COMPREHENSIVE ENVIRONMENTAL DATA SYSTEM (CEDS)

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Innovation and Partnership

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Philadelphia, Pennsylvania
#EN2017
http://www.exchangenetwork.net/en2017
ABSTRACT

VADEQ has completed the modernization of its Comprehensive Environmental Data System (CEDS) application rewrite was initiated to fulfill a requirement for compliance with a Commonwealth security standard but also provided conversion of legacy Oracle Forms and Reports modules to an n-tier, mobile-ready architecture. The new CEDS integrates enterprise content management, geographic information system, Oracle EBIZ financials, and CEDS data allowing a comprehensive view of facilities and permits across agency environmental media. It communicates with DEQ's other applications, the U.S. Environmental Protection Agency and citizens via the web. The scope of the project included internal data management and sharing but also improved the ability of the agency to respond to data requests from citizens, other states and the Environmental Protection Agency.
What is CEDS?

Comprehensive Environmental Data System

Single Repository for Permitting, Compliance, and Inspections data for Air, Water, Land (SW)

Also includes TMDL, WQMA, Petroleum Tanks, and Enforcement Modules

Y2k Project

Uses “Core Facility Model”..... with some exceptions

Oracle Db with UI originally developed in Oracle Forms and Reports 1997 – 2002
Legacy CEDS Structure
CEDS Modernization Effort

Revamp of entire system (~50 modules / 150 DB tables, 5 schema)

Effort began ~March 2015

Had to be complete no later than August 2016 due to Virginia Information Technology Agency (VITA) Security mandate

Strategy

- Use a common framework & reusable patterns
- Break functionality into smaller pieces
- Develop iteratively
- Break down the walls between Business and IT
- Don’t neglect user adoption
- Add/Update Business functionality where practical
CEDS Modernization-Portfolio Iteration Plan

2015

- Permitting/App fees
  - 12/14 – 3/15
  - 4/15 – 10/15

- Emissions inventory
  - 4/15 – 10/15

- Water U/I
  - 3/15 – 7/15

- Stormwater
  - 5/15 – 7/15
  - 6/15 – 10/15
  - 6/15 – 11/15

- BMP Collection & Upload
  - 6/15 – 11/15

- VPOCS IP & GP
  - 6/15 – 11/15
  - 7/15 – 12/15

- TMDL
  - 7/15 – 12/15
  - 3/15 – 3/16

- Animal Waste Program
  - 3/15 – 1/16

- Compliance & Informal Enforcement
  - 3/15 – 1/16

- Site Based Core
  - 3/15 – 1/16
  - 3/15 – 3/16

- VAP
  - 3/15 – 3/16

- VPA
  - 3/15 – 3/16

- WLD & Waga
  - 3/15 – 8/16

- Solid Waste U/I
  - 3/15 – 3/16

- Permitting
  - 3/15 – 3/16

- Compliance
  - 3/15 – 3/16

- Tanks U/I
  - 3/15 – 3/16

- Remediation
  - 3/15 – 3/16

- Reimbursement
  - 3/15 – 3/16

- Legl
  - 3/15 – 3/16

- Annual Billing
  - 3/15 – 3/16

2016

- Air Modernization

- Water Modernization

- Solid Waste Modernization

- Tanks Modernization

- Other CEDS Modernization
From this ....

<table>
<thead>
<tr>
<th>Facility</th>
<th>ID: FAC_ID</th>
<th>Facility contains info for following Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name:</td>
<td>FAC_NAME</td>
<td>Air</td>
</tr>
<tr>
<td>Location:</td>
<td>FAC_LOCATION</td>
<td>Water</td>
</tr>
<tr>
<td>Location (physical) Address:</td>
<td>FAC_L_ADDR_1</td>
<td>Waste</td>
</tr>
<tr>
<td></td>
<td>FAC_L_ADDR_2</td>
<td>Petroleum</td>
</tr>
<tr>
<td></td>
<td>FAC_L_ADDR_3</td>
<td>Air Check</td>
</tr>
<tr>
<td>City:</td>
<td>FAC_L_CITY</td>
<td>P2</td>
</tr>
<tr>
<td>FIPS:</td>
<td>FAC_FI</td>
<td>DSP_FIC_DESCRIPTION</td>
</tr>
</tbody>
</table>
|                |           | Zip Code: FAC_L_ZIP |}

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<table>
<thead>
<tr>
<th>Air Facility</th>
<th>Plant Name: FAC_NAME</th>
<th>Physical Plant Code: FAC_PHYSICAL_CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region: PLA_REC</td>
<td>Reg No: PLA_REG</td>
<td>UnReg: PLA_REG_FALSE</td>
</tr>
<tr>
<td>SIC: PLA_SIC</td>
<td>NAICS: PLA_NAICS</td>
<td>Principal Product: PLA_PRINCIPAL_PRODUCT</td>
</tr>
<tr>
<td>Primary Code: PLA_PRIMARY_CODE</td>
<td>Assigned Inspector: DSP_DES_FIRST_NAME</td>
<td>DSP_DES_LAST_NAME</td>
</tr>
<tr>
<td>Soc. Code: PLA_SOC_CODE</td>
<td>No. of Employees: PLA_N</td>
<td>Property Area (Acres): PLA_PHUP</td>
</tr>
<tr>
<td>Tertiary Code: PLA_TERTIARY_CODE</td>
<td>Billing Type: DSP_BILLING_TYPE</td>
<td>Operational Status: OPERATING_CODE</td>
</tr>
<tr>
<td>Govt. Facility: PLA_GOV_FAC</td>
<td>Plant Classification: ST_POLL_CLASS</td>
<td>Compliance Status: ST_POLL_COMPL_STAT</td>
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</tbody>
</table>

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<table>
<thead>
<tr>
<th>General</th>
<th>Permit</th>
<th>Compliance &amp; Enforcement</th>
<th>Emissions</th>
<th>Source Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emissions Unit</td>
<td>Permit</td>
<td>Applicable Requirements</td>
<td>Air Inspection</td>
<td>Emissions Inventory</td>
</tr>
<tr>
<td>Air Program</td>
<td>Allowables</td>
<td>Events</td>
<td>Targeting Data</td>
<td>Enforcement</td>
</tr>
</tbody>
</table>
To this....
Innovations in plain sight

Integration with Document Management (ECM)
• Allows user to immediately view documents related to that record

Badges to determine status, associations, etc.

Integration with Geographic Information System (GIS)
• Allows user to plot GIS location when entering the record
• Uses high res (>1:4800) imagery for accuracy of plotting
• Derives location data such as watershed info (Basins, HUCs, etc.), county, zip, lat-Long, topo map, DEQ Region,.....
• Provides buffer to other GIS layers and Driving directions

Ties to Oracle eBusiness Suite
• Billing & payment information for application fees, permit fees, etc.

Hyperlinks to other records, modules, systems
Action Buttons to kick off workflows
Innovations behind the scenes

Overhauled our App Development Process

Established a PMO
- DEQ PM, BSA, & DEQ “Architect” oversight on contracted projects

Developed an Agile/Iterative development process
- 2-4 weeks/"Release" 4-6 months/"Iteration" until complete
- Weekly standing meetings (status/demo)
- 3 week deployment to production cycle
- View-only version of UI 1st
- 15 Parallel Dev & Test Environments

Implemented some new tools
- Project Issue Tracker ("the PIT")
- Portfolio and resource management
- Git - versioning /Team City - builds

Heavy dependence on reusable patterns, processes, components, and APIs
## Final Plan

### CEDS Modernization-Portfolio Iteration Plan

<table>
<thead>
<tr>
<th>Date</th>
<th>Task Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/14/14</td>
<td>Compliance Enforcement/Inspections</td>
</tr>
<tr>
<td>8/14/15</td>
<td>Permitting/App Fees</td>
</tr>
<tr>
<td>9/15/15</td>
<td>Emissions Inventory</td>
</tr>
<tr>
<td>10/15/15</td>
<td>WATER MODERNIZATION</td>
</tr>
<tr>
<td>11/15/15</td>
<td>TMQI, HiP, HiA</td>
</tr>
<tr>
<td>12/15/15</td>
<td>Storm Water</td>
</tr>
<tr>
<td>1/16/16</td>
<td>MXS/Emissions Compliance/Informal Enforcement</td>
</tr>
<tr>
<td>2/16/16</td>
<td>SOLID WASTE MODERNIZATION</td>
</tr>
<tr>
<td>3/16/16</td>
<td>Compliance</td>
</tr>
<tr>
<td>4/16/16</td>
<td>WATER MODERNIZATION</td>
</tr>
<tr>
<td>5/16/16</td>
<td>WATER MODERNIZATION</td>
</tr>
<tr>
<td>6/16/16</td>
<td>WATER MODERNIZATION</td>
</tr>
<tr>
<td>7/16/16</td>
<td>WATER MODERNIZATION</td>
</tr>
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<td>8/16/16</td>
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<td>11/16/16</td>
<td>WATER MODERNIZATION</td>
</tr>
<tr>
<td>12/16/16</td>
<td>WATER MODERNIZATION</td>
</tr>
</tbody>
</table>

### Compliant Inspections

- 3/15/16
- 6/15/16
- 9/15/16
- 12/15/16

### Water Utilities

- 3/15/16
- 6/15/16
- 9/15/16
- 12/15/16

### Storm Water

- 3/15/16
- 6/15/16
- 9/15/16
- 12/15/16

### MXS/Emissions Compliance/Informal Enforcement

- 3/15/16
- 6/15/16
- 9/15/16
- 12/15/16

### Solid Waste Utilities

- 3/15/16
- 6/15/16
- 9/15/16
- 12/15/16

### Operations

- 3/15/16
- 6/15/16
- 9/15/16
- 12/15/16

### Compliance

- 3/15/16
- 6/15/16
- 9/15/16
- 12/15/16

### Other CEDS Modernization

- 3/15/16
- 6/15/16
- 9/15/16
- 12/15/16
Results

Provided a standard, modern, scalable, secure, and reliable agency-wide framework that meets DEQ’s needs and supports its business processes.

Consistent architecture utilizing current .NET technologies and web frameworks leveraged to replace aging systems.

Improved the end user experience with a clean design in a consistent and fully integrated application suite.

Developed agency outreach strategy to improve end user adoption, communication, and training.

Modular development approach to attack large scale rewrite in manageable, less risky, fixed price chunks.

Streamlined the deployment process (from 2 hours to 10 minutes!)

Won Virginia’s 2016 Governor’s Technology Award
(Innovative Use of Big Data and Analytics)
Some “Take-Aways”

“Needs” and “Requirements” are in the eye of the beholder
You LEAN before We Build
Change is hard; what was hated becomes loved when you take it away
The more you give, the more they want; and that’s not always a bad thing
Success can be measured by how quickly the phone rings
You can never thank your staff enough, but there actually can be “too much cake”