AV-12: 10 Tips for Success at a Large Complex Government Construction Project: Avantis Implementation, Usage, and Future Plans at NYC DEP (Water Utility)

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Schneider Electric 2014 Software Global Customer Conference
September 30, 2014 - October 2, 2014
Orlando, FL
Mobile App: Please take a moment...

Check into Session by:
• Select Detailed Schedule
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• Select the specific session
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DEP’s mission is to protect public health and the environment by supplying clean drinking water, collecting and treating wastewater, and reducing air, noise, and hazardous materials pollution.
The mission of the Bureau of Water Supply is to reliably deliver a sufficient quantity of high quality drinking water to protect public health and quality of life of the City of New York.
• Primarily a surface water supply

• System capacity: 580 billion gallons

• Serves 9 million people
  (half the population of New York State)

• Source of water is a 2,000 square mile watershed in parts of 8 counties
BWS Operations

• Eastern Operations
  ‒ Eastview Region
    • Cat/Del UV Facility – initial BWS Avantis implementation
    • Avantis Site EV
  ‒ Kensico Region
  ‒ Highlands Region

• Western Operations

• Wastewater Treatment Plants
Catskill/Delaware UV Facility in Valhalla, NY

- Drinking water disinfection using ultraviolet light
- Treats, on average, 1.2 BGD
- 50 staff dedicated to the plant
Challenges at Cat/DeI UV

The challenges of implementing Avantis CMMS for the world’s largest ultraviolet light water disinfection facility, a large and complex construction project:

- Avantis CMMS was a late contract addition
  - Maintenance Module
  - Inventory Module
  - Procurement Module
- Initial submittals contained
  - Data errors
  - Duplications
  - Omissions
- Contractors and construction managers not too interested in long-term operation of the facility
Solutions for Meeting the Challenges

10 tips for Avantis implementation success are...
1. Targeted Communication

- Hold frequent CMMS Workgroup meetings (e.g. BWS, BEDC, CMJV)
- Structure contractor inputs
- Monitor progress
2. Focused Personnel

Initial Avantis Core Team of UV personnel
- Engineering
- IT
- Maintenance
- Operations
- Procurement
- Management

Participate in
- Training
- System Definition
- Testing
3. DataPilot Sheet Population Process

- An evolving QC process
- Data flow & interactions described in flowchart
- Field definitions described in table, like a data dictionary
4. “Smart” Entity Numbering

- An Entity is anything that we track information about, i.e. it could be a real or virtual/organizational asset
  - ED Valve #4
  - Acid Cleaning System

- Equipment is *typically* listed by Tag No. (area code - equipment type - number)
  - 4101-UVU-001
  - 4301-MBFV-014
  - 2800-EWU/ES-001
5. Use of a Large Hierarchy “Poster”

- Very useful Visual for review and refinement
- Concatenate Avantis fields in Excel as follows:
  - NAME = Entity Type - Entity Number
  - REPORTS TO = Entity Type - Entity Number (of parent)
  - TITLE = Entity Name
- Import Organization Data in Visio, then format and plot
6. Customized process flowcharts

- Describe system functionality
- Useful for Staff
  - Testing
  - Training
  - Troubleshooting
7. Don’t sacrifice functionality for perfection

- Define a date, after which focus will be on testing system functionality
- Agree to note any data issues found and MOVE ON
- Correct data after testing

![Calendar showing June 2012 with dates 8, 17, and 24 highlighted.]

- Load all DataPilot sheets

  <FULL SYSTEM TEST->
8. Active User Participation in Development

- Develop Value Lists
  - Entity Classification (e.g. checkboxes)

- Define User Roles

- Correct PM Tasks

- Participate in System Testing
  - Maintenance Crew
  - Instrumentation Crew
  - Operations crew

- Refine printed Work Order
9. Detailed Tracking of Findings

Use coded Excel spreadsheet to keep track of things found during testing:

- Errors
- Questions
- Improvements
- Data problems
- Resolutions
- Avantis cases with Invensys

<table>
<thead>
<tr>
<th>DATE</th>
<th>TYPE</th>
<th>RESPONSIBLE</th>
<th>FINDING FROM JUNE 2012 SYSTEM TEST</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/11/2012</td>
<td>Error</td>
<td>Eric</td>
<td>Message &quot;The GL Account Entry is incorrect&quot; when issuing 101014 to 100053-1 on handheld.</td>
<td>Added template in Avantis</td>
</tr>
<tr>
<td>6/11/2012</td>
<td>Error</td>
<td>Piero</td>
<td>Add the Requestor name on the work order cabinet view.</td>
<td>Added WR requestor on all views.</td>
</tr>
<tr>
<td>6/11/2012</td>
<td>Question</td>
<td>Chris</td>
<td>How do we prevent the Zebra printer from feeding 4 labels every time it powers on?</td>
<td>Adjusted settings for power-on, still feeds after closing print head, but that's OK.</td>
</tr>
<tr>
<td>6/11/2012</td>
<td>Error</td>
<td>N/A</td>
<td>Work order requirements time per trade column is too wide (units cut off).</td>
<td>Avantis will remember after the first widening by the user.</td>
</tr>
<tr>
<td>6/11/2012</td>
<td>Error</td>
<td>N/A</td>
<td>DEP Pick Lists cabinet column too narrow (pick list number).</td>
<td>Avantis will remember after the first widening by the user.</td>
</tr>
<tr>
<td>6/11/2012</td>
<td>Error</td>
<td>Ryan Brian</td>
<td>Missing &quot;Consequence of Failure&quot; selections 5 and 6 on printed work order.</td>
<td>Get actuals of the last two consequences.</td>
</tr>
<tr>
<td>6/11/2012</td>
<td>Error</td>
<td>N/A</td>
<td>Work Request column too narrow (does not retain widening?).</td>
<td>Have trouble duplicating this, may depend on screen settings.</td>
</tr>
<tr>
<td>6/11/2012</td>
<td>Error</td>
<td>N/A</td>
<td>Initial descending sorting of DEP Work Order Tasks 2-Open Backlog was not correct.</td>
<td>Maybe we were looking at the crew view, this seems to work ok.</td>
</tr>
<tr>
<td>6/11/2012</td>
<td>Question</td>
<td>N/A</td>
<td>How do we cancel or delete a schedule?</td>
<td>Must have no linked work tasks, then use File Delete.</td>
</tr>
<tr>
<td>6/11/2012</td>
<td>Question</td>
<td>N/A</td>
<td>Can weekly schedules (e.g. M, I, O) be coordinated or synchronized somehow?</td>
<td>No, but we could just make one for both Ed and Chris (only one editor at a time)</td>
</tr>
<tr>
<td>6/11/2012</td>
<td>Question</td>
<td>N/A</td>
<td>Can substitute approver be a group of users?</td>
<td>No, only one user gets the substitute approval at a time.</td>
</tr>
<tr>
<td>6/11/2012</td>
<td>Question</td>
<td>N/A</td>
<td>Work order Description - Can we prevent loss of existing comments?</td>
<td>No, Should only be initial request and planner's additions.</td>
</tr>
<tr>
<td>6/11/2012</td>
<td>Data</td>
<td>Gary</td>
<td>Want to add all 9th precinct PM's to Avantis (currently in MP2; see Jim Fox).</td>
<td>Request was not made until testing, will have to do at a later date</td>
</tr>
<tr>
<td>6/11/2012</td>
<td>Error</td>
<td>Ryan Brian</td>
<td>Task description is cut off slightly on the printed Work Order.</td>
<td>See new version of Crystal report.</td>
</tr>
<tr>
<td>6/11/2012</td>
<td>Error</td>
<td>Ryan Brian</td>
<td>Work order printed bar codes do not scan correctly.</td>
<td>See new version of Crystal report; pick list still NG.</td>
</tr>
<tr>
<td>6/11/2012</td>
<td>Comment</td>
<td>N/A</td>
<td>The system is very slow, will consume much time just waiting for screens.</td>
<td>SEE's want to time Piero executing the entire maintenance flow.</td>
</tr>
</tbody>
</table>
10. Comprehensive Hands-on User Training

CMMS Module 1
Avantis Basic Training
Cat-Del UV Light Disinfection Facility

Gary Banks, PE
March 2013

CMMS Module 2
Avantis Maintenance Training
Cat-Del UV Light Disinfection Facility

Gary Banks, PE
March 2013

CMMS Module 3
Avantis Advanced Maintenance Training
Cat-Del UV Light Disinfection Facility

CMMS Module 7
Avantis System Administrator Training
Cat-Del UV Light Disinfection Facility

Piero Baldassarra
August 2012

Avantis CMJV Mobile Inventory Training
Cat-Del UV Light Disinfection Facility

Gary Banks
December 2012
Implementation at Cat/Del UV

- Went “live” August 2012 (really a “soft” go live)
- Closing PM work orders since January 2013
- Over 36,000 Entities loaded so far
- Over 2,800 Inventory Items
- 223 PM Job Tasks
  - New ones for UV facility (mostly from contractors)
  - Migrated from existing MP2 for police precinct
- Weekly Maintenance and Instrumentation schedules
Continued Implementation

• Inventory Control
  – Issuing/receiving office supplies since October 2013
  – Began issuing other items (e.g. spare parts) in July 2014
  – Mobile Inventory with
    • Motorola handheld barcode scanners
    • Zebra barcode printers

• Corrective Maintenance work orders
  – Since June 2014
  – Direct WO creation
  – Hardcopy form

• Ongoing implementation
  – Continue to load, link, & trigger more PM’s
  – Correct Entities and load more as needed
  – Optimize Hierarchy (e.g. create “assembly” Entities)
Lessons Learned

• Place enough focus on Inventory (e.g. our “Supervisor of Stock Workers” did not start until Jan. 2014)
• Use decent laptops for testing and training
• Include some Crystal Reports training early-on
• Have an efficient way to manage contractors
• Create a more flexible UOM Value List, to better handle packaging differences, like office supplies
• Do some research (e.g. good to have achievable goals)
Future Plans – Eastview

- Continue testing Citrix interface
  - Expecting to use Avantis at low-bandwidth facilities
- Upgrade to Avantis version 5.1 (from 5.0.5)
- Adopt iPads
  - Almost done testing Mobile Maintenance ("VIP")
- Daily rounds (operations and maintenance)
- Adopt some simple reporting using Crystal Reports
  (e.g. open Work Order Tasks)
- Refresher training for all users
- Install Condition Monitoring
  - 250 “managed conditions” from SCADA
- Optimize PM structure
  (e.g. “suppression” for quarterly and semi-annual fan tasks)
Future Avantis Plans – All BWS Operations

• Manage daily delivery of New York City’s water
• Ensure compliance with various operating rules
• Many entities will be required to maintain infrastructure
  – Over 280 water supply facilities
  – 19 reservoirs, 3 controlled lakes
  – 36 shafts
  – 57 bridges & 99 miles of roads
  – 300 miles of Aqueducts
  – 7 wastewater treatment facilities and collection systems
  – 29 water supply dams, 69 small dams
  – Chlorination
  – Dechlorination
Rollout to entire Bureau of Water Supply

- Support all functions of
  - Western Operations
  - Wastewater Treatment Plants
  - Water Quality

- 3-year agreement with Schneider Electric
  - Additional licenses
  - Consulting services

- Develop implementation plan, including
  - Work Order system
  - Inventory control system

- Review and consolidate existing PM’s from different locations
  - Employ consistent methodology
  - Migrate from MP2, Excel, paper forms
Any questions?
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEDC</td>
<td>Bureau of Engineering, Design, and Construction</td>
</tr>
<tr>
<td>BGD</td>
<td>Billions of Gallons per Day</td>
</tr>
<tr>
<td>BWS</td>
<td>Bureau of Water Supply</td>
</tr>
<tr>
<td>BWSEO</td>
<td>Bureau of Water and Sewer Operations</td>
</tr>
<tr>
<td>Cat/Del</td>
<td>Catskill Delaware</td>
</tr>
<tr>
<td>CM</td>
<td>Condition Manager</td>
</tr>
<tr>
<td>CMJV</td>
<td>Construction Management Joint Venture</td>
</tr>
<tr>
<td>CMMS</td>
<td>Computerized Maintenance Management System</td>
</tr>
<tr>
<td>DEP</td>
<td>Department of Environmental Protection</td>
</tr>
<tr>
<td>DEV</td>
<td>Development</td>
</tr>
<tr>
<td>DJV</td>
<td>Design Joint Venture</td>
</tr>
<tr>
<td>DP</td>
<td>DataPilot</td>
</tr>
<tr>
<td>ED</td>
<td>Energy Dissipating</td>
</tr>
<tr>
<td>Entity</td>
<td>Anything that we track information about; could be a real or organizational asset. Equipment Entities are typically listed as (area code)-(equipment type)-(number), e.g. 4101-UVU-001.</td>
</tr>
<tr>
<td>EV</td>
<td>Eastview Region (a “Site” as well as an “Entity” in Avantis)</td>
</tr>
<tr>
<td>FAC</td>
<td>Furnish as Corrected</td>
</tr>
<tr>
<td>FAS</td>
<td>Furnish as Supplied</td>
</tr>
<tr>
<td>FMS</td>
<td>Financial Management System</td>
</tr>
<tr>
<td>HL</td>
<td>Highlands</td>
</tr>
<tr>
<td>INV</td>
<td>Inventory</td>
</tr>
<tr>
<td>KS</td>
<td>Kensico</td>
</tr>
<tr>
<td>MBFV</td>
<td>Motorized butterfly valve</td>
</tr>
<tr>
<td>MGD</td>
<td>Millions of Gallons per Day</td>
</tr>
<tr>
<td>MP2</td>
<td>CMMS software from Datastream</td>
</tr>
<tr>
<td>NYC</td>
<td>New York City</td>
</tr>
<tr>
<td>OIT</td>
<td>Office of Information Technology</td>
</tr>
<tr>
<td>PCI</td>
<td>Product Catalog Item</td>
</tr>
<tr>
<td>PE</td>
<td>Professional Engineer</td>
</tr>
<tr>
<td>PM</td>
<td>Preventive Maintenance</td>
</tr>
<tr>
<td>PMCS</td>
<td>Process Monitoring and Control System</td>
</tr>
<tr>
<td>PO</td>
<td>Purchase Order</td>
</tr>
<tr>
<td>PROD</td>
<td>Production</td>
</tr>
<tr>
<td>QA</td>
<td>Quality Assurance</td>
</tr>
<tr>
<td>REQ</td>
<td>Requisition</td>
</tr>
<tr>
<td>RMP</td>
<td>Risk Management Program</td>
</tr>
<tr>
<td>SCADA</td>
<td>Supervisory Control and Data Acquisition</td>
</tr>
<tr>
<td>UOM</td>
<td>Unit of Measure</td>
</tr>
<tr>
<td>UV</td>
<td>Ultraviolet</td>
</tr>
<tr>
<td>UVU</td>
<td>UV Unit</td>
</tr>
<tr>
<td>WO</td>
<td>Work Order</td>
</tr>
<tr>
<td>WR</td>
<td>Work Request</td>
</tr>
</tbody>
</table>
Thank You

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