Entergy	IPEC SITE MANAGEMENT MANUAL	QUALITY RELATED ADMINISTRATIVE PROCEDURE	IP-SMM-CY-110	Revision 5
		INFORMATIONAL USE	Page 1 of 25	

Title: **Radiological Ground Water Monitoring Program**

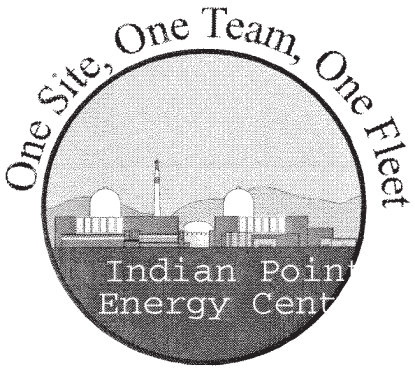
Reviews	Required
Cross Discipline Review	Yes
Code Reviews:	
10CFR50.59 Review	Yes
10CFR50.54 Review	No
On-Site Safety Review Committee Reviews	

Procedure Owner: Daniel Wilson / Chemistry Manager
Print Name / Title

Approved: _____ 2/9/11
Procedure Owners Signature (Date)

Approved _____ 3/3/11
IPEC Site VP/Designee Signature (Date)

Effective Dates: 3.9.11 (IP2) 3.9.11 (IP3)



New Procedure/Revision/Cancellation Basis:

This procedure was revised to:

- Revised Attachment 10.6; monitoring wells MW-66 and MW-67 were incorrectly placed into row 3 instead of row 4 of the table in Attachment 10.6.

TABLE OF CONTENTS

1.0 PURPOSE

This procedure establishes the objectives, organizational roles and responsibilities, and the program elements and requirements for the Radiological Groundwater Monitoring Program (RGWMP), in keeping with NEI 07-07, Industry Ground Water Protection Initiative.

2.0 PRECAUTIONS AND LIMITATIONS

Caution should be exercised when formulating actions based upon the indicator radionuclides; Tritium (H-3) or Strontium-90 (Sr-90) with results below 500 pCi/L or below 1 pCi/L, respectively. Results at these levels can be observed due to statistical counting errors, laboratory analysis or chemical separation errors, trace level cross contaminations, local deposition from monitored atmospheric plant releases, or from background levels of these radionuclides in precipitation, drinking water and surface water in the natural environment. Re-analysis, re-sampling, and trending over several data points should be initiated to confirm ground water contamination prior to making notifications or taking more aggressive actions based upon such results.

There are no potable water wells on the Indian Point Energy Center (IPEC) site. Additionally, as per ODCM Part II, Section 2.4.1, there is no potable water effluent pathway from IPEC. Subsequently, offsite dose calculations from IPEC do not include an exposure from ingestion of drinking water.

3.0 REFERENCES

3.1 Entergy Letter NI-06-033, Current Status/Future Plans Regarding Onsite Groundwater Contamination At IPEC, Fred Dacimo, Site Vice President, Indian Point Energy Center.

3.2 NRC Information Notice 2006-13, Ground-Water Contamination Due To Undetected Leakage of Radioactive Water.

3.3 10CFR §50.75(g), Reporting and Recordkeeping for Decommissioning Planning.

3.4 NRC Information Notice 2004-05 Spent Fuel Pool Leakage to Onsite Ground Water.

3.5 NEI Industry Ground Water Protection Initiative – Final Guidance Document, August 2007.

3.6 EN-CY-109, Sampling and Analysis of Ground Water Monitoring Wells.

3.7 GZA-IP-001, Radiological Groundwater Monitoring Program Quality Assurance and Procedures.

3.8 EN-RP-113, Response to Contaminated Spills/Leaks.

3.9 Analytical Data Management System (ADMS) ground water database by Radiation Safety and Control Services, Inc.

3.10 EN-DC-343, Buried Piping and Tanks Inspection and Monitoring Program.

4.0 DEFINITIONS

4.1 Boundary Monitoring Well – A ground water well located and used to provide early detection of licensed radioactive material prior to transport to adjacent properties via ground water.

4.2 Containment – An action or engineered control to limit the spread or migration of a contaminant.

4.3 Monitoring Well – A borehole drilled in the earth and lined, either partially or entirely, with a casing to stabilize and isolate one or more sections of the borehole.

4.4 Indicator Radionuclides - Specific radionuclides that are selected for monitoring, based upon their abundance in a source-term, migration characteristics in ground water, or their potential for adverse impact, which can be used to indicate the general nature and extent of ground water contamination or detect leaks from a structure or component containing radioactive fluids.

4.5 Investigation/Characterization – Sampling, tests and evaluations initiated when radioactive ground water contamination is suspected or has been identified to determine the source(s) of contamination, determine the locations, extent and concentrations of ground water contamination and/or to further study the hydrogeology of the effected area.

4.6 Investigation Level - the concentration of a specified radionuclide as detected in a specific ground water monitoring well that will initiate an evaluation or other actions.

4.7 Minimum Detectable Concentration – An a posteriori estimate of the minimum net activity level that can be measured reliably by a particular system or technique under a given set of conditions. It is the net concentration that has a 95% chance of being detected. It is an estimate of the detection capability of a measuring protocol and is calculated after measurements are taken. MDC is the detection limit expressed as an activity concentration. If the activity concentration in a sample is equal to the MDC, then there is a 95% chance that radioactive material in the sample will be detected.

4.8 Positive Detection- A radionuclide is positively detected when the analytical result for a given radionuclide is determined to be greater than or equal to 3 times the 1-sigma sample uncertainty.

4.9 River Front Monitoring Well – A ground water well used to monitor the concentrations and total activity of licensed radioactive material released to the Hudson River via ground water.

4.10 SSC - systems, structures, or components that contain or could contain licensed material and for which there is a credible mechanism for the licensed material to reach ground water. SSCs are site specific.

4.11 Stake Holder – A non-regulatory individual or group with an official capacity or responsibility for the welfare of the community and a desire to be involved in environmental issues.

4.12 Substantial on-Site Construction/Disturbance of Site Property- refers to the likelihood that the construction or disturbance has affected the subsurface flow of ground water.

4.13 Voluntary Communication – A communication made in accordance with NEI 07-07.

5.0 RESPONSIBILITIES

5.1 CHEMISTRY MANAGER OR DESIGNEE

5.1.1 Has ultimate responsibility for the Radiological Ground Water Monitoring Program (RGWMP).

5.1.2 Ensures adequate funding and resources to implement the RGWMP.

5.1.3 Designates key individuals to implement the program.

5.1.4 Approves Annual Ground Water Monitoring Program Reports.

5.2 CHEMISTRY SPECIALIST

5.2.1 Responsible for coordinating staffing, equipment and services required to support the RGWMP. Duties include:

- Procurement of hydrogeological and analytical laboratory services
- Installation and maintenance of ground water wells
- Maintenance and procurement of sampling and monitoring instrumentation and equipment
- Conduct of sampling activities, and data collection, review, evaluation and reporting.
- Estimates ground water budget annually to support staffing, equipment and services

5.2.2 Maintains a listing of ground water well status and type.

5.2.3 Maintains records of ground water well inspections.

5.2.4 Maintains documentation for RGWMP wells specifying minimum sampling and analysis frequencies. As a minimum the following should be specified:

- Well designator (e.g. MW-30-69)
- Frequency at which each location is to be sampled (e.g., quarterly, semi-annually, annually, etc.)
- Required analyses (e.g. H-3, gamma spectroscopy, Sr-90, transuranics) and Minimum Detectable Concentrations (MDC's) for each analysis.

5.2.5 Coordinates split samples with NY State and NRC as necessary.

5.2.6 Maintains and approves changes to ground water monitoring program procedures, training and Technical Information Documents.

5.2.7 Annually review the RGWMP sampling wells, frequencies and required analyses for changes.

5.2.8 Annually perform a review of existing station or contract lab(s) analytical capabilities including MDC/LLD and the time needed to obtain results.

5.2.9 Organizes and schedules sampling to meet project objectives.

5.2.10 Performs data review.

5.2.11 Performs or provides support for performance of technical evaluations, assessment reports and calculations.

5.2.12 Identifies and reports results above investigation levels. The Radiation Protection Manager (RPM) is consulted and communication is through EN-RP-113, Response to Contaminated Spills/Leaks.

5.2.13 Prepares Annual Ground Water Monitoring Program Reports.

5.2.14 Responsible for maintenance and administration of the ground water data management system.

5.3 CHEMISTRY SUPERVISOR

5.3.1 Designates individuals to fill positions of Ground Water Sampling Technician(s).

5.3.2 Supervises Ground Water Sampling Technicians.

5.3.3 Schedules and plans sampling events in accordance with the frequencies specified by the Chemistry Specialist.

5.4 GROUND WATER SAMPLING TECHNICIAN(S)

5.4.1 Collects samples in accordance with approved procedures.

5.4.2 Delivers samples to on-site laboratory, shipping and storage areas as directed.

5.4.3 Decontaminates and maintains sampling equipment and supplies as directed.

5.4.4 Logs and documents sample collection information as directed.

5.5 RADIATION PROTECTION MANAGERS OR DESIGNEE:

5.5.1 Responsible for the reporting requirements per EN-RP-113, Response to Contaminated Spills/Leaks.

5.5.2 Responsible for ensuring that records of leaks, spills, and remediation efforts are retained and are retrievable to meet the requirements of 10CFR §50.75(g), Reporting and Recordkeeping for Decommissioning Planning.

5.6 ENGINEERING DIRECTOR OR DESIGNEE:

5.6.1 Responsible for identifying site specific SSCs and existing leak detection methods as per EN-DC-343, Buried Piping and Tanks Inspection and Monitoring Program (Reference 3.10).

5.6.2 Responsible for periodic review identifying site specific SSCs and leak detection methods, per Reference 3.10.

5.6.3 Notifying Chemistry of any deficiencies in buried or partially buried piping and tanks that, if degraded, could provide a path for radioactive contamination of groundwater, per Reference 3.10.

5.7 MAINTENANCE MANAGER OR DESIGNEE:

5.7.1 Monitoring Well Maintenance, including:

5.7.2 Maintaining the exterior of the well and well vault (if equipped),

5.7.3 Maintain the well visible and protected,

5.7.4 Maintain access to the well (shoveling or mowing a path to the well)

6.0 DETAILS

6.1 OVERALL OBJECTIVES AND REQUIREMENTS

6.1.1 Procedures, staffing and equipment shall be maintained to monitor, investigate and characterize contamination of ground water with licensed radioactive material at Indian Point Energy Center (IPEC).

6.1.2 Monitoring activities shall be performed to accomplish one or more of the following objectives:

- Monitor the status of any known radiological ground water plumes.
- Detect and quantify previously unidentified sources of ground water contamination such as a spill or leak from a radioactively contaminated system, structure or component.
- Provide data to calculate potential doses to a member of the public.
- Monitor and evaluate the long term effectiveness of remediation or intervention actions.

6.1.3 Investigation/characterization activities are performed to evaluate and understand ground water contamination once it has been identified or an event such as a spill or leak with the potential to contaminate ground water to levels above the investigation levels has occurred. Investigation/characterization activities are conducted to accomplish one or more of the following objectives:

- Determine the source(s) of ground water contamination (e.g., leaking radioactive components or systems, radioactive spills or legacy soil or bedrock contamination.
- Determine the locations, extent and concentrations of ground water contamination (e.g., define the plume).
- Evaluate necessary corrective/investigative actions, utilizing the Corrective Action Program.

6.2 GROUND WATER WELL SYSTEM MANAGEMENT

6.2.1 Ground water system wells will provide one or more functions:

- Provide long term monitoring/sampling capabilities.
- Provide near term investigative/characterization sampling capabilities.
- Collect hydro-geological data (e.g., water table levels, flows, etc.)
- Support tests such as dye injection or draw down tests
- Support remediation, containment or intervention activities.

6.2.2 Hydrological data required to support the RGWMP shall be maintained in electronic or hard copy form as a plant record.

6.2.3 Maintain a list of monitoring wells, with their purpose and status. Attachment 10.1 is the current active RGWMP monitoring location list. Attachment 10.2 is the current inactive RGWMP monitoring location list.

6.3 WELL MAINTENANCE AND INSPECTION:

6.3.1 Periodic evaluations of well instrumentation (such as transducers) used to provide hydrological data supporting the RGWMP.

6.3.2 Periodically perform a visual inspection of surface facility, borehole, and any pulled components. This should include:

- The concrete pads should be inspected for cracks, separation from well, and heaving.
- The surface casing should be inspected for cracks or damage.
- Traffic cover (for flush-mounted wells) should be inspected for fit, cracks, and leaks.
- Locks, if equipped, should be serviceable and prevent unauthorized entry into the well.

6.3.3 Sample pump performance and the hydraulic performance of a well should be observed in response to pumping at the time of sampling.

6.3.4 Any discrepancies noted should be addressed and documented by the site corrective action program.

6.4 SAMPLE SCHEDULE AND PLANNING

6.4.1 Sampling and analysis of wells shall be performed to meet the objectives of the RGWMP.

6.4.2 Routine sampling will normally be initiated at the beginning of each quarter (e.g. January, April, July and October).

6.4.3 Attachment 10.3 is the current RGWMP sampling locations and schedule with the analysis suites.

6.5 GROUND WATER SAMPLE COLLECTION AND ANALYSIS

6.5.1 Ground water sample collection, handling and tracking for RGWMP well samples shall be performed in accordance with GZA's Standard Operating Procedures, Reference 3.7.

6.5.2 IF a sample cannot be collected during the sampling event due to such factors as no water or obstructions preventing access to the well, THEN document the condition in the field log book or equivalent.

6.5.3 Samples are normally sent to an approved off-site laboratory for analysis; however, analysis by the onsite Chemistry Department laboratory may also be utilized.

6.5.4 Attachment 10.4 lists the routine offsite laboratory analysis Minimum Detectable Concentrations (MDCs) for the principle plant-related radionuclides. MDCs for plant-related gamma emitters are typically equal to those specified in the Offsite Dose Calculation Manual. On-site analysis of samples for H-3 will typically have an MDC of approximately 700 pCi/L.

6.6 SOIL SAMPLE COLLECTION AND ANALYSIS IN SUPPORT OF THE RGWMP

6.6.1 Soil samples taken in support of the RGWMP shall be collected at locations, frequencies and volume as dictated by the Chemistry Specialist based on the objective of the soil sampling.

6.6.2 Attachment 10.5 lists the minimum MDCs for the principle plant-related radionuclides.

6.7 TRANSDUCER DATA COLLECTION AND ANALYSIS

6.7.1 Transducer data shall be collected to provide ongoing confirmatory data that demonstrate substantial changes to the on-site groundwater flow field have not taken place.

6.7.2 Transducer data shall be collected at the locations and frequencies listed in Attachment 10.3, RGWMP Sampling Schedule and Analysis Suites.

6.8 DATA REVIEW AND MANAGEMENT

6.8.1 Review incoming sample results to verify the following as a minimum:

- All required analyses for each sample have been performed.
- All required Minimum Detectable Concentrations have been met.
- All QC sample results are satisfactory.

6.8.2 Import the results into the Analytical Data Management System (ADMS) ground water database.

6.8.3 Review the results for:

- Any unusual results (e.g. very high or very low results).
- Any unexpected results (e.g. radionuclides not detected before).

6.8.4 Compare results to the investigation levels identified in Attachment 10.6. IF the sample result exceeds the associated investigation level THEN initiate a condition report and consider the following:

- Review well data trends over longer periods of time.
- Review recent Condition Reports for spills, incidents and work practices in nearby areas.
- Review recent rainfall data and possibility of downwash
- Evaluating the potential to change the off-site dose analysis.
- Increasing sample frequency in affected and down-gradient wells.

6.8.5 The following actions should be implemented as appropriate:

- Contact the laboratory to assure that all QC checks were satisfactory, sufficient sample volume was used, required MDC's were met, etc.
- Re-sampling to verify the result the original result.
- Increased frequency of sampling at affected and down-gradient wells.
- Initiation of an investigation utilizing the corrective action program and related resources as appropriate (e.g. site engineering / radiation protection)
- Initiation of source/ground water remediation techniques commensurate with the potential dose impact analyses and good environmental stewardship.

6.8.6 Once per quarter perform a review of other site programs that can provide additional information on systems that can affect ground water. This review should include the following systems:

- Ground water sample results,
- Storm Drain sample results,

- IE Bulletin 80-10 reports,
- Operational history
- Spill Reports,
- System Chemistry & Activity
- Notifications, Evaluations and Communication

6.8.7 Document this completed review in Attachment 10.7 RGWMP Quarterly Integrated Review Checklist.

6.9 GROUND WATER PROGRAM DATA COMPILATION

6.9.1 Sample data shall be compiled, organized and reviewed annually as a minimum to:

- Analyze for increasing or decreasing trends at individual sample points, wells or groups of wells. Include a review of seasonal and rainfall related fluctuations.
- Review the radionuclides detected to determine whether changes should be made to the analysis suites or sampling frequencies for each sampling location
- Evaluate the locations of radionuclides in ground water to determine if changes should be made to the sampling locations
- Review current investigation levels and determine if changes should be made

6.9.2 An annual summary report of ground water program activities and results shall be prepared. This report shall be reviewed and approved by the Chemistry Manager. As a minimum this report shall contain the following:

- Description of program objectives and activities conducted during the course of the year
- Summarize any new hydro-geologic data obtained and tests performed during the previous year.
- Summary of ground water sample results and trends observed
- Quantification of any spills, leaks or any other new sources of ground water contamination observed during the course of the year
- Determination of the new investigation levels for the next year (Attachment 10.6)
- Recommendations for future ground water monitoring

6.10 STAKEHOLDER BRIEFINGS

6.10.1 Briefings about the IPEC RGWMP shall be periodically conducted with the State/Local officials.

6.10.2 IPEC will coordinate these communications with other licensees in New York State.

6.10.3 The briefing should discuss:

- The background or industry events that led to the ground water monitoring program.
- Any additional information that the State/Local officials need to better understand the issue or place it in perspective for their constituents.
- "How" the State/Local officials will use or distribute the information.

6.11 VOLUNTARY COMMUNICATIONS

NOTE

Attachment 10.9, Spill/Leak and Ground Water Sample Result Reporting Criteria, contains a decision making flow chart to assist in determining voluntary reportability.

6.11.1 Voluntary notification of spills and leaks from radioactive or potentially radioactive systems is performed in accordance with Procedure EN-CY-113, Response to Contaminated Spills/Leaks.

6.11.2 IF any of the following events occur, THEN verify that the documentation and communication protocols outlined in EN-RP-113 are implemented:

- A confirmed water sample result from an offsite groundwater or surface water location exceeds the REMP reporting criterion for water as outlined in the ODCM.
- A confirmed water sample result from an onsite groundwater monitoring well or surface water that is hydro-logically connected to onsite groundwater exceeds the REMP reporting criterion for water as outlined in the ODCM.

6.11.3 Communication considerations:

- Communicating to the stakeholders if the results identify newly detected short lived radionuclides indicating a new leak, an increase in the potential offsite dose that could approach 1 percent of the limit or confirmed elevated levels at a boundary well.
- Any notification made to stakeholders or a regulatory agency shall be documented.
- Ensure NRC and DEC are notified prior to stakeholder notification.
- Ensure any reporting requirements to the NRC are evaluated.
- Ensure any REMP reporting requirements are evaluated.

6.12 REPORTS & REVIEWS

6.12.1 30-Day Reports

NOTE

There are no potable water wells on the IPEC site.

- Submit a written 30-day report to the NRC for any water sample result for on-site ground water that is or may be used as a source of drinking water that exceeds any of the criteria in the licensee's existing REMP as described in the ODCM for 30-day reporting of off-site

water sample results.

- The 30-day special report should include:
  - A statement that the report is being submitted in support of the RGWMP,
  - A list of the contaminant(s) and the verified concentration(s),
  - Description of the action(s) taken,
  - An estimate of the potential or bounding annual dose to a member of the public,
  - Corrective action(s), if necessary, that will be taken to reduce the projected annual dose to a member of the public to less than the limits in 10 CFR 50 Appendix I.
- All written 30-day NRC reports generated by this section are to be concurrently forwarded to State/Local officials as designated by Communications.

6.12.2 Annual Radiological Environmental Operating Report (AREOR)

- The Chemistry Specialist shall ensure that the sample results obtained from REMP wells listed in the Offsite Dose Calculation Manual (ODCM) are provide to the Radiological Environmental Monitoring Program (REMP) contact for inclusion in the Annual Radiological Environmental Operating Report (AREOR).
- The Chemistry Specialist shall review ODCM Part I, Section D5.6, to ensure the AREOR report includes all necessary aspects of the RGWMP.

6.12.3 Annual Radiological Effluent Release Report (ARERR)

- The Chemistry Specialist shall ensure that the sample results obtained from non-REMP ground water monitoring wells are provided to the Radiological Effluent Controls contact for inclusion in the Annual Radiological Effluent Release Report (ARERR).
- The Chemistry Specialist shall review ODCM Part I, Section D5.6, to ensure the ARERR contains all necessary information regarding the RGWMP.
- The Chemistry Specialist shall review the following (at a minimum) for inclusion in the report:
  - A listing of non-REMP wells and a summary of pertinent sample results from the RGWMP.
  - An estimate of the doses to a member of the public associated with off-site releases of licensed radioactive material via storm water and groundwater.

6.12.4 SSC & Work Practice Review

- Every five years, perform a periodic review of the site SSCs and work practices that involves or could involve licensed material and for which there is a credible potential for inadvertent releases to ground water.
  - Only those SSCs that have a credible potential for releasing radioactive liquid to soil or groundwater need be considered in this evaluation. Examples of SSCs of concern include, but are not limited to, radwaste systems, sumps and drains, spent fuel storage pools and leak detection systems, and secondary systems.

Identify the SSCs of concern and evaluate their applicable components, their locations, their age, and their current physical condition.

- Work practices shall be evaluated to assess their potential for contributing to groundwater contamination. Only those work practices that have a credible potential for causing or allowing the release of radioactive liquid to soil or groundwater need be considered in this evaluation.

6.13 GROUND WATER REMEDIATION AND DECISION MAKING PROCESS

NOTE

IPEC is presently utilizing monitored natural attenuation (MNA) as the remediation method for both the Unit 1 and the Unit 2 plumes.

6.13.1 Remediation of Existing Radioisotope Plumes at Unit 1 and Unit 2

- Contaminant source control and elimination of the ongoing leakage through corrective actions at Unit 1 and Unit 2 has been completed.
- Implementation of long-term ground water and SSC monitoring.
- Use of MNA has been selected as the remediation method.
- Performing long-term monitoring of contaminant plumes and verification of decreasing trends.

6.13.2 IF current remediation methods are ineffective OR new remediation efforts are required, THEN the following should be considered to determine the most effective remediation strategy:

- The location of the leak/spill and size or extent and movement of the contaminant plume.
- The dose to members of the public from the leak or spill using realistic exposure scenarios.
- The potential for detectable levels of licensed material resulting from planned releases of liquids and/or airborne materials.
- The decommissioning impacts resulting from remediation activities or the absence thereof.

6.13.3 Provide information to Radiation Protection for proper documentation of any remediation efforts to meet the requirements of 10 CFR 50.75(g)

6.13.4 A list of potential mitigating actions is contained in attachment 10.8, Potential Mitigating Actions.

6.14 SITE HYDROGEOLOGIC STUDIES REVIEW

6.14.1 A periodic review of site hydro-geologic studies should be conducted every 5 years or as a minimum, reviews should be performed whenever any of the following occurs: [Reference 6.5]

- Substantial on-site construction,
- Substantial disturbance of site property,
- Substantial changes in on-site or nearby off-site use of water, or
- Substantial changes in on-site or nearby off-site pumping rates of ground water.

6.15 PROGRAM SELF ASSESSMENTS

6.15.1 An independent, knowledgeable individual(s) shall perform the initial self-assessment within one year of implementation and no later than December 31, 2008. [Reference 3.5]

6.15.2 Perform periodic self-assessment of the RGWMP at least once every 5 years after initial self-assessment in step 6.16.1. [Reference 3.5]

6.15.3 The self-assessment, at a minimum, shall include evaluating implementation of all of the objectives identified in NEI 07-07, Industry Ground Water Protection Initiative. [Reference 3.5]

6.15.4 The self-assessment shall be documented consistent with applicable station procedures and programs. [Reference 3.5]

6.16 REVIEW OF THE PROGRAM UNDER THE AUSPICES OF NEI

6.16.1 An independent, knowledgeable individual(s) shall perform the initial review within one year of the initial self-assessment performed per step 6.16.1. [Reference 3.5]

6.16.2 Periodic review of the RGWMP should be performed every 5 years, subsequent to the license's periodic self-assessment performed per step 6.16.2. [Reference 3.5]

7.0 INTERFACES

7.1 NONE

8.0 RECORDS

8.1 RECORDS

Records generated by this procedure shall be retained in accordance with the Indian Point Records Retention Schedule. They include:

8.1.1 Radiological Ground Water Monitoring Program reports

8.1.2 Records of well inspections and maintenance

8.1.3 Lists of wells types and sampling frequencies

8.1.4 Self assessments

8.2 DOCUMENTATION

NONE

9.0 REQUIREMENTS AND COMMITMENTS CROSS-REFERENCE

NEI-07-07	Procedure	NEI 07-07	Procedure
Objective 1.1.d	6.14	Objective 2.3.a	10.4
Objective 1.2.g	6.12.4	Objective 2.3.b	6.12.1
Objective 1.3.c	6.5, 6.6, 10.4, 10.5	Objective 2.3.c	6.12.1
Objective 1.3.d	ALL	Objective 2.4.b	6.12.2
Objective 1.3.e	5.2.8	Objective 2.4.c	6.12.3
Objective 1.3.f	5.7, 6.3	Objective 3.1.a	6.15.1
Objective 1.3.g	6.15.2	Objective 3.1.b	6.15.2
Objective 1.4.a	6.13, 10.8	Objective 3.1.c	6.15.3
Objective 1.4.c	6.13	Objective 3.1.d	6.15.4
Objective 2.1.b	6.10	Objective 3.2.a	6.16.1
Objective 2.2.a – e	6.11	Objective 3.2.b	6.16.2

10.0 ATTACHMENTS

10.1 Active RGWMP Monitoring Locations

10.2 Inactive RGWMP Monitoring Locations

10.3 RGWMP Sampling Schedule and Analysis Suites

10.4 RGWMP Ground Water Radionuclide Analysis MDCs

10.5 RGWP Soil Radionuclide Analysis MDCs

10.6 RGWMP Investigation Levels

10.7 RGWMP Quarterly Integrated Review Check

10.8 Potential Mitigating Actions

10.1 ACTIVE RGWMP MONITORING LOCATIONS

Sampling Location	Purpose / Comments	Status
LAF-002	Boundary Monitoring / Off-site / REMP	Active
MW-30	U2 plume Mon. / U2 SFP Leak Detection	Active
MW-31	U2 plume Mon. / SSC Leak Detection	Active
MW-32	U2 plume Mon. / SSC Leak Detection	Active
MW-33	U2 plume Mon. / SSC Leak Detection	Active
MW-35	U2 plume Mon. / SSC Leak Detection	Active
MW-36	U1 / U2 Plume Monitoring	Active
MW-37	U1 / U2 Plume Monitoring	Active
MW-39	U3 SSC Leak Detection	Active
MW-40	Boundary Monitoring well	Active
MW-41	U3 SSC Leak Detection	Active
MW-42	U1 plume Monitoring	Active
MW-43	U3 SSC Leak Detection	Active
MW-44	U3 SSC Leak Detection	Active
MW-45	U3 SSC Leak Detection	Active
MW-46	U3 SSC Leak Detection	Active
MW-49	U1 / U2 Plume Monitoring	Active
MW-50	U1 / U2 Plume Monitoring	Active
MW-51	Boundary Monitoring well	Active
MW-52	U2 SSC Leak Detection	Active
MW-53	U1 Plume Monitoring	Active
MW-54	U1 Plume Monitoring	Active
MW-55	U1 / U2 Plume Monitoring	Active
MW-56	U1 Plume Monitoring	Active
MW-57	U1 Plume Monitoring	Active
MW-58	U3 Plume Monitoring	Active
MW-60	Boundary Monitoring / River Front	Active
MW-62	Boundary Monitoring / River Front	Active
MW-63	Boundary Monitoring / River Front	Active
MW-66	Boundary Monitoring / River Front	Active
MW-67	Boundary Monitoring / River Front	Active
MW-111	U2 plume Mon. / SSC Leak Detection	Active
MW-107	Background - NRC Commitment	Active
MH-5	U2 SFP / SSC Leak Detection	Active
B-1	U3 SSC Leak Detection	Active
B-6	U3 SSC Leak Detection	Active
I-2	Boundary Monitoring	Active
U1-CSS	U1 SSC Leak Detection	Active
U3-4D	U3 SSC Leak Detection	Active
U3-4S	U3 SSC Leak Detection	Active
U3-T1	U3 SSC Leak Detection	Active
U3-T2	U3 SSC Leak Detection	Active

10.2 INACTIVE RGWMP MONITORING LOCATIONS

Sampling Location	Purpose / Comments	Status
U3-1	U3 SSC Leak Detection	Inactive
U3-2	U3 SSC Leak Detection	Inactive
U3-3	U3 SSC Leak Detection	Inactive
MW-34	U2 SSC Leak Detection	Inactive
MW-38	River Front Monitoring	Inactive
MW-47	U1 SSC Leak Detection	Inactive
MW-48	River Front Monitoring	Inactive
MW-59	U3 SSC Leak Detection	Inactive
MW-65	U1 SSC Leak Detection	Inactive
LAF-001	Boundary Monitoring / Off-site	Inactive
LAF-003	Boundary Monitoring / Off-site	Inactive

10.3 RGWMP SAMPLING SCHEDULE AND ANALYSIS SUITES

Sampling Location	Transducer Sampling Frequency	Ground Water Sampling Frequency	Analysis Suite			
			H-3	^{90}Sr	Gamma Spec	Ni-63
LAF-002		Semi-Annual	X	X	X	X
MW-30	Quarterly	Quarterly	X	X	X	
MW-31		Quarterly	X	X	X	
MW-32		Quarterly	X	X	X	
MW-33		Annual	X	X	X	
MW-35		Annual	X	X	X	
MW-36		Quarterly	X	X	X	
MW-37		Quarterly	X	X	X	
MW-39		Semi-Annual	X	X	X	
MW-40	Quarterly	Quarterly	X	X	X	
MW-41		Quarterly	X	X	X	
MW-42		Quarterly	X	X	X	X
MW-43	Quarterly	Quarterly	X	X	X	
MW-44		Quarterly	X	X	X	
MW-45		Quarterly	X	X	X	
MW-46	Quarterly	Quarterly	X	X	X	
MW-49		Quarterly	X	X	X	X
MW-50		Quarterly	X	X	X	X
MW-51	Quarterly	Quarterly	X	X	X	
MW-52		Annual	X	X	X	
MW-53	Quarterly	Quarterly	X	X	X	X
MW-54		Quarterly	X	X	X	X
MW-55	Quarterly	Quarterly	X	X	X	X
MW-56		Semi-Annual	X	X	X	
MW-57		Annual	X	X	X	X
MW-58		Semi-Annual	X	X	X	
MW-60		Quarterly	X	X	X	
MW-62		Quarterly	X	X	X	
MW-63		Quarterly	X	X	X	
MW-65	Quarterly					
MW-66	Quarterly	Quarterly	X	X	X	X
MW-67	Quarterly	Quarterly	X	X	X	X
MW-107		Annual	X	X	X	
MW-111		Semi-Annual	X	X	X	
MH-5		Quarterly	X	X	X	
B-1		Quarterly	X	X	X	
B-6		Quarterly	X	X	X	
U3-4D		Quarterly	X	X	X	
U3-4S		Quarterly	X	X	X	
U3-C1	Quarterly					
U3-T1		Quarterly	X	X	X	
U3-T2		Quarterly	X	X	X	
U1-CSS		Semi-Annual	X	X	X	X
U1-NCD		Quarterly	X	X	X	X
U1-SFDS		Quarterly	X	X	X	X
I-2	Quarterly	Quarterly	X	X	X	
HR-1	Quarterly					

10.4 RGWMP GROUND WATER RADIONUCLIDE ANALYSIS MDCs

RADIONUCLIDE	MDC (pCi/L)	RADIONUCLIDE	MDC (pCi/L)
Gamma Emitters: [a]		**Beta Emitters:** [c]	
^{54}Mn	15	^{3}H	500 [d]
^{59}Fe	30	^{55}Fe	2200
^{58}Co	15	^{63}Ni	30 [e]
^{60}Co	15	^{89}Sr	140
^{65}Zn	30	^{90}Sr	2 [f]
^{95}Zr	30		
^{95}Nb	15	**Alpha Emitters:**	
^{131}I	1 [b]	Gross Alpha	15 [g]
^{134}Cs	15		
^{137}Cs	18		
^{140}Ba	60		
^{140}La	15		

[a] The gamma emitters and corresponding MDC values listed are derived from standard ODCM guidance for environmental water samples as found in Table 4.12-1 in NUREG-1301/1302.

[b] The MDC value of 1.0 pCi/L for I-131 is applicable only to groundwater used as a source of drinking water. If no drinking water pathway exists, a value of 15 pCi/L can be used.

[c] The beta emitters listed are based on common beta-emitting radionuclides observed through industry experience. The MDC values listed are based on a dose consequence of 1.0 mrem/yr total body dose from ingestion of 740 Liters of drinking water per year containing the nuclide at the specified MDC concentration.

[d] The MDC value of 500 pCi/L for tritium is derived by using 2.5% of the EPA drinking water standard, the analytical capabilities of the laboratory, the MDCs in use by the NYSDEC and the USNRC for split-sampling, and the ambient ground water tritium concentration.

[e] The MDC value of 30 pCi/L for ^{63}Ni is derived by using approximately 10% of the EPA drinking water standard and the analytical capabilities of the laboratory as documented in IPEC-CHM-08-009 dated 05/15/08.

[f] The MDC value of 2.0 pCi/L for Sr-90 is derived by using approximately 25% of the EPA drinking water standard and the analytical capabilities of the laboratory.

[g] The MDC value of 15 pCi/L for gross alpha is derived from EPA Drinking Water Maximum Contaminant Level and laboratory analytical capabilities.

10.5 RGWMP SOIL RADIONUCLIDE ANALYSIS MDCs

Radionuclide	MDC (pCi/Kg)	Radionuclide	MDC (pCi/Kg)
Gamma Emitters: [a]		**Beta Emitters:** [b]	
^{54}Mn	150	^{55}Fe	1,000,000
^{59}Fe	300	^{63}Ni	210,000
^{58}Co	150	^{90}Sr	170
^{60}Co	150		
^{65}Zn	300		
^{95}Zr	300		
^{95}Nb	150	**Alpha Emitters:** [b]	
^{131}I	150	^{238}Pu	250
^{134}Cs	150	^{239}Pu	230
^{137}Cs	180	^{241}Pu	7,200
^{140}Ba	600	^{241}Am	210
^{140}La	150	^{243}Cm	320

[a] The gamma emitters MDC values listed are derived from the Cs-134/137 10:1 ratio established in the environmental LLDs in NUREG-1301 and NUREG-1302, Table 4.12-1, Detection Capabilities for Environmental Sample Analysis.

[b] The beta and alpha-emitter MDC values are derived from the NRC Screening Values from NUREG-1757, "NRC Consolidated Decommissioning Guidance", Volumes 2, September 2006, Table H-2.

10.6 RGWMP INVESTIGATION LEVELS

WELL ID	H-3 (pCi/L)	SR-90 (pCi/L)	OTHER PLANT-RELATED RADIONUCLIDES
LAF-002	Any detection[1]	Any detection[1]	Any detection[1]
MW-40 MW-51 MW-52 MW-107	1000	2	Any detection[1]
MW-60 MW-62 MW-63	2000	2	Any detection[1]
All remaining wells	2 x average[2]	2 x average[2]	2 x average[2]

[1] A radionuclide is positively detected when the result is greater than or equal to 3 times the 1 sigma uncertainty.

[2] Any positively detected radionuclide that has a result greater than twice the average from the previous calendar year. Additionally, the investigation level is not reached until a minimum H-3 result of greater than 1000 pCi/L or a minimum Sr-90 result of greater than 2 pCi/L is detected.

General Note: The values of 1000 and 2000 pCi/L for H-3 and 2 pCi/L for Sr-90 have been chosen such that they are low enough to assure timely detection of any new release or change to an existing release and be outside the normal expected range of sample results at these locations.

10.7 RGWMP QUARTERLY INTEGRATED REVIEW CHECKLIST

Program	Item	Review/Comments
Monitoring Well Sample Data	*MW Sample Results* *MW Result Trends*	
Storm Drain Sample Data	*Storm Drain Activities* *Storm Drain Trends*	
IE Bulletin No. 80-10	*New 80-10 File Reports*	
Facility Operations	*Refueling Activities* *Spent Fuel Moves* *Construction Activities*	
Spills & Leaks	*Spill Reports* *Condition Reports* *10CFR50.75(g)* *EN-RP-113 Reports*	
System Chemistry & Activity	*SFP Chemistry* *RWST Chemistry* *RCS Activity*	
Other		

Quarter: _____ Reviewer / Date: _____

10.8 POTENTIAL MITIGATING ACTIONS

The following mitigating actions are listed to assist in the user in their consideration of future actions for a site with known groundwater contamination. Approval of local, state, and federal agencies is generally required prior to performing remediation.

- Repair the source of the leak/spill.
- Remediate the root cause of leakage through a major replacement or design change.
- Address the unanalyzed pathway.
- Remove contaminated soil within the source area.

- Initiate a program of Monitored Natural Attenuation.
  This relies on naturally-occurring processes such as dilution, dispersion, adsorption, and radioactive decay to reduce the concentration of radioactive contaminants over time. A groundwater monitoring program is essential to provide data to demonstrate the effectiveness of this approach. Use of this technique may be appropriate if a contaminant plume is generally in equilibrium, the risk to receptors is low, and contaminant concentrations are low enough so that applicable regulatory criteria can be achieved within a reasonable timeframe.

- Pump and treat (or release) near the source area.
  This approach should be used with caution because of the potential for re-distributing contamination. Groundwater flow should be well understood before employing this technique.

- Pump groundwater to intercept the plume before it advances to the site boundary.
  This approach should be used with caution because of the potential for re-distributing contamination. Groundwater flow should be well understood before employing this technique.

- Install grout curtains or sheet piling to create low-permeability boundaries which divert groundwater flow.
  This technique usually also requires pumping and treating of the intercepted plume.

- Initiate a program of phytoremediation.
  This technique uses vegetation to transpire groundwater and dissolved contaminants from the shallow subsurface. This technique results in a portion of the contaminant being released to the atmosphere and a portion accumulating in the plant tissue.

10.9 SPILL/LEAK AND GROUND WATER SAMPLE RESULT REPORTING CRITERIA