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FPL

JUL 31 2006

Mr. Stuart A. Richards, Deputy Director
Division of Inspection and Regional Support
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

L-2006-180

RE: Groundwater Protection – Data Collection Questionnaire

Dear Mr. Richards:

The nuclear industry, in conjunction with the Nuclear Energy Institute (NEI), has developed a questionnaire to facilitate the collection of groundwater data at commercial nuclear reactor sites. The objective of the questionnaire is to compile baseline information about the current status of site programs for monitoring and protecting groundwater and to share that information with NRC. The completed questionnaire provides historical information and does not address actions being taken in response to the NEI initiative on managing situations involving inadvertent radiological release into groundwater.

Attachment 1 provides the completed questionnaire for St. Lucie Units 1 and 2;
Attachment 2 provides the completed questionnaire for Turkey Point Units 3 and 4;
Attachment 3 provides the completed questionnaire for Seabrook Station; and
Attachment 4 provides the completed questionnaire for Duane Arnold Energy Center.

This submittal contains no new regulatory commitments.

If there are any questions regarding this letter, please contact Al Gould, Senior Staff Engineer, at (561) 694-4199.

Sincerely yours,

Rajiv S. Kundalkar

for J.A. Stall
Senior Vice President Nuclear and
Chief Nuclear Officer

Attachments: (4)

cc: USNRC Document Control Desk
USNRC Regional Administrator, Region I
USNRC Regional Administrator, Region II
USNRC Regional Administrator, Region III
USNRC NRR Project Manager, St. Lucie and Turkey Point
USNRC NRR Project Manager, Seabrook Station
USNRC NRR Project Manager, Duane Arnold Energy Center
USNRC Resident Inspector, St. Lucie
USNRC Resident Inspector, Turkey Point
USNRC Resident Inspector, Seabrook Station
USNRC Resident Inspector, Duane Arnold Energy Center
Ralph Andersen, Nuclear Energy Institute

ATTACHMENT 1

Questionnaire Response for St. Lucie Unit 1 and Unit 2

Industry Groundwater Protection Initiative
Voluntary Data Collection Questionnaire

Plant: St. Lucie Units 1 and 2

1. **Briefly describe the program and/or methods used for detection of leakage or spills from plant systems, structures, and components that have a potential for an inadvertent release of radioactivity from plant operations into groundwater.**

   a. Several groundwater monitoring and recovery wells are currently available and have recently been sampled for radioactivity. Analysis is in progress.

   b. Periodic sampling and analysis of the east and west settling basins surface water are performed. Sewage discharges are sampled.

   c. Routine and scheduled sampling and analysis of surface water as required by the radiological environmental monitoring program.

   d. Operations personnel perform leakage checks of plant systems during routine surveillances (rounds).

   e. Radiation Protection performs routine radiological surveys of plant structures and components to detect increased radiation levels, contamination levels, and to identify leaks/spills. Investigations and analyses are required by procedures.

   f. System Engineering performs routine system walk downs to assess system performance. One aspect of the walk down is to identify component leakage.

   g. The spent fuel pools leak detection system is routinely monitored for leakage by Operations personnel. Chemistry personnel evaluate any accumulated liquids from the leak detection collection points.

   h. The boric acid corrosion control program requires plant personnel to routinely inspect plant systems and components for leakage. The program documents leakage in the corrective action program and work management process.

   i. The plant radiation monitors detect leakage into non-radioactive systems, such as component cooling water, steam generator blowdown, and steam jet air ejectors.

Industry Groundwater Protection Initiative
Voluntary Data Collection Questionnaire

Plant: St. Lucie Units 1 and 2

2. Briefly describe the program and/or methods for monitoring onsite groundwater for the presence of radioactivity released from plant operations.

The current Radiological Environmental Monitoring Program (REMP) at the St. Lucie Plant does not include onsite or offsite groundwater wells. However, the St. Lucie Plant has historically performed quarterly groundwater monitoring from selected monitoring wells within the radiation controlled area (RCA) for Tritium and gross activity. Over time, the number of wells being sampled has been reduced based on results that have fallen below the lower limit of detection (LLD). Currently, one groundwater monitoring well within the RCA continues to be sampled quarterly for radioactivity. In addition, there are also a significant number of groundwater wells that have been installed onsite (inside and outside the RCA) at the St. Lucie Plant. A number of these wells are currently in use for non-radiological environmental monitoring. Samples from these monitoring wells are analyzed for radioactivity prior to their removal from the site. The detection limits for this monitoring have been based on meeting or exceeding the LLD values specified in the plant's Offsite Dose Calculation Manual (ODCM) under the program for liquid radioactive effluent releases.

A surface water sample is collected from the ocean shoreline immediately adjacent to the St. Lucie Plant under the REMP. Supplemental REMP water samples are also collected from a water body at the north end of the plant site and from the plant's discharge canal. The REMP laboratory's current detection capabilities are as follows:

Analysis/Nuclide	Detection Cabability Typical Water MDA (pCi/L)
Gross Beta	0.87
H-3	172
K-40	58
Mn-54	3
Co-58	3
Fe-59	6
Co-60	4
Zn-65	7
Zr-95	6
Nb-95	3
I-131	4
Cs-134	4
Cs-137	4
Ba-140	9
La-140	3

Industry Groundwater Protection Initiative
Voluntary Data Collection Questionnaire

Plant: St. Lucie Units 1 and 2

3. If applicable, briefly summarize any occurrences of inadvertent releases of radioactive liquids that had the potential to reach groundwater and have been documented in accordance with 10 CFR 50.75(g).

a. April 6, 1977 – Unit 1 refueling water tank (RWT) was overfilled, and approximately 3800 gallons of contaminated water was spilled onto the ground. An estimated 2856 gallons was released to the plant storm drains, which drain to a settling basin within the plant Protected Area. The total activity was estimated to be 3.27 curies (1.61 curies to the settling basin). Tritium activity was 7.3E-2 micro curies per milliliter.

b. June 15, 1993 – The Unit 1 RWT was found leaking, and approximately 55,141 gallons of water was spilled onto the ground. The total activity in the spilled water was 6.54 curies (6.5 curies of the activity was Tritium).

c. August 19, 1995 – The Unit 1 primary water tank (PWT) was overfilled, spilling an estimated 11,250 gallons of water onto the ground and partially, into the site storm drains. The total activity spilled was 3.94 curies, almost entirely Tritium.

d. July 20, 2000 – A leak in the 12C waste monitor tank occurred when painters inadvertently breached the integrity of the tank. Approximately 100 gallons of water was spilled onto the ground. Only Tritium was detected in the spill water, and the total Tritium activity was estimated to be 15 micro curies.

e. September 20, 2001 - Approximately 83 gallons of contaminated water leaked from a hose connected to the 1A waste monitor tank. The total activity spilled was estimated to be 2.31E-2 curies (predominantly Tritium).

f. February 8, 2002 – A Unit 1 resin dewatering hose became dislodged from a floor drain and spilled an estimated 15 gallons of water onto the ground (400 square feet). Approximately 5 gallons of the water went into the storm drains. The spilled water was found to be contaminated, but no gamma isotopic analysis was performed. The Tritium concentration in the water was 2.24E-2 micro curies per milliliter.

g. April 13, 2004 – Unit 1 RWT was overfilled spilling an estimated 2400 gallons of contaminated water to the ground and into the storm drain system. The total activity was approximately 0.481 curies, with 0.392 curies of Tritium.

h. September 5, 2005 - A line break occurred during the dredging of the discharge canal. Several cubic yards of discharge spoils (slurry of sand-like material and salt water) were discharged to an area by the Nuclear Training Center. The spoils accumulated at low points, flowed to storm drains, and followed designed drainage flow paths to a common discharge settling channel located northwest of the Nuclear Training Center. The spoils sediment was counted using gamma spectroscopy and determined to contain Co-58 (1.1E-8 micro curies per gram), Mn-54 (1.96E-8 micro curies per gram), and Cs-137 (1.4E-8 micro curies per gram). No detectable activity was found in the discharge canal water.

Industry Groundwater Protection Initiative
Voluntary Data Collection Questionnaire

Plant: St. Lucie Units 1 and 2

4. If applicable, briefly summarize the circumstances associated with any onsite or offsite groundwater monitoring result indicating a concentration in groundwater of radioactivity released from plant operations that exceeds the maximum contaminant level (MCL) established by the USEPA for drinking water.

Onsite Groundwater Monitoring Well Results		
Location	**Maximum Tritium Activity and Sample Date**	**Potential Source(s) of contamination**
Monitoring Well 1	161,000 pCi/l (April 10, 2000) Note: Well #1 Tritium <MDA since 10/9/01.	1977 Unit 1 RWT overfill (see 3.a.) 1993 Unit 1 RWT leak (see 3.b)
Monitoring Well 3	22,800 pCi/l (January 22, 1998) Note: Well #3 Tritium <MDA since 1/8/01.	1995 Unit 1 PWT overfill (see 3.c)
Monitoring Well 6	28,800 pCi/l (October 10, 2000) Note: Well #6 Tritium <MDA since 10/9/01.	1977 Unit 1 RWT overfill (see 3.a.) 1993 Unit 1 RWT leak (see 3.b)
Monitoring Well 9	109,000 pCi/l (January 22, 1998) Note: Well #9 Tritium <MDA since 1/8/01.	1977 Unit 1 RWT overfill (see 3.a.) 1993 Unit 1 RWT leak (see 3.b)
Monitoring Well 18D	25,100 pCi/l (June 26, 1998) Note: Well #18 Tritium <MDA since 8/12/05.	1977 Unit 1 RWT overfill (see 3.a.) 1993 Unit 1 RWT leak (see 3.b)

No offsite groundwater locations are sampled in the REMP.

Industry Groundwater Protection Initiative
Voluntary Data Collection Questionnaire

Plant: St. Lucie Units 1 and 2

5. **Briefly describe any remediation efforts undertaken or planned to reduce or eliminate levels of radioactivity resulting from plant operations in soil or groundwater onsite or offsite.**

   a. Corrective actions were taken to address previous spills/leaks. The most extensive of these involved the remediation of the Unit 1 RWT area. During this remediation effort, 92,360 pounds of soil was removed from the ground area adjacent to the Unit 1 RWT. The soil has been disposed of as radioactive waste.

   b. There are no additional remediation efforts currently in progress or planned at this time.

ATTACHMENT 2

Questionnaire Response for Turkey Point Unit 3 and Unit 4

Industry Groundwater Protection Initiative
Voluntary Data Collection Questionnaire

Plant: Turkey Point Units 3 and 4

1. **Briefly describe the program and/or methods used for detection of leakage or spills from plant systems, structures, and components that have a potential for an inadvertent release of radioactivity from plant operations into groundwater.**

   Programs and/or methods used for detection of leakage or spills from plant systems, structures and components that have a potential for an inadvertent release of radioactivity include:

   a. Routine radiation monitoring surveys of systems, structures, and components to detect increased radiation levels and potential spread of radioactive material.

   b. Periodic sampling and analysis of the storm drains in accordance with the radiological effluent monitoring program.

   c. Sampling and monitoring of surface water per the radiological environmental monitoring program. This includes the cooling canal intake and discharge, Biscayne Bay at the Turkey Point Nuclear Plant, Card Sound near the old discharge canal, and the Florida City canal northwest of the Turkey Point Nuclear Plant.

   d. Operations personnel perform routine surveillances during rounds to ensure proper operation and no abnormal leakage from systems. These rounds include the requirement to identify and report leaks and spills. Leaks and spills are addressed through immediate clean up, notifying supervision for assistance, writing a work request and/or initiating a condition report.

   e. Operational leak testing of selected radioactive systems are performed during each cycle to identify abnormal leakage under operational conditions.

   f. Plant system radiation monitors are located in systems, which have potential to become contaminated, based on a system leak. Examples include steam generator blow down monitors, component cooling water, and steam jet air ejector monitors. These monitors have set points based on detection of activity and are monitored routinely for trends.

   g. The spent fuel pool has an operational leak detection system, which is routinely monitored for leakage.

   h. System engineers perform monthly system walk downs to assess system performance and status. One of the requirements for the walk downs is to identify and report leaks and spills. Leaks and spills are addressed through immediate clean up, notifying supervision for assistance, writing a work request or initiating a condition report.

Industry Groundwater Protection Initiative
Voluntary Data Collection Questionnaire

Plant: Turkey Point Units 3 and 4

2. Briefly describe the program and/or methods for monitoring onsite groundwater for the presence of radioactivity released from plant operations.

- The current Radiological Environmental Monitoring Program (REMP) at the Turkey Point Nuclear Plant does not include monitoring of onsite groundwater wells for radioactivity. There are no onsite wells which are used to supply drinking or makeup water for plant operations. All potable and raw water used to by the plant is supplied through the local county water supply. Based on the hydrology and the potential for contamination of surface water, the monitoring is focused on the surface water. Monitoring for radioactivity is performed in accordance with the Radiological Effluents Monitoring Program and the REMP at the closed loop cooling canals intake and discharge; Biscayne Bay at the Turkey Point Nuclear Plant; Card Sound near the old discharge canal; the Florida City canal northwest of the Turkey Point Nuclear Plant; and routinely at the storm drain discharge.

- Samples analyzed under the Radiological Effluents Monitoring and Radiological Environmental Monitoring Programs meet the lower limits of detection prescribed in the respective programs.

- Typical minimum detectable activities (MDA) for water samples currently monitored under the Turkey Point Nuclear Plant REMP are provided below:

Analysis/Nuclide	Detection Capability Typical Water MDA (pCi/L)
Gross Beta	0.87
H-3	172
K-40	58
Mn-54	3
Co-58	3
Fe-59	6
Co-60	4
Zn-65	7
Zr-95	6
Nb-95	3
I-131	4
Cs-134	4
Cs-137	4
Ba-140	9
La-140	3

Industry Groundwater Protection Initiative
Voluntary Data Collection Questionnaire

Plant: Turkey Point Units 3 and 4

3. **If applicable, briefly summarize any occurrences of inadvertent releases of radioactive liquids that had the potential to reach groundwater and have been documented in accordance with 10 CFR 50.75(g).**

- October 21, 1975, 880 gallons of waste water stored in 55 gallon drums was inadvertently pumped into a storm drain from the Unit 4 Cask Wash Area. The water was from sludge, which was removed from the Waste Holdup Tank. This water was transferred to an underground drywell south of the plant. Analytical results of the sampling indicated that approximately 2.1 Curies of Co-58 / Co-60 was released through the storm drain system.

- November 6, 1975, the Unit 4 Spent Fuel Pit was identified leaking through a concrete wall, the leak rate was determined to be approximately 2 gallons per hour. Calculations identified that approximately 2960 gallons of water was absorbed by the ground. The total activity estimated for this spill was 240 mCi Co-58.

- September 11, 1978, the Unit 4 Spent Fuel Pit Cooling Pump seal failed which caused approximately 150 gallons to spill out to a paved area immediately outside of the room. The total activity released was estimated to be 0.0063 Curies of Co-60.

- August 16, 1988, the Unit 4 Spent Fuel Pit Cooling Pump leaked resulting in a spill of approximately 1460 gallons of which 6 to 7 gallons of water leaked into the storm drains. Concentration of the radioactivity in the liquid released was measured at 2.5 E-3 uCi/cc of Cs-137, 2.5 E-4 uCi/cc of Tritium and 2.2E-2 uCi/cc of Co-60.

- March 28, 1979, the Unit 3 Refueling Water Storage Tank leaked approximately 25 gallons into the soil from a level instrument line located on the tank. Total activity from the spill was 6.2 E-4 Curies.

- August 28, 1979, the Unit 4 Refueling Water Storage Tank valve misalignment caused the Unit 4 Spent Fuel Pit to fill and overflow. This resulted in approximately a 3000 gallon spill from the pit to the ground in the radiation controlled area (RCA). The activity released by the spill was 1.091 Curies and the water was contained to the area immediately adjacent to the SFP and drain system in the RCA.

- November 6, 1982, a spill from B Monitor tank occurred during the transfer of laundry water to the tank. Approximately 600 gallons of water spilled from the tank to the High Head Safety Injection (HHSI) Pump Room, Component Cooling Room and potentially to the storm drain system. Total activity estimated for the spill was 9.96E-5 Curies. Tank samples identified Co-58, Co-60, Cs-137, and Cs-134.

- August 21, 2003, a temporary pump for the Molybdate Tank leaked water to the ground on the north side of the radioactive waste building. Water samples taken in the area identified Co-60.

Industry Groundwater Protection Initiative
Voluntary Data Collection Questionnaire

Plant: Turkey Point Units 3 and 4

- May 10, 2005, a ¾-inch water hose used to fill the Unit 4 Reactor Cavity siphoned water from the cavity due to a valve that was left partially opened and spilled out near the Unit 4 Tendon Gallery. The total amount of water spilled was estimated at 5 gallons. Contamination identified in the area was between 200 and 1000 ncpm.

4. **If applicable, briefly summarize the circumstances associated with any onsite or offsite groundwater monitoring result indicating a concentration in groundwater of radioactivity released from plant operations that exceeds the allowable maximum contaminant level (MCL) established by the USEPA for drinking water.**

   There have been no identified instances of radioactivity released from the Turkey Point Nuclear Plant that resulted in groundwater concentrations exceeding the allowable USEPA maximum contaminant levels for drinking water.

5. **Briefly describe any remediation efforts undertaken or planned to reduce or eliminate levels of radioactivity resulting from plant operations in soil or groundwater onsite or offsite.**

   Currently there are no remediation efforts in progress or planned to further reduce or eliminate levels of radioactivity in the soil or ground water at the Turkey Point Nuclear Plant onsite or offsite. Corrective actions have been taken to address previous spills and routine monitoring is being performed as part of the radiological monitoring programs.

   In 1982, a request was approved by the NRC to allow certain contaminated earth to remain in place in the Radiation Controlled area (RCA). There is approximately 41,800 cubic feet of soil containing Co-60, Cs-134, and Cs-137 remaining in a 100' x 100' area in the southeast side of the RCA. At the time of approval, the soil was covered with a 5.5 ft overburden and the dose rates at one meter above the overburden were equal to background. Some migration of radionuclides may occur as a function of time but the rate of ground/surface water movement and final transference of nuclides to the environment was judged to be insignificant.

ATTACHMENT 3

Questionnaire Response for Seabrook Station

Industry Groundwater Protection Initiative
Voluntary Data Collection Questionnaire

Plant: Seabrook Station

1. **Briefly describe the program and/or methods used for detection of leakage or spills from plant systems, structures, and components that have a potential for an *inadvertent release of radioactivity from plant operations into groundwater.***

   - An operational groundwater sampling and monitoring system is in place. In 2005, 15 monitoring wells outside of the powerblock buildings were installed and are sampled on a routine basis.
   - Operations personnel perform routine observations of dewatering locations inside of the powerblock buildings and routine plant system checks for leaks during their periodic rounds.
   - Operations, Engineering, Radiation Protection, and Chemistry personnel are trained to look for and report leaks inside and outside of the powerblock.
   - The Corrective Action Program is utilized for reporting and trending any potential leakage.
   - The Radiological Environmental Monitoring Program samples are evaluated for radioactivity.
   - A piping integrity test was performed on the Waste Liquid discharge line.
   - The spent fuel/cask pit/transfer canal leakage detection system is monitored and maintained.
   - In 1999 and 2000, a root cause investigation was performed in response to the identification of Tritium in water in the Containment Annulus. This systematic investigation identified a leak in the spent fuel cask wash pit/transfer canal as discussed in question 3 below.

2. **Briefly describe the program and/or methods for monitoring onsite groundwater for the presence of radioactivity released from plant operations.**

   - Fifteen (15) monitoring wells (shallow and deep) are sampled on a routine basis. The well locations were based on site hydrology (most wells are placed down gradient, or to indicate potential plume movement). On occasion, samples could not be obtained due water table or inclement weather conditions.
   - Samples are drawn on a quarterly basis and utilize a Lower Limit of Detection (LLD) of approximately 600 pCi/liter for Tritium. The actual LLD is dependent upon the background activity present at the time the sample is counted.

Industry Groundwater Protection Initiative
Voluntary Data Collection Questionnaire

Plant: Seabrook Station

- Offsite town drinking water and a nearby offsite well are sampled periodically. There is no drinking water source onsite. Hydrology indicates flow away from any drinking water sources or offsite wells and there has been no indication of radioactivity in drinking water or offsite wells.

MDA Information

Nuclide	LLD (pCi/L)
H-3	600
Fe-55	200
Ni-63	25
Sr-90	5
Tc-99	200
Principal Gamma Emitters (1)	500
Note (1) Principal gamma emitters as listed in the ODCM: Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, Ce-141 and Ce-144	

3. **If applicable, briefly summarize any occurrences of inadvertent releases of radioactive liquids that had the potential to reach groundwater and have been documented in accordance with 10 CFR 50.75(g).**

   A 10 to 30 gpd leak was identified in the spent fuel cask wash pit/transfer canal area in 1999. Tritium was detected in subsurface water under the powerblock buildings. NRC, State and Local officials were previously informed of this condition. A weld repair and the application of a non-metallic liner completed in 2004 have stopped the leakage. Prior to the repair, these areas were often drained and kept in a dry state when operationally allowed to prevent further leakage.

4. **If applicable, briefly summarize the circumstances associated with any onsite or offsite groundwater monitoring result indicating a concentration in groundwater of radioactivity released from plant operations that exceeds the allowable maximum contaminant level (MCL) established by the USEPA for drinking water.**

   There have been no instances where radioactivity has been measured in groundwater on site or off site that exceeded the maximum contaminant level (MCL) established by the USEPA for drinking water.

Industry Groundwater Protection Initiative
Voluntary Data Collection Questionnaire

Plant: Seabrook Station

5. **Briefly describe any remediation efforts undertaken or planned to reduce or eliminate levels of radioactivity resulting from plant operations in soil or groundwater onsite or offsite.**

To control water that contains tritium below the "powerblock" buildings we have established two pumping practices.

1) Four dewatering wells located within the powerblock buildings:

- RHR B Vault, Elev. -61'
- Primary Auxiliary Building, Elev. 7'
- Emergency Feedwater Building, Elev. -26'
- Containment Annulus, Elev. -32'

These areas are pumped on a routine basis and monitored daily by Operations. The water from these wells are processed as radioactive effluents per our normal practices. Dewatering within the powerblock reduces the chance of tritium migrating outside the powerblock area.

2) Dewatering outside the powerblock buildings is generally not performed. This practice is to reduce the potential of creating a void in the groundwater table which would allow water that contains Tritium to be drawn outside the powerblock area. Pumping an area outside the powerblock buildings would be assessed on a case by case basis dependent on the need, and hydrological proximity.

These two practices are designed to prevent the migration of water that contains Tritium.

ATTACHMENT 4

Questionnaire Response for Duane Arnold Energy Center

Industry Groundwater Protection Initiative
Voluntary Data Collection Questionnaire

Plant: Duane Arnold Energy Center

1. **Briefly describe the program and/or methods used for detection of leakage or spills from plant systems, structures, and components that have a potential for an inadvertent release of radioactivity from plant operations into groundwater.**

The site's Radiological Environmental Monitoring Program includes several samples that are taken on site. These samples include:

- A quarterly sample for Tritium and gross beta from the common header to the four site wells.
- A monthly sample of the site's sewage plant liquid effluent. It is analyzed for gamma emitters and Tritium.
- Two samples per year of bottoms sediments from the north discharge canal. The samples are analyzed for gamma emitters.
- Monthly samples of precipitation are collected on site at the meteorological tower. The samples are analyzed for gamma emitters and composited for a quarterly analysis for Tritium.
- On an annual basis, soil samples are collected from two different locations on site. The samples are analyzed for gamma emitters and Strontium-90.

The site's Effluents Controls Program includes:

- Weekly sampling and analysis of circulating (condenser cooling) water for gamma emitters. Samples are composited and analyzed monthly for Tritium and gross alpha.
- Sampling and analysis of liquids from three non-radioactive liquid release points (Transformer Pit, CST Pit, Neutralizing Tank). Samples are analyzed for gamma emitters and Tritium.

Operations personnel perform routine surveillance rounds each shift. These rounds include the requirement to identify and report leaks and spills.

Operations personnel check the fuel pool liner "tell-tale" drains once per day. Any significant increase in volume would result in the initiation of corrective action.

Operational leak testing of radioactive systems are performed each cycle to identify abnormal leakage under operational conditions.

Industry Groundwater Protection Initiative
Voluntary Data Collection Questionnaire

Plant: Duane Arnold Energy Center

2. Briefly describe the program and/or methods for monitoring onsite groundwater for the presence of radioactivity released from plant operations.

The site's Radiological Environmental Monitoring Program includes well water monitoring activities. Samples are taken quarterly and analyzed for Tritium and gross beta. Sample locations include:

- The common header to the four site deep wells.

Additionally,

- Wells from two farms adjacent to the site.
- A well from a farm 2 miles to the SSE.
- City of Cedar Rapids well water.
- Results from the REMP program are included in the site's annual REMP report.

A project to install a shallow monitoring well system has been initiated. Results are expected in August 2006.

Typical minimum detectable activities (MDA) for water samples for the REMP program are provided below:

Nuclide	Typical Water MDA (pCi/L)
Gross Beta	1.5
H-3	170
Mn-54	6
Fe-59	15
Co-58	9
Co-60	7
Zn-65	14
Nb-95	5
Zr-95	9
I-131	11
Cs-134	10
Cs-137	6
Ba-140	46
La-140	5

Industry Groundwater Protection Initiative
Voluntary Data Collection Questionnaire

Plant: Duane Arnold Energy Center

3. **If applicable, briefly summarize any occurrences of inadvertent releases of radioactive liquids that had the potential to reach groundwater and have been documented in accordance with 10 CFR 50.75(g).**

   On February 14, 1983, 30 gallons of condensate water was spilled to the ground and into the storm sewer when a barrel tipped over.

4. **If applicable, briefly summarize the circumstances associated with any onsite or offsite groundwater monitoring result indicating a concentration in groundwater of radioactivity released from plant operations that exceeds the maximum contaminant level (MCL) established by the USEPA for drinking water.**

   There have been no identified instances of radioactivity released from the DAEC that resulted in groundwater concentrations exceeding the allowable USEPA maximum contaminant levels for drinking water.

5. **Briefly describe any remediation efforts undertaken or planned to reduce or eliminate levels of radioactivity resulting from plant operations in soil or groundwater onsite or offsite.**

   Currently there are no remediation efforts in progress or planned to eliminate levels of radioactivity in the soil or groundwater at DAEC or offsite.