John White - QC summary

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Date: 02/06/2007 12:42 PM
Subject: QC summary
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John,

Attached is a summary of the QC protocol that IPEC is instituting for the ground water program.

Jay Adler <<Areva QC Protocol.pdf>>

B/23

REVISIONS TO:
WORKPLAN FOR A GROUNDWATER TRACING STUDY AT INDIAN POINT NUCLEAR POWER PLANT BUCHANAN, NEW YORK

January 31, 2007

Philip Moss, RG and PG

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FOR

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The investigative approach has changed in a number of ways since the August 2006 draft of the workplan, including some refinements to the sampling network for groundwater tracing studies at Indian Point. We anticipate that further minor changes may be deemed necessary in order to achieve the goals of the groundwater tracing study.

Purpose of the Study

The primary purpose of the study is to create a series of dye plumes at Indian Point which are expected to be very similar to the plumes of radioactive contaminants that currently are present at the site. If the dye plumes are very similar to the contaminant plumes, then the sources of radioactive contamination must have been very close to the dye introduction points. If there is poor correspondence among the plumes, then we must conclude that the source areas are or were not very close to the dye introduction points.

Other purposes of the investigation include obtaining empirical groundwater velocity data for both the dye front and the peak dye concentration, and providing a tool for estimating the radioactive contaminant load being discharged into the Hudson River. This is made possible by having detectable concentrations of dye in the river, in spite of undetectable radioactive contamination in the river. It is likely that radioactive contamination is being discharged into the Hudson River, but in quantities that are below detection limits. We can correlate concentrations of dye with concentrations of contaminants where both are detectable and extrapolate to areas where only dye is detectable.

Modifications in Approach

1. There will be four dye introductions, one in the Unit 2 Fuel Storage Building, two traces near Unit 1, and one trace into a pipeline that runs south of Unit 1.

2. Instead of all dyes being introduced on the same day, we anticipate that the Unit 2 dye trace will be completed prior to the introduction of the three remaining traces and that the three remaining traces will be started on the same day or as close together chronologically as possible.

3. Instead of most of the wells and catch basins being sampled intensively, we now plan to have two different sampling schedules. A high intensity network that will be sampled on the schedule found in Revision 1 of the Workplan (August 2006), and a low intensity network that will be sampled every other week. It is our intention to have a halo of sampling locations that are outside the dye plumes. We plan to adjust the sampling network as needed to maintain the halo of nondetections. We believe that the nondetections are necessary for defining the limits of the plumes.

4. Philip Moss of the Ozark Underground Laboratory (OUL) will be onsite as needed to assist with the high frequency sampling period for the first trace.

5. OUL will assist GZA in obtaining field supplies as needed.

6. Any or all dye introduction points will be tested for their ability to transmit adequate quantities of water (at least one gallon minute) into the groundwater system if deemed necessary by OUL personnel.

Consequences of the Modifications

- The duration of tracing will be about twice as long as previously planned.
- Significantly more samples will be collected, shipped, and analyzed.
- A progress report will be drafted following the completion of the first dye trace.
- There will have appreciably more fieldwork, report writing, and travel.

The high and low intensity sampling network locations for the Unit 2 Trace are listed below. These sampling locations were selected by David Winslow and Philip Moss.

High Intensity Network for the Unit 2 Trace

Hudson River D/S	MW-37-57	MW-59-A
Hudson River U/S	MW-49-26	MW-59-B
Hudson River Unit 3	MW-49-42	MW-60
intake	MW-49-65	MW-63
MW-30	MW-50-42	MW-63 - 18
MW-31	MW-50-67	MW-63 - 35
MW-32	MW-52-A,B,C,D	MW-62
MW-33	MW-52-12	MW-62-18
MW-34	MW-53-82	MW-62-35
MW-35	MW-53-120	MW-66
MW-36-26	MW-54	MW-111
MW-36-41	MW-57-11	I-2
MW-36-53	MW-57-20	MH-5
MW-37-22	MW-57-45	MH-6
MW-37-32	MW-58-28	HR-1
MW-37-40	MW-58-65	U3-C1
U2-C1		

Low Intensity Network for the Unit 2 Trace

MW-38	MW-45-43	MW-56-85
MW-39 (67', 86', 100')	MW-45-62	MW-65A (39')
MW-41-15	MW-46	MW-65B (74'))
MW-41-42	MW-47-56	MW-107
MW-41-64	MW-47-80	Sump
MW-42-51	MW-55-24	North Curtain Drain
MW-42-79	MW-55-34	U3-3
MW-44-67	MW-55-54	U3-4D
MW-44-104	MW-56-55	

The networks for the remaining traces have not been entirely resolved as of this date and will be finalized prior to dye injection at Unit 1.

Entergy – Indian Point Groundwater Batch QC Protocol
(Groundwaters only)

1. All groundwater samples received Monday through Friday for a given week will be considered a batch.
2. AREVA NP will make every effort to ensure that the following batch QC samples are included with each batch:
   a. One Laboratory Control Standard (LCS) per twenty samples.
   b. One Matrix Spike (MS) per twenty samples.
   c. One Split Sample per twenty samples
   d. One Analytical Blank (AB) per twenty samples.
3. The LCS and MS will be spiked with an activity concentration approximately ten (10) times the required MDC.
   a. The LCS will be prepared as a DI spike.
   b. The matrix spike will be prepared by taking an aliquot of the sample for each analysis required. An analyte for that analysis will be direct spiked into the aliquot and processed.
   c. AREVA NP will select one sample in the batch for use as a split sample.
4. Quality Control Sample Performance\Acceptance Limits
   a. Split samples shall be evaluated for acceptability using the same acceptance criteria as that used for Matrix Spikes (MS) and Laboratory Control Spikes (LCS) (see 4.b below) with the additional criteria that the results may also be acceptable if the two results cross at the 2-sigma uncertainty level (as described in the AREVA NP Environmental Laboratory Quality Assurance Manual 100 and the equation below).

      Duplicate/Split Sample Results are Acceptable if:

      (Result 1 – Result 2) $\leq$ (2-sigma Unc. Result 1 + 2-sigma Unc. Result 2)

   b. LCS/MS samples shall be evaluated for acceptability by determining the Relative Percent Difference (RPD), or Bias, in accordance with the following calculation:

      RPD/Bias = ((analysis result –known value)/ known value) *100

      The resultant RPD value is then compared to the limits specified in the table below.

Radionuclide/Category	Bias Acceptance Criteria for Samples 1-10 Times MDC	Bias Acceptance Criteria for Samples >10 Times MDC
Tritium	30%	15%
Gamma Emitters	25%	20%
Beta Only (except Sr-90)	60%	30%
Sr-90	30%	20%
Alpha Emitters	60%	30%

c. Analytical Blanks (AB) shall be evaluated using the acceptance limit stated in the AREVA NP Environmental Laboratory Quality Assurance Manual 100, that is, the reported value shall be less than 3 times the stated 1-sigma uncertainty.

d. For any Quality Control value listed above that fails to meet the stated acceptance limit, an explanatory note shall be provided in the QC Summary Report for the specific batch.

5. The sample turnaround time will not start until all samples are received and accepted for analysis.

Entergy Indian Point Approval of Batch QC Protocol

Patrick Donahue
Signature

Date 2/1/07

PATRICK DONAHUE
Print Name