



U.S. DEPARTMENT OF
ENERGY



Department of Energy - Savannah River Site Common Infrastructure Challenges

David Bender

Director, Infrastructure and Area Completion Division

Assistant Manager for Infrastructure and Environmental Stewardship

September 24, 2018

Purpose and Basic Definitions

- **Purpose:** Provide an overview of how DOE-SR manages and maintains Savannah River Site's Common Infrastructure



- **Basic Definitions:**
 - **Infrastructure:** Natural or manmade physical structures and supporting equipment that is necessary to accomplish a defined mission or specific purpose
 - **Common Infrastructure:** Infrastructure that supports **one or more** missions, tenants, or DOE organizations

SRS Common Infrastructure 101 – Infrastructure Types

Mission Specific (Program) Infrastructure:

Dedicated to a specific DOE mission or task

H-Canyon



Common Infrastructure:

Basic Common Infrastructure:

Maintenance of Site common infrastructure
(examples: common use facilities, administrative facilities, roads, parking areas, and bridges)

Badge Office



Utilities:

Common Infrastructure that provides utility commodities in support of more than one Site tenant
(examples: electrical distribution, domestic water, steam, sanitary waste)

Biomass Plant (Steam)



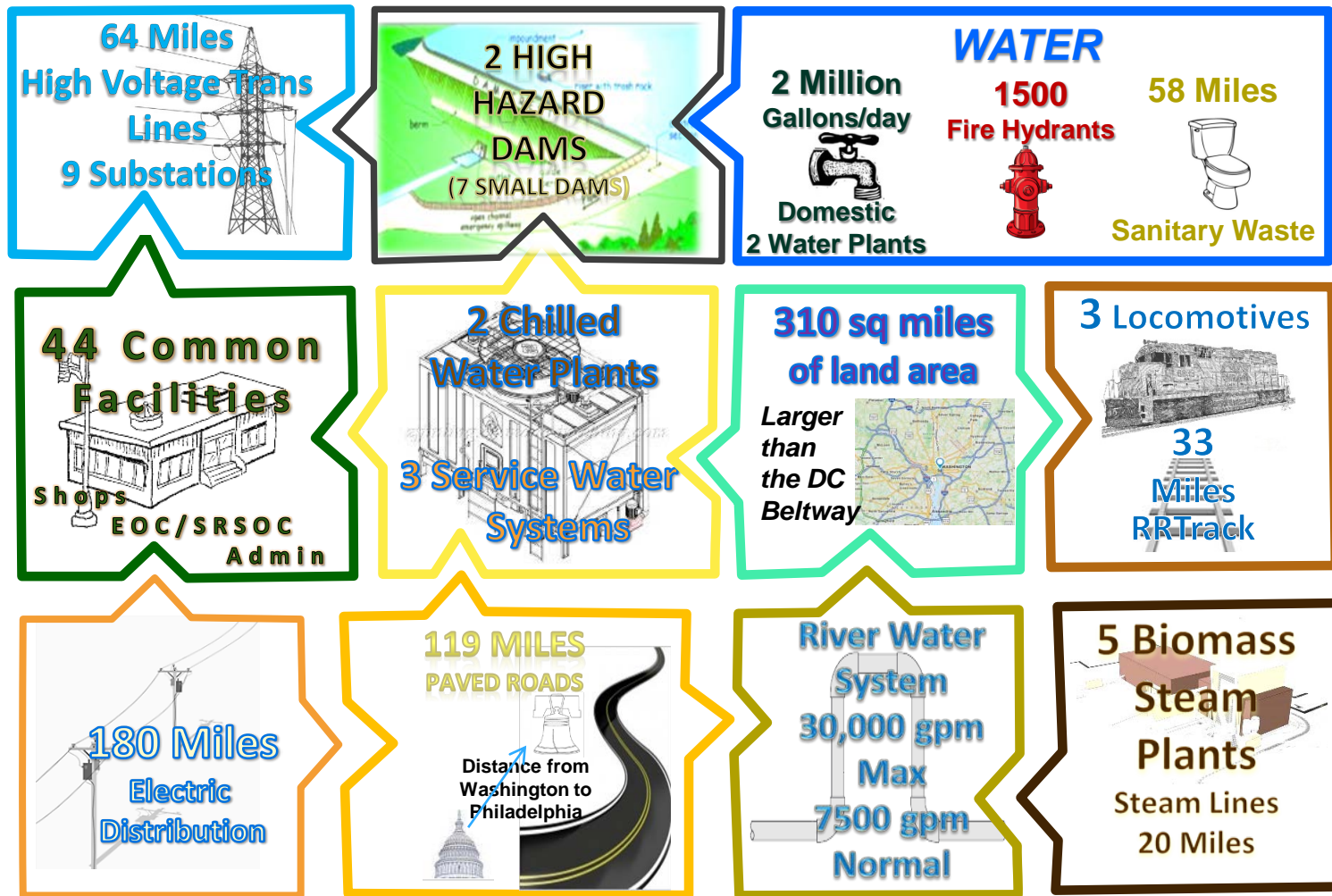
Service Centers:

Common Infrastructure that enables a critical service in supports of more than one Site tenant
(examples: IT services, radios, telephones)

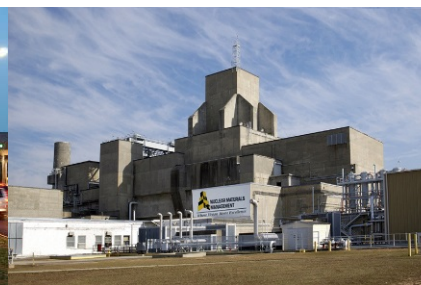
Calibration Shop



SRS Common Infrastructure Snapshot – Critical Systems



Age of SRS Infrastructure



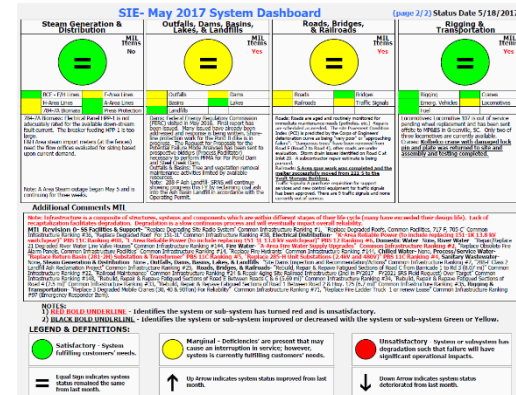
Savannah River Site Common Infrastructure Identification and Prioritization Tools

- Condition Assessment Information System and Facility Information Management System (FIMS)

- SRS Real Property Five-Year Plan →



- SRS: System Health Reports and Dashboard →



- SRS: Master Infrastructure List (MIL) →

- Unfunded Project Priority List
- Integrated Program and Common
- Increased use for funding decisions

Project Title	PBSIfundir	2019	2020	2021	2022	Risk Score	Business Score	Total Score	Contractor Priority
Disassembly Basin & Transfer Bay HVAC Replacement	PBS 12	1,000	1,500			125	60	185	1
234-H Sand Filter Roof Upgrades for Original Facility	PBS 11C	2,331				100	60	160	2
Argus Safeguards and Security Project (H, Multi-Year Execution)	PBS 20	3,209							3
Replace Chillers 105-L	PBS 12	200	1000			100	48	148	4
H-Canyon Air Tunnel Repair/Replacement - Tunnel Repair Preparation Project	PBS 11C	6,000	6,000	6,000		100	48	148	5
Replace Roofs, 717-K, 701-1K & 701-2K	PBS 11C	955	375			105	60	165	6
Tie In Connection and Installation for HB-Line Alternate Diesel Generator	PBS 11C	400				55	60	115	7
Failure of H & K Area Instrument, Process & Plant Air Compressor Systems Results in Mission Impact	PBS 11C	1,350				80	48	128	8

Savannah River Site Common Infrastructure Planning

The 5-Year Common Infrastructure Improvement Plan

December 2017

Savannah River
NUCLEAR SOLUTIONS®
FLEET • NEWPORT NEWS NUCLEAR • HOMEYELL

SRNS-RP-2017-00761

FY19 - FY23 Site Services' Common Infrastructure 5-Year Plan Revision 0

Prepared By:	<u>Jordha B. Cole</u>	<u>12/14/17</u>
	Brent Cole, Lead Operations, Strategic Planning	Date
Approved By:	<u>Rodney Rabon</u>	<u>12/18/2017</u>
	Rodney Rabon, Site Infrastructure Chief Engineer	Date
Approved By:	<u>William Tadioc</u>	<u>12/14/17</u>
	William Tadioc, Director, Site Maint. & Facility Support	Date
Approved By:	<u>Wayne Gleason</u>	<u>12/14/17</u>
	Wayne Gleason, Director, Site Infrastructure	Date
Approved By:	<u>Erene Ferguson</u>	<u>12/14/2017</u>
	Erene Ferguson, Strategic Planning Mgr. SS	Date
Approved By:	<u>Marquene Gentry</u>	<u>12/10/2017</u>
	Marquene Gentry, Director, Business Support SS	Date
Approved By:	<u>Geoff Reynolds</u>	<u>12-18-17</u>
	Geoff Reynolds, Director, Site Services	Date

SAVANNAH RIVER SITE • AIKEN, SOUTH CAROLINA

Due December

The Fiscal Year Common Infrastructure Improvement Plan (upcoming FY)

July 2018

Savannah River
NUCLEAR SOLUTIONS®
FLEET • NEWPORT NEWS NUCLEAR • HOMEYELL

SRNS-RP-2018-00147
RMS# 10667

FY2019 Site Services' Common Infrastructure Improvement Plan (SRNS2018LS-1.01 c) Revision 0

Prepared By:	<u>James D. Denny</u>	<u>7/23/18</u>
	James Denny, Strategic Planning	Date
Reviewed By:	<u>Erene Ferguson</u>	<u>7/23/2018</u>
	Erene Ferguson, Strategic Planning Mgr. SS	Date
Reviewed By:	<u>Marquene Gentry</u>	<u>7/25/18</u>
	Marquene Gentry, Director, Business Support SS	Date
Reviewed By:	<u>Rodney Rabon</u>	<u>7/24/2018</u>
	Rodney Rabon, Site Infrastructure Chief Engineer	Date
Reviewed By:	<u>William Tadioc</u>	<u>7/24/18</u>
	William Tadioc, Director, Site Maint. & Facility Support	Date
Reviewed By:	<u>Wayne Gleason</u>	<u>7/24/18</u>
	Wayne Gleason, Director, Site Infrastructure	Date
Approved By:	<u>Geoff Reynolds</u>	<u>7-26-18</u>
	Geoff Reynolds, Director, Site Services	Date

SAVANNAH RIVER SITE • AIKEN, SOUTH CAROLINA

Due September

The Fiscal Year Infrastructure Improvement Plan Execution Output (current FY)

July 2018

Savannah River
NUCLEAR SOLUTIONS®
FLEET • NEWPORT NEWS NUCLEAR • HOMEYELL

SRNS-RP-2018-00747
RMS# 10667

FY2018 Site Services' Infrastructure Improvement Plan Execution Output (SRNS2018LS-1.01a)

Prepared By:	<u>Jordha B. Cole</u>	<u>7/25/18</u>
	Brent Cole, Lead Operations, Strategic Planning	Date
Reviewed By:	<u>Erene Ferguson</u>	<u>7/25/2018</u>
	Erene Ferguson, Strategic Planning Mgr. SS	Date
Approved By:	<u>Marquene Gentry</u>	<u>7/26/2018</u>
	Marquene Gentry, Director, Business Support SS	Date
Approved By:	<u>William Tadioc</u>	<u>7/26/18</u>
	William Tadioc, Director, Site Maint. & Facility Support	Date
Approved By:	<u>Wayne Gleason</u>	<u>7/26/18</u>
	Wayne Gleason, Director, Site Infrastructure	Date
Approved By:	<u>Geoff Reynolds</u>	<u>7-26-18</u>
	Geoff Reynolds, Director, Site Services	Date

Due September

SRS COMMON INFRASTRUCTURE ANNUAL PLANNING CYCLE

SRS Infrastructure 101 – Common Infrastructure Funding

\$\$\$

Appropriation Level - Defense Environmental Cleanup
Program Level (Risk Management Operations, Rad Liquid Tank Waste, ...)

\$\$\$

SRS
MISSION
WORK
\$\$

Program Baseline Summary – PBS (Control Point Level)

The budgeting and funding mechanism to resource specific DOE-SRS programs that are contained within the DOE-Environmental Management Work Breakdown Structure (PBS 14 – Liquid Waste Disposition, PBS 30 – Soil and Water Remediation,)

SRS
MISSION
WORK
\$\$

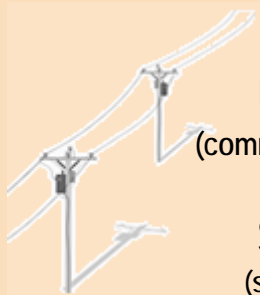
Utilities and Services

DOE-SR
Establishes
Rates
for
consumption
or use

\$

Utilities (Pool)
(commodity and infrastructure)

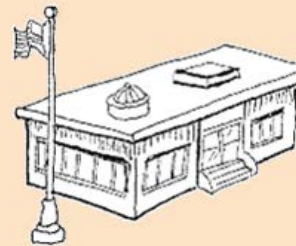
Services (Pool)
(service and infrastructure)



DOE-SR Establishes Set
Rate (s)

\$

Common Infrastructure



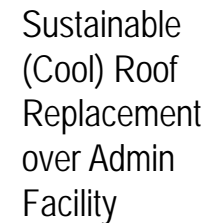
INDIRECTS / OVERHEADS

INDIRECTS / OVERHEADS

- Common Infrastructure Right-Sizing



- Invest Efficiency Savings



Savannah River Site Common Infrastructure Progress

Common Infrastructure System Health Reports

February 2013

Site Services - February 2013 System Health Dashboard

(page 1/2, 02/21/13) Rev0

SS Facilities & Support	Electrical Distribution	Domestic Water	River Water
<div>Roofs</div> <div>Electrical</div> <div>HVAC</div>	<div>13.8 V/Sgear</div> <div>Dist Xformers</div> <div>Recy Tanks</div> <div>Pole/OH Lines</div>	<div>A-Plant</div> <div>Small System</div> <div>Wells</div> <div>D-Plant</div> <div>Distribution</div> <div>Instrumentation</div>	<div>Intake</div> <div>Electrical</div> <div>Pumps</div> <div>Acc System</div> <div>Dist Acc</div>
Roofs - Issues @ 703A, 707C, 703B, 703-1B, HVAC - Issues @ 717F, 730B, 730-1B, 730-2B, 730-4B, 706N, 713N.	Recy Tanks - 13.8 KV Degraded cor tanks @ 151-1/2XGL10 NCR's and documented in CIPR 9.13 "Replace K and L Area Switchgear". Aging issues @ 285H, 152L, 153K, voltage issue @ 752-67A, Pole/OH Lines - Hot Spots on Arresters.	Instrumentation - RTU system non-functional (to be replaced) - Documented in CIPR 5.9 "Replace Degraded Domestic Water Control System".	Dist Accessories - Old valve house/patron valves. Documented in CIPR 7.8 "Repair/Replace 21 Degraded River Water Line Valve Houses". Intake - Old screws. Pumps - #4 RTD Board. Elec - old switchgear. Accessories Syst - Service Water valves. Pumps - #4 RTD Board has been replaced.
Fire Water	Chilled Water A & B Areas	Process/Service Water A, F, H Areas	Sanitary Wastewater
<div>Water Source</div> <div>Pumps</div> <div>Piping</div> <div>Tanks</div> <div>Controllers</div> <div>Valves</div>	<div>Chilled Water</div> <div>Support Sys</div> <div>Cooling Water</div>	<div>A/F Service Wtr</div> <div>A/F SWT Support</div> <div>Wells</div> <div>H Proc/Cool Wtr</div> <div>H RVC Support</div> <div>Chem Neutralize</div>	<div>Collection Sys</div> <div>Central SWT</div> <div>Lift Stations</div> <div>K-Area SWWT</div>
Fire Water Upgrade documented in CIPR. Tanks - B & F-Areas internal coating concerns. N-Area pumps - (not meeting NFPA 25 annual flow criteria). Valves - PW & Hydrants aging & isolation ability concerns.	B-Area Chilled Water - The VFDs for chilled water secondary pumps have been Spec'd and is currently with Procurement. The #2 Fan motor pedestal will be machined (currently in 717-A machine shop) and the motor will be replaced with spare. Cooling tower fan gearbox failures. Chemical feed system for A-Area Cooling Tower experiencing operational deficiencies.	235-H Supply Basin Level Alarm/Switch Chem Neutralization - manually taking pH readings; pH probes have been ordered. A-Area caustic storage tank fill line configuration. Replace F-Area caustic injection pumps. H-Area bromination syst configuration.	Collection - aging issue. Lift Stations - aging equip issue, lack of autodialers. K-Area SWT - aging equip issue.



Satisfactory - System fulfilling customers' needs.



Equal Sign indicates system status remained the same from last month.



Marginal - Deficiencies are present that may cause an interruption in service; however, system is currently fulfilling customers' needs.



Up Arrow indicates system status improved from last month.



Unsatisfactory - System is not fulfilling customers' needs. (System has single points of failure.)



Down Arrow indicates system status deteriorated from last month.

July 2018

SIE - July 2018 System Dashboard

(page 1/2) Status Date 7/18/2018

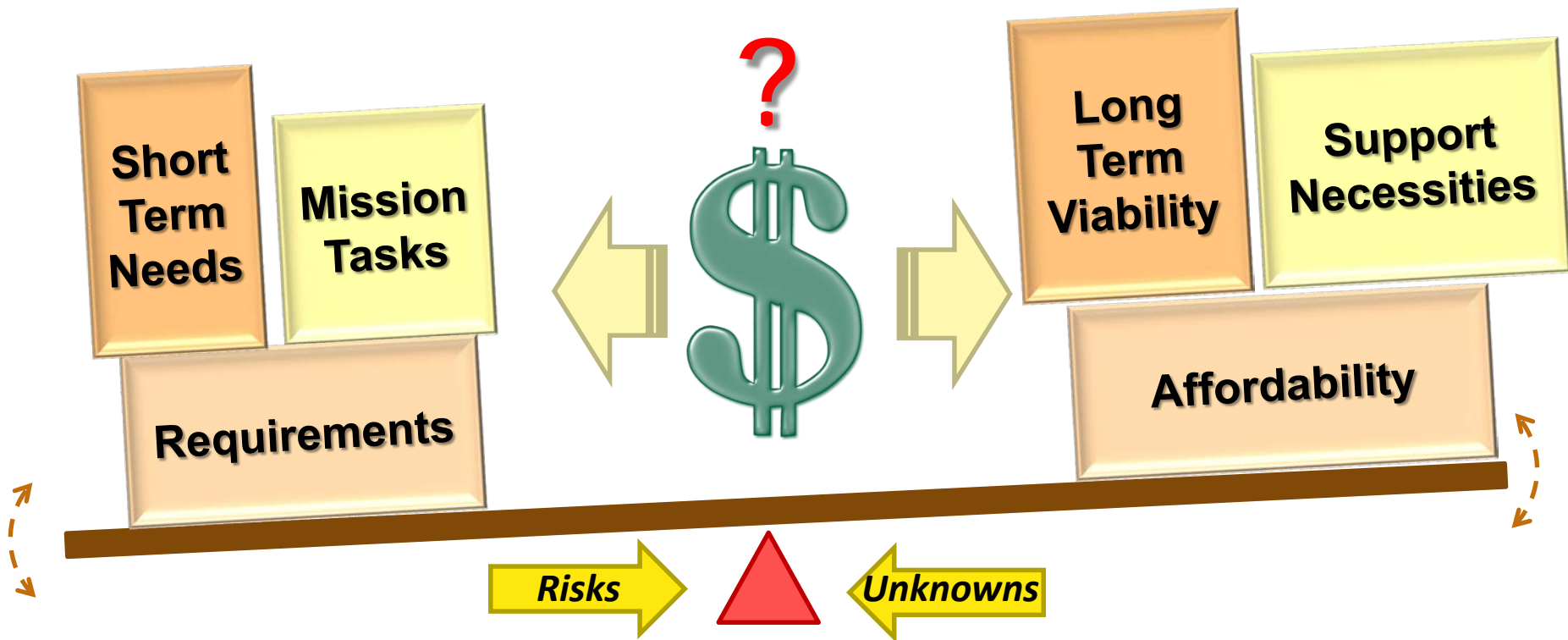
SS Facilities & Support	Electrical Distribution	Domestic Water	River Water
<div>Roofs</div> <div>Electrical/D.G.</div> <div>Radio/Paging</div> <div>HVAC</div> <div>Gen Bldg Cond</div> <div>Fire Systems</div>	<div>13.8 V/Sgear</div> <div>Feeders</div> <div>Dist Xformers</div>	<div>A-Plant</div> <div>Small Systems</div> <div>Wells</div> <div>Distribution</div> <div>Instrumentation</div>	<div>Intake</div> <div>Electrical</div> <div>Dist Piping</div> <div>Pumps</div> <div>Misc. Equip.</div> <div>Valves</div>
Roofs: 703-42A, 705-C and 703-47A roof replacements all working. Continuing to respond with temporary repairs and leak mitigation strategies. HVAC: Continuing to respond to aging equipment issues in many buildings. Gen Bldg Cond: Compelling Place To Work- 766-H painting in hallways in progress. Fire Systems: 707-C fire panel in acceptance testing.	Feeders: Power poles to be replaced or structurally reinforced, wiring connection hot spots to be repaired. Dist Transformers: Transformers to be replaced or have moisture reduction via DryMax process.	Distribution: Maintenance efforts continue in response to leaks as these occur in the individual distribution legs.	Valves: Air inlet release valves and valve houses have failed. Pumps: The #10 pump motor tripped with the indicator relay indicating a ground fault. Repair is initiated.
Fire Water	Chilled Water	Process/Service Water	Sanitary Wastewater
<div>Water Source</div> <div>Pumps</div> <div>Piping</div> <div>Tanks</div> <div>Controllers</div> <div>Valves</div>	<div>Chilled Water</div> <div>Treatment Sys</div> <div>Cooling Tower</div>	<div>SW Sys</div> <div>SW Treat. Sys</div> <div>Wells</div> <div>H Proc Wtr Sys</div> <div>H Proc Wtr Treat</div>	<div>Collection Sys</div> <div>Central SWWT</div> <div>L-Area SWWT</div> <div>Lift Stations</div> <div>K-Area SWWT</div>
Piping/Valves: Final repair of line to Hydrant 3014 in SRN still pending.	A Area Chillers: #4 Primary CHW Pump has boiling spot. New pump and motor on order. #5 Secondary CHW Pump shaft seal has been replaced. PH1 to follow. A Area Cooling Tower: CW 1-4 breakers need auxiliary contacts replaced. Installation to be scheduled. Motor for #2 Cooling Tower Fan replaced, associated #2 fan motor starter training offline. trouble-shooting in progress. B Area Chillers: #1 Primary CHW Pump bearing failing. Pump rebuild kit received. #2 Primary CHW Pump exhibiting bearing failure. Pump and motor replacement received.	H Proc Wtr Sys: Return Pump #1 & 2 overhaul needed (bald bearing) #1 also needs actuator repaired/replaced. Wells (SW): 905-20A motor & pump replacement underway.	Lift Stations: General aging issues. Six (6) Air Release Valves have been replaced in FY18. Currently, ten (10) have been replaced with ten (10) remaining. 607-67G Pump #1 Priming issues resolved. Pump #2 internal replacement scheduled. 607-466 Pump #2 failed and is in a single pump operation, replacement ordered. Central SWWT: UV Replacement System has been ordered. K-Area SWWT: Corrosion potential degradation has developed to structural steel components. Investigating repair options.

Note: A Area Fire Water Supply (APWS) Project contract has been awarded for the Pump Houses. Storage Tank RFP was issued. Domestic Water in for APWS Project working. One out of two bio-ins complete (10" diameter).

Note: 285-H and 281-2H switchgear aged & obsolete, requires replacement. (11C MIL).

SNAPSHOTS

Maintaining the Delicate Balance ...



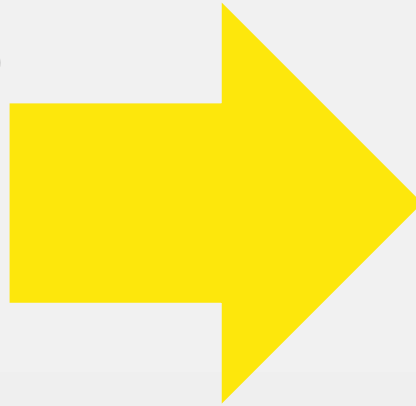
Savannah River Site Common Infrastructure Immediate Challenges

- **Common Administrative Facilities – Maintenance of safe, comfortable, and environmentally controllable facilities and workspaces**
 - Maintenance and Replacement of roofs
 - Maintenance, balancing, and replacement of HVAC systems
 - General Building conditions: functionality, health, and aesthetics (interiors and exteriors)
 - Replacement of aging fire alarm and suppression systems
- **Maintenance of Transportation Network**
 - Re-pavement of failing roadway surfaces
 - Parking area maintenance
- **Electrical Distribution System**
 - Maintenance
 - Modernization
- **Energy (and maintenance) Efficiencies**
 - Lighting conversions to LED
 - Modernization of HVAC systems
 - Right Sizing utilities to meet current and future missions
- **Integrated Maintenance Management System (Work Control, Work Packages, Procurements, Financials, Preventive Maintenance, Scheduling, Metrics)**



Savannah River Site Common Infrastructure - Conclusion

- ☐ Consistent Resourcing (\$)
- ☒ Realistic Planning
- ☒ Disciplined Execution
- ☒ Innovative Management
- ☒ Skilled Workforce



Safe, Efficient, and Durable Common Infrastructure that enables SRS to meet current and future mission needs

