

Plutonium Pit Manufacturing at the Savannah River Site

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Plutonium Pit Processing at the Savannah River Site

- Repurpose the unfinished Mixed Oxide Fuel Fabrication Facility as the Savannah River Plutonium Processing Facility
- Achieve NNSA two-site solution to deliver 80 pits per year
 - 50 from Savannah River Site
 - 30 from Los Alamos National Laboratory

- Received CD-1 approval June 28 for Design/Build Project
- Conceptual design completed
- Life Cycle Cost Estimate completed
- EIS completed and ROD issued



The Program Requirement is to go from this concept ...



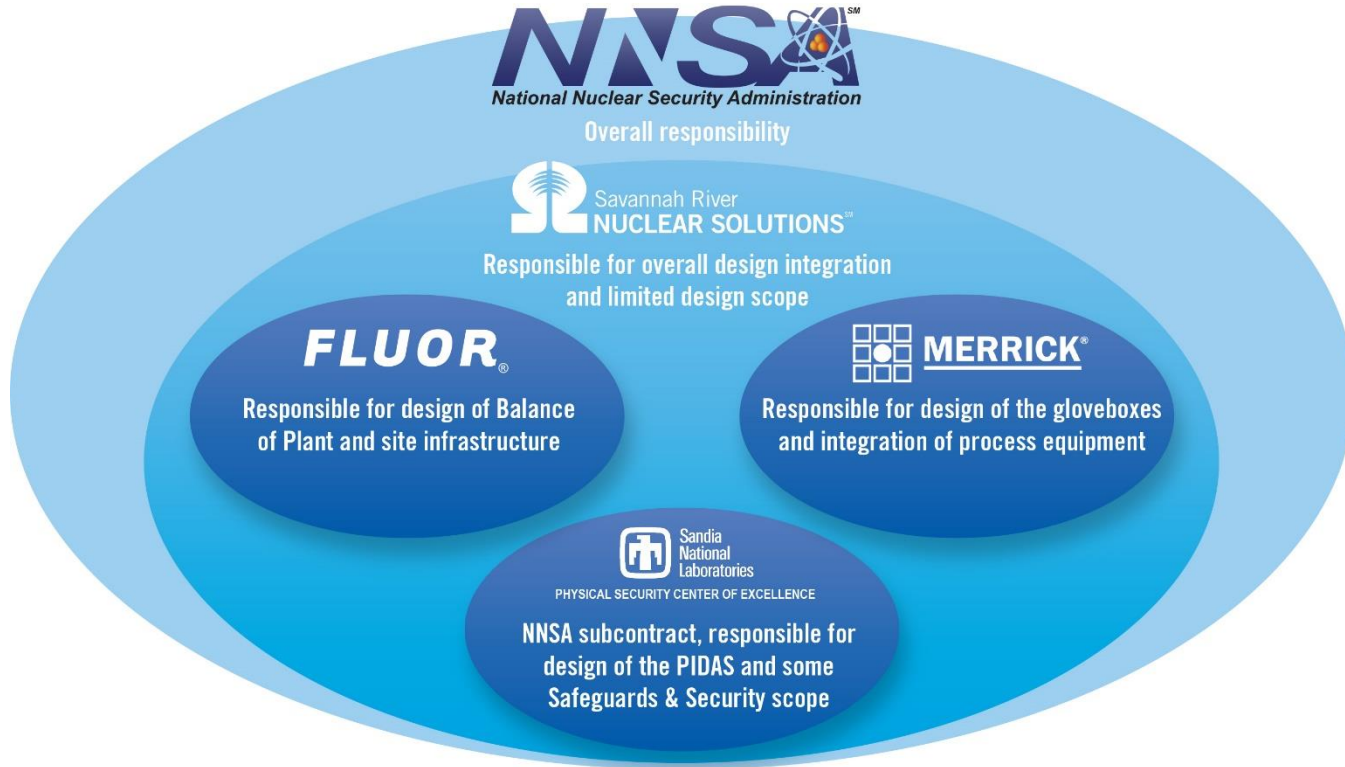
... to this reality, fully equipped and fully staffed for pit production



The SRS Plutonium Pit Processing Mission Focus for next 2 years

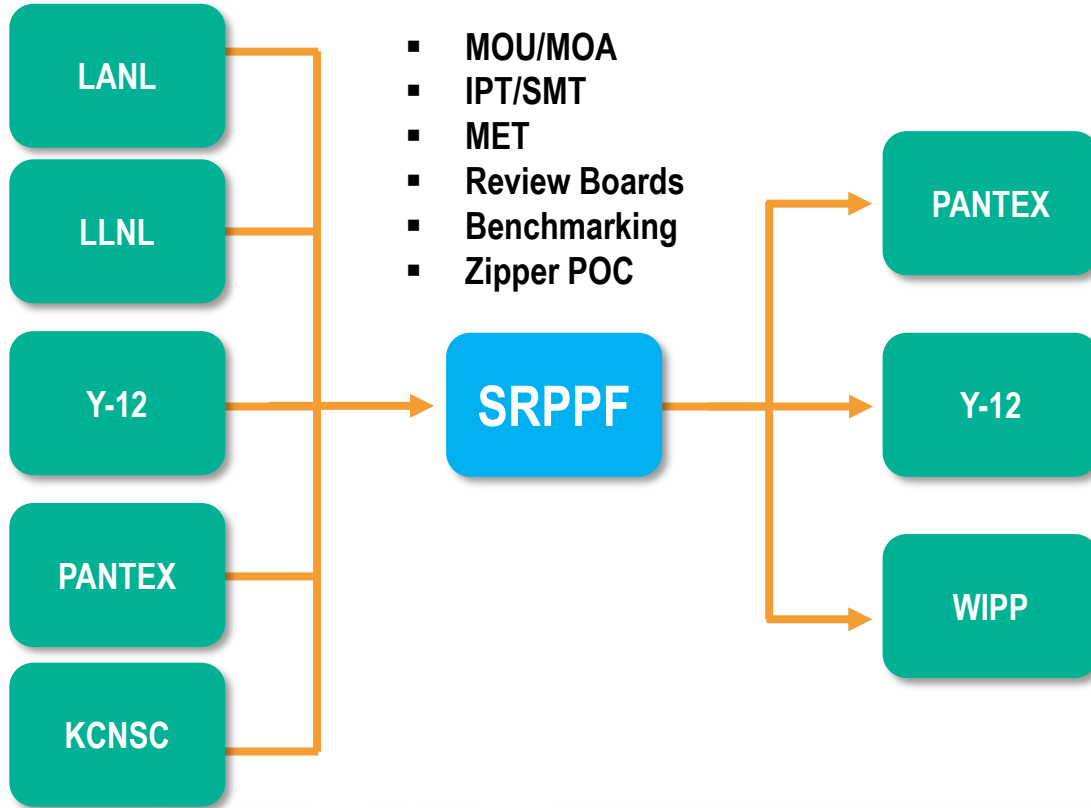


SRPPF Project Focus for next 2 years – Design Engineering



SRS Plutonium Pit Processing – Interface Management

- Programs
- Product
- Waste
- Parts
- Commodities
- Expertise
- Technologies
- Procedures



SRS Pu Pit Processing – FY 2021 – FY 2022 Program Benchmarking

	LANL	Y-12	KCNSC	EFCOG	HPIC	WIPP	LLNL	SNL	Newport News	Boeing
Radiological Protection	X	X		X	X					
Industrial Hygiene (Beryllium Management)	X						X			
Occupational Safety	X	X								
Environmental Management (RCRA Permitting)	X	X								
Waste Management	X			X		X				
Quality Assurance, Quality Control, Supplier Quality	X	X								
Weapons Quality / Nuclear Enterprise Assurance	X	X	X							
Governance & Contractor Assurance	X			X						
Physical Security	X	X					X	X		
Enterprise Resource Planning (ERP) system	X	X	X						X	X
Work Management System	X	X	X						X	X
IT / OT – Manufacturing System	X									

EFCOG – Energy Facility Contractors Group (working groups)
 HPIC – Health Physics Instrumentation Committee
 Newport News Shipbuilding, Newport News, VA
 Boeing Defense, Space and Security, St. Louis, MO

Workforce Recruitment and Training

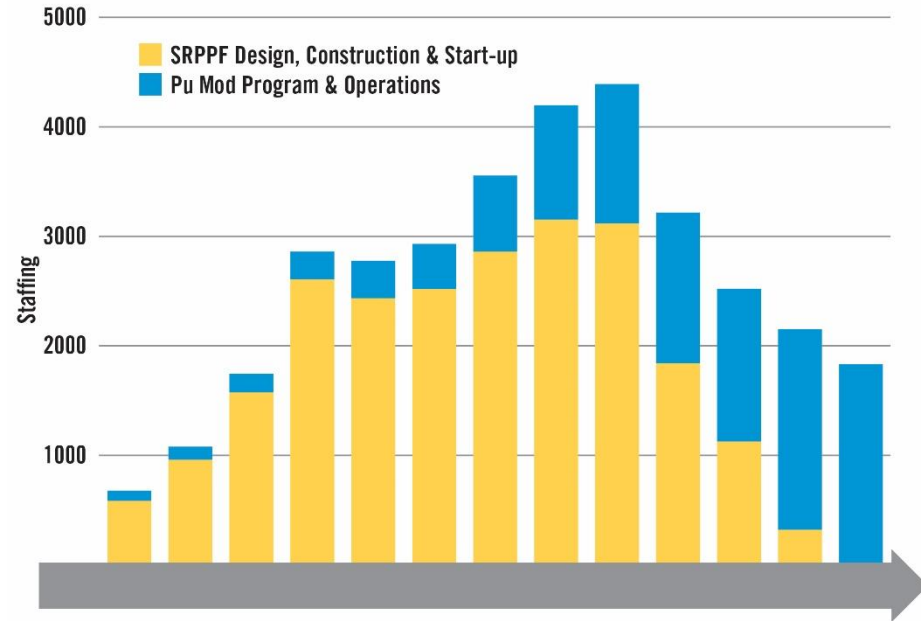
Objective: Recruit, hire, train and qualify ~1,800 future O&M and security staff over next 10 years

Status:

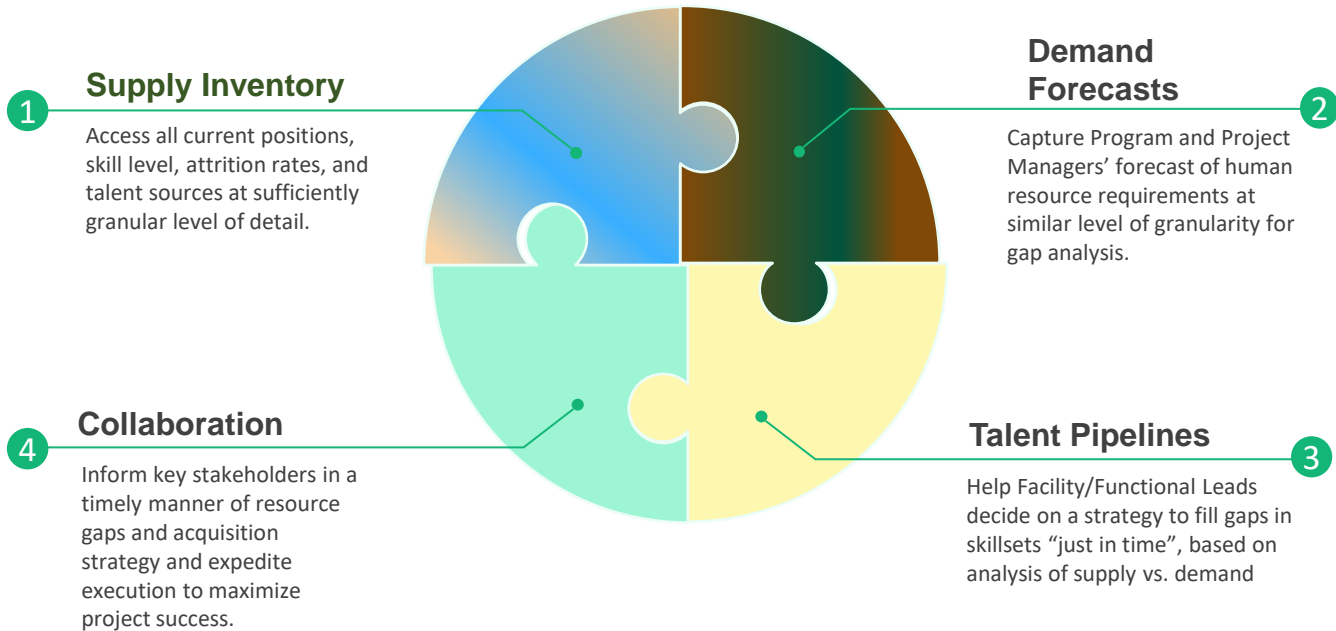
- Currently at 45 program staff (plus >600 project staff)
- Software model being utilized to balance staffing supply vs demand
- Working with colleges/tech schools to prime pipeline with candidates
- Active knowledge transfer program from LANL to SRS
- Benchmarking other NSE sites

Near-Term Program Needs:

- Staffing – (see later slides)
- Other – Virtual Reality/Augmented Reality training platform for operators



InVizion Resource Modeling for SRS Pu Pit Processing



Identifying the SRS Plutonium Pit Processing Workers of the Future

- **Looking locally first and then within 15 state region**
- **Traditional SRNS supply chain for many of the skill sets**
- **Several skill sets unique for SRNS**
 - Metrology, high precision machining, cyber security, etc.
 - Machinists with nuclear skills
- **Outreach into the academic community to begin within next 6 months**
- **Working with InVizion on innovative program to model supply resources and demand for selected critical positions**

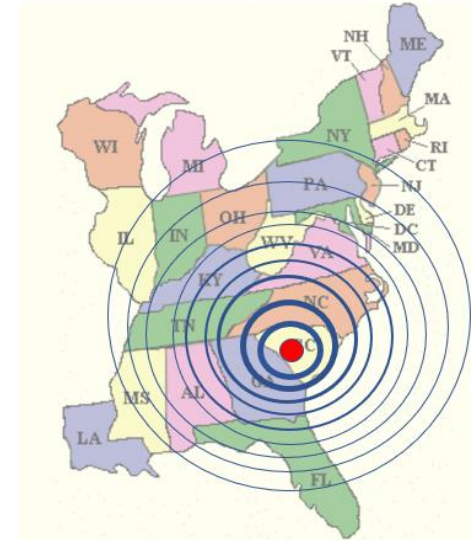
Supply/Demand Pipeline Parameters

Critical Positions

1. QA/QC Technicians – EX and Non-Exempt
2. Machinists
3. Welders
4. Nuclear / Pu Operators
5. Production Control
6. Product Acceptance Technicians
7. Engineer/Scientists
8. RADCON Inspectors and Technicians
9. Information Technology / Systems & Cyber Security

15 States for Critical Resource Pools

- Group I
 - South Carolina
 - Georgia
 - Florida
 - Virginia
 - North Carolina
- Group II
 - Alabama
 - Mississippi
 - Louisiana
 - Arkansas
 - Missouri
- Group III
 - Kentucky
 - Ohio
 - Indiana
 - Tennessee
 - West Virginia



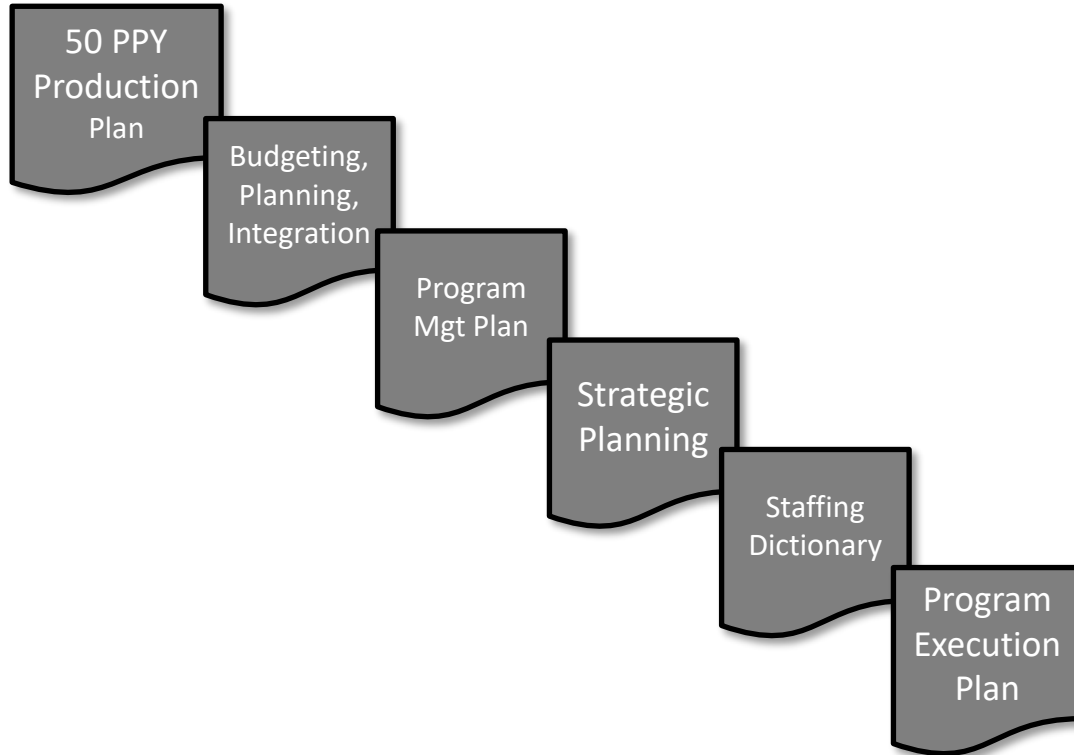
SRS Plutonium Pit Processing – Knowledge Management Strategy

- **Knowledge Transfer:** Expand the skillset of the workforce. Develop a deeper knowledge and understanding of roles and functions
 - Current: two-year rotational assignments at LANL alongside PF-4 workers.
 - *Pu metal processing, fabrication, and assembly*
 - Future: one-to-three-month job-shadowing rotations at one or more locations across the NSE.
 - *Operations, Maintenance, Engineering, Radiological Control, QA, Weapons Certification*
- **Knowledge Preservation:** Document and capture existing organizational knowledge on Process Systems and Support Evolutions
 - Documented interviews, development of facility systems training (Study Guides), refinement of operations philosophy / procedure development
- **Knowledge Share:** Provide the knowledge gained from Transfer/Preservation throughout the workforce



First group of Knowledge Transfer Program participants at LANL

Life Cycle Planning



Objective: Establish program elements for commissioning, hot startup and steady state operations

Status:

- Issued initial LCCE with SRPPF Project CD-1
- Established interfaces with National Lab counterparts
- Developed O&M staffing and training plans
- Prepared to perform O&M vision casting and team development
- Established ongoing integration with NNSA field and program offices

Near-Term Program Needs:

- Staffing – O&M Trainers, O&M procedure writers, Program financial analysts
- Other – LCCE support

SRS Plutonium Processing – Weapons Quality Approach

Objective: Establish weapons quality program for qualification of product

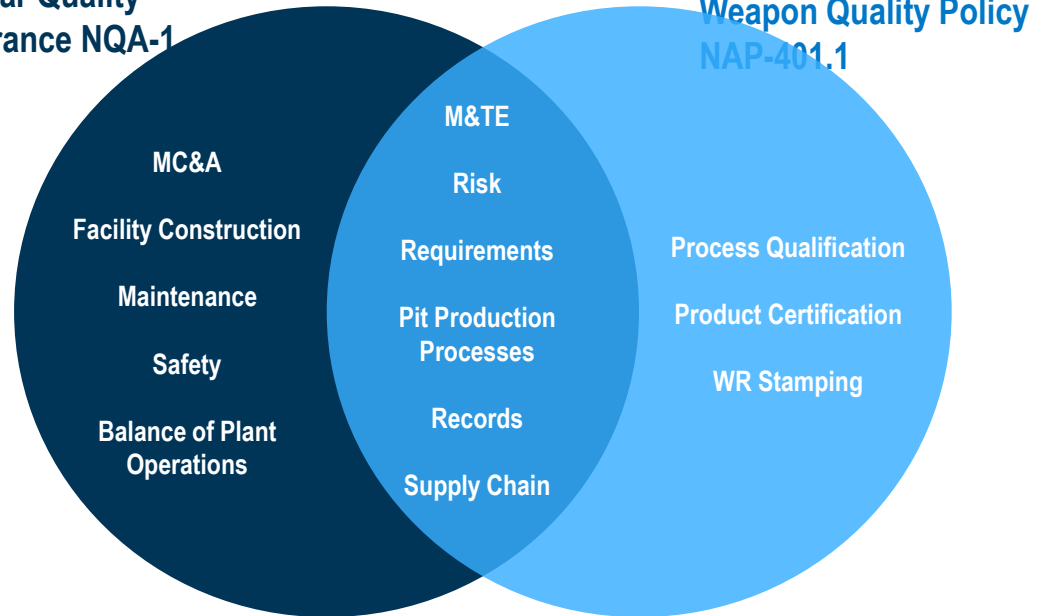
Status:

- Established interface with National Lab counterparts
- Began hiring of staff and establishment of quality functions
- Established SRPPF Nuclear Enterprise Assurance within Weapons Quality
- Developed implementation plan for weapons quality policies and procedures
- Developing process equipment WQA matrix
- Performing initial NEA/OTA risk assessment to help guide detailed design of selected production equipment

Near-Term Program Needs:

- Staffing – Weapons quality technical staff
- Other – WQA procedures and policies

Nuclear Quality Assurance NQA-1



Created Chief Quality Officer position to integrate Weapons Quality with NQA-1 requirements

Analytical Chemistry/Material Characterization Program

Objectives:

- Establish AC/MC approach and organization for SRS Plutonium Pit Processing
- Establish AC/MC program elements for operational readiness, hot startup, and operations

Status:

- Established Interface with National Lab counterparts
- Hired first Lab supervisor
- Setting up technical support team for methods

Near-Term Program Needs:

- Staffing – Chemists, Lab Manager
- Other – Input on methods development



ESH&QA Programs

Objective: Establish ESH & QA program elements for operational readiness, hot startup, and operations

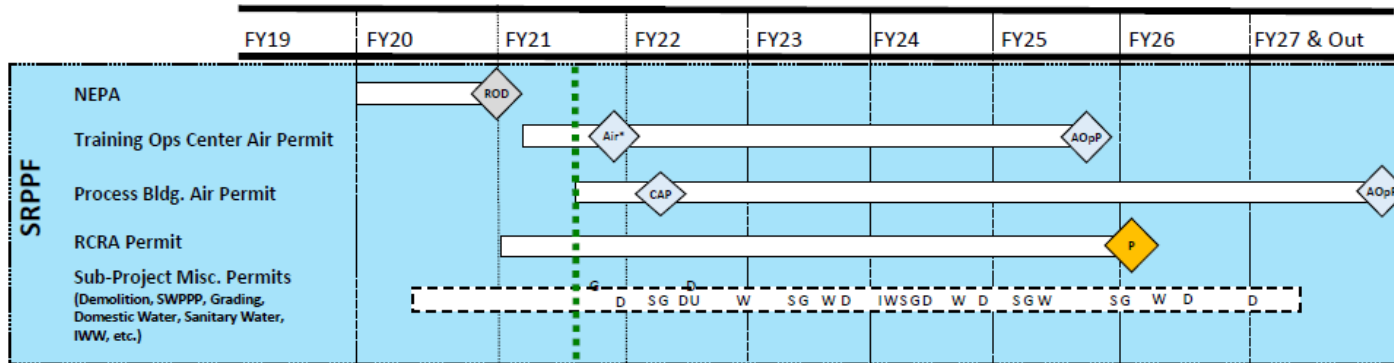
Status:

- Established interfaces with National Labs
- Developing of staffing and training plans
- Develop ESHQ programs supportive of SRPPF Project EPC environment

Near-Term Program Needs:

- Staffing – Industrial Hygienist Program Lead, Health Physics Program Lead, Lead Engineers
- Other – Support for EPC ESHQ program development and implementation

Environmental Permitting Needs



Disciplined and Reliable Operations

Objectives:

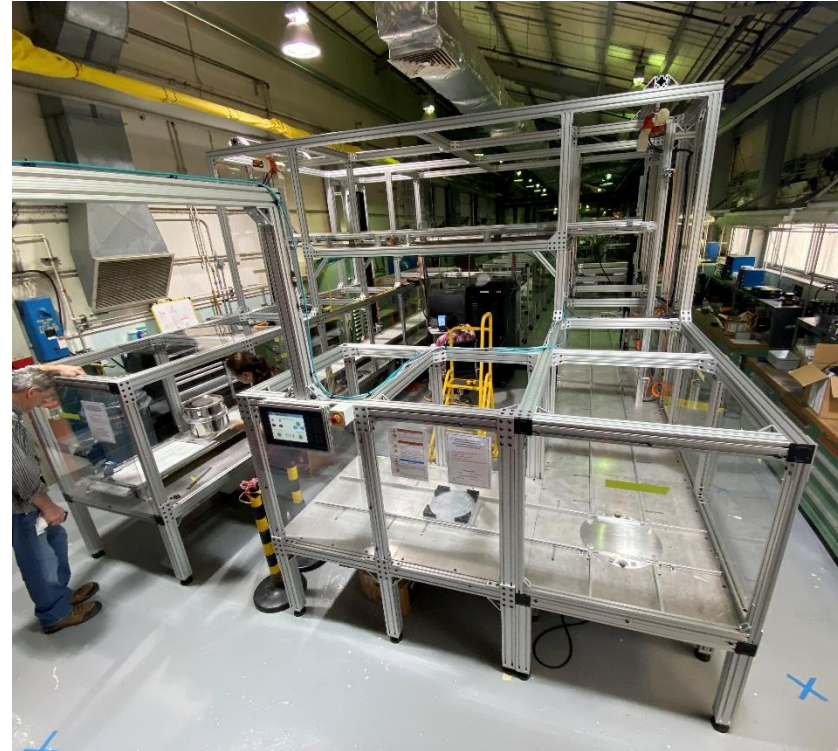
- Establish O&M program elements for operational readiness, hot startup, and operations
- Establish Production Authority (PA) role
- Establish Conduct of Operations program including training
- Develop Operating and Maintenance procedures
- Develop RAMI and Maintenance Plans/Modeling
- Establish Waste Management and Product Handling program elements for operational readiness, hot startup, and operations
- Establish product and waste shipping strategy and agreements with waste receivers

Status:

- Established Interface with National Lab counterparts
- Developing staffing and training plans
- Establishing start-up testing and commissioning group

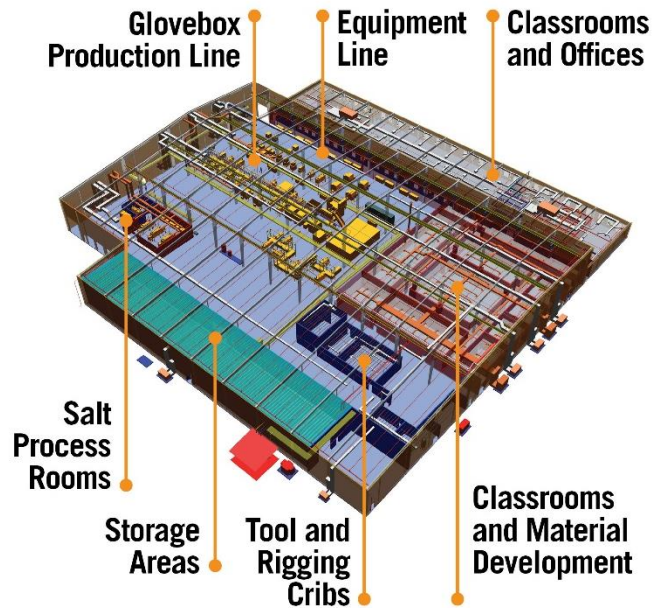
Near-Term Program Needs:

- Staffing – Trainers, Procedure writers, Process operators, Mechanics, Welders, Machinists/lathe operators
- Other – Support for RAMI analyses, establishing PA role, and further development of start-up/commissioning approach



Operations and Maintenance Training

- **Modify an existing assembly facility for O&M training**
 - Build skill and competency in pit production technologies
 - Build skill and competency in managing and operating an NSE pit production mission
 - Prepare and practice for the ORR and transition of plant into hot operations
- **Opportunity to begin production process optimization in parallel with plant construction**
 - Engineering development activities (transfer system, casting, pyro, machining)
 - Building the digital systems needed to operate 226-F (data collection, electronic procedures, bomb book, etc.)
 - Plan on producing and “selling” mock (non-radiological) parts
 - Work up to a relevant production tempo to quickly move from FPU to full production
 - Provide shop capability for fabrication of tools and fixtures for TOC and 226-F



Security and Nuclear Materials Control and Accountability Programs

Objectives:

- Establish Security program elements for operational readiness, hot startup, and operations
- Establish Nuclear Materials Control and Accountability program elements for operational readiness, hot startup, and operations
- Incorporate NNSA requirements for Physical Security, Cyber Security, NMC&A, Counterintelligence, Operations Security

Status:

- Interfacing with National Lab counterparts
- Development of staffing and training plans

Near-Term Program Needs:

- Staffing – Engineers (Security, NMC&A, Cyber)
- Other – Support development of Conceptual Vulnerability Analyses, determining optimal approach to NMC&A, and establishing Limited Areas in several facilities



Information Management Program

Objectives:

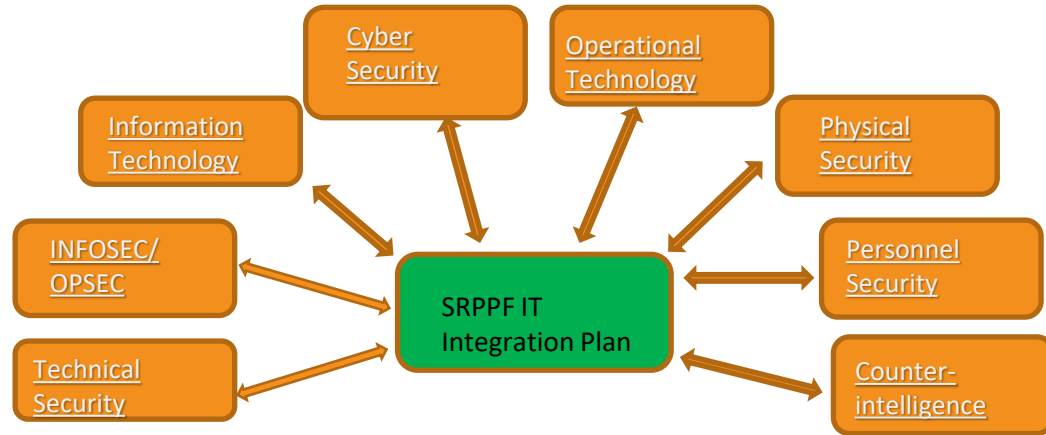
- Deploy and maintain approved applications, network and infrastructure required to support the SRS Plutonium Pit Processing Mission by FY25 and beyond

Status:

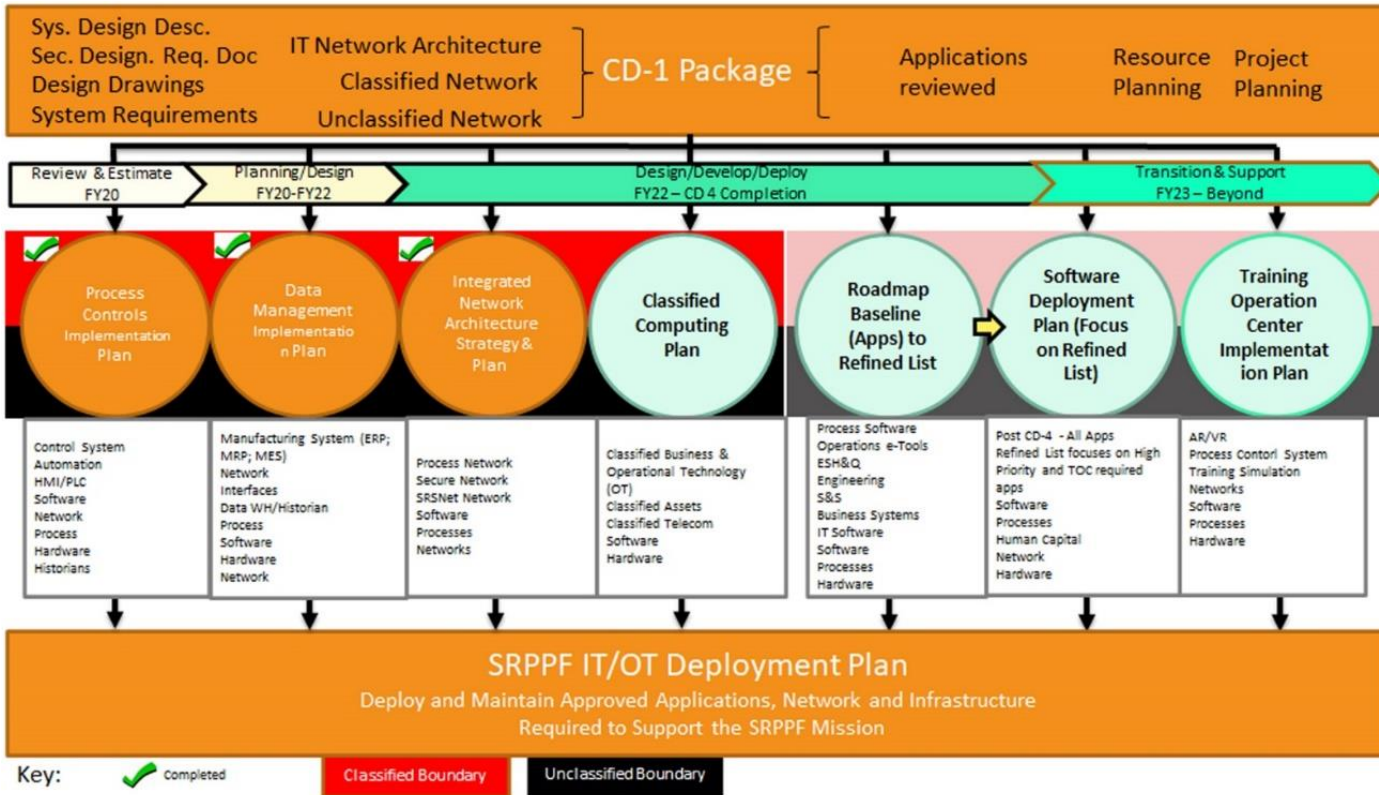
- Hired a CIO and established an integration function for IT, OT, PC&A, Cyber, and CI
- Developed Software Product Roadmap
 - Phase 1 for baseline completed - identification of 300+ applications spanning 12 functional areas
- Establish IT/OT requirements including software management strategy
- Began staffing CIO organization

Near-Term Program Needs:

- Staffing – Data analysts, Software engineers, IT specialists, Classified System computing expertise
- Implement Roadmap Phase 2 (refined list of high priority products) and Phase 3 (detailed schedules to support deployment and integration)



SRPPF Software Product Roadmap Effort



Other SRS Plutonium Pit Processing Support Programs

Objectives:

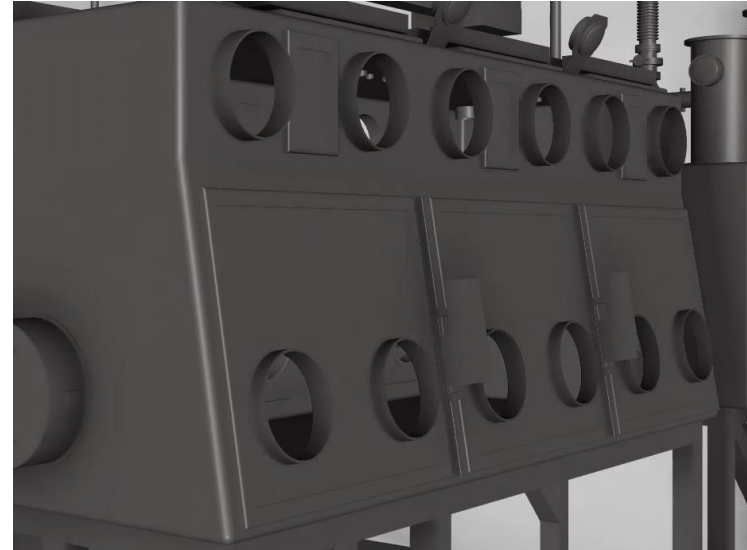
- Establish Supply Chain organization to support purchase of process equipment, gloveboxes and balance of plant equipment
- Establish secure supply chains providing needed commodities, specialty equipment, technical services and consumables
- Establish business services processes for financial analysis and reporting
- Establish Contractor Assurance program
- Establish Risk Management program
- Establish Process Engineering program elements for operational readiness, hot startup, and operations

Status:

- Supply Chain organization in place
- Business, Risk Management and CAS programs and staffing is in place
- List of qualified suppliers for critical services and equipment under development
- Program development in progress in other areas of staffing and training plans

Near-Term Program Needs:

- Staffing – Process engineers, Financial planners



SRS Plutonium Pit Processing Program – Final Thoughts

- SRS has experience in NNSA program management – Plutonium, NNP and Tritium
- The Pu Modernization Program implementation is important to stay aligned to the SRPPF project as it moves through design and construction of the plant
- Lessons learned have been, and will be, applied for efficiency and effectiveness of the program
- The Pu Pit Processing program is modeled after LANL (Pu), Rocky Flats (Pu), Y-12 (U), and SRS (Tritium and Pu)
- There are many opportunities to support implementation

