



Engineering Assessment Overview



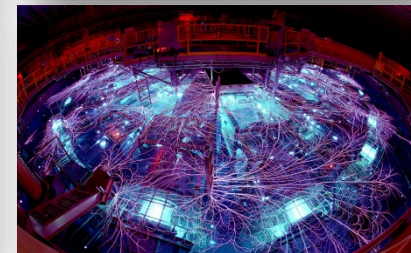
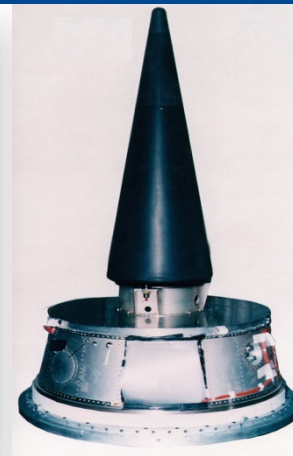
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Plutonium Program Office

October 2018

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Guidance Used: TCG-PUP-2, 02/04/2003, DOE-OC



NATIONAL NUCLEAR SECURITY ADMINISTRATION OFFICE OF DEFENSE PROGRAMS

Introduction

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- The Engineering Analysis (EA) refines recommendations from the Plutonium Pit Production Analysis of Alternatives (AoA) to support selection of a single preferred alternative for conceptual design:
 - Repurposing the Mixed Oxide Fuel Fabrication Facilities (MFFF) at the Savannah River Site (SRS) to produce 50 Weapons Reserve (WR) pits per year (ppy) (complementary to the enduring 30 WR ppy mission at Los Alamos National Laboratory)
- The EA was completed by an independent Architectural & Engineering firm, PARSONS, with plutonium expertise provided by a team of subject matter experts
- The EA provides analysis related to:
 - Engineering Feasibility
 - Cost
 - Schedule
 - Risk

Engineering Feasibility

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- MFFF was **designed and constructed** to meet Nuclear Regulatory Commission requirements for nuclear safety and DOE requirements for material control and accountability (MC&A) and for safeguards and security
- The **safety strategy** is to conservatively assume that all the passive and active engineering controls credited for the Los Alamos National Laboratory Plutonium Facility
- Because MFFF is an **existing structure**, design for the 50 ppy project would be limited to designing process and support systems and the minor modifications to the building.
- Modifying MFFF does include the addition of a significant and somewhat complex **conveyance system**
- There is **more than sufficient** room for process equipment, support areas, and utility systems for the production of 50 ppy at high confidence
- The **existing Technical Support Building** has more than sufficient room to house the operational staff needed

Provides a fully independent and self-contained 50 ppy capability

Construction Scope

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- Mixed Oxide Fuel Fabrication Facility
 - Removing the existing fuel manufacturing equipment previously installed in the areas that are being used for pit production
 - Installation of gloveboxes and process equipment
 - Installing an analytical chemistry laboratory
 - Installation of process support and building utility systems
 - Commodity routing and final system connections
- Technical Support Building
 - Modifications to provide Entry Control Facility and Office and Support Space
- Waste Solidification Building
 - Testing and repairing or replacing the existing equipment
- Security Upgrades
 - Installation Perimeter Intrusion Detection and Assessment System (PIDAS)

Equipment and Process Space

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- Process Equipment List
 - 117 Manufacturing
 - 36 Aqueous

Process Area	Room(s) Size (ft ²)
Disassembly and Metal Preparation	6,084
Foundry	5,919
Machining	8,942
Subassembly and Assembly	8,322
Post Assembly	1,581
Material Management	2,055
Material Characterization	1,920
Sample Preparation and Analytical Laboratory	19,960
Aqueous Recovery	6,838
High Energy Radiography	4,100
Total	65,721

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Pre-Conceptual Equipment Layouts 1st Floor Plan

(b)(3)



Pre-Conceptual Equipment Layout 2nd Floor Plan

(b)(3)



Pre-conceptual Equipment Layout 3rd Floor Plan

(b)(3)

Cost and Schedule Estimates

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- Cost Estimate Range - \$1.83 - \$4.58 B
- Point Estimate - \$2.29 B
- Schedule
 - Start Conceptual Design – Oct 2018
 - CD-1 Approval – Dec 2019
 - CD-3A Approval – Feb 2021
 - CD-2/3 Approval – Sep 2022
 - Construction Completion – Jul 2025
 - CD-4 Approval – Jan 2028

Cost Element	\$M
Project Management	263.4
Engineering/Design	252.0
Site Preparation/D&D	25.9
Equipment Procurement	258.4
Construction/Installation	563.9
Startup/Commissioning	194.9
Management Reserve/Contingency	589.4
Other Project Costs	157.1
Total (Point Estimate)	2,294.8

The cost estimate and schedule is a rough-order-of-magnitude estimate (Class 5 in accordance with DOE Cost Estimating Guide estimate classification) and is intended to provide a means of comparing relative costs to support the decision-making process.

Estimates and schedule are not intended for budgeting purposes.

Qualitative Risk Assessment

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■ Threats

- MFFF ongoing construction leads to increased costs for modifications or facility retrofit
- Difficulties closing out the MOX project and contract result in schedule delays
- Facility configuration results in increased safety and security requirements and associated lifecycle costs

■ Opportunities

- Some work required for pit production at MFFF can be completed as part of MFFF closeout
- Analytical capability will be located in existing HC-2 Security Category 1 space
- Improved operational efficiency using lessons learned and best practices with SMEs from separate sites
- Separate sites each with production capabilities can ensure continuing mission support
- Additional HC-2 space is available to support other NNSA programs.
- Opportunity to make use of purchase and stored commodities from the MOX project
- Remove walls for construction and operations
- MFFF would not have to be safety class due to distance from the site boundary
- Use of F/H analytical laboratory



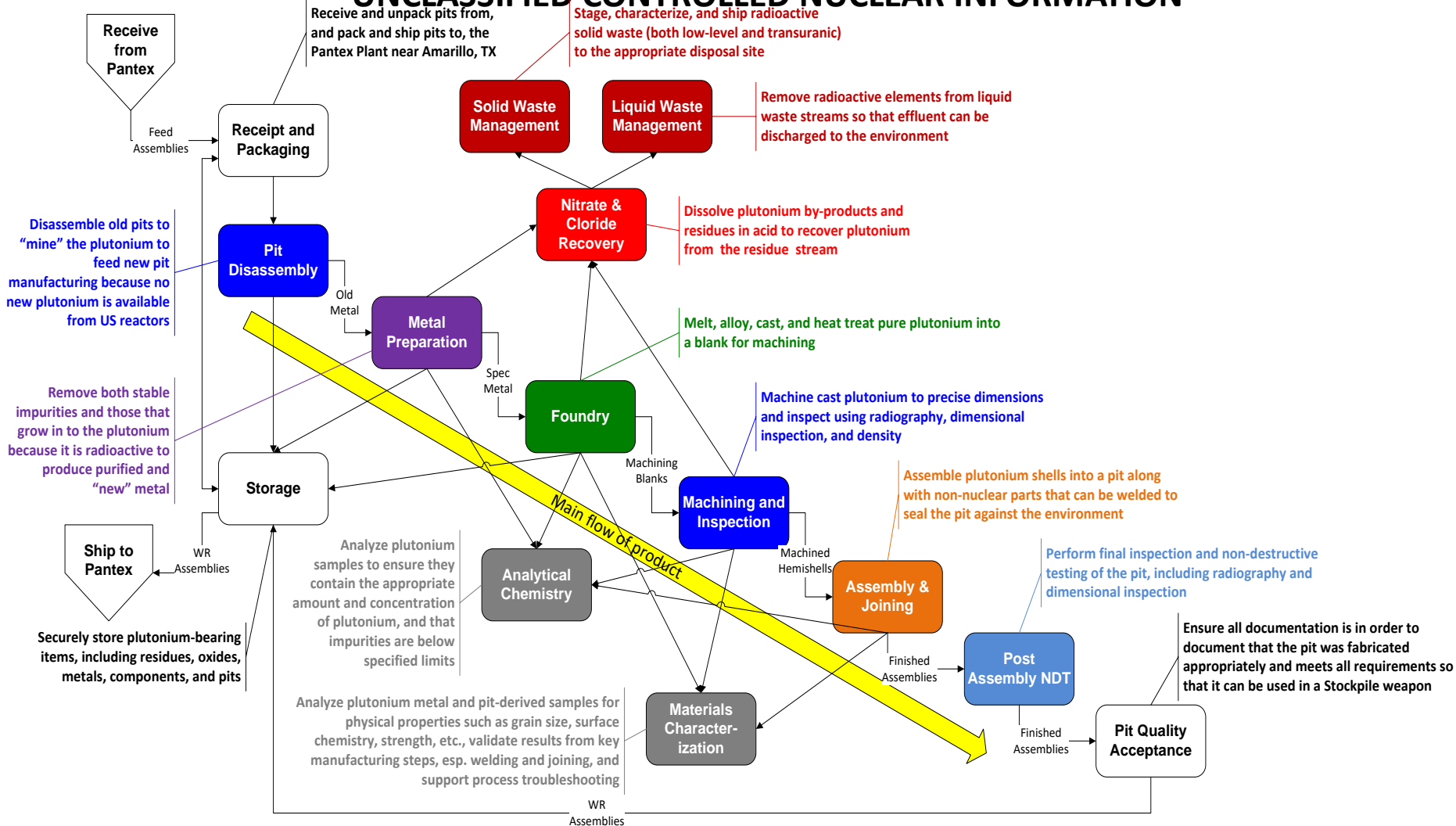
Back-up Slides

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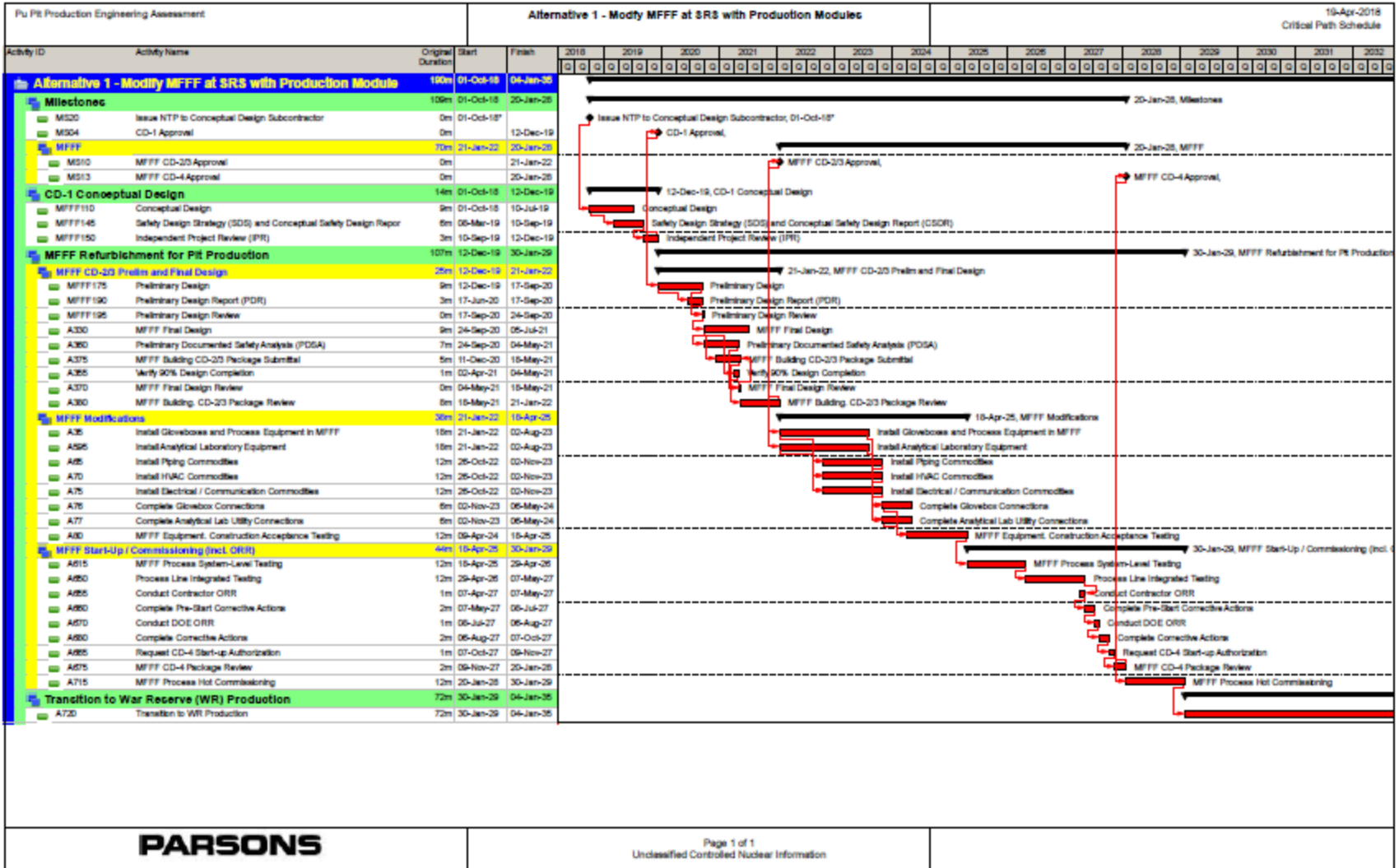
Process Overview

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Critical Path Schedule

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