



MECKLENBURG COUNTY
Land Use & Environmental Services Agency
Water & Land Resources
2/27/2008

McGuire Tritium Release

Background

On February 6, 2008, Tim Gause (Business Relations Manager with Duke Energy) notified Land Use and Environmental Service Agency (LUESA) that the McGuire Nuclear facility experienced an unintentional release of treated wastewater to the environment. Duke Energy reported that approximately 140,000 gallons of low-level tritiated wastewater containing approximately 9,000 Pico-curies/liter (pCi/L), leaked from a containment pond into the subsurface on Sunday, February 3, 2008. The wastewater was being held, prior to a scheduled release, in accordance with the facility's permit. Duke Energy notified the State of NC and the Nuclear Regulatory Commission on Monday, February 4, 2008. Duke Energy asserted that there was no public health risk associated with this release in that the radionuclide levels in the leaked wastewater were far below the EPA's Drinking Water Standard for tritium, which is 20,000 pCi/L.

Groundwater

Following the report of the discharge on 2/6/2008 a map showing the facility with adjacent properties and well locations was produced. Potential release locations were identified. The actual location of the release was not confirmed by Duke Energy until 2/11/2008.

2/7/2008 The Mecklenburg County Health Director was notified verbally of the release. There was not an immediate public health concern because the level of tritium discharged was below the EPA Drinking Water Standard. However, it was noted that active drinking water wells are located on properties adjacent to the McGuire Facility.

2/11/2008 John Williamson (704-875-5894) of Duke Energy Environmental Group identified the actual release location during a telephone conversation. The closest drinking water wells, on Stinson Cove Road are more than 4,000 feet away and are not believed to be directly impacted by this release. Surface water was within 1,000 feet. John referred questions about the flow of the water, the levels of tritium in the groundwater and the location of groundwater monitoring wells on the property to Steve Mooneyhan (704-875-4646).

2/12/2008 A conversation with Steve Mooneyhan highlighted the following:

- The release came from a final holding pond (one million gallons) constructed of concrete with sealed joints. In a permitted discharge the water flows from one of three ponds (the final holding pond or one of the two settling ponds) through a pipe to a sluice where a composite sample is taken. The water enters a storm water canal and is discharged to the

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river. Nuclear Regulatory Commission regulates the discharge. The discharge limit is 20,000 pCi/L. (Note: it is my understanding that this is based on a dose amount so higher levels can be discharged as long as the diluted level of tritium does not exceed 20,000 pCi/L.)

- The final holding pond was drained and no obvious leaks were detected. There is sludge in the bottom of the pond that will be removed and further investigation to determine the cause of the release.
- Water that flows through the ponds is secondary water originating from steam process and water treatment. The water first goes to a sump where is moved to one of the two settling ponds (each 2.5 million gallons). If additional treatment is needed (ex. foaming) it goes to the final holding pond. Typically water does not flow through the final holding pond so having it off line is not an issue. Water from the two settling ponds is discharged along the same route as the final holding pond.
- There are 65 groundwater monitoring wells around the facility. Duke Energy completes quarterly sampling of the monitoring wells. Duke Energy is currently completing a Groundwater flow analysis. In general terms the groundwater is flowing towards the river.
- Duke Energy completes an annual radiological environmental report.
- The McGuire Facility does a voluntary notification when
 - monitoring well results are > 20,000pCi/L
 - an unintended loss of more than 100 gallons.
- Duke Energy and GWS discussed adding a representative from the Health Department to the notification list and the possibility of a site visit.

February 19, 2008 GWS contacted Andrew Pitner, NCDENR- Aquifer Protection Section to confirm he was aware of the release and to notify him that LUESA would be making a site visit. Andrew had been notified.

On February 20, 2008, Duke Energy employees Harry Sloan (704-875-4671) and Cyndi Martinec (704-382-4367) provided a field tour for Lisa Corbitt and David Buetow of LUESA of the area where the spill occurred and nearby groundwater monitoring wells at the McGuire Nuclear Facility. Duke Energy provided monitoring wells maps, quarterly tritium results, and the 2006 Annual Radiological Environmental operating report.

- During a site visit LUESA was notified of a second previous release from a pipe that extended into the woods. Releases from this pipe occurred in batches during the monitoring of the pH. The pipe had visibly been disconnected and the discharge from the pH monitoring was redirected. Water was discharging from the pipe in the woods during the site visit but according to Harry Sloan and Cyndi Martinec this was a groundwater discharge. There are monitoring wells in the area of the discharge.
- Primary water is brought in from Lake Norman through 8 recirculation pumps. Each pump is capable of 250,000 gallons per minute. This water enters the facility and is discharged through the main discharge canal. Nuclear Regulatory Commission regulates

the discharge. The discharge limit is 20,000-pCi/L. (Note: it is my understanding that this is based on a dose amount so higher levels can be discharged as long as the diluted level of tritium does not exceed 20,000 pCi/L.)

- Typical tritium levels in the discharge canal are 1,500-2,000 pCi/L.
- The other two large ponds on the facility are for emergency cooling water and for storm water runoff.
- Duke Energy has two drinking water wells located on the property across NC 73. The McGuire Nuclear facility is served by Charlotte Mecklenburg Utilities.

February 21, 2008 A review of the monitoring well data provided by Duke Energy showed:

- That tritium is in the groundwater but at levels below the drinking water standards.
- The highest tritium level in the groundwater monitoring wells is 11,600 pCi/L (5/23/07) at M-104R. The well is located between the settling ponds and the lake. The R indicates the well is in bedrock. This well has had tritium above 10,000 pCi/L for all sampling events in 2007.

Follow-up conversations included:

- Andrew Pitner of NCDENR – Aquifer Protection Section will take the lead on determining if there is a violation to the Groundwater 2L standards.
- Valerie Patterson (704-875-5605) Public Awareness Manager contact for Duke Energy
 - Confirmed who is notified of a release –All Surrounding Counties, DWQ, NCDENR, EOC for Mecklenburg, Gaston, Lincoln, Iredell and Catawba. Towns include Huntersville, Davidson, Cornelius Mooresville and Mount Holly. Individuals include Doug Bean, Rusty Rozzelle, Cary Saul and Harry Jones.
 - A request was made to add Rick Christenbury to the contacts so that the Mecklenburg County Health Director would have a direct notification.

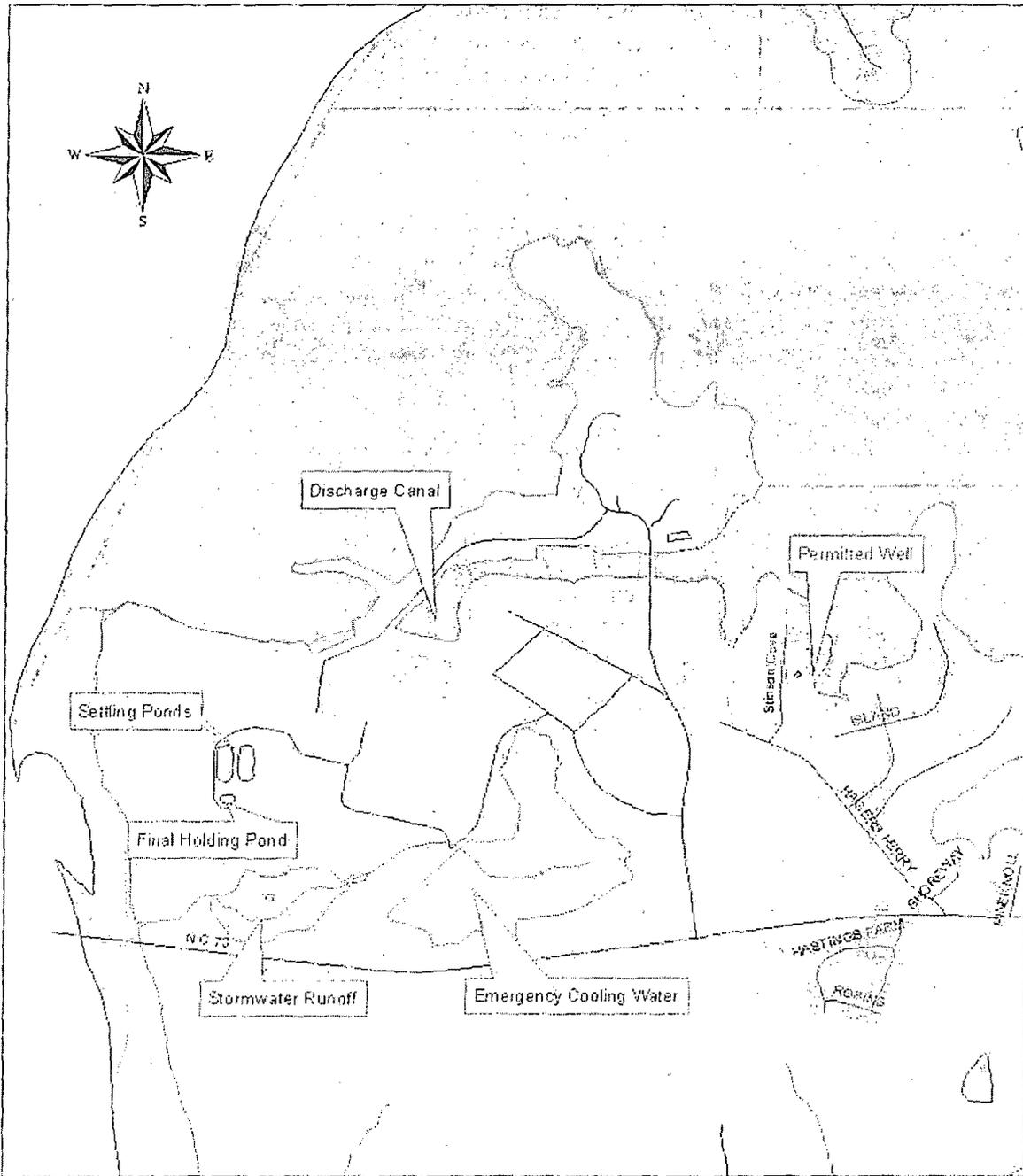
In conclusion, continued monitoring of the groundwater will be necessary to determine if there was an impact from the release. Tritium levels in monitoring well M104R west of the release exceed the levels of tritium that were released from the final holding pond. Duke Energy has a series of Groundwater monitoring wells in the area of the release that are monitored on a quarterly basis. The closest drinking water well is more than 4,000 feet east of the release and the level of the tritium in the water released is below the drinking water standard and thus presents no health risk to the public as initially indicated by Duke Energy.

Tritium is naturally occurring in the environment and is a radiological by-product. To establish a background level of tritium in Mecklenburg County GWS will sample drinking water wells in the GWS Ambient Monitoring Network for tritium. To better understand potential impacts from the operation of the McGuire Nuclear Facility, Groundwater & Wastewater Services will sample at least two off-site wells adjacent to the McGuire Facility.

- Well 1 will be located east of the primary discharge canal on Stinson Cove Road.
- Well 2 will be located south of the plant near the old unlined landfill.

The results from these two wells will be compared to the background levels established through the GWS Ambient Monitoring Network. In addition a request has been made that Duke Energy consider including wells located in these two areas for the annual radiological monitoring.

McGuire Tritium Release



Map Created By: Groundwater & Wastewater Services
Map Created On: 2/28/2006

0 500 1,000 2,000
Feet

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Surface Water

Charlotte-Mecklenburg Storm Water Services staff collected samples for Tritium analysis from both Lake Norman and Mt. Island Lake on February 7, 2008. In order to determine the extent of the impact of the release on surface water, if any, samples were collected upstream of the facility, at the facility's outfall / discharge point on Mountain Island Lake, at the drinking water intakes on both lakes and at several points downstream of the facility ending at the Mountain Island Lake dam. A "blank" sample of de-ionized water was also collected from Charlotte-Mecklenburg Utilities' Laboratory for quality control purposes. For specific sampling site locations, refer to Figure 1. Samples from each site were collected in glass bottles and immediately placed in sealed zip-loc bags to prevent cross-site contamination. All samples were shipped Fed-Ex overnight to GEL Laboratories in Charleston, SC for analysis.

Literature indicates that naturally occurring Tritium levels in the environment range upward to approximately 30 pCi/L. However, sample analysis indicated that average local background Tritium levels across both Lake Norman and Mountain Island Lake were approximately 915 pCi/L. This is approximately 30 times higher than levels that might be expected from an area unimpacted by nuclear power generation facilities.

The McGuire Nuclear facility outfall / discharge point on Mountain Island Lake was reported at 6,490 pCi/L. Although this site was elevated to approximately 7 times the local average background Tritium level, this sample remained well below the EPA's Drinking Water Standard for the contaminant.

The DI water blank collected during the sample run was reported at 815 pCi/L. DI water generation facilities at the Charlotte-Mecklenburg Utilities' Laboratory draw process water directly from the City water supply. The City's water supply is drawn from both Lake Norman and Mountain Island Lakes where this is very close to the average background contaminant level. For specific sample results, refer to Table 1.

Steve Mooneyhan of Duke Energy indicated that Duke routinely collects composite samples at the discharge point (location #5 in Figure 1) for compliance monitoring. Steve was not surprised by the 6,490 pCi/L result and indicated that typical treated discharges from the facility were in that range or higher, up to approximately 9,000 pCi/L.

On February 20, 2008, Duke Energy employees provided Lisa Corbitt and David Buetow of LUESA with a field tour of the area where the spill occurred and nearby groundwater monitoring wells at the McGuire Nuclear Facility. Both Lisa and David expressed confidence in the manner in which Duke Energy has responded to the incident.

In conclusion, the incident appears to have resulted in minimal, if any, impacts to surface water quality in Lake Norman and Mountain Island Lake. Surface water sampling results indicate that if impacts have occurred from the Tritium release they are well below the drinking water standard and thus present no health risk to the public as initially indicated by Duke Energy. In addition, it is important to note that the McGuire Nuclear Facility is allowed to discharge Tritium to Lake Norman and Mountain Island Lake at the drinking water standard of 20,000 pCi/L. The highest Tritium level detected in the monitoring performed by LUESA on February 7, 2008 was less than half this allowed discharge concentration.

To better understand the surface water quality impacts from the operation of the McGuire Nuclear Facility, the LUESA Water Quality Program will begin regular radiological monitoring at select locations on Lake Norman and Mountain Island Lake effective March 2008.

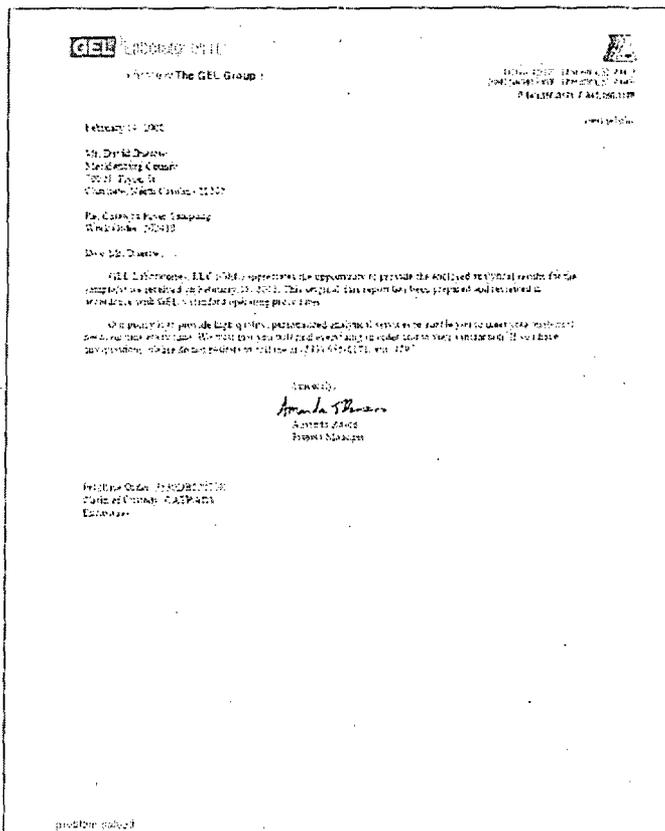
Figure 1. Radiological Monitoring Sites; Lake Norman and Mt. Island Lake



Table 1. Radiological Monitoring Results.

ID	Location Description	Date	Time	pCi/L		
				Result	+/-	MIDL
1	DI Water Blank	2/7/08	8:30	815	381	700
2	Upstream McGuire, North of the Peninsula	2/7/08	12:20	990	395	700
3	Lake Norman Drinking Water Intake	2/7/08	11:43	1230	411	700
4	Upstream McGuire, South of Lake Norman Dam	2/7/08	10:35	914	388	700
5	McGuire Nuclear Facility Outfall	2/7/08	10:28	6490	679	700
6	Mt. Island Lake 1; Mid-Channel	2/7/08	10:15	805	383	700
7	Mt. Island Lake 2; Mid-Channel	2/7/08	10:00	992	396	700
8	Mt. Island Lake Drinking Water Intake	2/7/08	9:50	686	372	700
9	Mt. Island Lake at the Dam	2/7/08	9:35	904	389	700

Attachments: Double Click cover letter to view entire lab report.



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