

Oconee Ground Water Communication Supplemental Information
Questions and Answers
2/8/2010

1. Q: When were the wells sampled?

A: Most of the Oconee ground water monitoring wells are sampled quarterly. The wells were last sampled during the week of January 25, 2010.

2. Q: When were results received?

A: Analysis results were received Feb. 8, 2010.

3. Q: How long have you known about elevated tritium concentrations?

A: Tritium concentrations at one well were elevated during sampling in January 2008 but samples have been below the nuclear industry communication threshold of 20,000 picocuries per liter until the latest sample results received on Feb. 8.

Two wells were installed at this location in 2007 and a third deeper well was installed in December 2009 as part of response to the initial elevated readings. The Feb. 8 sample results were the first samples from this newer well (see question 17 for well depths).

4. Q: If you have known about elevated levels since last year what has ONS been doing to correct the situation?

A: We have been investigating potential sources to determine if this is an on-going leak or an old leak that was detected by our new groundwater wells. We have performed the following activities:

- Two of the Chemical Treatment Ponds were lined about 1 1/2 years ago in response to low levels of tritium being detected in some of the original monitoring wells. Tritium levels in these wells were about 1/2 of the limit and have been trending down since the ponds were lined.
- The yard drain piping leading from the Chemical Treatment Ponds was slip lined. These ponds and associated piping lead to a larger on-site pond that is part of Oconee's NRC licensed effluent release pathway.
- Liquid waste discharge line has been pressure tested and soil samples have been collected along the suspect area along the discharge line. No leak was detected during the pressure test and the soil samples are still being evaluated.
- Some underground drain piping has been inspected. Potential leak pathways were identified, and the discharge from the drain piping was rerouted to on-site chemical treatment ponds 1 & 2 (CTP 1 & 2). The turbine building sumps normally discharge to the east side yard drains, but due to the concern that this yard drain piping may be leaking

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the sumps were realigned to CTP 1&2. There is a nuclear industry underground piping initiative underway. All underground piping will be identified, risk ranked and inspection plans developed.

- In addition to the initial 26 monitoring wells that were installed in 2007, 14 new wells (with 5 more in progress) have been installed around the plant site to further determine the extent of the elevated tritium levels.

5. Q: Where are the two wells with elevated levels located?

A: These wells are located between the turbine building and one of our switchyards (525 kV on the east side of the plant. It is approximately 1/2 mile from the wells to the Keowee River and 1.5 miles to a private well that Duke samples regularly.

6. Q: Where does the ground water go?

A: The groundwater flow direction in the area where the wells are located discharges to Chemical Treatment Pond 3 (CTP3) or the conveyance system directly below CTP3. The conveyance is a monitored surface water discharge point to the Keowee River and listed as Outfall 002 under the station's NPDES permit (SC0000515). Four of the new wells are located on the south side of CTP 3 and the conveyance closer to the site boundary. Tritium has not been detected in these wells indicating that groundwater from the affected area is not moving beyond CTP 3 and the conveyance.

7. Q: What sources are suspected?

A: Underground piping carrying liquid waste from the plant and the yard drain piping are two possible sources that are being investigated. No other likely sources have been identified to date, but the investigation is continuing.

8. Q: What changes have been made to plant operations in response to the ground water samples?

A: Discharges through the yard drains on the east side of the plant were stopped in fall of 2008.

9. Q: What is the dose from 35,400 picocuries per liter?

A: This water is not used for drinking purposes. However, if it were to be consumed, the maximum dose would be approximately 7 millirem per year (using EPA assumptions). The average annual dose to a member of the public is 360 millirem per year (due to natural, medical, and consumer products).

10. Q: What is the NRC public dose limit?

A: 100 mrem/year

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11. Was SC DHEC aware of this before now?

A: Yes. The State was informed of the original sample results as a courtesy in Jan. 2008 and has been briefed as new data has been acquired. They were also briefed on the results of the detailed groundwater site characterization report that was produced using the data from the existing and new groundwater monitoring wells. This report discusses the Oconee site hydrogeology, ground water flow direction, flow speed, etc.

12. What about the other wells you monitor?

A: We are sampling 54 on-site monitoring wells. All of the other wells have tritium levels less than the reporting level.

We have also sampled a private well about 1.5 miles from the plant site. We have not seen elevated tritium levels from this well. The well is located in Pickens County. This well is sampled quarterly.

13. Can tritium at these levels migrate into any drinking water supplies? What will prevent it from reaching my property and my well?

A. Ground water from the affected area flows south into CTP 3 and the conveyance which enters the Keowee River as surface water through a licensed and monitored release discharge point. See question 6.

14. Should I have my well sampled? Do you have any plans to test private wells?

A. We do not plan to test individual wells, as all results indicated that tritium is not migrating off-site through the ground water.

If a resident wants to have their well water tested, they may contact the South Carolina Dept. of Health and Environmental Control (DEHC) at 1-800-476-9677. This number is the agency's "response and public information" line.

15. Are you prepared to test for tritium beyond the plant's property boundary?

A. We have an extensive ground water monitoring program in place in addition to our environmental monitoring program. Data from our ground water samples do not show radioactivity from this plume migrating off-site through the ground water.

16. Is there a health or safety hazard for people living near the plant or working at the plant?

A. No. The tritium found in the monitoring wells does not pose a health or safety hazard to the public or plant employees and it is not available for consumption.

17. How deep are the wells with the elevated tritium and what are their associated tritium levels?

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A. GM-7R is approximately 65 feet deep and had a tritium level of 24,400 picocuries per liter. GM-7DR is approximately 150 feet deep and had a tritium level of 35,400 picocuries per liter.

18. Is there a way to remove tritium from the groundwater?

A. Tritium cannot be easily removed from water since it is part of the water itself. In some cases the best strategy is to monitor the groundwater and allow it to naturally dissipate through radioactive decay and dilution. This strategy works well when the source of tritium has been eliminated and the groundwater is not flowing in a direction that could affect drinking water wells. Another strategy is to pump the groundwater for monitoring and discharge to a permitted discharge pathway.

19. How long have you been putting tritium into the environment?

A. All nuclear power plants release tritium into the environment through NRC permitted discharge pathways. These discharges are conducted using NRC approved plant procedures and are monitored by the NRC and state agencies. These releases are part of the normal plant operating program.

20. Do you measure tritium as part of the dose to your workers?

A. Yes, air and liquid samples are collected in the plant to assure workers are not exposed to levels of tritium that would require dose to be calculated and assigned. We carefully monitor and control any employee's exposure to radiation, and have very strict limits for annual exposure.

21. What will this do to my property value?

A. It is impossible for us to speculate on future property values due to various factors involved, which do not involve the Oconee Nuclear Plant.

22. How much will the monitoring and investigation cost and will these costs get passed along to your customers?

A. No final costs are available since we are still investigating.

23. What is tritium?

A. Tritium (chemical symbol H-3) is a radioactive isotope of the element hydrogen (chemical symbol H). Tritium is produced naturally in the upper atmosphere when cosmic rays strike air molecules. It is also a byproduct of the production of electricity in nuclear reactors and is used commercially in concentrated quantities in self-luminescent devices, such as exit signs, gun sights and wristwatches. It is commonly found in water and is generally not considered hazardous.

24. Are low levels of tritium in water safe?

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A. Yes. The U.S. Environmental Protection Agency sets standards for acceptable public drinking water. Under these standards, any concentration of tritium up to 20,000 picocuries per liter is safe to drink. According to EPA figures, a person who drinks two liters of water per day with tritium of 20,000 picocuries per liter would receive four millirem of radiological exposure from the tritium. This is slightly less than the amount of exposure a person would receive in one chest x-ray which is 6-10 millirems.

25. What did Oconee do when it found the tritium?

A. We began a thorough investigation and we continue to investigate the source. Once we received samples with elevated levels we shared the information with the Nuclear Regulatory Commission, SC DHEC, local officials, plant employees and local media.

26. Why have you not found the source after 2 years of looking?

A. Work has been on-going to determine the source of the radioactivity since it was first discovered. Temporary wells were installed and sampled in spring of 2008. Testing of the release pipe was performed in February of 2008. Releases through one of the suspected pipe were discontinued in the fall of 2008. The trend in GM-7R was identified the first quarter of 2009. A plan to install an additional 19 wells was approved in November of 2009.

27. What will you do if it does reach the drinking supply?

A. We have every reason to believe that drinking water wells will not be affected by tritium in ground water. See question 6 & 13.

28. How does tritium affect people's health?

A. The levels of tritium found in the areas identified do not pose a health or safety hazard to the public or plant workers. Tritium enters the body by drinking water, absorption through the skin or breathing. Tritium emits very weak radiation and leaves the body relatively quickly through normal waste streams. Radioactivity is part of our environment and is present naturally in our bodies from the food we eat. For example, we receive approximately 15 millirem annually just from radioactivity in foods such as bananas and potatoes. (Table 3.14, NCRP 160)

29. What will prevent this tritium from reaching the Keowee River?

A. All nuclear power plants release tritium into the environment through NRC permitted discharge pathways. These discharges are conducted using NRC approved plant procedures and are monitored by the NRC and state agencies. These releases are part of the normal plant operating program. Through our environmental monitoring program we sample the Keowee River to ensure that radioactivity levels are below all release limits.

30. Is it safe to eat fish from Lake Keowee?

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A. Based on routine radiological sampling of fish and water, it is safe to eat fish from Lake Keowee.

31. Have tritium leaks been discovered at other Duke Energy nuclear plants? What did they do about it?

A. Because tritium is naturally occurring and is a by-product of nuclear operations, we have detected low levels of tritium in groundwater at our other nuclear stations. These levels are attributable to station operations and do not pose any health or safety hazards. We have also placed additional monitoring wells in service at our other two stations to further enhance our monitoring program.

In October 2007, Catawba Nuclear Station, reported elevated levels of tritium of 42,335 picocuries per liter in a sample from one of the station's on-site environmental monitoring wells. The tritium was contained on the plant's property. The SC DHEC sampled 27 residential wells surrounding Catawba. Results from these samples did not find any evidence that the tritium had moved off the plant property. The source of the elevated tritium was a leak from 2006 that had been repaired. The monitoring well which had the elevated tritium was installed to get better information about the leak.

32. If you find a leak will you fix it?

Yes.

33. Where can I find more information about tritium?

A. The Nuclear Regulatory Commission and the Environmental Protection Agency provide detailed information on their websites: <http://www.nrc.gov/reactors/operating/ops-experience/grndwtr-contam-tritium.html>

<http://www.epa.gov/radiation/radionuclides/tritium.htm>. The SC Department of Health and Environmental Control also has information on their website: <http://www.scdhec.gov>

34. How are you communicating about the tritium?

A. Oconee is dedicated to keeping the community informed, and will provide the most accurate information as it becomes available. Oconee commits to open dialogue on this subject, and will continue to:

- Engage in ongoing conversations with inquiring residents.
- Release new information as appropriate
- Continue conversation with local officials regarding new information.
- Participate in ongoing discussions and with various regulatory agencies including the State, Environmental Protection Agency, and the Nuclear Regulatory Commission.

Duke Energy's highest concern is the safety and well-being of our employees, the public and the environment: