



Environmental Protection Agency

Office of Solid Waste and Emergency Response (OSWER)

Architecting the Land Between HQs and Regions

**presented at the OEI National Symposium
St. Louis, Missouri, November 15, 2007**

John Sullivan, OEI/Chief Architect
Lisa Jenkins, OSWER/IMDQS
Wendy Bartel, Region 3
Steve Goranson, Region 5
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November 2007

Introductions: Meet the Speakers

- ▶ **John Sullivan, HQ – OEI**
 - Chief Architect – EPA

- ▶ **Lisa Jenkins, HQ – OSWER**
 - Lead Architect, OSWER / IMDQS

- ▶ **Wendy Bartel, Region 3**
 - Chief, Information Systems Branch

- ▶ **Stephen Goranson, Region 5**
 - Chief, Office of Information Services

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Agenda

- ▶ **Welcome and Introductions**
- ▶ **Session Overview**
- ▶ **HQ to Regional Interaction**
 - Region 3 Surveys
 - Region 5 Case-Studies
- ▶ **Architecting Solutions**
- ▶ **Proposed Next Steps**
- ▶ **Open Forum Discussion**
 - Other Pain-Points Between Regions and OSWER?
 - Between Other HQ Offices and OSWER?

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Session Overview – OSWER’s Segment Architecture

Focus Areas for OSWER’s Segment Architecture Effort

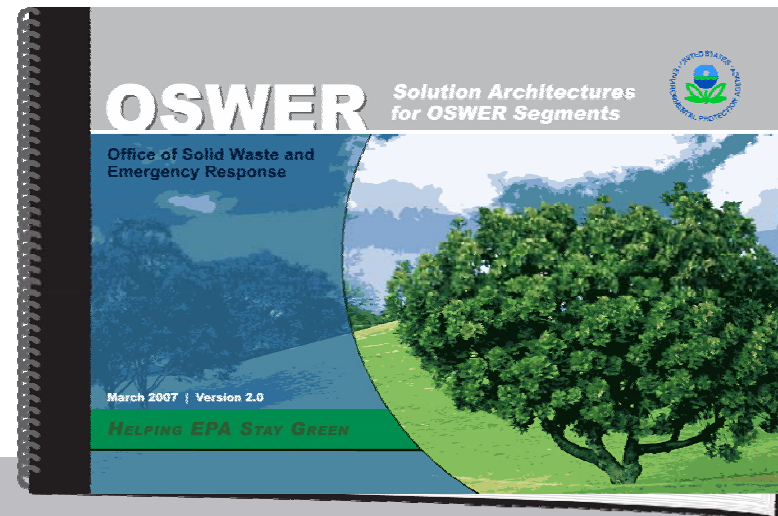
- ▶ **Identify areas for reducing redundancy and maintenance costs**
 - Leveraging Agency-wide tools
 - Coordinating system consolidation efforts

- ▶ **Identify areas of potential programmatic overlap**
 - e.g. Analytical data across Cleanup and Emergency Management Segments



Improve communication and coordination across the organization

- Provide a common framework and venue for sharing
- Identify and sequence target solutions
- Communicate to business and technology stakeholders



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Session Overview – Regional Outreach

Communicate, Listen, Coordinate

- ▶ **OSWER’s Segment Architecture Efforts Identified the Need for Regional Outreach**
 - Goal is to identify “touch-points” between systems, services, processes, and data
 - Document “pain-points” where further analysis / architecture can be leveraged

- ▶ **Regional Participation**
 - Contacted each region to seek input on touch-points
 - Region 3: Lead for Superfund, Brownfields and OEM
 - Developed Survey tool to identify potential starting points
 - Region 5: Lead for RCRA (OSW and OUST)
 - Reviewed relevant case-studies that highlighted the need for further analysis

- ▶ **Centralizing Theme of Analysis – Data is the Key!**
 - 1.) Data Availability (“Get the Right Data”)
 - 2.) Data Quality (“Get the Data Right”)
 - 3.) Data Integration (“Get Right to the Data”)

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Region 3 Surveys

Wendy Bartel
Chief, Information Systems Branch

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HQ to Regional Interaction – Region 3

About the Region 3 Survey

▶ Introduction

- ~3 years involved with EAWG
- Been difficult to see EA impact on Regions
- First overture on part of a (OSWER) NPM Office to solicit Regional Issues/Concerns

▶ **Region 3 is at the beginning of this discussion, with a preliminary poll of issues**

- The goal is to gather preliminary insight into the ‘touch-points’ / ‘pain-points’ between HQ and Region 3
- Prioritize focus based on Survey results and Program needs

▶ Survey Statistics

- Survey consisted of 10 questions
- ~30 surveys have been distributed to date across multiple programs
- Division Directors and Deputy Division Directors were the primary means for circulation
- ~16 responses gathered so far (50%) identifying ~46 areas of concern (pain points).

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HQ to Regional Interaction – Region 3

Survey Results Aligned to the 3 Themes

- ▶ **Data Availability (“Get the Right Data”)**
 - 8 Offices identified this type of issue
 - 34 business processes identified this type of issue

- ▶ **Data Quality (“Get the Data Right”)**
 - 3 Offices identified this type of issue
 - 4 business processes identified this type of issue

- ▶ **Data Integration (“Get Right to the Data”)**
 - 7 Offices identified this type of issue
 - 12 business processes identified this type of issue

Region 3 Architecture Survey

1. Please select one of the following offices to identify the program in which you function in EPA Region 3:

To check or uncheck the box next to each system:
1. double click the check box
2. under 'default value,' select radial button for either 'checked' or 'unchecked')

- Hazardous Site Cleanup Division - Office of Federal Facility Remediation and Site Assessment
- Hazardous Site Cleanup Division - Office of Superfund Site Remediation
- Hazardous Site Cleanup Division - Office of Preparedness and Response
- Hazardous Site Cleanup Division - Office of Technical and Administrative Support
- Hazardous Site Cleanup Division - Office of Brownfields and Outreach
- Hazardous Site Cleanup Division - Office of Enforcement
- Waste and Chemicals Management Division - Technical Support Branch
- Waste and Chemicals Management Division - State Programs Office
- Waste and Chemicals Management Division - Pennsylvania Operations Branch
- Waste and Chemicals Management Division - General Operations Branch
- Waste and Chemicals Management Division - RCRA Compliance and Enforcement Branch**
- Other: Please explain: _____

2. Please identify the business processes which you support as part of your responsibilities in EPA Region 3:

- Superfund Remedial Response Process
- Superfund Removal Response Process
- Federal Facilities Removal Response Process
- RCRA Cleanup Corrective Action Process
- Underground Storage Tank Cleanup Corrective Action Process
- Brownfields Assessment, Revolving Loan Fund and Cleanup Process
- Emergency Response Process
- Emergency Prevention (Chemical and Oil Program) Process
- Emergency Preparedness (Chemical and Oil Program) Process
- Pollution Prevention Process
- Pollution Control Process
- Combination of the above. Please explain: _____
- Other: Please explain: **RCRA-C and UST Compliance and Enforcement**

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R3 Survey Example

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HQ to Regional Interaction – Region 3

Example Issues Identified through the R3 Survey

▶ Data Availability (“Get the Right Data”)

- Queries pulling from multiple systems lead to multiple and different representations of the same data
- Links (URLs) on Regional websites to HQ websites become non-functional when HQ relocates or eliminates URLs without prior notification
- Changes to Toxic Release Inventory Form R have caused loss of important information (e.g. RCRA ID, lat/long, thresholds)
- No National/Regional system to validate State submission dates for underground storage tank data
- Concern over access and dissemination restrictions on some pre-decisional ORC data
- Systems should contain electronic links (e.g. PDFs) of all relevant guidance documents
- ...

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HQ to Regional Interaction – Region 3

Example Issues Identified through the R3 Survey

▶ Data Quality (“Get the Data Right”)

- Duplicative accomplishments reporting between RCRAInfo and ACS
- End of year accomplishments projections beginning ~9 months out make it difficult to ensure accuracy
- No clear programmatic training/guidance for RCRAInfo resulting in data gaps and inaccuracies
- NPEP Enrollment forms changing without prior consultation/agreement with Regions
- Duplicative UST reporting to OUST and ACS Measures Report
- ...

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HQ to Regional Interaction – Region 3

Example Issues Identified through the R3 Survey

▶ Data Integration (“Get Right at the Data”)

- Difficult to generate accomplishments reports that match up with annual commitments
- Data refreshes causing timing concerns (e.g. Priority Chemicals and the NPEP program)
- Real-time reporting needs for information collected in ACRES
- Potential “lag” up to several months between submittal of reported accomplishments data and the time it shows up on HQ reports
- Questions of functionality of several “search” features within systems and websites
- Linking SCORPIOS data and SDMS to facilitate availability of expenditure information and documents on Superfund sites
- ...

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Region III Guiding Principle

Program Office and Regions need to jointly solve the Ultimate Knowledge Management equation

Data + Context = Information

Information + Analysis = Knowledge

- Data accuracy
- Context in which data is presented
- Analysis Tools

- ▶ All must work in harmony to result in sound decisions.
- ▶ EA is the necessary technique to ensure this harmony

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HQ to Regional Interaction – Region 3

Moving Toward Solutions – Next Steps

- ▶ **Continue to Collect Survey Results / Feedback**
- ▶ **Synthesize Findings and Communicate Results Back to the Regional and HQ Program Offices**
- ▶ **Prioritize Based on Analysis of Findings**
 - Which issues appeared more than once?
 - Which issues span across multiple program offices?
 - Are there any quick wins?
- ▶ **Integrate HQ Analysis with Regional Findings**
 - Agency-shared services / Enterprise Tools
 - Target 'vision' for Land Quality Management
- ▶ **Follow-up with Survey Responders on the Path Forward**

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Region 5 Case Studies

Stephen Goranson
Chief, Office of Information Services

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HQ-Region Data Collaboration Opportunities

1. Data Collection & Data Quality Improvement

- Standards
- Completeness
- Accuracy

2. Data Discovery and Use

- Availability
- Accessibility

3. Data Integration

- Data layering & display applications
- Data analysis & modeling applications

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HQ-Region Data Collaboration: R5 Example Opportunities

1. Data Collection & Data Quality Improvement

- a. R5 SONS 07 Lessons Learned
- b. Incident / Remediation Tracking (CERCLIS-epaosc.net)
- c. Landfill Data
- d. 2002 - 2007 Ohio River Outfall Survey

2. Data Discovery and Use

- a. Leverage Exchange Network (HERE, HLS)
- b. Emergency Response Web Sites (WebEOC, Geospatial Data Gateway)

3. Data Integration

- a. Layering & Display Tools (ISA, ER Analyzer, ArcGIS Explorer)
- b. Data Analysis & Modeling Tools (FIELDS, RATS, NEPAAssist)

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1. Data Quality Improvement: a.) R5 SONS 07 Lessons Learned

- ▶ Reviewed data bases needed for ER **and** rank order by need to improve (**accuracy, completeness, accessibility**)
- ▶ Separated EPA purchased or acquired versus Program databases
- ▶ Examples: FRS, UST, Landfills, PWS

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1. Data Quality Improvement: b.) Incident/Remediation Tracking (CERCLIS <-> epaosc.net)

Background:

- ▶ Data from epaosc.net extract was lacking (lat/long, start & completion dates, authority, action)
- ▶ Explored ER Analyzer for its capabilities
- ▶ Extracted CERCLIS removal data to get a more complete set of locations and dates

Challenges:

- ▶ How do we capture/improve non-removal data?
 - Pre-deployments
 - Exercises
- ▶ How do we capture/improve Oil Pollution Act data?
- ▶ How do we reconcile epaosc.net data with systems like CERCLIS?

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1. Data Quality Improvement c.) Landfill Data

Non-hazardous Waste Landfills

- ▶ A data gap identified during SONS07:

Get the right data

- ✓ States manage this data

Get the data right

- ✗ 41% of facilities not in FRS

Get the data right now

- ✗ online in static PDFs

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Processing Landfill Data

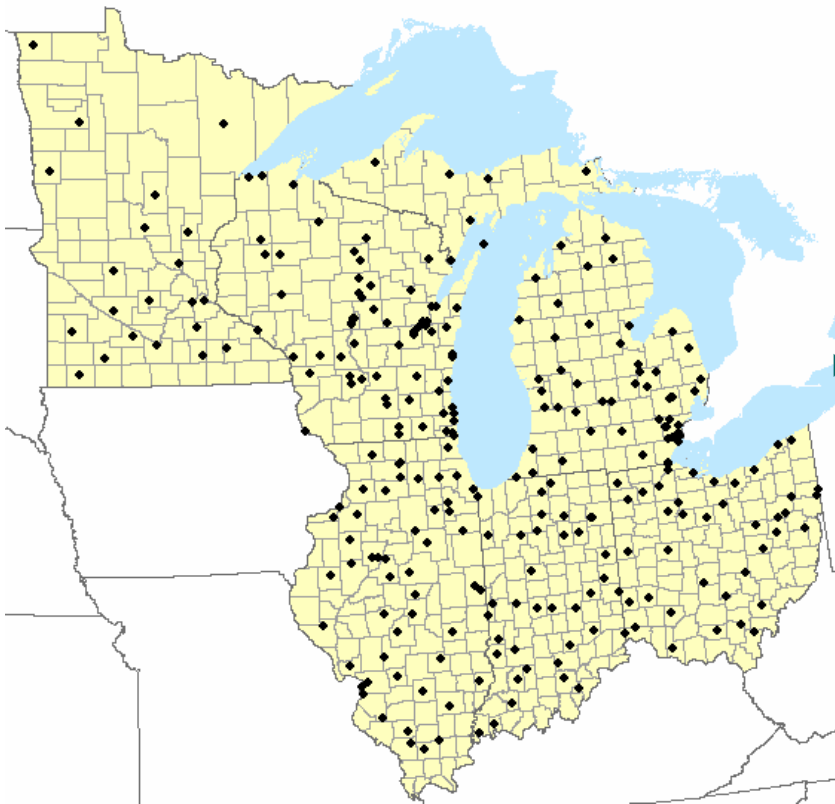
- ▶ **Data download/lookup/verification very time-consuming = approx. 80 man-hours**
- ▶ **Not realistic for larger datasets i.e. Tanks**
- ▶ **All of this data processing makes a quality dataset with accurate latitude/longitude coordinates**
- ▶ **Other sources like private sector databases could be substituted, except**
 - These datasets are generally older
 - Require subscription \$\$

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Municipal Solid Waste Landfills In Region 5



▶ SHORT TERM (good)

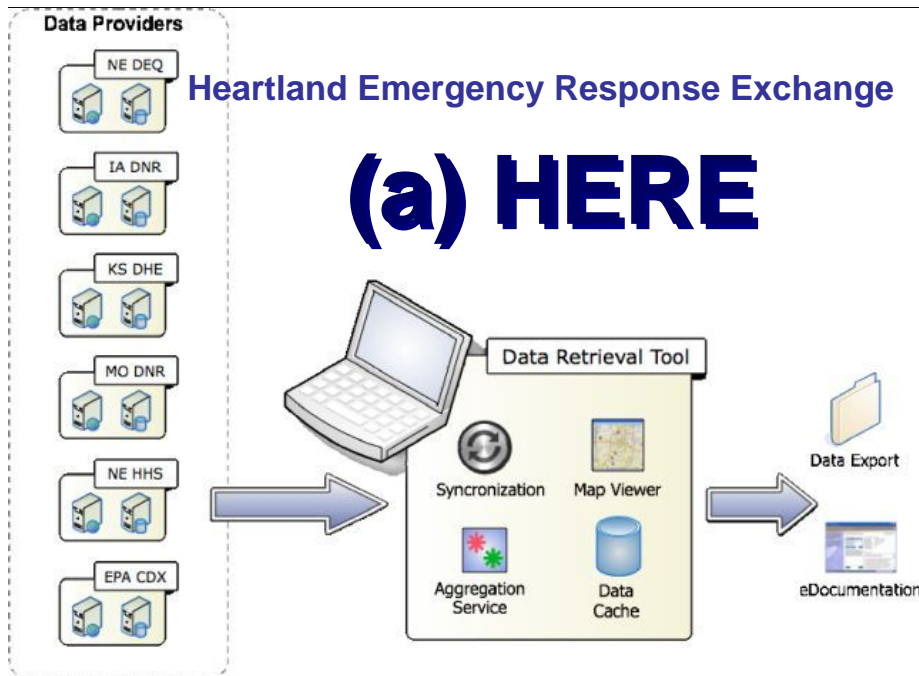
- Gather data from state websites
- Format into GIS data layer (SDE or geodatabase)
- Publish to EPA Geodata Gateway
- Usually have restrictions on sharing data outside EPA or Federal community

▶ LONG TERM (better!)

- Link state databases to EPA through Exchange Network nodes
 - MSW Landfills
 - Construction & Demolition Landfills
 - Underground Storage Tanks
- Expand Heartland Emergency Response Exchange to Region 5

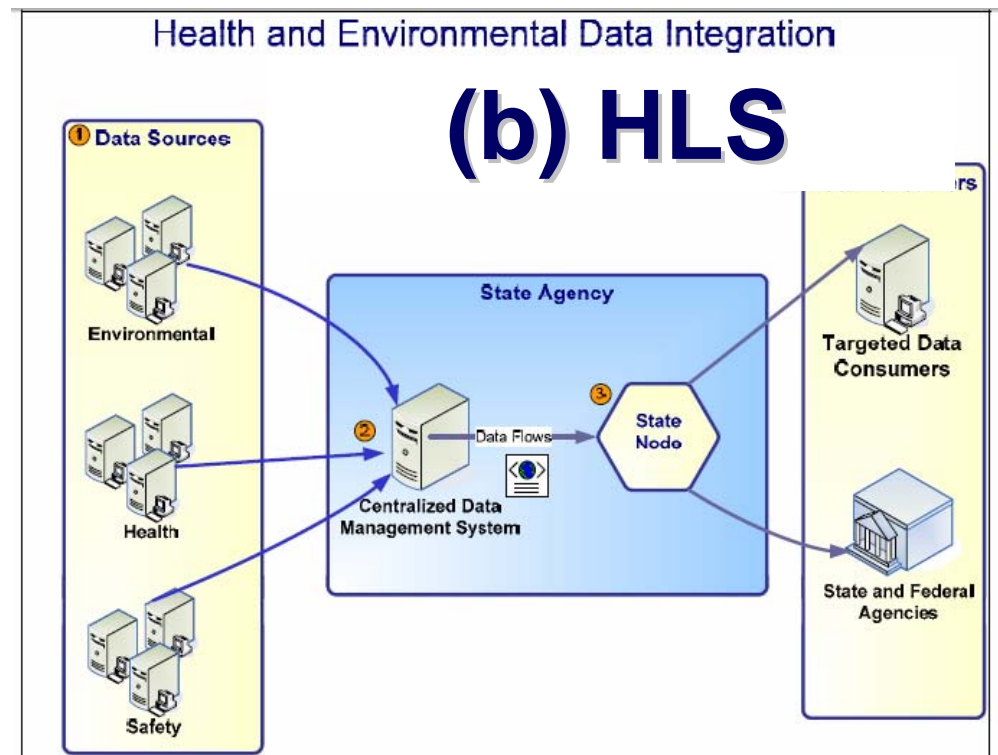
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2. Data Discovery and Use: a.) Leverage Exchange Network



R7, NE, IA, KS, MO):

<http://www.exchangenetwork.net/exchanges/cross/here.htm>



R1, R2, R5 Homeland Security (MI, ME, NH, NJ):

<http://statesdx.net/homelandsecurity/pages/public/background.htm>

2. Data Discovery and Use: b.) Emergency Response Web Sites

- ▶ **On-Scene Coordinator Web Site (WebEOC):**

<http://www.epaosc.net/webeoc.htm>

- ▶ **Geospatial Gateway site:**

<http://geogateway.epa.gov/Portal>

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3. Data Integration: a.) Layering & Display Tools

- ▶ Inland Sensitivity Atlas (ISA)
- ▶ DHS HSIP Gold 2005
- ▶ **Response to Midwest Floods, August:
(e.g., ArcGIS Explorer 9.2)**
- ▶ **Use of existing tools (e.g, ER Analyzer)**
- ▶ **Development of ER-Assist application**
- ▶ **Future uses of Google Earth, Virtual Earth**


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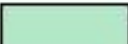
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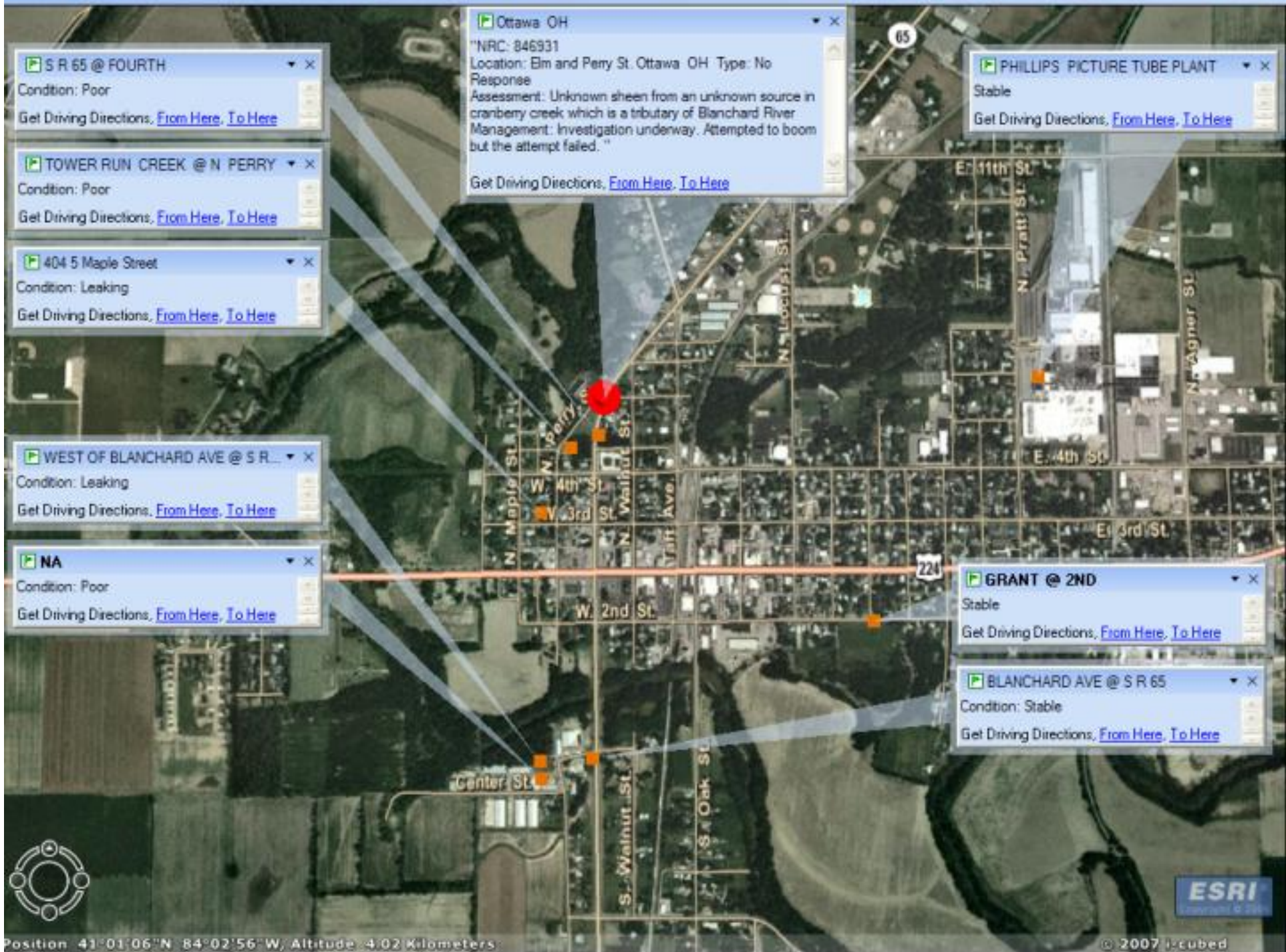
 **NRC Locations of Interest**

 **NPL Locations of Interest**

The screenshot displays an ArcGIS application window with several panels and a map. On the left, the 'Task Center' panel lists tasks such as 'Find Place', 'Find Address', and 'Get Driving Directions'. Below it, the 'Results' panel shows a list of items including 'NPL Round 3.csv', 'NPL Round 2', 'Midland, MI', '136 N. Main Street', and 'hancock%20county%2003'. The 'Contents' panel at the bottom left shows layers like 'In Range', 'FEMA_Flood', 'Transportation', 'Imagery', 'Out of View', and 'Boundaries and Places'. The main map area shows a satellite-style view with two flood plain overlays: a light green area representing the 'FEMA 500 Year Flood Plain' and a darker green area representing the 'FEMA 100 Year Flood Plain'. A red pin is placed on the map near the town of Finley, OH. A pop-up window titled 'Finley OH' provides details for an NRC incident: 'NRC: 846527 Location: 5 East Main Cross Street Finley OH 45840 Hancock County Type: EPA responded Assessment: There was a spill of materials from two storage tanks inside of the auto repair shop due to flooding in the area. Management:'. An inset window titled 'hancock%20county%2003_h...' shows a photograph of numerous paint cans and other containers stacked outdoors. The bottom of the map shows the position coordinates: 'Position: 41°02'12"N 86°38'59"W, Altitude: 4.96 Kilometers' and the ESRI logo with '© 2007 3-cubed'.

 **FEMA 500 Year Flood Plain**

 **FEMA 100 Year Flood Plain**



Ottawa OH
 "NRC: 846931
 Location: Elm and Perry St. Ottawa OH Type: No Response
 Assessment: Unknown sheen from an unknown source in cranberry creek which is a tributary of Blanchard River
 Management: Investigation underway. Attempted to boom but the attempt failed."
 Get Driving Directions: [From Here](#), [To Here](#)

PHILLIPS PICTURE TUBE PLANT
 Stable
 Get Driving Directions: [From Here](#), [To Here](#)

S R 65 @ FOURTH
 Condition: Poor
 Get Driving Directions: [From Here](#), [To Here](#)

TOWER RUN CREEK @ N PERRY
 Condition: Poor
 Get Driving Directions: [From Here](#), [To Here](#)

404 5 Maple Street
 Condition: Leaking
 Get Driving Directions: [From Here](#), [To Here](#)

WEST OF BLANCHARD AVE @ S R...
 Condition: Leaking
 Get Driving Directions: [From Here](#), [To Here](#)

NA
 Condition: Poor
 Get Driving Directions: [From Here](#), [To Here](#)

GRANT @ 2ND
 Stable
 Get Driving Directions: [From Here](#), [To Here](#)

BLANCHARD AVE @ S R 65
 Condition: Stable
 Get Driving Directions: [From Here](#), [To Here](#)

3. Data Integration: b.) R5 Data Analysis & Modeling Tools

- ▶ RATS

<http://epa.instepsoftware.com/rat/>

- ▶ FIELDS

<http://www.epa.gov/region5fields/>

- ▶ NEPAssist

<http://r5gisintra2.r05.epa.gov/nepa/>

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Concluding Thoughts

- ▶ Information is the major asset for decision making
- ▶ Communications and Partnerships
- ▶ Effective & efficient data sharing depends on:
 - ✓ Overall organization **support** and momentum
 - ✓ Information infrastructure that is **tied** to organization **goals, objectives & measures**
 - ✓ Developing useful, understandable, and comprehensive **data standards**, data **documentation**, and data **content quality** that can be **integrated** into multiple program data
 - ✓ Clear policies & guidelines on appropriate **security & confidentiality**

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Architecting Solutions

Lisa Jenkins
Lead Architect, OSWER

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Architecting Solutions

Several Areas for Consideration:

- ▶ **How do you effectively document and communicate a problem and its solution?**
 - 1.) Know your audience – addressing business AND technology stakeholders
 - 2.) Take a business-driven, inclusive approach to defining an issue
 - 3.) Leverage a framework that captures and links both business and technical analysis
 - 4.) Provide a 'Line-of-Sight' from the business need to the technical solution that addresses the need

- ▶ **What resources and/or background information is relevant?**
 - Agency-wide Enterprise Tools (“build once, use many”)
 - Knowledge of Services Oriented Architecture (SOA) approach to “Enable to Share”
 - Focus on building upon what is already there
 - Try not to think in a ‘stove-piped’ manner

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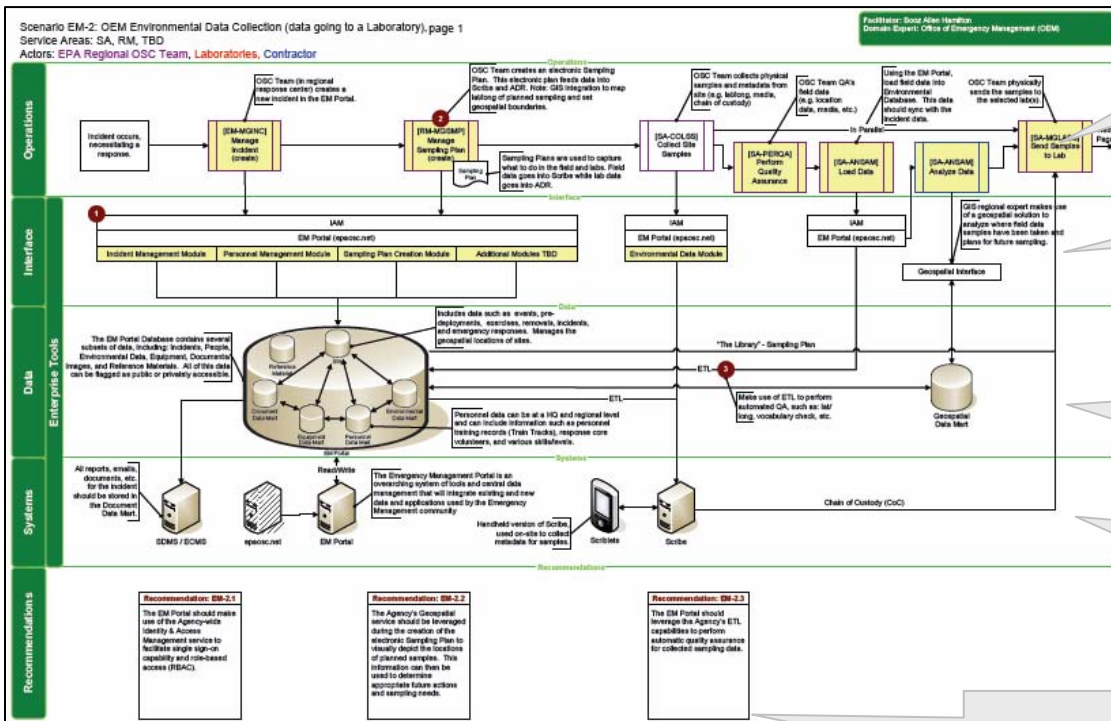


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Architecting Solutions – OSWER’s Approach

OSWER’s Framework to Capture and Link Business to Technology

Multi-dimensional Recommendations Views (MRVs)



Operations – Depicts an operational scenario that would be affected by the solution

Interface – Identifies user interaction with data and systems

Data – Highlights high-level data repositories

System – Shows how systems play a role in the target architecture

Recommendations – Summarizes actionable steps to transition towards the target environment shown in the MRV

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Summary / Next Steps

Where to go from here...?

- ▶ **Work with R3 and R5 to incorporate the solutions into OSWER's Segment Architecture**
 - Create and Validate MRVs for the pain-points identified in R3 and R5
 - Continue to work and communicate with R3 and R5 and our OSWER offices for Superfund, Brownfields, Emergency Management, etc.
 - Architect → Invest → Build

- ▶ **Identify other Regions and HQ Offices willing to participate**
 - Identify solutions that span across Regions
 - Identify pain points and solutions that span across HQ Offices
 - Integrate solutions into OSWER's Transition Strategy and Sequencing Plan and Target Architecture

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Open Forum Discussion / Q&A

- ▶ **Do you have any other “pain points at the touch points” between OSWER HQ applications, data or processes you would like to share?**
- ▶ **Any questions?**

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