Naval Installation Restoration Information Solution

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Federal Remediation Technologies Roundtable
Wed May 20th, 2009
Agenda

- Overview of Navy Environmental Restoration Program Needs
- NIRIS Components
  - NIRIS Database Network Components
  - Data Checker and NIRIS Electronic Data Deliverables (NEDD)
  - Visualization tools - Mapping
- Interoperability
- Summary
Environmental Restoration Program Needs

- Improve our day-to-day data management
  - Data Management in the cleanup program is a complex process
    - Installation Restoration Program + Munitions Response Program includes nearly 4000 sites
    - About $300 million per year, with nearly $3.0 B Cost-to-Complete (CTC)
    - Involves several organizations participating in data collection, assessment, and evaluation of the information.
    - Several regional NAVFAC offices (NAVFACT Facility Engineering Commands – FECs)
    - Terra Bytes of data, 100s of users!
  - Previous Conditions
    - Data and documents maintained differently between FECs and maintained differently between contractors
    - Managing multiple data structures was extremely costly
    - When new contractors take over, data was lost
    - Paying for duplicate data
Environmental Restoration Program Needs

• Enhance the utilization of data with available tools and technologies
  – Visualization and modeling of data for decision-making
  – Query, analysis and reporting of data
  – Collaboration with state and federal regulators
  – Faster availability of the data

• Leverage other data sources
  – Focus on environmental restoration data
  – Not in the business of base mapping
The NIRIS Concept

Two components of the Solution:

• The Data
• Tools and Business Processes
The NIRIS Concept
- The Data -

• Definition of data needs
  – Primarily related to field sampling events (i.e. analytical and field data)

• Development of a standardized data structure that will be commonly used by all FECs and support contractors
  – Enhance data integrity, and availability
  – Reduce cost of managing multiple structures

• Compliance with DoD Spatial Data Standard for Facilities, Infrastructure, and Environment (SDSFIE)
  – Facilitate integration with other data systems
The NIRIS Concept
- Processes and Tools -

• Process and Tools for inputting and managing data in the system
  – NIRIS Electronic Data Deliverables (NEDD)
  – Labs, Contractors
  – Data QA/QC

• Process and Tools for utilizing data
  – Web based tools for collaboration, querying, analysis, reporting, and visualization of data
  – Export data to other applications – GMS, SURFER, etc.
NIRIS Concept

• Central management of all Navy and Marine Corps ER project data, documents and records
  – Environmental sample data
  – Munitions Response / Unexploded Ordnance Data
  – Spatial Data
  – Land Use Control Data
  – Documents and Reports
• Tools to use data e.g., GIS
• Tools and policies to ensure only quality data gets loaded
  – NIRIS Electronic Data Deliverable (NEDD)
  – Data Checker
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NIRIS Components

NIRIS database

- Stores tabular (analytical) data
- Stores ER specific spatial data

Tools to upload data

- Data Checker
- Validates NIRIS Electronic Data Deliverables (NEDDs)

Tools to extract and visualize data

- Query Tool (Analytical data)
- Web GIS (ArcIMS)
- Other tools (GMS, SADA, Surfer)

Environmental Document Management System (EDMS)

- Administrative Record, Post Decision, and Site File documents
Main component of NIRIS database

• Tabular
  – Updated daily (transactional)
  – Oracle 10g
  – Stores all ER data
  – Audit schema

• Spatial
  – Dynamically updated based on tabular
  – Database Link between tabular and spatial
  – Audit table to track changes, including deletions
  – Automatically triggered when tabular updated
• Spatial data is managed using:
  – Oracle 10G Enterprise (10.1.2) Geodatabase
  – ESRI ArcSDE (Spatial Database Engine) V9.1
  – Separate schema for each regional State Plane Coordinate System
  – All schema use NAD 83
  – !!Navy Marine Corps Intranet (NMCI) Compliant!!
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Data Checker:
• Web based
• Ensures only complete data sets of known quality get loaded
• Flags potential errors for data submitter
• Not data validation
Submittal standard for contractors loading ER data
Approximately 50 tables - 10 will be commonly used
Specify precision, format for data fields
Example NEDD tables:
- Analytical Result
- Borehole
- Groundwater level
- Sample
- Quality Control
SOP for use
# NEDD Tables

- **Analytical Result**
  - Agency
  - Hydro Calculation
  - Laboratory
  - Land Restriction
  - Lithologic Description
  - Local Regulation
  - Location
  - Location Site
  - LUC Implementation
  - Measurement Site Zone
  - Ordnance
  - Owner
  - Point of Contact
  - Program Contract
  - Pump Rate
  - Pumping Interval
  - QC Results
  - Sample
  - Sample Site Zone
  - Sample Tracking
  - Screening Criterion
  - Screening Value
  - Test Water Level
  - Toxicity Testing
  - Tracer Injection
  - Transect
  - Validation Update
  - Water Well History
  - Well
  - Well Construction
  - Well Pump

*Note: Tables in Bold Type Represent the Most Commonly Used.*
<table>
<thead>
<tr>
<th>NEDD FIELD &amp; DESCRIPTION</th>
<th>DATA TYPE</th>
<th>FIELD SIZE</th>
<th>REQ</th>
<th>EXAMPLE</th>
<th>BUSINESS RULE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTRACT_ID</td>
<td>Text</td>
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<td>Yes</td>
<td>D45559365800</td>
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</tr>
<tr>
<td>DO_CTO_NUMBER</td>
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<td>Yes</td>
<td>0012</td>
<td></td>
</tr>
<tr>
<td>PHASE</td>
<td>Text</td>
<td>8</td>
<td>No</td>
<td>QTR1</td>
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<td>INSTALLATION_ID</td>
<td>Text</td>
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<td>Yes</td>
<td>WHIDBEY</td>
<td>INSTALLATION_ID must be selected from the INSTALLATION_ID Naval Master List.</td>
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<tr>
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<tr>
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<td>6010</td>
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<tr>
<td>LAB_NAME</td>
<td>Text</td>
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<tr>
<td>CONTRACTOR_NAME</td>
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<td>No</td>
<td>CONTRACTOR INC.</td>
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<tr>
<td>LEACHATE_METHOD</td>
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<td>No</td>
<td>SW1310</td>
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<tr>
<td>SAMPLE_BASIS</td>
<td>Text</td>
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<td>DRY</td>
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<tr>
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<td>Text</td>
<td>16</td>
<td>No</td>
<td>FLTRES</td>
<td></td>
</tr>
</tbody>
</table>
### Analytical Result

This NEDD specification addresses information associated with the sample results (test method, lab sample ID, qualifiers, etc.). One record should be submitted for each result.

<table>
<thead>
<tr>
<th>NEDD Field &amp; Description</th>
<th>Data Type</th>
<th>Field Size</th>
<th>Req</th>
<th>Example</th>
<th>Business Rule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract ID</td>
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<td>Yes</td>
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<tr>
<td>DO_CTO_NUMBER</td>
<td>Text</td>
<td>4</td>
<td>Yes</td>
<td>0012</td>
<td></td>
</tr>
<tr>
<td>Phase</td>
<td>Text</td>
<td>8</td>
<td>No</td>
<td>QTR1</td>
<td></td>
</tr>
<tr>
<td>Installation ID</td>
<td>Text</td>
<td>20</td>
<td>Yes</td>
<td>WHIDBEY</td>
<td></td>
</tr>
<tr>
<td>Installation ID must be selected from the INSTALLATION_ID Naval Master List.</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample Name</td>
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<tr>
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<td>Yes</td>
<td>6010</td>
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<tr>
<td>Lab Name</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contractor Name</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEACHATE METHOD</td>
<td>Data code for the leach method used on sample.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAMPLE BASIS</td>
<td>Sample basis of analysis, wet weight, dry weight</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXTRACTION METHOD</td>
<td>Data code for the extraction method used on the sample.</td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D91AVSM</td>
<td>Draft 1991 Determination of acid volatile in sediment leachate</td>
</tr>
<tr>
<td>DISWAT</td>
<td>Leaching of analyte from soil samples using distilled water.</td>
</tr>
<tr>
<td>M1311</td>
<td>Modified toxicity characteristic leaching procedure - water leachate</td>
</tr>
<tr>
<td>SW1310</td>
<td>Extraction procedure (EP) toxicity test method and structural integrity procedure.</td>
</tr>
<tr>
<td>SW1310A</td>
<td>Extraction procedure (EP) toxicity test method</td>
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<tr>
<td>SW1311</td>
<td>Toxicity characteristic leaching procedure</td>
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<tr>
<td>SW1312</td>
<td>Synthetic Precipitation leaching procedure</td>
</tr>
<tr>
<td>SW924</td>
<td>SW-924 leaching procedure</td>
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<tr>
<td>TRN</td>
<td>Transition</td>
</tr>
<tr>
<td>WET</td>
<td>California Waste Extraction Test (WET)</td>
</tr>
</tbody>
</table>
Overview of NAVFAC Data Flow Process

Data compiled by laboratory, contractor, etc. → NEDD tables prepared and submitted to Navy → NEDD Tables

Verified? Yes → Verified NEDD Data

Verified? No → Error report sent to data contractor

Verified? Yes → Data Loader application checks data

Verified? No → Data Manager

Who fixes?

Data Checker application verifies or rejects data

Verified? Yes → Loads to NIRIS

Data Viewers GIS, etc.
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Visualization Tools - Mapping

• WebGIS
  – ESRI ArcIMS, preset functionality
  – Easy access
  – Data is dynamically updated
  – Only works over intranet

• Desktop GIS via Citrix (eGIS)
  – ArcGIS 9.1, all the features you learned with customized tools
  – Citrix account required
  – May be used online, or data export allows data to be used in desktop GIS
  – Not dynamically updated, but RPM can request update
Demo of Web GIS
EGIS Analytical Query Tool
Time Trend

Generate an Excel time trend chart based on the location and parameter(s) selected below.
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Invested in Interoperability early on:
• Key ID fields from other enterprise databases
• Centralized, Uniform database
• Spatial Data Standard compliance

Interoperability allows:
• Sharing, leveraging of data
  – Asset Management Business Line: Regional Shore Installation Management System (RSIMS)
  – NIRIS provides ER data e.g., IR site boundaries, Land Use Controls
  – RSIMS provides base boundaries, buildings

• Roll up of ER program data
  – GeoReadiness Repository
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Summary

- NIRIS uses common business practices to manage, access, and view NAVFAC Environmental Restoration (ER) Program information:
  - IRP and MRP analytical and spatial data
  - Documents (including the Administrative Record, Post Decision, and Site Files)

- Using GIS and web-based applications in a consistent and cost-effective manner

**Naval Installation Restoration Information Solution**