

## EVALUATION OF SYSTEMS THAT HANDLE RADIOACTIVELY CONTAMINATED WATER

### 1.0 Problem Statement

In response to the event that occurred at the Braidwood Generating Station as well as events at other nuclear plants, Exelon is launching an initiative at each of its ten operating plants, as well as Salem, Hope Creek and Zion to systematically assess structures, systems and components that handle radioactively contaminated water and take the necessary actions to minimize the risk of inadvertent discharge to the environment. The assessments will take place in 2006.

### 2.0 Objectives

With this program, Exelon will ensure that we have a full understanding of the safety and reliability of our equipment that stores, processes and conveys radioactively contaminated water. Further, as a result of this program we will satisfy ourselves, our stakeholders, and the communities in which our plants are located that we operate and maintain our equipment and systems with a high degree of integrity.

The execution of this program will:

- Provide the opportunity to critically analyze and document the effectiveness of the operational controls and warning systems that we use to prevent, detect, and contain non-permitted releases;
- Identify opportunities for improving the management systems that govern the storage, processing and conveyance of radioactively contaminated water;
- Ensure that the corrective actions taken are thorough and effective and will remain so for the life of our stations;
- Document and enhance our understanding of the subsurface structures and groundwater characteristics beneath our properties;
- Ensure that we are timely, accurate and proficient in communicating radiological releases and concerns with the surrounding communities and other external stakeholders; and
- Ensure all organizations understand their ownership and responsibilities in operations, maintenance, oversight and response to system and environmental issues.

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### 3.0 Responsibilities

Project responsibilities are outlined in the remainder of this section. As the project progresses, the management team will populate a more extensive organization chart.

#### 3.1 Executive Sponsor

Thomas O'Neill, VP Regulatory & Legal Affairs, is the Executive Sponsor.

#### 3.2 Exelon Nuclear Environmental Affairs

Nuclear Environmental Affairs will assign a Project Lead to identify and evaluate the systems, structures and components that handle radioactively contaminated water. To support the Project Lead, Nuclear Corporate will assemble a team of persons who collectively are knowledgeable in potential sources of contamination, environmental interfaces, contaminant migration, groundwater characteristics, and contaminant detection systems. This team will be responsible for performing these activities:

- ❑ Develop templates for use at the stations;
- ❑ Provide base maps and create final maps for each station;
- ❑ Evaluate and document the nature and extent of historic releases;
- ❑ Document hydrogeologic conditions;
- ❑ Lead the comprehensive risk evaluation;
- ❑ Assess the adequacy of existing groundwater monitoring systems;
- ❑ Develop a groundwater monitoring program, if implementation of such a program is indicated by the results of the foregoing studies;
- ❑ Evaluate industry experiences to identify technical vulnerabilities;
- ❑ Provide governance and oversight to ensure the quality and effectiveness of the evaluation program across the fleet;
- ❑ Develop internal and external communications strategies to ensure timely and accurate dissemination of information; and
- ❑ Administer service contracts for geology, hydrogeology and environmental support.

#### 3.3 Stations

Each station must identify a point-of-contact for this project. To support the point-of-contact, each station must assemble a team that understands the plant layout and design, including location and configuration of systems and components that convey radioactively contaminated water.

This team will be responsible for coordinating all site activities, identifying and engaging station personnel, creating action tracking assignments, and interfacing with Nuclear Environmental Affairs. More specifically, each station's responsibilities include:

- Assigning a point-of-contact and developing a project team;
- Identifying and mapping potential sources of radiological fluids;
- Documenting the material conditions of the potential sources;
- Identifying underground structures, materials used in construction, and equipment that may affect groundwater flow;
- Investigating and documenting known and alleged releases, spills and accidental discharges;
- Collecting baseline environmental data;
- Assisting in the risk evaluation process;
- Developing and implementing corrective actions (*i.e.* leak prevention, detection and mitigation programs);
- Documenting the results of the evaluation process;
- Documenting the effectiveness of the corrective actions for the identified issues;
- Maintaining an accurate and current file on the quality of their program;
- Contractor oversight; and
- Submitting project cost and approval documentation (*i.e.* PRC and NSAC)

### **3.4 Project Management**

Nuclear Environmental Affairs will work with the Project Management Group to establish a comprehensive project plan that can be tracked. More specifically, project management will:

- Manage and track schedules;
- Conduct and lead periodic status updates and telephone calls;
- Manage and coordinate all budget estimates and projections;
- Assemble periodic management reports;
- Develop fleet-wide performance indicators and project tracking mechanisms;
- Identify and track actions arising from the investigations; and
- Ensure consistency in project costs across the fleet.

### **3.5 Communications, Engineering, Legal and Licensing**

Corporate Nuclear Management will support the stations throughout this program. Nuclear Environmental Affairs will support the respective stations in responding to any identified non-permitted release. Additionally, Nuclear Environmental Affairs and Project Management will promptly notify and engage the appropriate Corporate Departments including Communications and Legal.

Nuclear Communications has assigned a project lead and will develop communications strategies to manage internal and external information both at the fleet project level and at the station level. Site-based tactics will be tailored to findings at each location and Communications will have plans in place to handle a range of potential site investigation results. The overall approach to project communications will be to provide employees and the public with complete and timely information regarding project progress and findings at all locations, including background information. This will be accomplished

using specific tactics and tools that are part of the Nuclear Communications ongoing program as well as tools developed specifically for tritium-related communications.

Strategies will focus on four primary areas:

- Outreach to individual plant neighbors;
- Outreach to plant communities;
- Local, regional, national and trade press; and
- Employee communications and updates.

These will be tied closely to a fifth primary focus area managed by Public Affairs and Government Affairs: outreach to local, state and federal government entities.

### **3.6 Public Affairs**

Public Affairs will create a strategy to keep our relationships with governmental/regulatory agencies and officials at all levels of government strong throughout this initiative. Public Affairs will develop an Exelon Nuclear Strategy along with specific site strategies that align with communications, environmental, and legal. The strategy will have two parts: internal and external. The internal strategy will be designed to keep information flowing to corporate and the distribution company regarding our communications with governmental stakeholders and those stakeholders' reactions and potential consequences to the company. This is necessary to ensure that this project does not conflict with other company programs or agendas in the various jurisdictions.

The external strategy will include outreach to federal, state, county, and local officials. This outreach will align with information communicated to the regulatory agencies by each site, environmental affairs, communications, and legal. Public Affairs will be responsible for communicating information back to the sites with regard to reactions by those officials to site activities.

### **4.0 Scope of Work**

We have designed a scope of work that consists of four phases:

Phase I	Project Planning
Phase II	Data Gathering
Phase III	Risk Evaluation
Phase IV	Work Plan Development

The remainder of this section provides details on each of these four phases.

## 4.1 Phase I - Project Planning

Corporate Nuclear will refine this project plan by:

- Assigning a project and corporate project teams to lead the stations;
- Assigning project teams at the stations;
- Developing detailed schedules;
- Scheduling and conducting kick-off meetings;
- Communicating technical expectations and deliverables to the stations;
- Developing templates and technical data management tools and protocols;
- Developing project records retention program; and
- Create fleet procedures for program management.

## 4.2 Phase II – Data Gathering

### 4.2.1 Identify and Map Potential Sources (Current and Former)

Each station must identify, list, and map the systems, structures and components that are used to contain, process or convey radioactively contaminated water. More specifically, each station must focus on all systems, structures and components that interface, or could potentially interface, with the environment. These systems, structures, and components, at a minimum, include:

- |                             |                                                         |
|-----------------------------|---------------------------------------------------------|
| □ Aboveground storage tanks | □ Vacuum breakers                                       |
| □ Underground storage tanks | □ Trenches                                              |
| □ Valves                    | □ Pumps                                                 |
| □ Supply lines              | □ Containers                                            |
| □ Discharge lines           | □ Surface impoundments (pits, ponds, lagoons and lakes) |
| □ Fuel pools                | □ Discharge canals                                      |
| □ Sumps                     | □ Other vessels                                         |
| □ Relief valves             |                                                         |

Each of these components must be mapped and tied to a spreadsheet. Corporate Environmental Affairs will design and distribute templates (Section 4.2.1) and spreadsheets to assure consistency throughout this process.

As part of the source identification process, each station must include information related to all historic or legacy equipment. At a minimum, the stations must consider any equipment or piping that may have been redesigned, decommissioned, abandoned in-place or removed.

#### 4.2.2 Document Material Conditions

After a comprehensive list is developed and the potential sources are mapped, each station shall assemble the information and populate the specified template for each system or component identified in Section 4.2.1:

- *Description* – Age, dimensions, location, design capacity (*i.e.* volume or flow rate), construction materials, mechanical joints, welded joints, cathodic protection (coated or cathodic protected) leak detection devices, and any other pertinent information identified;
- *Fluid concentrations* – Estimate of the maximum concentrations of radioactive material in each system or component (*i.e.* historic or existing);
- *Controls and Inspections* – Equipment and system components inspection frequencies and types (*i.e.* 10% of components on a quarterly basis), summary of leak repair records, and inventory control methods for tanks; and
- *Maintenance Records* – Records of any repairs or replacements related to equipment that is known or suspected of having leaked radioactively contaminated water.

Each of the completed templates will be reviewed and critiqued by the Nuclear Corporate oversight team, which at a minimum will be comprised of representatives of Corporate Engineering and Environmental. Our review will focus on the adequacy, clarity, and completeness of the information in the templates. Data gaps that are identified must either be addressed or become an objective of the station-specific work plan (Section 4.4).

#### 4.2.3 Document Historical Releases, Spills and Accidental Discharges

Each station must identify, list, and map historical releases as recorded in accordance with 10 CFR 50.75.g. Additionally, each station shall review available records and interview knowledgeable personnel to identify accidental discharges, spill areas, and disposal areas. The information for all documented and alleged events and disposal areas that have potentially impacted the environment will be recorded in a corporate-supplied template. At a minimum, this information should include:

- Date of event;
- Source of release;
- Location of release;
- Material released including concentrations, if known;
- Amount of material released;
- Media impacted (*i.e.* soil, groundwater, surface water);
- Area impacted;
- Remedial efforts and documentation; and
- Agency notifications.

The review of historical releases must also include a review of historic or current radioactively contaminated soil, sediment and sludge storage or disposal areas.

#### 4.2.4 Develop Environmental Baseline

Each station must assemble all baseline environmental data.

- ❑ Regional and site specific-geology
- ❑ Regional and site specific-hydrogeology
  - On-site groundwater monitoring wells
  - On-site groundwater dewatering systems and recovery wells
- ❑ Potable, industrial, and irrigation wells (location, depth and construction details)
- ❑ Existing and historic monitoring programs
  - Soil logs, locations and data
  - Groundwater elevations, contour maps and analytical data
  - Sediment sample locations and data
  - REMP data and reports

This information must be assembled together in one location at each site. Once assembled, Nuclear Environmental Affairs will conduct a working meeting at the site to extract and synthesize all of the pertinent environmental data. Nuclear Environmental Affairs will compile this data into a report that summarizes what is known, and not known, about the soil and groundwater quality beneath the respective station.

#### 4.3 Phase III – Complete Risk Evaluation

Each station, with assistance from corporate, must evaluate the systems, structures and components identified in Section 4.2 based on risk. The plant description, which was documented in Sections 4.2.2 and 4.2.3 of the administrative controls, engineering controls, and historic performance shall be used to evaluate whether additional actions are warranted to detect, prevent or mitigate releases. At a minimum, the risk evaluation process will consider:

- ❑ Failure modes, failure effects;
- ❑ Likelihood of occurrence;
- ❑ Ability to detect a release; and
- ❑ Degree of severity.

Nuclear Environmental Affairs will evaluate each of the historic spills and disposal/storage areas to determine whether:

- ❑ Appropriate documentation exists to evaluate the area of concern;
- ❑ The medias of concern were appropriately identified and evaluated;
- ❑ The areas of concern require additional investigation;
- ❑ Spills or releases were reported in accordance with applicable regulatory requirements;

- Any corrective actions implemented were effective; and
- If any additional corrective actions are warranted.

A standardized risk model will be developed and the information collected as part of the program will be evaluated against the risk model. The results of the risk evaluation process will be documented in a Risk Evaluation Matrix and accompanying report. Identified gaps in the management or implementation of our programs that may result in an un-permitted or unmonitored release of radioactively contaminated water to the environment will be addressed in the development and implementation of the work plans presented in Section 4.4.

#### **4.4 Phase IV – Work Plan Development**

The following work plans will be developed for each station:

- Station Operational Work Plan;
- Integrated Environmental Work Plan (RP, Chemistry & Environmental); and
- Communications Work Plan.

##### **4.4.1 Station Operational Work Plans**

The primary objective of the Station Operational Work Plans will be to enhance the operational and physical controls at our stations that prevent non-permitted or unmonitored releases of radioactively contaminated water to the environment. This work plan, which will be owned and managed by the stations, will include:

- Equipment integrity testing programs (where appropriate);
- Release prevention programs;
- Release containment systems;
- Leak detection systems;
- Release detection systems;
- Procedure modification or development; and
- Program milestones and completion dates.

The stations must place each identified component of the work plan in their action tracking system and must track it to completion. The stations must also develop and implement a change management plan as part of the Operational Work Plan implementation.

##### **4.4.2 Integrated Environmental Work Plans**

Nuclear Environmental Affairs will develop station specific environmental work plans to address data gaps identified as part of the environmental baseline review and to evaluate identified risks. The focus of the work plans will be to ensure each station understands the characteristics of groundwater beneath its site.

This work plan may include:

- Installation of additional monitoring wells;
- Refurbishing existing monitoring wells;
- Surveying various data points;
- Completing soil borings;
- Obtaining groundwater measurement data;
- Sampling groundwater-monitoring wells;
- Determining appropriate state-specific regulatory processes to pursue for each station;
- Determining appropriate actions to respond to the identification of contamination at concentrations above the groundwater quality criterion;
- Documenting and communicating release data to Corporate Nuclear;
- In the event of a release, mapping contaminant plumes; and
- Evaluating the need for remediation systems.

Nuclear Environmental Affairs will manage the implementation of the station-specific environmental work plans. Each plan will incorporate milestones and completion dates. The stations are responsible for mark-out and clearing utilities, providing access and supporting the program. If long-term groundwater monitoring programs are agreed upon, these programs will be the responsibility of the respective stations.

The extent of the subsurface investigation that will be needed at each station will be determined by unique characteristics of each station and their operating histories. Several major variables will be evaluated in the investigation work plan design process. These variables include, but are not limited to:

- Existing geologic, hydrogeologic and groundwater monitoring information; and
- A review of the data and risk analysis completed as part of this project.

Each identified component of the work plan will be placed in the action tracking system and tracked to completion.

#### **4.4.3 Communications Work Plan**

Exelon Nuclear Communications will develop station-specific communications action plans regarding the project based on common themes and actions for the fleet tailored to needs of the individual stations and circumstances. These include all existing elements of the Nuclear Communications program but may include new elements designed to address specific circumstances. Individual station action plans will be based on actual project schedules and involve internal, external, media and community outreach coordinated with Public and Government Affairs.