\mu\text{Ci/ml}$. These concentrations would meet the ODCM release limits for liquids and are well within 10CFR20 limits for release into sanitary sewerage.

The licensee began investigating the losses from the final holdup pond with approximately 13 corrective actions identified in PIP M-08-00585. As a result of the investigation it was determined that the sample line which flows 1.3 gallons per minute when a release is in progress drains to a valve pit that does not drain back to the final holding pond but rather a pipe that discharges into a ditch a couple of hundred feet below the pond. This was reported to the NRC and North Carolina on 2/8/08. A temporary modification was made that routed the sample to a large basin which contained a float controlled submersible sump pump to pump the water back to one of the mixing ponds. The licensee initially had personnel stationed at the basin to ensure that the release would be secured if the pump failed preventing the basin from overflowing. The licensee determined that since a release can take several days requiring continuous manning around the clock that the initial design was insufficient and added a float switch which would trip the pump thereby securing the release. The licensee is still evaluating options for the valve pit that contains a waste pump that could constitute an unmonitored release by draining to the woods if the pump were to start leaking. The licensee has performed calculations to verify that the magnitude of the unmonitored release was not sufficient to require inclusion in the ODCM nor sufficient to require re-submitting the annual radiological effluent report for prior years. The calculated dose from this pathway using the highest activity from the previous three years is less than one tenth of a percent ($<0.1\%$). This is consistent with NRC Regulatory Guide 1.109.

On 2/27/08 Mecklenburg County Land Use & Environmental Services Agency (LUESA) released their report on the McGuire tritium release. The report detailed that they had been

notified on 2/6/08 that McGuire Nuclear facility experienced an unintentional release of treated wastewater to the environment. Duke Energy had reported the loss of 140,000 gallons of low level tritiated wastewater containing 9000 pCi/L from a containment pond into the subsurface on 2/3/08.

Discussion between the agency and the utility occurred over several days and it was established that the release was below the EPA drinking water standard, that there were drinking water wells in vicinity of the site and that the nearest drinking water well was 4000 feet away and not believed to be impacted by this release. The source of the water in the ponds is secondary water originating from steam process and water treatment. The site has 65 monitoring wells and is currently completing a groundwater flow analysis and in general terms the groundwater flows downhill to the Catawba River.

On 2/19/08 NCDENR –Aquifer Protection Section was contacted to confirm that they were aware of the release and that LUESA would be making a site visit. NCDENR had been notified.

On 2/20/08 two representatives from LUESA toured the site and were provided monitoring well maps, quarterly tritium results and the McGuire Nuclear Station 2006 Annual Radiological Environmental Operating Report. During the visit they LUESA representatives were notified of the problem with the sampling line. They were told that the typical tritium level in the discharge canal was 1500 to 2000 pCi/L and that there were two other large ponds on site, one was for emergency cooling water and the other was for storm water runoff.

On 2/21/08 while reviewing the tritium values from the quarterly sampling it was noted that the highest tritium level in a groundwater monitoring well was reported on 5/23/08 for well M-104R at a concentration of 11,600 pCi/L. This well is into the bedrock between the ponds and the lake. This well had tritium levels above 10,000 pCi/L for each sample collected in 2007. The LUESA collected their own samples and had them analyzed for tritium. The samples included Lake Norman and Mountain Island Lake in addition to the McGuire outfall. Of particular note is that a DI water blank from the City of Charlotte showed an activity of 815 pCi/L the sample of the water taken at the Lake Norman drinking water intake showed 1230 pCi/L and the Mountain Island Lake drinking water intake was at 686 pCi/L. The McGuire Nuclear Station outfall had a concentration of 6490 pCi/L.

Both of the LUESA representatives expressed confidence in the manner in which the utility had responded to the event.

Ruben Hamilton
Sr. Health Physicist