and the ARIES. These tests and demonstrations would slightly reduce the quantity of RFETS pit and non-pit materials to be stored at Pantex and SRS, respectively.

The storage and disposition actions proposed for various DOE sites by the Preferred Alternative are summarized in Table S.2–1.

Table S.2–1. Storage and Disposition Actions Proposed by the Preferred Alternative

Action	Hanford	NTS	INEL	Pantex	ORR	SRS	RFETS	LANL
Storage								
No Action	X[a]	X[b]	X[a]					X[a]
Upgrade				X[c]	X[d]	X[e]		
Phaseout							X	
Disposition[f]								
Pit Disassembly/Conversion	X		X	X		X		
MOX Fuel Fabrication	X		X	X		X		
Pu Conversion	X					X		
Immobilization	X					X		

[a] Pending subsequent tiered NEPA decisions for disposition of surplus Pu.

[b] NTS does not currently store either Pu or HEU.

[c] For storage of those pits currently at Pantex and pits from RFETS.

[d] For storage of HEU only.

[e] For storage of only those Pu materials currently at SRS and non-pit Pu materials from RFETS.

[f] "X" denotes potential sites for locating the disposition facilities pending subsequent tiered NEPA decisions. Only one of each facility is needed for accomplishing the disposition mission.

S.3 DEVELOPMENT OF ALTERNATIVES

The Storage and Disposition PEIS analyzes a number of reasonable alternatives for storage and disposition in addition to the No Action Alternative. DOE used a screening process along with public input to identify a range of reasonable alternatives for the storage and disposition of weapons-usable fissile materials. The process was conducted by a screening committee that consisted of experts from DOE assisted by technical advisors from DOE's national laboratories and other support staff. The committee was responsible for identifying the reasonable alternatives to be evaluated. It compared alternatives against screening criteria, considered input from the public, and used technical reports and analyses from the national laboratories and industry to develop a final list of alternatives.

The first step in the screening process was to develop criteria against which to judge potential alternatives. The criteria were developed for the screening process based on the President's *Nonproliferation and Export Control Policy* of September 1993, the *Joint Statement Between the United States and Russia on Nonproliferation of Weapons of Mass Destruction and the Means of Their Delivery* of January 1994, and the analytical framework established by the National Academy of Sciences in its 1994 report, *Management and Disposition of Excess Weapons Plutonium*. The criteria include resistance to theft and diversion; resistance to retrieval and reuse; impact to environment, safety, and health (ES&H); public and institutional acceptance; timeliness and technological viability; cost-effectiveness; international cooperation; and additional benefits. The criteria were discussed at the public scoping workshops, and participants were invited to comment further using questionnaires. The questionnaires allowed participants to rank criteria based on relative importance, comment on the appropriateness of the criteria, and suggest new criteria. Details on how the screening process was developed and applied, and the results obtained from the process, were published in a separate report, the *Summary Report of the Screening Process* (DOE/MD-0002, March 1995). Figures S.3–1 and S.3–2 show the results of the screening process for the long-term storage and the disposition options, respectively, including the

options that were selected as reasonable alternatives for analysis in the PEIS, the options that were disqualified and eliminated, and the reasons for disqualification and elimination (given in parentheses).[11]

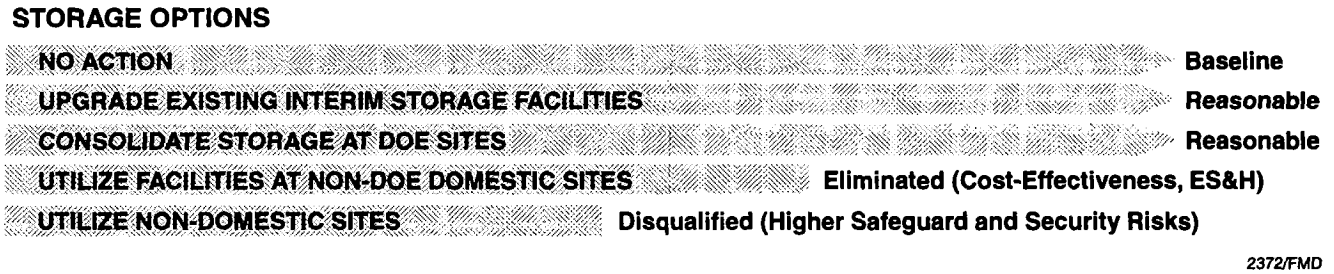


Figure S.3–1. Results of the Screening Process—Long-Term Storage Options.

Development of Long-Term Storage Alternatives

For storage, DOE began with five potential alternatives (see Figure S.3–1), including the No Action Alternative. The screening process identified two action alternatives as reasonable: (1) upgrade storage facilities and (2) consolidate storage at DOE sites. The second alternative was later refined and converted into two alternatives: consolidate Pu storage at one site (while HEU storage remains at ORR), and collocation of Pu and HEU storage at one site. [Text deleted.] Subalternatives and options were also added (see discussions in next section). In addition, the Preferred Alternative for storage (discussed previously) was developed and reflects a combination of the Upgrade Alternative, sub-options, and the No Action Alternative.

To select candidate sites for long-term storage, DOE used a separate set of siting criteria consistent with those used in the evaluation of sites for reconfiguration of the Nuclear Weapons Complex in February 1991. The siting criteria included population; ES&H; socioeconomics; transportation; and site availability and flexibility. The process resulted in six candidate storage sites: Hanford, NTS, INEL, Pantex, ORR, and SRS.

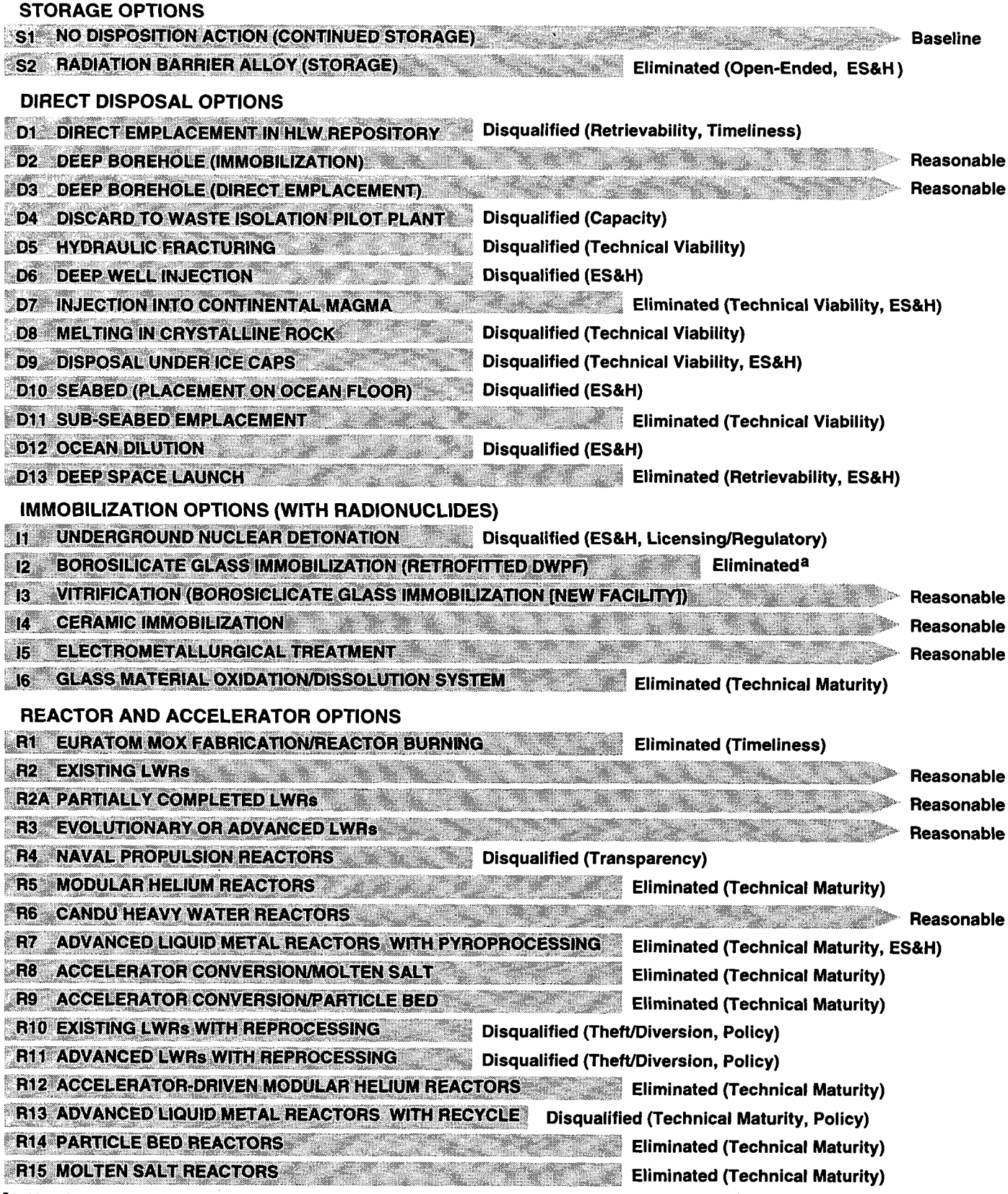
Development of Long-Term Storage Subalternatives

With the exception of weapons program materials in use, the Storage and Disposition PEIS analyzes the environmental impacts of reasonable alternatives for long-term storage of all surplus and nonsurplus weapons-usable fissile material categories (see Figure S.1–1). In DOE's Stockpile Stewardship and Management PEIS, a portion of the nonsurplus weapons-usable fissile materials, namely the strategic reserve materials and the plutonium-242 (Pu-242) materials used for weapons R&D, is analyzed for long-term storage. The Preferred Alternative in the Stockpile Stewardship and Management PEIS is to move Pu-242 currently stored at SRS to LANL for long-term storage. The Storage and Disposition PEIS includes a subalternative analyzing the environmental effects of each long-term storage alternative without the strategic reserve materials and weapons R&D materials.[12] Preparation of these two documents is being closely coordinated to ensure that all necessary information is available to the decisionmaker. Preferred alternatives are being presented to the Secretary of Energy on both PEISs for the Secretary's decisions and the publication of the RODs.

Because of the cleanup agreement for RFETS, the proximity of RFETS to the Denver metropolitan area, and the fact that three out of the five most vulnerable facilities identified in DOE's *Plutonium Working Group Report on Environmental, Safety, and Health Vulnerabilities Associated With the Department's Plutonium Storage* (DOE/EH-0415, November 1994) are located at the site, RFETS is considered as a storage site only under the

[11] Following issuance of the screening report, two changes were made during subsequent meetings of the screening committee; that is, options I6 (glass material oxidation/dissolution system) and R1 (Euratom MOX fuel fabrication/reactor burning) were eliminated.

[12] The Storage and Disposition PEIS also analyzes the "umbrella" option, for each storage alternative, of storing strategic reserves and weapons R&D material together with other nonsurplus material.



[a] In this option, the present DWPF at SRS would have a new, specially designed melter installed. Much of the supporting equipment would require major retrofitting for this application because DWPF was not designed for criticality control. Retrofitting the DWPF would create additional total personnel radiation exposure and would significantly interfere with its mission to stabilize and treat HLW, resulting in delays and cost escalation. Note that eliminating this "DWPF Upgrade" variant does not preclude other DWPF-related variants of the Vitrification and Ceramic Immobilization Alternatives (such as adding an adjunct melter adjacent to the DWPF or the can-in-canister approach in the DWPF) if these other variants do not introduce increased radiation or Pu criticality concerns into the DWPF. Can-in-canister at a retrofitted DWPF is discussed in Appendix O and would be examined along with other site-specific alternatives in subsequent NEPA review tiered from the PEIS.
Note: ES&H=Environmental Safety and Health.

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Figure S.3–2. Results of the Screening Process—Surplus Plutonium Disposition Options.

No Action Alternative in the Storage and Disposition PEIS. For other long-term storage alternatives, existing Pu stored at RFETS (approximately 12.9 t [14.2 tons], as stated in DOE's Openness Initiative of December 7, 1993) would be moved to one or more other Pu storage sites. Therefore, DOE developed a subalternative under the Upgrade at Multiple Sites Alternative to analyze the storage of all or some Pu from RFETS at each candidate site. The phaseout of Pu storage at RFETS is also analyzed.

Two other locations, LANL and LLNL, also store quantities of Pu material. As of September 1994, LLNL stored 0.3 t (0.3 tons), and LANL stored 2.7 t (3.0 tons) of Pu. Quantities at LLNL are weapons R&D and operational feedstock materials not surplus to government needs; consequently, none of the Pu stored at LLNL falls within the scope of the Storage and Disposition PEIS. Some Pu material at LANL does fall within scope of the Storage and Disposition PEIS. Approximately 1.5 t (1.7 tons) of Pu material at LANL have been declared surplus to national security needs. As a result, storage of the current Pu inventory at LANL is analyzed under the No Action Alternative. Because LANL is not a candidate storage site, environmental impacts associated with a partial phaseout at LANL and relocation of the surplus Pu material to one or more of the candidate storage sites, is analyzed.

Development of Disposition Alternatives

For disposition, DOE began with 37 potential alternatives (see Figure S.3–2), including the No Disposition Action in which the surplus Pu would remain in long-term storage. Using the same general criteria as those for long-term storage, DOE identified 11 alternatives for surplus Pu disposition, including deep borehole (immobilization), deep borehole (direct emplacement), vitrification (borosilicate glass immobilization), ceramic immobilization, electrometallurgical treatment, glass material oxidation/dissolution, Euratom MOX fuel fabrication/reactor burning, existing LWRs, partially completed LWRs, evolutionary or advanced LWRs, and CANDU reactors. Upon further study of supply/demand conditions for Euratom MOX fuel and due to lack of maturity of the technologies for glass material oxidation/dissolution, DOE deleted the glass material oxidation/dissolution and the Euratom MOX fuel fabrication/reactor burning alternatives. However, MOX fuel fabrication (but not reactor burning) at European facilities remains a reasonable short-term option for the Existing LWR Alternative. Therefore, a total of nine reasonable disposition alternatives in addition to the No Disposition Action and the Preferred Alternative, were selected for analysis in the PEIS. These alternatives were grouped into three categories: Deep Borehole, Immobilization, and Reactor.

Facilities under each alternative within the Immobilization and Deep Borehole Categories could be designed such that they could disposition all the surplus Pu over their operating lives. Each disposition alternative under the Reactor Category would consist of reactors that could use all the MOX fuel produced from surplus Pu. However, existing surplus Pu comes in various forms, and some of these forms may not be suitable for conversion to MOX fuel without specialized chemical processing. The Preferred Alternative for disposition of surplus weapons-usable Pu, discussed previously, involves a combination of disposition alternatives.The Storage and Disposition PEIS identifies the reasonable long-term storage and disposition alternatives as follows:

Deep Borehole

A borehole extended several kilometers below the water table into ancient, geologically stable rock formations.

Storage:

- Storage Alternatives
  - Preferred Alternative (Combination)
  - Upgrade at Multiple Sites Alternative
  - Consolidation of Pu Alternative
  - Collocation of Pu and HEU Alternative
  - No Action Alternative

- Candidate Storage Sites
  - Hanford
  - NTS
  - INEL
  - Pantex
  - ORR
  - SRS

Environmental impacts of each storage alternative and the No Action Alternative are analyzed for each of the six candidate storage sites, to allow (1) the comparison of impacts by site for each alternative and (2) the comparison of impacts by alternative for each site. As a result, decisions can be made to select a single storage alternative for all sites or a combination of different alternatives for different sites.

Disposition:

- Preferred Alternative (Combination)

- Deep Borehole Category
  - Direct Disposition Alternative
  - Immobilized Disposition Alternative

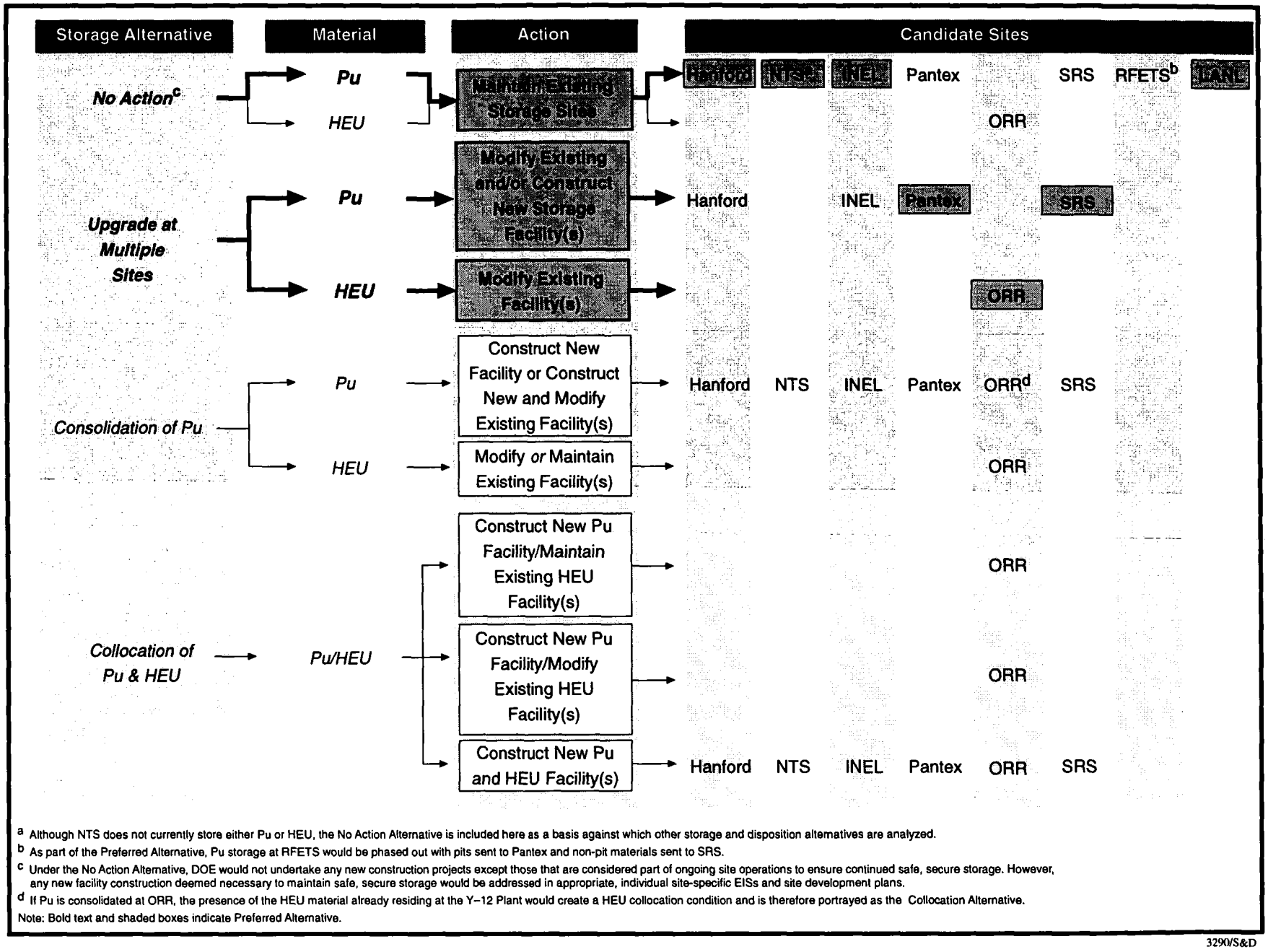
- Immobilization Category
  - Vitrification Alternative
  - Ceramic Immobilization Alternative
  - Electrometallurgical Treatment Alternative

- Reactor Category
  - Existing LWR Alternative
  - Partially Completed LWR Alternative
  - Evolutionary LWR Alternative
  - CANDU Reactor Alternative

- No Disposition Action

The Storage and Disposition PEIS analyzes the reasonable alternatives in addition to the No Action Alternative. For the No Action Alternative, all weapons-usable fissile materials would remain in storage at existing sites using proven nuclear material safeguards and security procedures. For the No Disposition Action Alternative, all weapons-usable fissile materials would remain in storage. The conceptual structures for the long-term storage and disposition alternatives, including the Preferred Alternative (in boldface text and shaded boxes), are presented in Figures S.3–3 and S.3–4, respectively. A more detailed description of these alternatives follows.

[Text deleted.]



[a] Although NTS does not currently store either Pu or HEU, the No Action Alternative is included here as a basis against which other storage and disposition alternatives are analyzed.

[b] As part of the Preferred Alternative, Pu storage at RFETS would be phased out with pits sent to Pantex and non-pit materials sent to SRS.

[c] Under the No Action Alternative, DOE would not undertake any new construction projects except those that are considered part of ongoing site operations to ensure continued safe, secure storage. However, any new facility construction deemed necessary to maintain safe, secure storage would be addressed in appropriate, individual site-specific EISs and site development plans.

[d] If Pu is consolidated at ORR, the presence of the HEU material already residing at the Y–12 Plant would create a HEU collocation condition and is therefore portrayed as the Collocation Alternative.

Note: Bold text and shaded boxes indicate Preferred Alternative.

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Figure S.3–3. Long-Term Storage Alternatives, Including the Preferred Alternative for Storage.

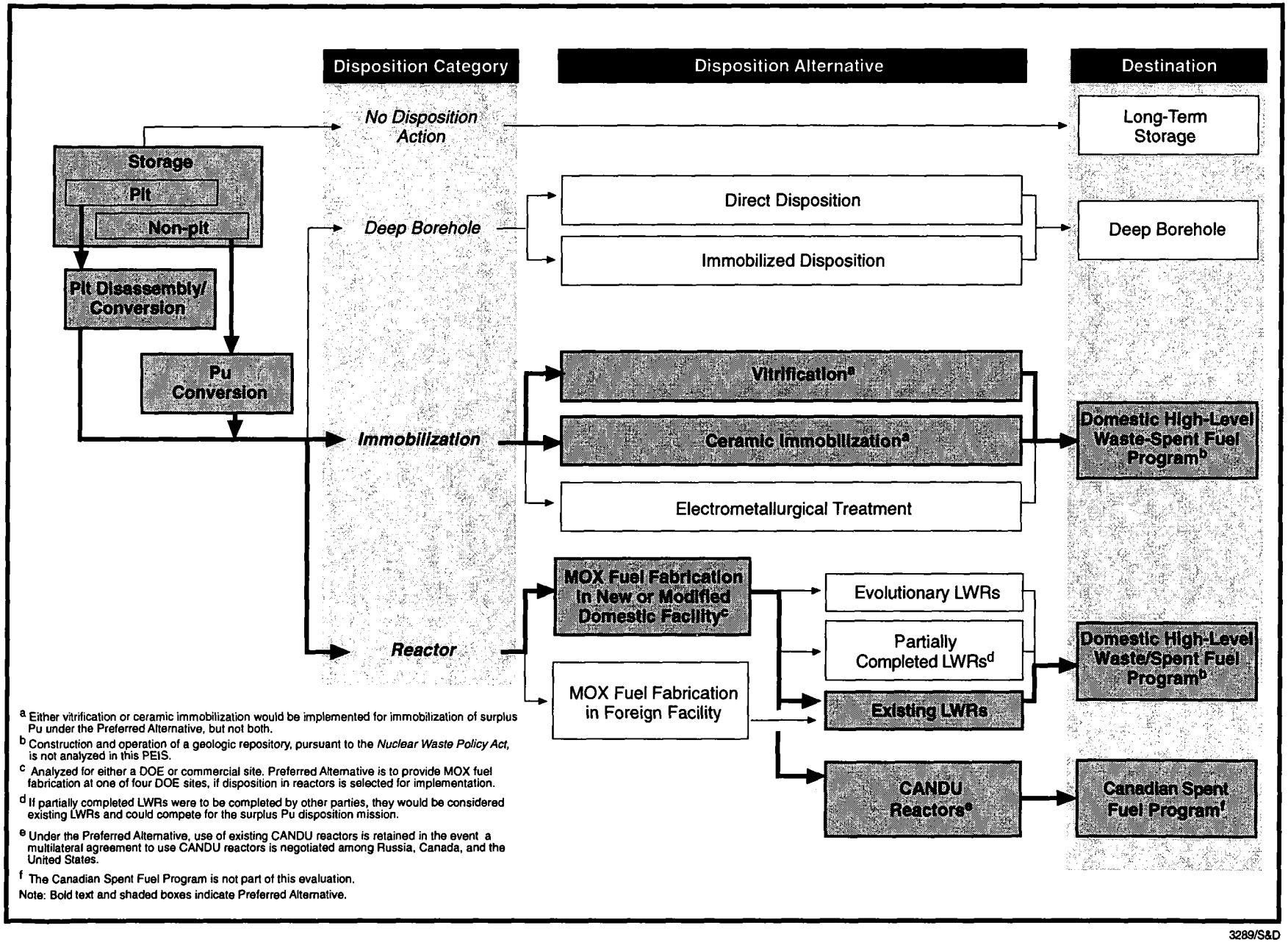

Figure S.3–4. Surplus Plutonium Disposition Alternatives, Including the Preferred Alternative for Disposition.