

specifications that were applicable for weapons production. In addition, DOE has made a commitment that plutonium-239 from stabilization actions would not be used for nuclear explosive purposes. The plutonium metal would be packaged and stored, similar to other plutonium metal already in vault storage. DOE expects this stabilization alternative could be accomplished in 20 months from the date of a Record of Decision, which would be significantly faster than stabilization could be accomplished under the other alternatives. In conjunction with stabilizing the solutions to metal, DOE would undertake a project to modify a portion of the FB-Line facility to provide the capability to repackage the plutonium metal into a configuration that meets the recently issued DOE standard for long-term storage of plutonium (U.S. Department of Energy Criteria for Storage of Plutonium Metals and Oxides, DOE-STD-3013-94, Washington, D.C.). The new storage standard requires plutonium to be packaged in a form that is stable over an extended period (e.g., 20 years) without human intervention. Plutonium metal would be packaged in sealed metal cans without the presence of plastics. Current SRS plutonium metal packaging requires the use of plastic around an inner can for contamination control purposes. DOE estimates that it could accomplish the modifications to the FB-Line packaging capability by late 1997 at a cost of approximately \$3 million. Alternatively, while the solutions are stabilized to metal, DOE could modify a different vault facility to provide the necessary equipment to repackage the metal to meet long-term storage requirements. DOE estimates this could cost between \$70 million and \$150 million and that it could complete repackaging by the end of 2001.

The stabilization to metal alternative would produce a solid form of plutonium that would be safer and easier to store in the shortest period of time. As a result, this is DOE's preferred alternative.

#### C. Processing to Plutonium Oxide

DOE would modify the FB-Line to support conversion of the plutonium solutions to a plutonium oxide and to package the material for storage. The objective would be to produce a material form and packaging configuration that met the new DOE standard for long-term storage of plutonium. If the extent of the FB-Line modifications necessary to convert the plutonium solutions to a plutonium oxide and to package the material to

meet the long-term storage standard were economically or physically impractical, DOE would perform the stabilization in two phases. DOE would modify FB-Line to be able to convert the material initially to an oxide form and package it in FB-Line. At the same time, DOE would design and construct a new facility to process, package, and store the oxide in accordance with the new standard. DOE estimates that the minimally required modifications to FB-Line to provide the solution-to-oxide conversion capability would cost \$7 million and take three years to complete. Following completion and modification, DOE would operate the FB-line for approximately 9 months to convert and package the oxide for storage. Repackaging the oxide to meet the new plutonium storage standard would not occur for another three years when the new facility for packaging were available. This new facility is estimated to cost between \$70 million and \$150 million; repackaging of the oxide could also be completed by the end of 2001.

#### D. Vitrification in the Defense Waste Processing Facility

DOE would transfer the plutonium solutions to the SRS waste tank farm. Before transfer, the solutions would be adjusted to ensure the safety of the material in the tanks. DOE has identified several concepts for adjusting the solutions: diluting the solutions with water and chemicals to achieve very low plutonium concentration, diluting the solutions with depleted uranium, or adding iron and manganese or other neutron poisons such as gadolinium. In the waste tanks, high-activity waste would settle to the bottom of the tank in the form of sludge. DOE would transfer highly radioactive sludge to the Defense Waste Processing Facility, where it would be vitrified (converted to a glass-like substance) and stored on the Site until DOE made and implemented final disposition decisions.

DOE estimates it would take approximately six years to perform the technical studies, training, and qualification efforts necessary to ensure safe operations for transferring the solutions for subsequent vitrification under this alternative. The solutions would not be transferred to the high-level waste tanks until all studies for vitrification were final. After these studies were completed, DOE estimates that it would take an additional three years to complete the process of transferring all the plutonium solutions to the high-level waste tanks because of the limited availability of tank space

and criticality concerns. The plutonium solutions would remain in the high-level waste tanks until DOE transferred the contents to the Defense Waste Processing Facility for vitrification.

#### E. Vitrification in F-Canyon

Under this alternative, DOE would vitrify the plutonium into a borosilicate glass matrix using an F-Canyon vitrification facility. Modifications to the F-Canyon would be necessary, and include the installation of a geometrically favorable evaporator to concentrate plutonium solution, and equipment to convert the concentrated plutonium solution to a glass matrix using technology similar to that to be used on a larger scale in the Defense Waste Processing Facility. The capital costs of these modifications would be about \$27 million; the facility could be available by January 1999.

When the modifications to the F-Canyon to install the vitrification facility were completed, the plutonium solutions would be transferred to the facility and evaporated. This concentrated plutonium solution would be fed, along with finely ground glass (frit), to a melter to produce a borosilicate glass containing the plutonium. The molten glass would be poured into stainless steel packages and stored in an existing vault at the SRS until final disposition decisions were made and implemented.

Although the vitrification of this plutonium could begin as early as January 1999, DOE analyzed the Vitrification in F-Canyon Alternative as though it began during the first six months of 2000. The Final EIS describes its environmental consequences, which are largely independent of the schedule for vitrification.

#### F. Other Activities for Reduction of Risk

In addition to the alternatives analyzed in detail in the Final F-Canyon Plutonium Solutions EIS to stabilize the plutonium solutions, DOE identified other activities that have the potential to reduce the risk associated with storing the plutonium solutions in liquid form. These activities are: (1) transporting the solutions to H-Canyon for stabilization, (2) purification of the solutions by processing those that have the greatest criticality risk through the second plutonium cycle in F-Canyon, (3) risk reduction activities identified in the DOE Office of Environment, Safety and Health Assessment of Interim Storage of Plutonium Solutions in F-Canyon and Mark-31 Targets in L-Basin at the Savannah River Site (DOE-EH-0397P/SRS-FCAN-94-01), and (4) shipment of the solutions off the Site for