S.3.4 Alternatives Considered but Eliminated from Detailed Study

S.3.4.1 Purchase Pits

While there is no national policy that prohibits purchase of defense materials such as pits from foreign sources, NNSA has determined that the uncertainties associated with obtaining pits from foreign sources render this alternative unreasonable for an assured long-term supply.

S.3.4.2 Utilizing the Pit Disassembly and Conversion Facility at the Savannah River Site

NNSA is currently planning for the permanent disposition of weapons-grade plutonium no longer required for defense purposes. In September 2000, the United States and Russia signed a Plutonium Management and Disposition Agreement (PMDA) in which each country agreed to permanently dispose of 34 metric tons (37 tons) of plutonium. The obligations under this "government-to-government" agreement equate to a pledge by each country to meet the terms put forth in the agreement. Under current plans, surplus nuclear weapons pits would be disassembled and the resulting plutonium metal converted into oxide in a planned Pit Disassembly and Conversion Facility (PDCF). The resulting plutonium oxide would then be fabricated into mixed-oxide fuel at a second facility, the Mixed-Oxide Fuel Fabrication Facility, to be built at the SRS and then irradiated in existing commercial reactors. However, the PMDA includes several restrictions that would likely impact synergy between the plutonium disposition program and the MPF. For example, facilities constructed under the PMDA are designated "disposition facilities" and the use of these facilities to process plutonium other than "disposition plutonium" (such as pit manufacturing, or other defense purposes) is prohibited. Article VI Paragraph 5 of the PMDA states, "Disposition facilities may only receive and process disposition plutonium and blend stock." (See Appendix G for more details regarding the PMDA and other potential restrictions.)

NNSA has decided that the international constraints on the PDCF render the facility at SRS incompatible with the MPF National Security mission.

S.3.4.3 TA-55 Upgrade Alternatives

In August 2002, a multidisciplinary team comprised of national laboratory, NNSA production plant, and Federal Government personnel was chartered to: (1) determine the potential production rates that might be achieved at LANL with upgrades to PF-4; (2) estimate the implementation costs of these upgrade options; (3) address the advantages and disadvantages of upgrading PF-4 to higher production capacities; and (4) prepare information to support a determination on the "reasonableness" of the alternative of relying on an upgraded PF-4. The team was also tasked to prepare detailed environmental data for the MPF Draft EIS on any PF-4 upgrade alternative considered reasonable even though a 50-year life for a MPF may not be achievable for a TA-55 Upgrade.

The team evaluated three upgrade options for TA-55/PF-4 to increase production rate:

- TA-55 Upgrade Option 1 - No impact on current LANL missions in PF-4.
- TA-55 Upgrade Option 2 - Impact some current LANL nondefense-related missions in PF-4.
- TA-55 Upgrade Option 3 - Add floorspace (new wing) to PF-4 and impact some current LANL nondefense-related missions.

Based on the team's evaluation, NNSA determined that TA-55 Upgrade Option 1 would not result in an upgraded TA-55 production capacity that was greater than 50 ppy. Since production capacities in this range are already included in the bounding analyses for the No Action Alternative, no separate evaluation of TA-55 Upgrade Option 1 is necessary.

NNSA also determined that TA-55 Upgrade Option 3, which required construction of additional floor space on PF-4 and had hypothetical potential to achieve a maximum capacity of up to 150 ppy, was not a reasonable alternative. Option 3 approaches the cost and schedule of a small, newly-constructed MPF, but does not provide the agility or contingent capacity needed for the long-term.

TA-55 Upgrade Option 2, estimated to achieve a nominal manufacturing capacity approximately 80 ppy, was determined to be a reasonable alternative for evaluation in the MPF EIS. While the NNSA notes that Option 2 does not have the potential to reach the minimum production capacity (125 ppy) or agility required by a MPF, inclusion of this upgrade alternative provides a capacity greater than the No Action Alternative. This provides a "hedge" in the event of unforeseeable changes in stockpile size or pit lifetime result in a significantly smaller pit production capacity requirement. It is noted that this Upgrade Alternative would need to be timed to minimize disruptions to LANL's interim small-scale pit production activities required to meet current DOD requirements.

S.3.4.4 Upgrade Building 332 at Lawrence Livermore National Laboratory

Building 332 at the Lawrence Livermore National Laboratory (LLNL) is located in what is known as the "Superblock." Building 332 is a plutonium R&D facility containing a wide breadth of plutonium processing and fabrication technologies but offering minimal production-like capability. Building 332 does not have an existing pit-manufacturing mission and is small in comparison to the TA-55/PF-4 facility at LANL. In order to produce a meaningful quantity of pits, drastic modifications to Building 332 would be required. Additionally, because of the significant population encroachment at LLNL, an upgrade alternative at LLNL is undesirable. Accordingly, the alternative to upgrade Building 332 was eliminated from detailed study.

S.3.4.5 Chemistry and Metallurgy Research Building Replacement (CMRR)

NNSA is currently preparing an EIS for the CMRR. The purpose of the CMRR EIS is to evaluate alternatives for replacing the existing Chemistry and Metallurgy Research Building at LANL, where nuclear operations are scheduled to be shut down in approximately 2010. A new CMRR would provide analytical, chemical and material characterization support to existing missions at LANL that are expected to continue for the long term. Such support is needed independent of the MPF EIS proposal. While a CMRR could provide support to an eventual

MPF at LANL (if LANL were the selected site), such support is not in the baseline design of the CMRR, nor is it required. The environmental impacts of providing chemical and metallurgical support for a MPF at LANL would be essentially the same whether such support were to occur within the CMRR or the MPF; thus, the MPF EIS includes this analysis as a direct impact in this MPF EIS. Under the No Action Alternative and the TA-55 Upgrade Alternative, direct analytical chemistry and metallurgical support would be provided by the existing CMR or the proposed CMRR. As such, the CMRR EIS includes an analysis of environmental impacts associated with pit production up to approximately 80 ppy.

S.3.4.6 Savannah River Site Facilities

The F&H Canyon facilities, which are approximately 50-plus years old, were originally designed to recover plutonium and uranium from reactor fuel rods. As such, the portions of these facilities that might be applicable to pit production are primarily in the areas where processing operations took place. Because the only F-Area Canyon Facility that is set up to purify plutonium material from recycled pits is the New Special Recovery Facility, extensive upgrades and modifications would be required to generate an adequate capacity over the life of the MPF mission. A list of some of the major deficiencies associated with utilizing the canyons to support a MPF follows:

- Modifications to existing contaminated facilities are very costly due to radiological control issues. Labor cost increases of 300-500 percent vs. “clean” work are commonly estimated.

- Project risks are increased when using existing facilities due to the higher number of unknown conditions that may be encountered during the project, and the challenges of coordinating construction activities with any ongoing facility operations.

- There is a high potential for hidden cost and regulatory risks associated with the long-term commitment to a legacy facility.

- The service life of the renovated facility would likely not meet the 50-year MPF design requirement.

- The existing robust canyon structures cannot be modified significantly and would therefore result in inefficient equipment arrangement, material handling, and storage locations.

- Imbedded infrastructure such as shielding, ventilation systems, electrical cable/switchgear, and process piping/drains may not be suitable for a revised facility mission.

- Obstacles to adding distance and wall shielding in existing structures make achievement of the 500 millirem per year design goal, personnel exposure limit unlikely.

Based on these factors, NNSA determined that the F&H Canyon facilities are not reasonable alternatives for supporting a MPF mission. Likewise, NNSA considered whether use of the K-Area Materials Storage Facility would be beneficial to the MPF, but concluded that no such advantages existed.

S.3.4.7 Other Department of Energy/National Nuclear Security Administration Sites

Section S.3.2.2 describes the site screening process utilized to determine the reasonable site alternatives for the MPF EIS. As described in that section, all existing, major DOE sites were considered to serve as the host location for a MPF. A two-step screening process was employed: first, all potential sites were judged against "go/no go" criteria; and second, those sites satisfying the go/no go criteria were judged against desired, weighted criteria. Sites that did not satisfy the go/no go criteria, or which scored lowest against desired, weighted criteria were judged to be unreasonable site alternatives for a MPF.

S.3.4.8 Construct and Operate a Smaller Modern Pit Facility

As stated previously, the exact size and composition of the enduring stockpile is uncertain. Studies in the classified appendix have examined capacity requirements that would result from a wide range of enduring stockpile sizes and compositions, pit lifetimes, emergency production needs (referred to as "contingency" requirements), and facility full-production start dates. Although the precise future capacity requirements are not known with certainty, enough clarity has been obtained through these ongoing classified studies that the NNSA has identified a range of pit production capacity requirements (125-450 ppy) that form the basis of the capacity evaluations in this EIS. The EIS evaluates the impacts of a new MPF designed to produce three capacities: 125 ppy, 250 ppy, and 450 ppy. If there were significant further reductions in the nuclear weapons stockpile (beyond those already considered in the classified analyses), or if future technical studies demonstrate that pit lifetimes significantly exceed 45-60 years, then the need, capacity, and timing for a new MPF would need to be reassessed. With respect to these uncertainties, NNSA has chosen not to speculate beyond the assumptions described in this EIS. As such, this EIS does not propose to construct and operate a new MPF with a capacity smaller than 125 ppy. However, as described in Sections S.3.3.3, this EIS does evaluate a TA-55 Upgrade Alternative (80 ppy) as a "hedge" in the event of unforeseeable significant changes in stockpile size or pit lifetime.

S.4 PREFERRED ALTERNATIVE

The CEQ regulations require an agency to identify its preferred alternative to fulfill its statutory mission, if one or more exists in a draft EIS (40 CFR 1502.14 [e]). For this MPF Draft EIS, constructing and operating a new MPF is the preferred alternative based on considerations of environmental, economic, technical, and other factors. A preferred host site for the MPF has not yet been determined, but will be identified in the Final EIS, if the Secretary decides to proceed with a MPF.

S.5 COMPARISON OF ALTERNATIVES

S.5.1 Introduction

To aid the reader in understanding the differences among the various alternatives, this section presents a summary comparison of the potential environmental impacts associated with the alternatives in the MPF EIS. The comparisons concentrate on those resources with the greatest potential to be impacted.