


Attachment 19 to

GNRO-2012/00039

**ER Reference - Entergy. 2008a. Entergy Nuclear Fleet Procedure EN-CY-109,
Sampling and Analysis of Groundwater Monitoring Wells, Revision 2. April 1, 2008**

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1.0 PURPOSE

- [1] This procedure provides common sampling and analysis criteria for groundwater monitoring wells at Entergy sites. These criteria are intended to provide consistency in sampling process, as well as in data evaluation.

2.0 REFERENCES


- [1] Groundwater Monitoring Guidance for Nuclear Power Plants, Technical Report 1011730.
- [2] USEPA Low Stress Purging and Sampling for the Collection of Ground Water Samples from Monitoring Wells, SOP # 0001.
- [3] NMM EN-RP-113, Response to Contaminated Spills/Leaks.
- [4] NMM EN-CY-108, Monitoring of Nonradioactive Systems.
- [5] NMM EN-RP-121, Radioactive Material Control.
- [6] Standard Methods for Ground Water Monitoring (ASTMs: D5612, D5903, D6517, D6771, D6911, D7069)

3.0 DEFINITIONS

- [1] Contamination – Detectable plant generated radioactivity in a nonradioactive system.
- [2] Supplemental nuclides - nuclides of interests based on plant knowledge/ experience due to plant design, characteristics, or historical events, per 10CFR50.75(g), which may become signature isotopes from a given source, if leaking into groundwater. An example would be Sr-90 for a plant storing 1st generation fuel in their fuel pools.

4.0 RESPONSIBILITIES

- [1] Entergy Nuclear Chemistry Peer Group or Focus Group is responsible for maintaining, reviewing, and interpreting this procedure.
- [2] Site Chemistry Superintendent or Designee is responsible for:
- (a) Administering this procedure at the site level.
 - (b) Reviewing analytical data associated with sampling of groundwater.
 - (c) Notifying site management personnel and regulatory agencies, as required.

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(d) Making notifications as may be required through EN-CY-108.

- [3] Site Radiation Protection Managers or designees are responsible for reporting requirements per EN-RP-113.

5.0 DETAILS

5.1 PRECAUTIONS AND LIMITATIONS

- [1] Water removed from wells during fabrication and purging shall be evaluated for proper control prior to bulk displacement. No controls are required for non-contaminated purge/sample water that has no plant generated radioactivity.
- [2] To prevent contamination of other samples or other wells, sampling equipment shall either be decontaminated between sampling of individual wells, or be dedicated to one specific well.
- [3] Only new, unused sample containers shall be used.
- [4] This procedure is for new on site wells and does not include existing wells already being sampled per existing site procedures.

5.2 SAMPLING EQUIPMENT

- [1] Sampling equipment can include bailers, manual hand pumps, or automatic pumps. Installed pumps may be placed on wells for routine sampling.
- [2] Pumps or pump tubing should be lowered and retrieved from the well slowly and carefully to minimize disturbance to the formation water.

5.3 WELL PURGING

- [1] Calculate the total volume of water in the well using the following formula:

$$V = (0.041)d^2 \times h$$


Where:

V = volume in gallons

d = well diameter in inches

h = height of the water column in feet

$$0.041 = \text{unit conversion } [(d/2)^2 * \pi * (\text{ft}^2/144 \text{ in}^2) * 7.48 \text{ gal/ft}^3]$$

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- [2] Purge for normally 1.5-3.0 volumes. Other volumes may be used based on the design of the well or technical direction from qualified well monitoring specialist (vendor or plant staff)

5.4 USE OF VENDOR TO PERFORM SAMPLING OR ANALYSES

- [1] Vendor procedures shall be reviewed by site specialist prior to sampling by a vendor.
- [2] Vendor must use approved procedures defined for sampling of groundwater monitoring wells.
- [3] Fleet procedures for control of vendors shall be followed.
- [4] Vendors who perform analysis for groundwater samples shall be on the Entergy QSL.

5.5 SAMPLE ANALYSES FOR RADIOACTIVITY

- [1] Samples shall be taken quarterly when available for the first two years after a well has been installed. After two years the sampling frequency should be consistent with Entergy guidelines or industry standards.
- [2] All groundwater samples shall be analyzed for gamma-emitting nuclides per the ODCM/REMP requirements..
- [3] Tritium analyses are to be performed on all groundwater samples.
- (a) Tritium samples shall be analyzed to exclude interferences.
- (b) The lower limit of detection for H-3 shall be a value ***at or below the federal requirements*** dictated in the REMP. These values are commonly dictated by individual site state and local requirements.
- (c) Reporting levels shall be determined in a similar manner, at or below the federally imposed limits.
- [4] If gamma isotopic or tritium analysis indicate contamination due to plant related nuclides, that station should perform analyses for hard to detect radionuclides (examples Sr90, Fe55, Ni63, alpha emitters, etc.). The analyses should be based on the plant's source term, isotopic ratios, and transport characteristics.

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5.6 DATA REVIEW

- [1] Sample data is reviewed by Chemistry for compliance with QA standards and detection of trends, for both contractor lab results and in-house data.
- [2] Verified analytical results shall be communicated to Radiation Protection for possible reporting requirements.
- [3] Clarification of trends or data suggesting greater levels of investigation should be performed with site or fleet expertise or contractor as required, for purposes of maintaining a complete site characterization of ground water.
- [4] Accumulated data shall be reviewed for potential Radiological Effluent impact per Regulatory Guide 1.21.

6.0 INTERFACES

- [1] NMM Procedure EN-CY-108, Monitoring of Nonradioactive Systems.
- [2] NMM Procedure EN-RP-113, Response to Contaminated Spills/Leaks.

7.0 RECORDS

Results of groundwater testing are to be placed in a Chemistry tracking system for record-keeping and archival purposes.

8.0 OBLIGATIONS AND COMMITMENTS IMPLEMENTED BY THE PROCEDURE

None

9.0 ATTACHMENTS

None