

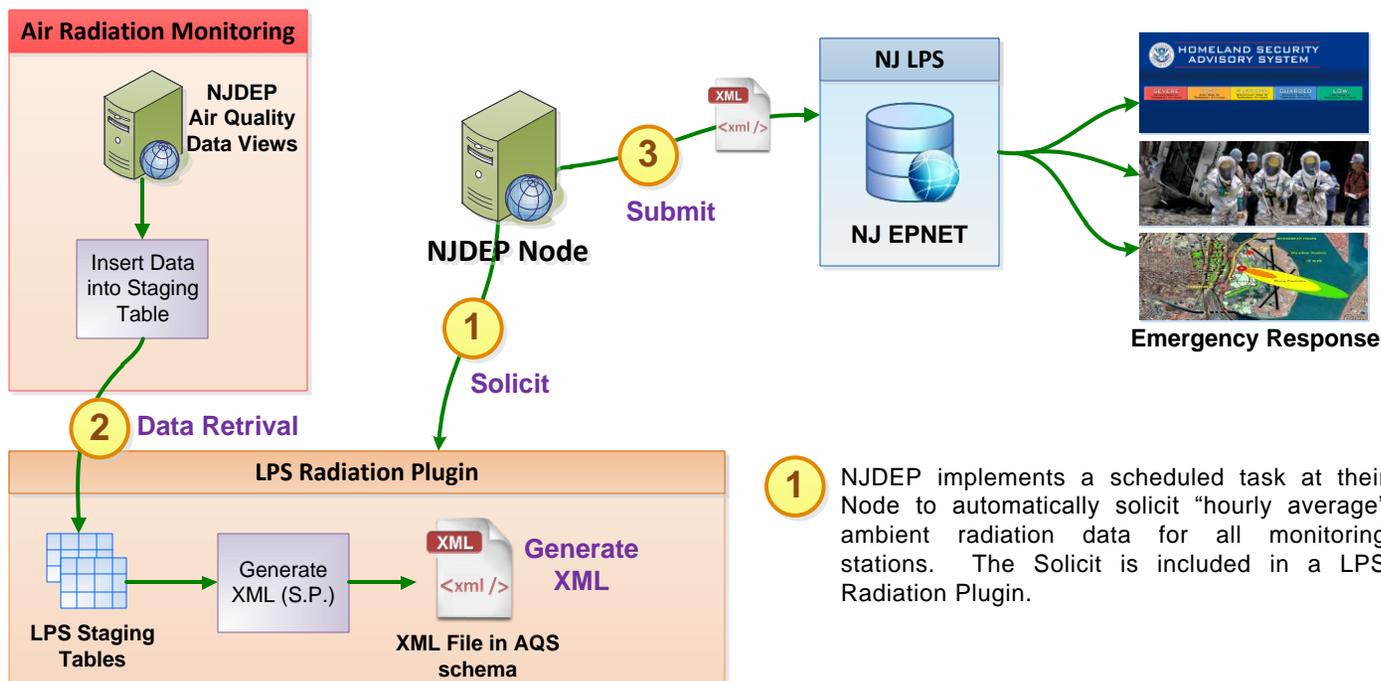
NJDEP Initiatives To Share Air Monitoring Data

The New Jersey Department of Environmental Protection (NJDEP) is a State Agency responsible for the protection of human health and the environment by ensuring clean air and water, managing solid waste, disposing hazardous waste and preserving wetlands and coastal resources. While NJDEP maintains its own database repository to store important environmental data, it also shares this information with other enforcement and interest groups. These agencies include the U.S. Environmental Protection Agency (EPA), the New Jersey Department of Health (DOH), the U.S. Department of Energy (DOE), the Federal Emergency Management Agency (FEMA), New Jersey Office of Law & Public Safety, National Oceanic and Atmospheric Administration (NOAA), other state partners, and the general public.

To share environmental information with these groups efficiently, NJDEP implemented a Node based data flow using the National Environmental Information Exchange Network (EN) open protocols. The EN protocols provide an information technology (IT) infrastructure (data standards and open protocols) to allow data providers to publish their data and the data consumers to access the data, without the limitation of the computer or operating platforms. In addition, the Node, in conjunction with the EN Browser (a data discovery and analysis tool for the Exchange Network), allows NJDEP to broaden its data sharing capability with the highest return-on-investment and minimal effort.

Integrating Air Radiation Data with NJ Homeland Security System

Studies have shown that human exposure to radiation levels above 5 rem can potentially cause adverse health effects. The average US citizen is exposed to approximately 620 millirem of radiation per year according to a National Council on Radiation Protection and Measurements (NCRP) report. A percentage of the radiation that people are exposed to originates from natural background sources such as the air, soil, and water. Throughout the years, NJDEP's mission has been to protect its residents from unnecessary exposure to radiation and the release of hazardous substances. NJDEP currently performs comprehensive ambient radiation monitoring and data collection from the two nuclear power sites, Oyster Creek and Salem/Hope Creek in New Jersey. NJDEP has implemented an Ambient Radiation Flow to allow the Office of Law & Public Safety (LPS) to integrate with the state-wide EPINet system for emergency response. In light of the Fukushima Japan nuclear plant accident in 2011, providing a mechanism to automatically feed the environmental data to an emergency response center will offer significant aid and value to response teams in the event of an emergency. The following diagram illustrates the data exchange process.



- 1** NJDEP implements a scheduled task at their Node to automatically solicit "hourly average" ambient radiation data for all monitoring stations. The Solicit is included in a LPS Radiation Plugin.
- 2** The Node LPS Radiation Plug-in will interact with the DEP's backend database to retrieve the required ambient radiation data and save them in the AQS schema format published by the Exchange Network.
- 3** NJDEP's Node will Submit the ambient radiation data to the New Jersey Office of Law and Public Safety EPINet system using the Node protocols. The data will be automatically processed by EPINet, saved in the database, and contribute to EPNet functions designed for emergency response.

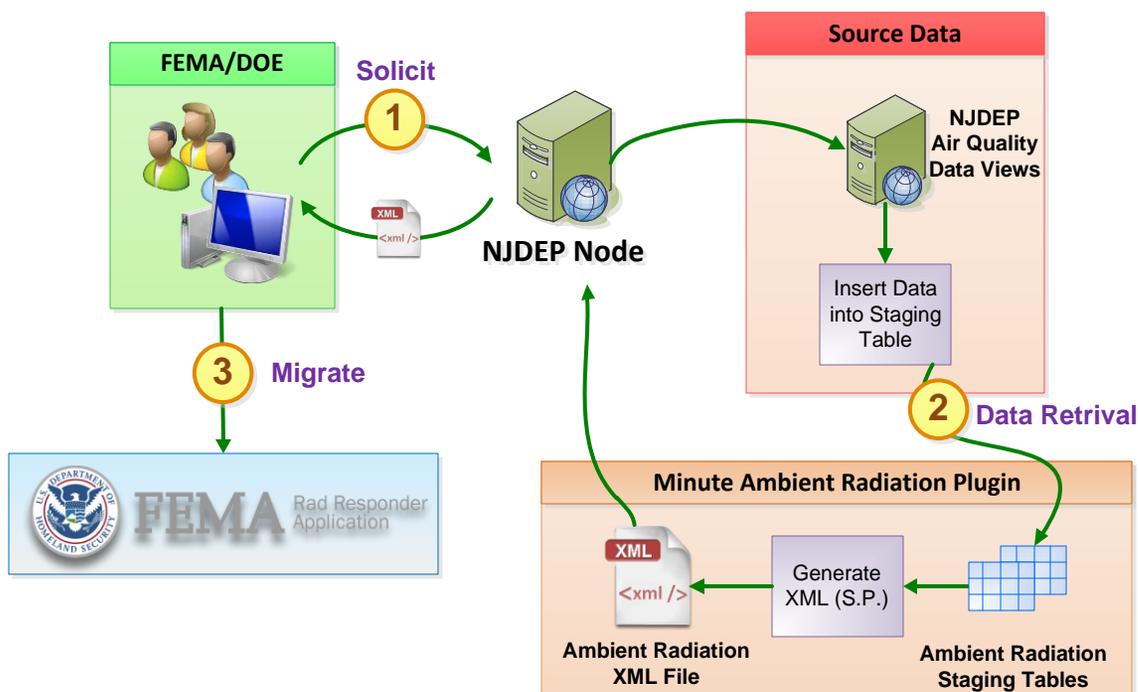


Integrating Air Radiation Data with DOE/FEMA RadResponder

NJDEP recently collaborated with Chainbridge Technologies, the U.S. Department of Energy (DOE), the Federal Emergency Management Agency (FEMA), and enfoTech to share their ambient radiation data with FEMA's Rad Responder system, an online repository of resources and radiation data intended to support responses to radiation incidents within the United States.

Leveraging EN technologies, NJDEP collaborated with enfoTech and Chainbridge Technologies to implement a minute-by-minute ambient radiation solicit service that could be used to automatically pull ambient radiation minute data from NJDEP's air quality data views, and generate the data in the AQS Schema format. Once exported as an XML file, the data can be inputted into the Rad Responder system.

The Proof of Concept (PoC) initiative was an instant success, and demonstrated the concept and potential of leveraging EN technologies to share data with environmental partners outside of the Exchange Network. The diagram shown below illustrates the approach taken for the Proof of Concept.

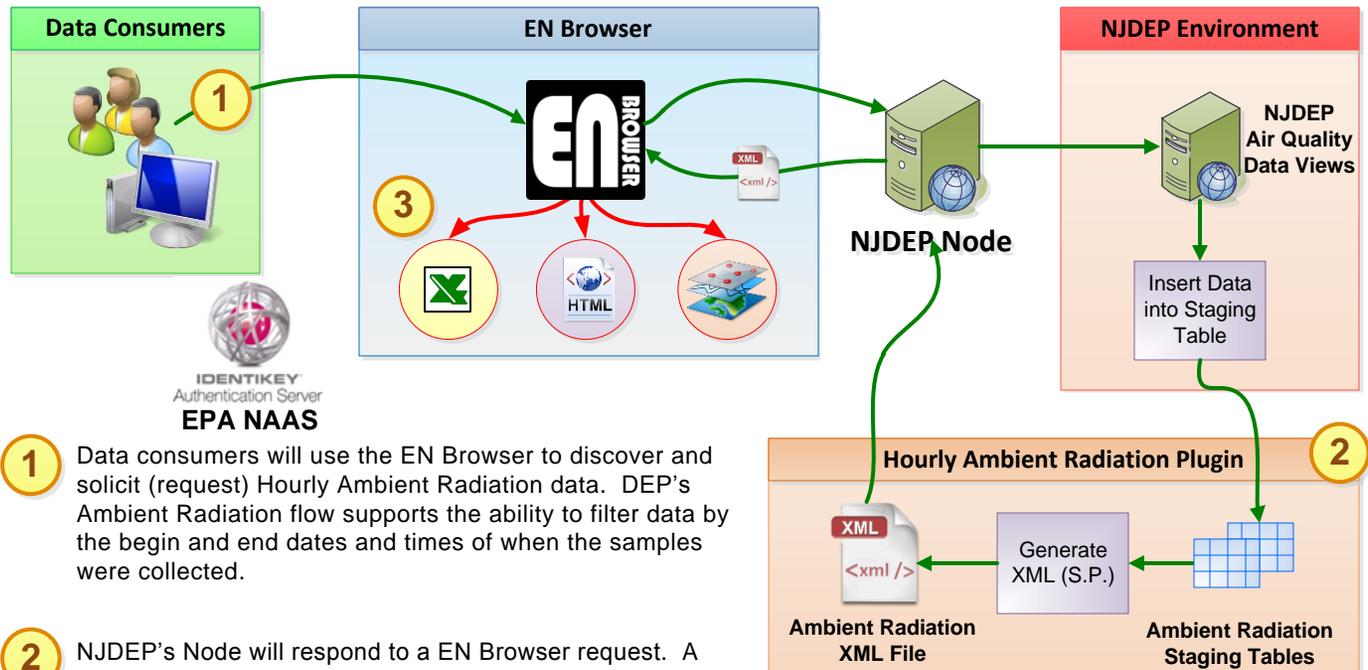


- 1 FEMA/DOE sends a solicit web service request to NJDEP's Node to retrieve NJDEP's ambient radiation one-minute data. FEMA/DOE can filter the requested data by the sample collection begin and end dates and times and the monitoring location sites.
- 2 Once the request is received by NJDEP's Node, the One-Minute Ambient Radiation Plug-in will interact with the DEP's backend database to retrieve the required air radiation data and save them in the AQS schema format published by the Exchange Network. The Node will send the ambient radiation minute data back to the data requestor in XML format.
- 3 FEMA/DOE receives the ambient radiation one-minute data from NJDEP, and migrates the data to their Rad Responder application.



Publishing Air Radiation Data for Public Use

In an effort to promote data sharing on the EN, NJDEP has published their hourly ambient radiation solicit service on the EN to enable interested and authorized parties to request and view their data through the Exchange Network Browser (ENB). The following diagram illustrates the data exchange process.

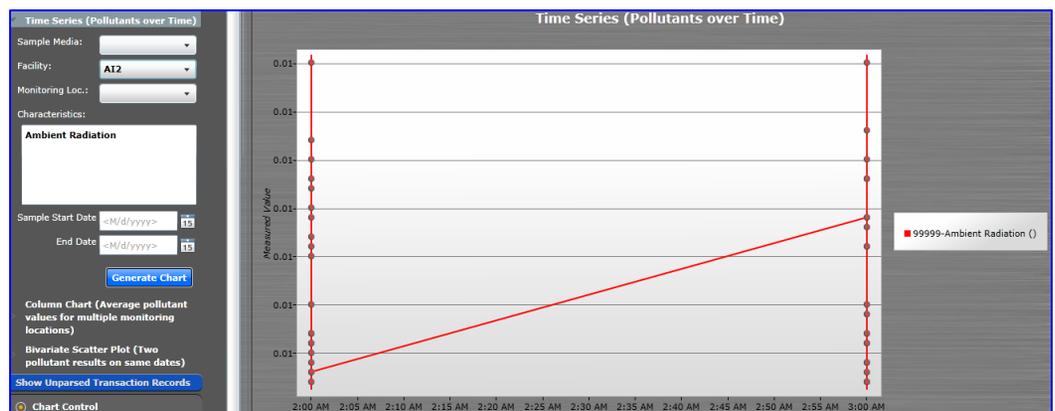


- 1 Data consumers will use the EN Browser to discover and solicit (request) Hourly Ambient Radiation data. DEP's Ambient Radiation flow supports the ability to filter data by the begin and end dates and times of when the samples were collected.
- 2 NJDEP's Node will respond to a EN Browser request. A Node Ambient Radiation Plug-in will interact with the DEP's Air Quality Data Views to retrieve the data and generate the data in the AQS schema format published by the Exchange Network. The XML file from the Node will be sent to the EN Browser. The EN Browser will automatically alert the data consumer when the data is ready for download and analysis.
- 3 After receiving an ENB alert, the data consumer could use the EN Browser's analytical, GIS and graphing tools to perform further manipulation of the returned XML file. It can transform the file into HTML or CSV format so that the Ambient Radiation data is presented in a more user-friendly structure. In addition, the EN Browser can portray the data on a GIS map as well as display the data in a time series plot to analyze Ambient Radiation over different time frames.

ENB Data Analysis Features

Time-Series Graphing and Analysis

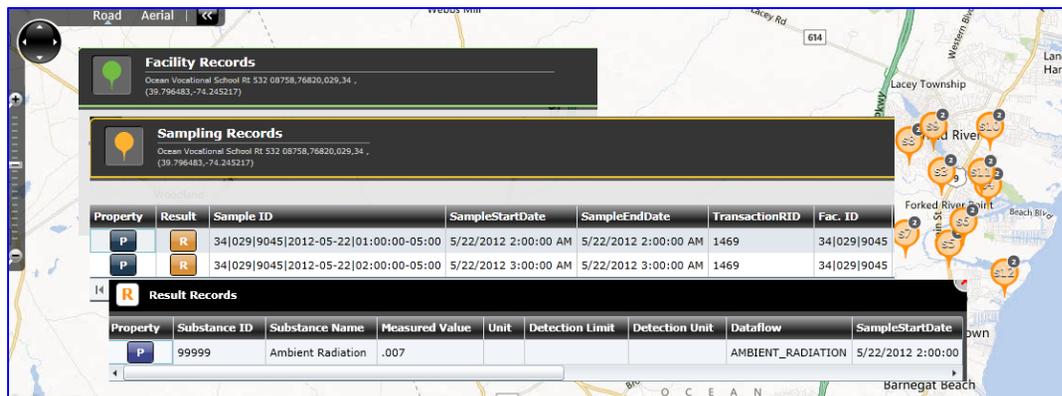
The EN Browser includes an interactive graphing tool to graph the requested data into a Time-Series chart for the user to analyze. Users may filter by different parameters such as the date range, the contaminant of interest, or by facility/monitoring locations. This tool is especially useful for data consumers who are seeking to analyze trends and patterns in the data over time.



ENB Data Analysis Features

Data on a GIS Map and Analysis

The EN Browser includes an interactive mapping service hosted by Bing Map to interface with the requested Ambient Radiation data and display the points of interest on the map. In addition, the platform provides an analysis service for the user to view all the samples and results pertaining to an area of high Ambient Air Radiation concentration. This tool is especially useful for groups such as the Department of



The screenshot displays a web-based GIS application. On the left, a map shows a coastal area with several orange location markers. Overlaid on the map are three data tables:

- Facility Records:**

| | | | | | | |
|----------|--------|---------------------------------------|----------------------|----------------------|----------------|-------------|
| Property | Result | Sample ID | SampleStartDate | SampleEndDate | TransactionRID | Fac. ID |
| P | R | 34 029 9045 2012-05-22 01:00:00-05:00 | 5/22/2012 2:00:00 AM | 5/22/2012 2:00:00 AM | 1469 | 34 029 9045 |
| P | R | 34 029 9045 2012-05-22 02:00:00-05:00 | 5/22/2012 3:00:00 AM | 5/22/2012 3:00:00 AM | 1469 | 34 029 9045 |
- Result Records:**

| Property | Substance ID | Substance Name | Measured Value | Unit | Detection Limit | Detection Unit | Dataflow | SampleStartDate |
|----------|--------------|-------------------|----------------|------|-----------------|----------------|-------------------|-------------------|
| P | 99999 | Ambient Radiation | .007 | | | | AMBIENT_RADIATION | 5/22/2012 2:00:00 |

Energy to analyze the hazardous area in New Jersey with high exposure to Ambient Air Radiation. All visual map features are supported by accessible text equivalents through HTML and CSV file formats. Radiation Data in these formats allow users to conduct additional data manipulation and analysis.

Reusability

Reusability

DEP's Ambient Radiation dataflow consists of several components that potentially could be reusable and easily implemented by other EN Partners who wish to share their Ambient Radiation Data with interested parties. These components are highlighted below:

AQS XML Schema: The AQS dataflow uses a shared, common XML schema that has been approved by the US EPA. This provides and creates a set structure for future data providers to fit their AQS Data into and exchange data.

Node LPS Radiation Plug-in (Hourly Data): The Node LPS Radiation Plug-in provides pre-defined staging tables and stored procedures that can be leveraged to generate an LPS Radiation Submission XML file that complies with the AQS XML Schema.

Node Ambient Radiation Plug-in (for Hourly and Minute Data): The Ambient Radiation Dataflow Plug-In provides the capability to generate XML files from pre-defined staging tables that comply with the AQS XML schema structure. The XML generation code (i.e., stored procedure) is universal and will grab the data that has been put into the Ambient Radiation staging table, and generate the XML file. Data providers may simply map their source data to the corresponding fields in the staging table to generate the Ambient Radiation XML file. Both the staging table and XML generation code potentially may be reused by other Radiation data providers seeking to publish their data on the Exchange Network.

EN Browser: The ENB provides analysis tools that can be leveraged by any individual seeking to retrieve and analyze environmental data published on the EN. The Hourly Ambient Radiation HTML and CSV stylesheet can be used by data consumers and/or providers to transform the XML data into CSV and/ or HTML for easier viewing. In addition, individuals may utilize ENB's native GIS and graphing tools to analyze their data

Contacts

To learn more about the reusable components of NJDEP's Ambient Radiation dataflow or the Ambient Radiation Minute Data Proof of Concept, please contact:

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