CHMEMS Software Transition Lessons Learned at the Savannah River Site

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Worker Safety & Health Working Group
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Purpose of Today’s Presentation

• Share the history of the SRS Chemical Management Program and WHY a software change
• Lessons Learned in Software Project execution
• Quick tour of the capabilities of CHMEMS Platform
ISMS Approach to the Task

- Scope of work (Implement software platform to solve tracking of containers)
- Hazards Analysis (What will cause this project to fail?)
- Establish controls (Mitigate the project risks)
- Execute work (Project)
- Feedback (This presentation)
History of the SRS Chemical Management Program

- 1994 Best Management Practice launch
- Incremental adoption of Functional Program obligations
- Leadership Role in support of DOE HQ Policy development
- “Best in Class” status by 2004
- 2008 drift starts:
  - People (retirements, headcount shifts, less than timely action to address changes)
  - Platforms (IT determination that Oracle did not align to future state)
  - Reporting Needs (Ad Hoc queries development not documented; knowledgeable generators in CMC and receivers in the field organizations both leave)
  - Program Performance (Hazard Communications focus)
  - Swiss cheese all lined up…….
Triggering Event #1 in March 2014

Improper Treatment of Gas Cylinders

- CMC let gas cylinder contract without complete programmatic reviews

- Vented cylinders without proper technical work documents

- *Root Cause:* CMC lack of disciplined Conduct of Operations
  - procedures
  - training
  - storage
  - inventory controls
  - tracking
  - reporting
Triggering Event #2 in April 2014

Improper Management of Excess Chemicals (Speculative Waste)

- Site organizations and facilities took advantage of excess materials program

- CMC did not assign time limit to received excess in disposition path

Root Cause: CMC focus on customer needs and expectations rather than proper CONOPS

The prime motivation for a software platform change was the tracking of containers to avoid speculative waste generation.
Corrective Actions

- Clear out facility inventories as waste (til 2017)
- Revise documents and stop taking excess chemicals into AMDO organization
- Conduct Effectiveness Review

SRNS-RP-2016-00667

Savannah River Nuclear Solutions
Asset Management and Distribution Operations

2014-CTS-007549 Corrective Actions
Effectiveness Evaluation
for
Chemical Commodity Management Center
and
Compressed Gas Cylinder Management
“Overall, the corrective actions outlined ....have been effective in preventing recurrence of issues and non-compliances in CMC and AMDO organizations.”

May 2017 assignment as Technical Advisor..... taking another look
Framing Requirements through Discovery 2017

- Used DOE Chemical Management Handbook Number 1 to assess execution

<table>
<thead>
<tr>
<th>Model Program Elements</th>
<th>Met</th>
<th>Partially Met</th>
<th>Not Met</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Program”</td>
<td></td>
<td>Not Met</td>
<td></td>
<td>Effective and integrated program meeting DOE requirements (Records</td>
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<tr>
<td></td>
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<td></td>
<td>Management, Data Quality, Self-Assessment) are lacking</td>
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<tr>
<td>Hazard Analysis</td>
<td></td>
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<td>Issue with FMTS Data Quality Assurance and Fire MAQs</td>
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<tr>
<td>Acquisition</td>
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<td>Issue with data maintenance supporting requisition process</td>
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<td>Inventory and Tracking</td>
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<td>FAPM accuracy of Real Time information by location and product hazard</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>class</td>
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<tr>
<td>Transportation</td>
<td></td>
<td>Indeterminate</td>
<td></td>
<td>None</td>
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<tr>
<td>Storage</td>
<td></td>
<td>Indeterminate</td>
<td></td>
<td>Needs further exploration regarding transition from useful in storage</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td>to move to disposal.</td>
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<tr>
<td>Control of Chemical Hazards</td>
<td></td>
<td>Not Met</td>
<td></td>
<td>Based on flammables inventory against Fire MAQs</td>
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<tr>
<td>P2/Waste Minimization</td>
<td></td>
<td>Not Met</td>
<td></td>
<td>Need policy on effort required to document decisions on product</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>substitution</td>
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<tr>
<td>Emergency Management</td>
<td></td>
<td>Indeterminate</td>
<td></td>
<td>Pending DOE Order 151.1D will impact FMTS</td>
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<tr>
<td>Disposal</td>
<td></td>
<td>Not Met</td>
<td></td>
<td>No ownership at the product container level, no forced sunset (“no</td>
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<td></td>
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<td></td>
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<td>longer needed”) date on products</td>
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<tr>
<td>Training</td>
<td></td>
<td>Not Met</td>
<td></td>
<td>No CSLM Training Program Description document</td>
</tr>
</tbody>
</table>
Framing Requirements through Discovery

- Found “drift” had negatively affected CMC

- Launched into discovery phase of meetings, discussions, documents review
Requirements Summary

Eleven Functional Area Programs need data!
- for hazards analysis
- for regulatory reporting
- for ad hoc reporting (serving assessments)

All needs are not met the same way
- content
- format
- frequency
# DOE Facility Operational Obligations per DNFSB 94-1

<table>
<thead>
<tr>
<th>FA 00</th>
<th>S/RID Purpose and Development</th>
<th>FA 11</th>
<th>Radiation Protection</th>
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<td>FA 01</td>
<td>Management Systems</td>
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<td>Fire Protection</td>
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<td>FA 02</td>
<td>Quality Assurance</td>
<td>FA 13*</td>
<td>Packaging and Transport</td>
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<td>Basis Report</td>
<td>Basis Edit</td>
<td>FA</td>
<td>Description</td>
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<td>Report</td>
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<td>Design</td>
<td>11 Radiation Protection</td>
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<tr>
<td>Report</td>
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<td>Management Systems</td>
<td>13 Emergency Management</td>
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<td>Report</td>
<td>04</td>
<td>Training and Quality Assurance</td>
<td>15 Nuclear Criticality Safety</td>
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<td>Report</td>
<td>06</td>
<td>Safety Documentation</td>
<td>16 Testing</td>
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<td>24 Waste Management</td>
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<tr>
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<td>25 Chemical Safety &amp; Lifecycle Management</td>
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<tr>
<td>Report</td>
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<td>27 Work Planning and Control</td>
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</tbody>
</table>
Conclusion of Program Status

• Extensive breadth of program elements
• Functional Program management belongs to others
• Simplification of program is challenging (huge culture shift)

Addressing all of this a parallel activity to software launch!
Evolution of Actions supporting the Software Project

• Arrival of project manager November 2017
• Schedule and scope discussions and tools
• Worked through Cyber security concerns
• Formalized training on software use to meet DOE Training Order obligations
• Identified chemical stakeholders needing roles in the new software
• Identified implications of system transition to regulatory reports (Tier II and Form R under EPCRA)
Evolution of Actions supporting the Project

- System “Go Live” November 27, 2018
- Initiated barcode labeling December 17, 2018 with February 14, 2019 deadline.
- Estimated 106,000 containers across 2500 validated locations
- Actual ~64,000 containers when we credited exemptions in the program for various reasons.
- Piloted system barcode printing execution (software to network interface, label stock problems)
Lessons Learned Part 1: Program (Chemical Management Obligations)

• No formal risk register

• Lack of a “good” requirements document

• Project schedule pressures

• Challenged to “constantly communicate” program changes affecting legacy stakeholders (CMC staff, Chemical Coordinators, etc.)
Lessons Learned Part 2: Project (PMP Assigned by Organization)

• Better served with external party to the organization driving the change

• Bypass funding owner chain of command when:
  – Driving culture change to “commercial practices outside of DOE” which force adoption of different business model
  – needing bad news delivered bluntly (risks of the program requirements to the project schedule)
  – needing to press senior leadership on risks of parallel activities (program change along with implementation of software) with transparency and accuracy of the picture.

• Lacked experience in what constituted good planning segregation documents of program versus project at the outset.
Successful Project Completion with forecast continuing improvements

• Learning the intricacies of software
• Integrating those 11 functional programs more thoroughly into the nuances of data creation and use
• Reconciling culture shift of the program to the functions of the software
• Responding to all the bumps in the road
Takeaways for your use

• This is not a new road; others have been here before

• Evidence, Part 1:
  Sort Out Your Software Solution by Dave Risi, December 2012 Synergist
  Strategies for Selecting an IH Software Solution by Monica Melkonian, April 2013
  Synergist and
  Making the Most of Your IH Data September 2013

All these available at AIHA website Synergist Link
https://www.aiha.org/publications-and-resources/TheSynergist/Pages/default.aspx
Requires log in as a member.
Takeaways continued

Evidence:

– Selling Enterprise Risk to those dependent upon the data you hold (a “less than successful project” risks a “less than effective program” in implementation)
Takeaways

Sell the Culture Shift that comes with COTS Solution
Build a Team
Start early
Communicate everywhere and often
Accept less than perfection and adopt a positive attitude to continuous improvement (projectize successive efforts at incremental improvement)
Questions?