

PREPARING THE FUTURE

# PORTS

D&D PROJECT



**Dennis Carr**

Fluor-B&W Portsmouth LLC  
Site Project Director



## Cleanup challenges:

- Reducing mortgage costs
- Driving Critical Path Performance



X-326: 2,340 Stages, U up to HEU

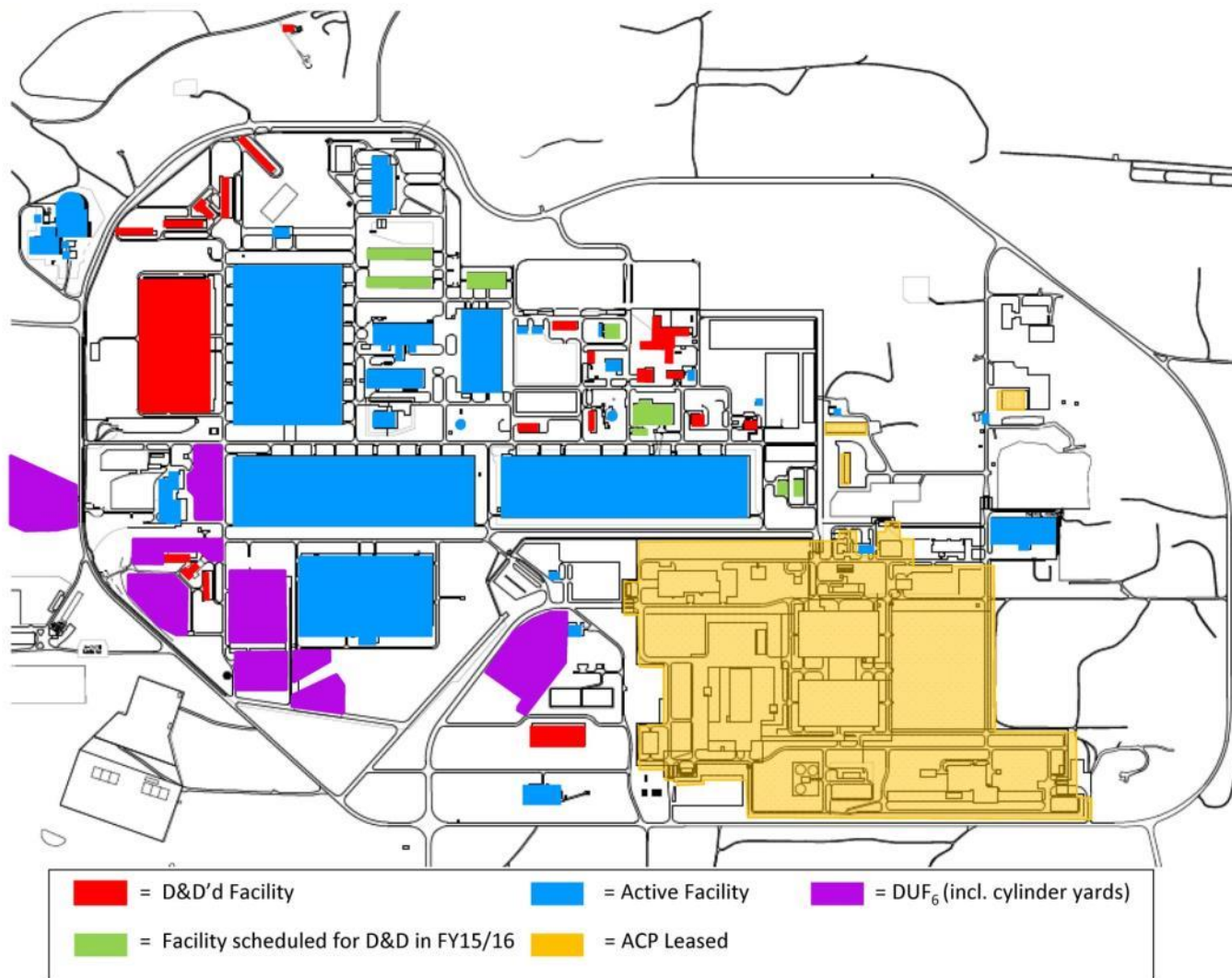
X-333: 640 Stages, U to 3%

X-330: 1,100 Stages, U to 10%

## ➤ Physical Conditions at PORTS

- 3,777 acres total
- 415 structures / facilities
- 3 main process buildings
- 22 HazCat 2 Facilities
- 1,000-acre Limited Area

## ➤ Physical Conditions at PORTS



## ➤ Physical Conditions at PORTS

### 1. 145 Acres Under Roof (10.1M sq/ft floor space)

#### ■ Utilities in process of being “right-sized” from operations to D&D

- |  |                  |
|--|------------------|
| □ Electric – 345kV/13.8V<br>(BES member) | □ Steam          |
| □ Water                                  | □ Air            |
|  | □ Sanitary Sewer |

### 2. Essentially providing the functions/ services of a medium-sized town

#### ■ Services provided to other site tenants and the surrounding community

- |                                       |                               |
|---------------------------------------|-------------------------------|
| □ Fire Department                     | □ Engineering                 |
| □ Security                            | □ Roads & Grounds             |
| □ Utilities & Maintenance             | □ Planning &<br>Redevelopment |
| □ Environmental & Waste<br>Management |                               |

### 3. Maintain operating nuclear processes (Barter)



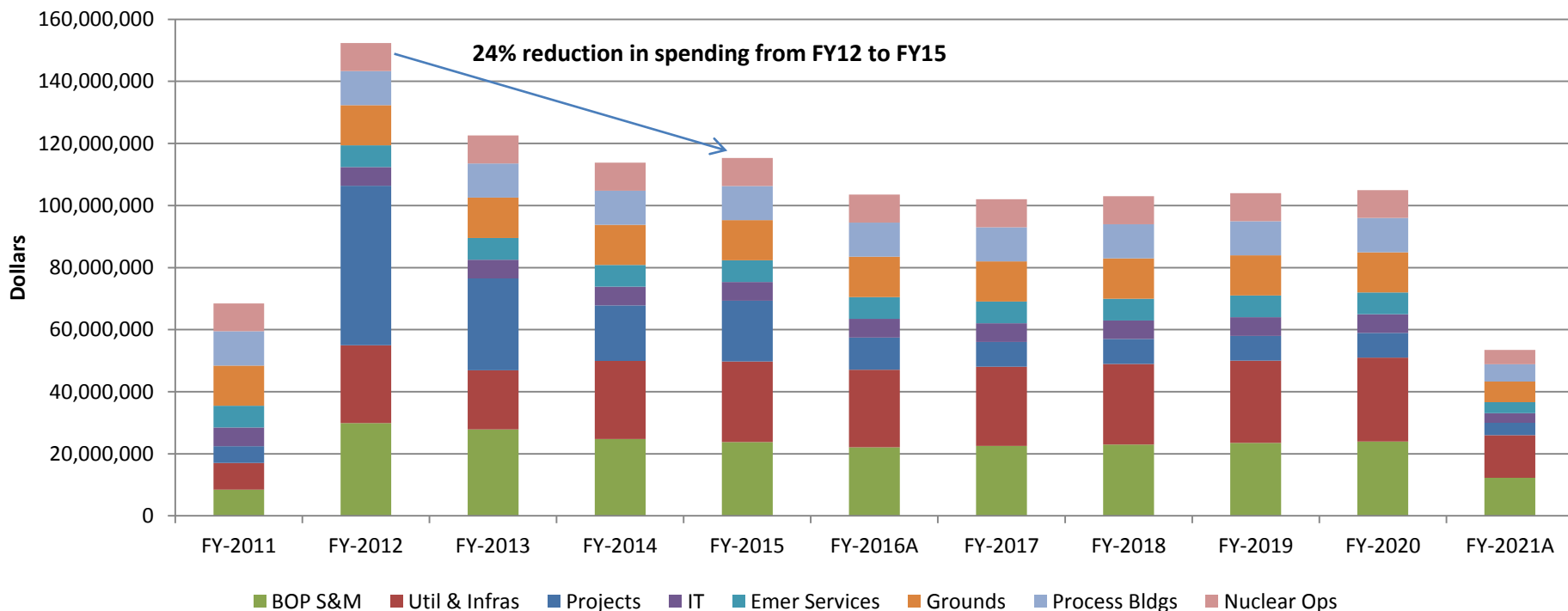
Infrastructure		Cost
Roads and Grounds/Site Svcs	FSS Contractor scope that includes roads and grounds, Shipping and Receiving, Records Mgmt, Training, Fleet Mgmt, etc	\$ 13M
Information Technology	FSS Contractor scope that includes site intranet, computer systems, and telecommunications	\$ 6M
Infrastructure Projects	X-530 Medium Voltage Reutilization and 13.8kV OH Distribution	\$ 4M
Emergency Svcs	Fire Services, Fire Department, and EOC	\$ 7M
Utility Operations	Electric (345kV-13.8kV), Water, Sanitary Sewer, Dry Air, Nitrogen, and Steam	\$ 15M
Sitewide Services	Laundry, Respirators, PPE, Plant Shift Superintendent	\$ 11M
		<b>\$ 56M</b>
S&M		Cost
Balance of Plant Maintenance	Mtc on all facilities other than Process Buildings.	\$ 15M
Nuclear Operations Mtc	Mtc on radiological test and detection equipment and non-process equipment in operating nuclear facilities	\$ 9M
Process Building Maintenance	Mtc on process buildings	\$ 11M
Planning and Work Control	Sitewide work planning, scheduling and coordination	\$ 5M
Balance of Plant Deactivation	Universal waste and ACM removal on buildings slated for D&D	\$ 4M
Balance of Plant Projects	Facility improvements and upgrades such as roofs, doors, cooling tower replacement, and facility consolidations.	\$ 15M
		<b>\$ 59M</b>

Original	Current/Planned	Reduction/Savings
<p><b>Electrical</b> 2200MW system. 2 Switchyards. Equivalent to power produced by Hoover Dam.</p>	<p><b>Electrical</b> 1 switchyard D&amp;D'd, New switchgear installed in remaining SY and downsized to &lt; 75 MW. All power overhead to facilitate utility isolations</p>	<p><b>Electrical</b> Annual O&amp;M reduction of \$2.75M</p>
<p><b>Water</b> 30M GPD system supported by 4 well fields. Equivalent to 2X the Knoxville usage.</p>	<p><b>Water</b> Current water usage at &lt; 3M GPD. Transferred 2 well fields for public use. Projects to further reduce consumption and convert to municipal supply under way.</p>	<p><b>Water</b> Annual O&amp;M reduction of \$1.25M</p>
<p><b>Steam</b> X-600 coal-fired steam plant. 375K lb/hr facility with high CO<sub>2</sub> emissions</p>	<p><b>Steam</b> Installed 2 new gas-fired boilers to produce ~80K lb/hr. Reduced CO<sub>2</sub> emissions by &gt; 43 tons/yr</p>	<p><b>Steam</b> Annual O&amp;M reduction of \$3.3M</p>

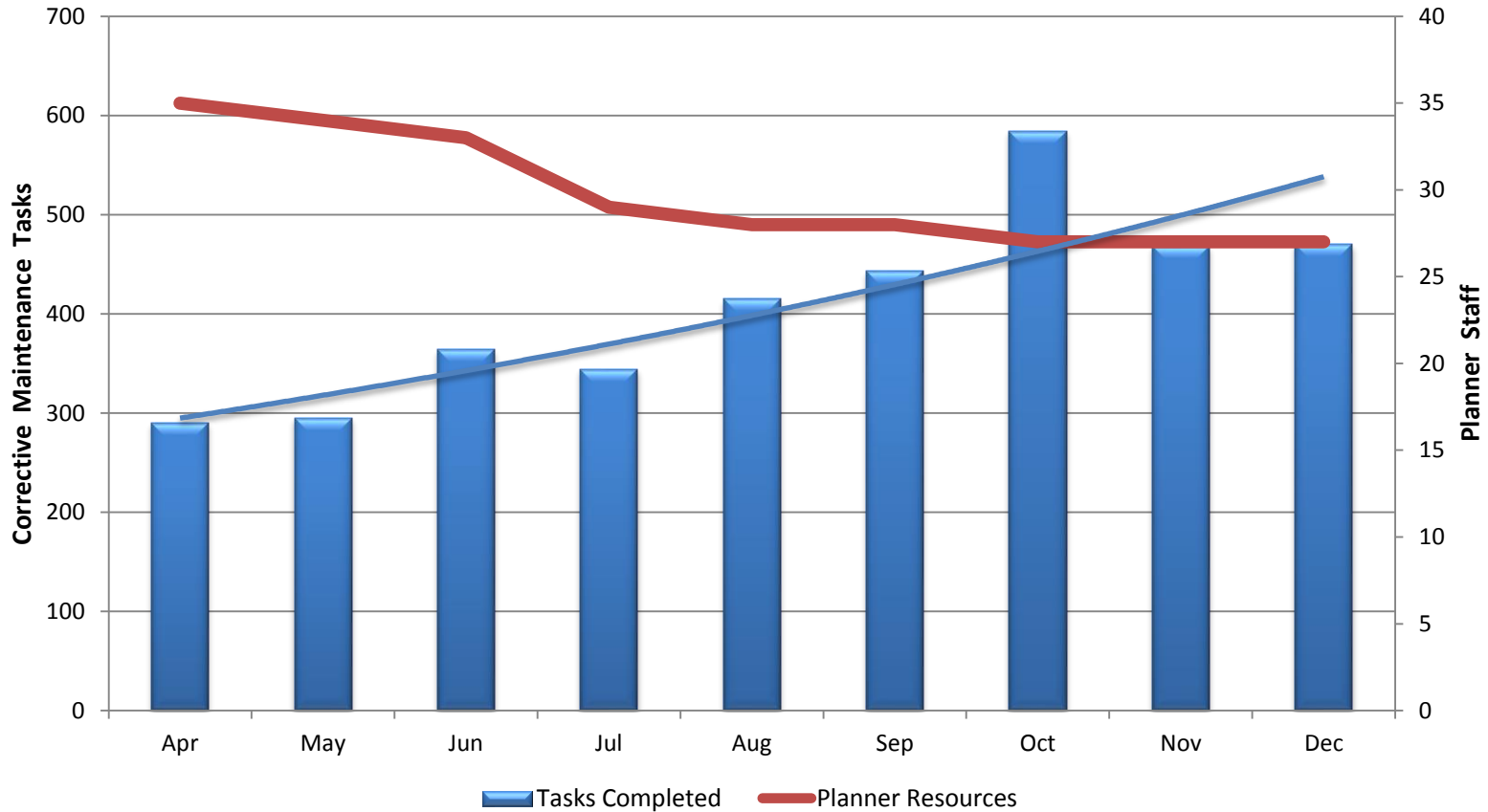
Original	Current/Planned	Reduction/Savings
<p><b>Plant Air</b> Air supplied by compressor rooms in process buildings. 44,800 scfm available including 2 diesel units.</p>	<p><b>Plant Air</b> Stand alone dry air plant constructed with 4 efficient centrifugal compressors. 10,500 scfm available.</p>	<p><b>Plant Air</b> Annual O&amp;M reduction of \$4.5M.</p>
<p><b>Sanitary Sewer</b> Sewage plant with .7M/1.2M GPD capacity constructed in the 1980s.</p>	<p><b>Sanitary Sewer</b> Continue life of current sewage facility with upgrades to controls and instrumentation. Began accepting off site waste in 2014.</p>	<p><b>Sanitary Sewer</b> Improved operations and service to the off site communities.</p>
<p><b>Nitrogen</b> Dual location plant capable of both high (2500 psig) and low (55 psig) pressure operations.</p>	<p><b>Nitrogen</b> Consolidate operations into one low pressure plant.</p>	<p><b>Nitrogen</b> Annual O&amp;M reduction of \$0.1M.</p>

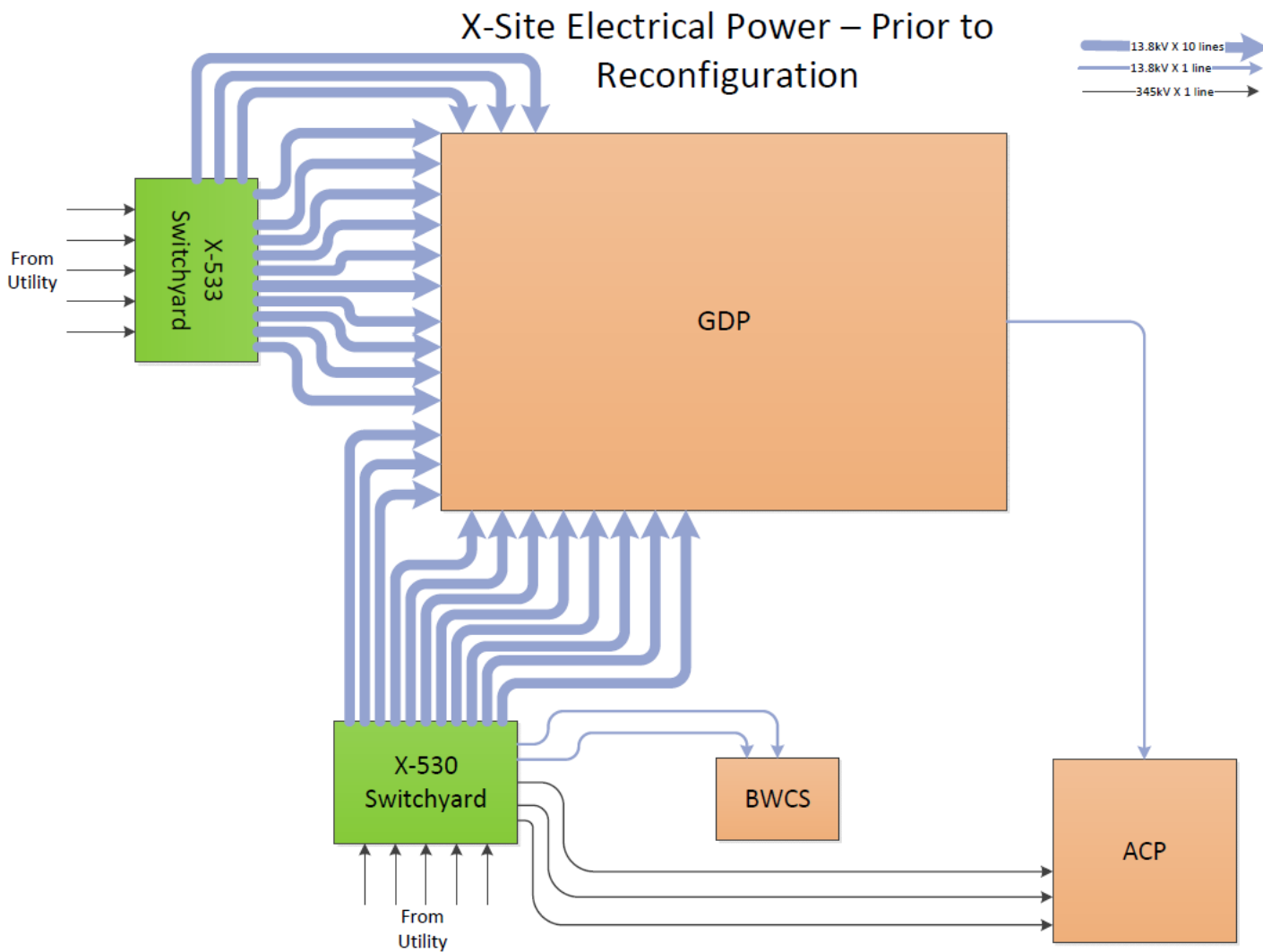


## Maintenance, Infrastructure, Deactivation & Demolition - FY11 thru FY21A

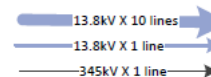


## ➤ Maintenance Efficiency



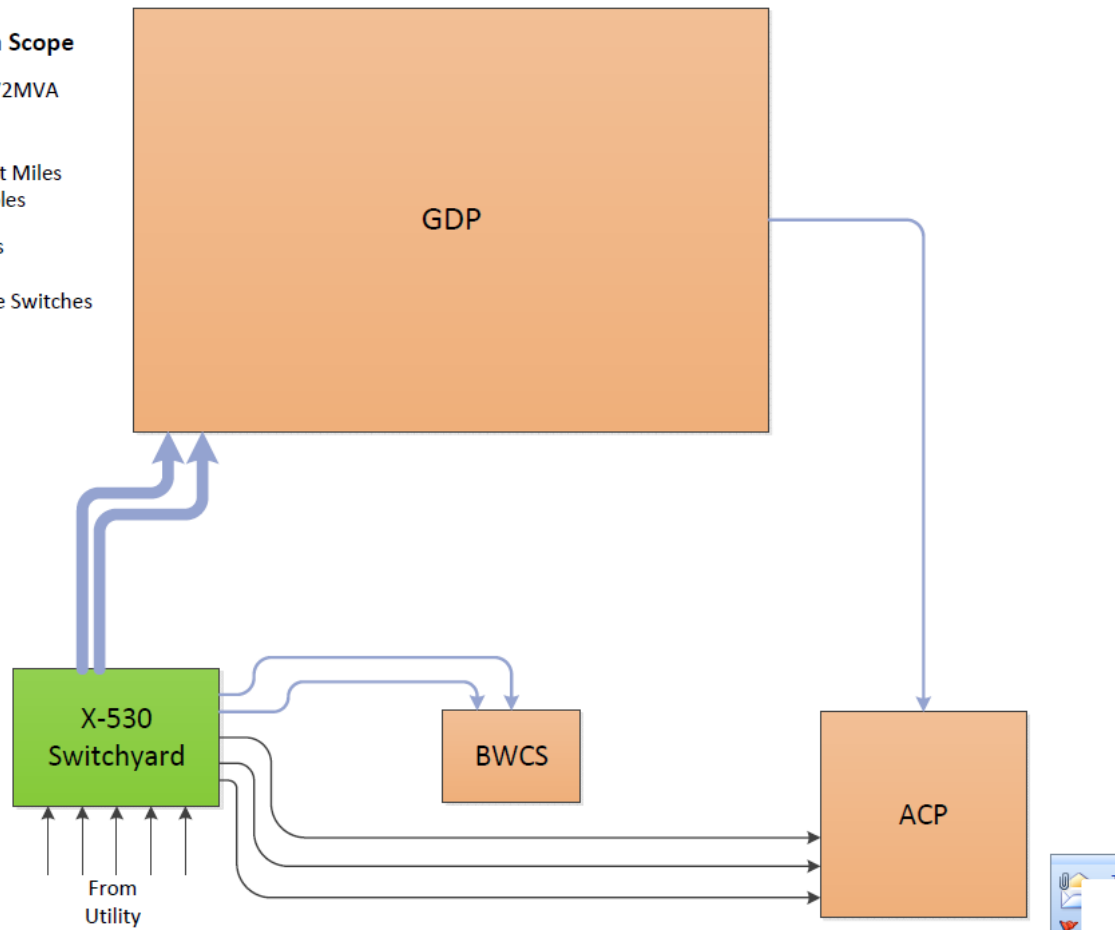


## X-Site Electrical Power – Reconfiguration (complete in FY16)

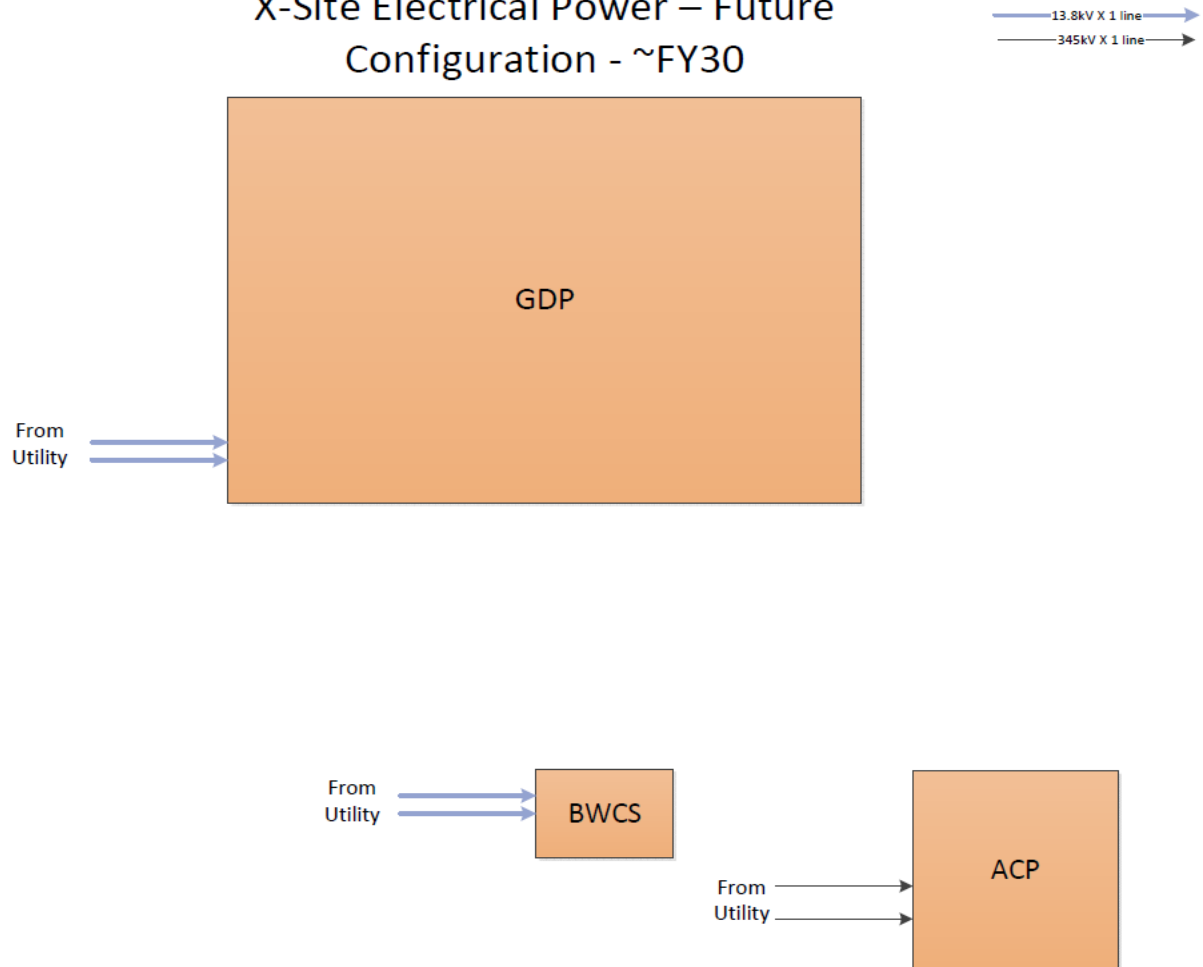


### X-530 Reconfiguration Scope

- Installed new 13.8kV 72MVA Substation
- Installed over 4.2 Circuit Miles of overhead 13.8kV cables
- Installed 93 Utility Poles
- Installed 36 13.8kV Pole Switches



## X-Site Electrical Power – Future Configuration - ~FY30



## ➤ Deactivation of the PORTS Cascade to D&D

- 2008 CERCLA Agreement covering Deactivation and D&D and waste placement with 48-54 month RI/FS decision process
  - X-326: 2,230' long, 552' wide, 30-acre roof, 2,600,000 ft<sup>2</sup> of floor space, 200 cells, 2,340 stages
    - PGE spares
    - DOE Material Storage Areas (DMSA) - Legacy/HEU components
    - Legacy wastes (RCRA)
    - HEU accountable nuclear material areas
  - X-330: 2,176' long, 640' wide, 33 acre roof, 2,800,000 ft<sup>2</sup> of floor space, 110 cells, 1,100 stages
  - X-333: 1,456' long, 970' wide, 33-acre roof, 2,824,640 ft<sup>2</sup> of floor space, 80 cells, 640 stages

## ➤ X-326 Deactivation Approach

- X-326 Deactivation in Parallel with ROD process (OSWDF) using RI/FS SAP
  - DOE & FBP successfully negotiated approach with OEPA to streamline ROD process and permit deactivation to proceed under RI/FS investigations
- X-326 PGE removal and shipment off site
- Chemical Cell treatment & Tc-99 treatments allowed off site shipment for most components without additional Deposit Removal (DR)
- Provides less problematic Criticality Incredibility (CI) conditions for HEU Facility downgrade to radiological facility for subsequent demolition
- Many Deposit Removal activities can be performed in-situ in X-326
- X-705 Decontamination Facility intact; precludes creating an alternative

## ➤ Deactivation of the PORTS Cascade

### Approach Summary

- Remove equipment necessary to achieve Criticality Incredibility (CI)
  - PGE
- Characterize remaining PG piping & PG auxiliaries to confirm CI
  - Perform Deposit Removal (DR) as necessary
- Hazardous and universal wastes removal
- RCRA wastes relocated or disposed (as applicable)
- Accountable materials processed or relocated (as applicable)
- Characterization necessary to support waste placement
- Remove items of historical significance
- Criticality incredible (CI) declared; downgrade to a Radiological facility
- Downgrade Security status of building
- Utility disconnections; cold and dark
- Demolition; Open Air



## ➤ Existing Facilities Conditions

- Cascade facilities structurally intact; buildings in generally sound condition
- Cranes, elevators, ventilation, PG systems, infrastructure (power, water) intact and useable for deactivation activities
- Cascade equipment maintained using double contingency/spacing controls
- Removal allows for use of potential nickel recovery operations
- Reduces problems associated with remaining in facility during demolition



## ➤ X-326 Current Deactivation Status

- Project is managed as discrete scope with easily measurable EVM Techniques
- Baseline is aligned with contract and under configuration control
- To date focus had been PGE; recent unilateral mod brought in remaining scope such as PG auxiliaries and utility isolation
- Though using operating funds, managed as a capital asset project
- To date SPI 1.0 CPI 1.08
- Cumulative (CY 13/14) Safety Performance; most hazardous work on site
  - TRC – 0.5
  - DART – 0.14

## X-326 Current Deactivation Status

Unit 25-7		Unit 25-6		Unit 25-5		Unit 25-4		Unit 25-3		Unit 25-2		Unit 25-1		Unit 27-3		Unit 27-2		Unit 27-1	
Cell 20 0%	Cell 19 0%	Cell 20 96%	Cell 19 96%	Cell 20 96%	Cell 19 66%	Cell 20 96%	Cell 19 66%	Cell 20 66%	Cell 19 96%	Cell 20 96%	Cell 19 66%	Cell 20 66%	Cell 19 66%	Cell 20 96%	Cell 19 96%	Cell 20 96%	Cell 19 66%	Cell 20 66%	Cell 19 96%
Cell 18 0%	Cell 17 0%	Cell 18 96%	Cell 17 96%	Cell 18 96%	Cell 17 96%	Cell 18 96%	Cell 17 66%	Cell 18 96%	Cell 17 96%	Cell 18 96%	Cell 17 96%	Cell 18 66%	Cell 17 66%	Cell 18 66%	Cell 17 66%	Cell 18 66%	Cell 17 66%	Cell 18 96%	Cell 17 66%
Cell 16 66%	Cell 15 66%	Cell 16 96%	Cell 15 96%	Cell 16 96%	Cell 15 96%	Cell 16 96%	Cell 15 96%	Cell 16 96%	Cell 15 66%	Cell 16 66%	Cell 15 66%	Cell 16 66%	Cell 15 96%	Cell 16 66%	Cell 15 66%	Cell 16 66%	Cell 15 96%	Cell 16 66%	Cell 15 0%
Cell 14 0%	Cell 13 66%	Cell 14 96%	Cell 13 96%	Cell 14 66%	Cell 13 96%	Cell 14 66%	Cell 13 96%	Cell 14 96%	Cell 13 66%	Cell 14 66%	Cell 13 96%	Cell 14 66%	Cell 13 96%	Cell 14 96%	Cell 13 66%	Cell 14 66%	Cell 13 66%	Cell 14 0%	Cell 13 0%
Cell 12 0%	Cell 11 66%	Cell 12 96%	Cell 11 96%	Cell 12 96%	Cell 11 96%	Cell 12 96%	Cell 11 96%	Cell 12 96%	Cell 11 66%	Cell 12 96%	Cell 11 96%	Cell 12 66%	Cell 11 96%	Cell 12 96%	Cell 11 66%	Cell 12 96%	Cell 11 66%	Cell 12 96%	Cell 11 66%
Cell 10 0%	Cell 9 0%	Cell 10 96%	Cell 9 96%	Cell 10 96%	Cell 9 96%	Cell 10 96%	Cell 9 93%	Cell 10 96%	Cell 9 96%	Cell 10 96%	Cell 9 96%	Cell 10 96%	Cell 9 66%	Cell 10 66%	Cell 9 66%	Cell 10 96%	Cell 9 0%	Cell 10 0%	Cell 9 0%
Cell 8 0%	Cell 7 0%	Cell 8 95%	Cell 7 96%	Cell 8 96%	Cell 7 96%	Cell 8 96%	Cell 7 96%	Cell 8 96%	Cell 7 66%	Cell 8 96%	Cell 7 66%	Cell 8 66%	Cell 7 96%	Cell 8 96%	Cell 7 0%	Cell 8 0%	Cell 7 96%	Cell 8 0%	Cell 7 0%
Cell 6 0%	Cell 5 0%	Cell 6 96%	Cell 5 96%	Cell 6 96%	Cell 5 96%	Cell 6 66%	Cell 5 66%	Cell 6 96%	Cell 5 96%	Cell 6 96%	Cell 5 66%	Cell 6 96%	Cell 5 66%	Cell 6 66%	Cell 5 66%	Cell 6 66%	Cell 5 66%	Cell 6 66%	Cell 5 96%
Cell 4 0%	Cell 3 0%	Cell 4 96%	Cell 3 96%	Cell 4 96%	Cell 3 96%	Cell 4 96%	Cell 3 96%	Cell 4 96%	Cell 3 96%	Cell 4 96%	Cell 3 66%	Cell 4 96%	Cell 3 66%	Cell 4 96%	Cell 3 66%	Cell 4 66%	Cell 3 66%	Cell 4 0%	Cell 3 66%
Cell 2 0%	Cell 1 0%	Cell 2 96%	Cell 1 96%	Cell 2 96%	Cell 1 96%	Cell 2 96%	Cell 1 96%	Cell 2 96%	Cell 1 96%	Cell 2 96%	Cell 1 66%	Cell 2 96%	Cell 1 94%	Cell 2 66%	Cell 1 96%	Cell 2 66%	Cell 1 0%	Cell 2 66%	Cell 1 18%
Unit 25-7 2.64 Cells Done 13.2% Complete	Unit 25-6 19.19 Cells Done 96% Complete	Unit 25-5 18.6 Cells Done 93% Complete	Unit 25-4 17.69 Cells Done 88.4% Complete	Unit 25-3 17.7 Cells Done 88.5% Complete	Unit 25-2 17.1 Cells Done 85.5% Complete	Unit 25-1 15.88 Cells Done 79.4% Complete	Unit 27-3 14.64 Cells Done 73.2% Complete	Unit 27-2 12.72 Cells Done 63.6% Complete	Unit 27-1 8.64 Cells Done 43.2% Complete										

### X-326 Status

144.8 Cells Done

72.4% Complete as of 02/02/15



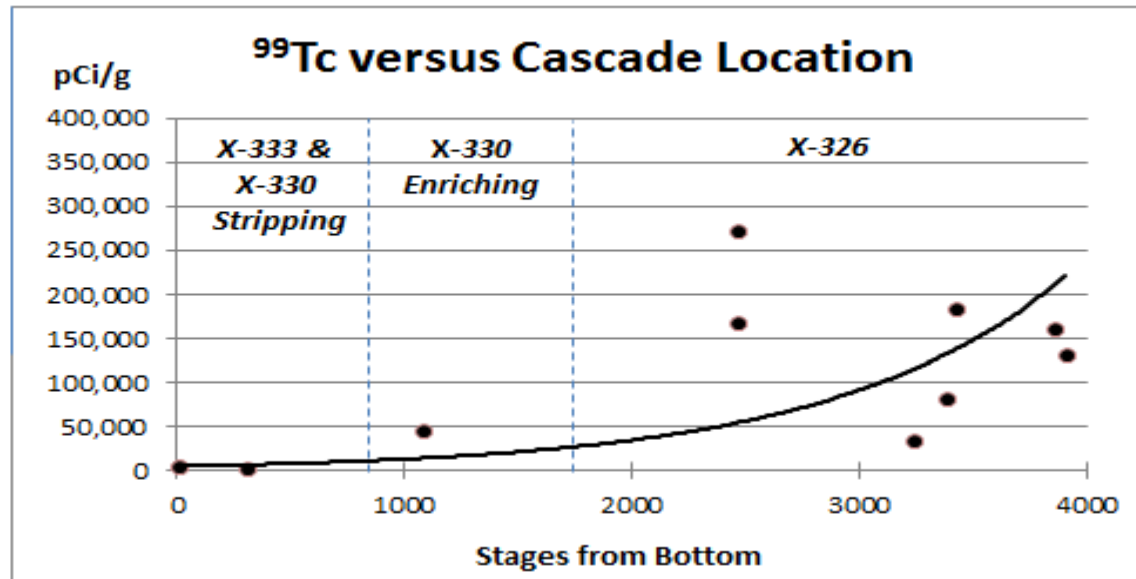
Key: Green – complete      Yellow - >1% and <100%      Red 0%

## ➤ Addressing Tc-99

- **Cut and Cap has moved into known high Tc-99 concentration areas**
  - ❑ Implemented practices prior to high isotopic/purge cascade work evolutions
  - ❑ Worker briefings on Tc-99/Arsenic potential (NIOSH 1992)
  - ❑ RWP and JHA developed specific to these work locations
  - ❑ Implemented Anti-C change out based on in-situ RadCon monitoring
  - ❑ Implemented supplied air for cells with increased Arsenic potential
  - ❑ Implemented Nitrate/Nitrite/Arsenic/Arsine sampling
  - ❑ Completed C&C of four 25-7 (high Tc-99) cells using these controls
    - ❑ No skin contamination issues; good feedback from workers

## ➤ Addressing Tc-99

Expected Tc distribution using FBP RI/FS and USEC sample data



- Cells in units 25-6 & 25-7 had heat treatments when S/D (historical)
- System parameter adjustments and portable Tc traps used when operating
- FBP performed “heat” treatments for Tc-99 reduction on 14 cells prior to S/D
  - High isotopic and purge cells
  - Tc feed clean up cells
  - Reduced Tc concentrations for C&C workers
- X-326 PGE components shipped to NNSS

## ➤ NO<sub>2</sub> mitigation

- Employee noted “chlorine-like” odor through PAPR (PAPRs are NIOSH rated for Cl<sub>2</sub>) – December 2013
- “STOP WORK” was issued for hazard evaluation/control
- Process of elimination/new equipment confirmed NO<sub>2</sub>
- New multi-gas meters were purchased (Multi-Rae with NO<sub>2</sub> sensor)
- Sampling plans for EACH type of evolution were developed
- Work performed in supplied air (PAPRs are not NIOSH rated for NO<sub>2</sub>)
- Negative Exposure Assessments (NEA) completed on evolutions
- Utilized NEAs to determine path forward on respiratory requirements
- Revised IWD/JHA to coincide with characterization
- Performed worker briefs
- Still achieved FY 14 goals – 76 cell equivalents PGE C&C

- **Driving Critical Path Performance – Deposit Identification & Removal**
  - Developed method for stabilization of residual uranium
  - Utilized cascade purge and evacuation systems to mitigate HF produced
  - Revised Nuclear Criticality Safety Evaluations (NCSE) and SBDs to handle large scale equipment removal
  - Steel covers welded on Process Gas Equipment (PGE) for disposal
  - Transitioned NDA program to meet rigor required by DOE-PPPO
  - X-326 PGE components shipped to NNS (based on meeting shipping and NNS disposal requirements) using ex-situ NDA measurements (QSNDA)
  - Equipment with residual uranium above the applicable limits being disassembled and uranium removed for processing

## ➤ Lessons Learned

- Facility conditions (Integrity) maintained
  - Structural integrity of building sound and utilities operational\*
  - Support systems cranes, ventilation, lighting, etc. functional
- Installed PG systems maintained to support deactivation
  - STR (DR) before shutting cascade down\*
  - Tc-99 reduction
  - Cell servicing capability
  - Provides opportunity to support barter
- Integrated SME's into new mission
  - Characterization\*
  - System utilization
  - OR experience: >100 years – NCS, NS, WM, NDA, ESH, Deactivation & Demolition

\* - OR lessons learned



## ➤ Lessons Learned

- Leveraged advantage of having an operating facility; expedite deactivation
- Maintained capabilities for manual DR and HEU down blending
- Security Integration \*
  - Work packages are reviewed by pertinent disciplines
  - Reduce classification requirements to reduce access controls; reduced security costs

\* - OR lessons learned