MHTGR has a moderate probability of production assurance (0.49).

The production assurance of a multipurpose reactor would not change from that of the MHTGR, ALWR, and commercial reactor purchase options, as long as tritium production is the primary mission of the facility. National security requirements mandate that tritium supply remain the primary mission of a multipurpose reactor.

In summary, the no action alternative has no chance of meeting the tritium production requirements. With the exception of the direct cycle MHTGR, all other alternatives have very high probabilities of meeting the steady-state and maximum production requirements.

3. Environmental Impacts. The Final PEIS presents numerous environmental impacts for a variety of resource areas for each of the new tritium supply facility alternatives at each of the five sites, and generic impacts for the commercial reactor options. The analysis was completed for meeting the maximum (3/8) goal requirement of tritium. Many of these impacts are very small. For example, the air quality impacts of all technological alternatives at all sites are very low. Most other impacts show little or no differentiation among alternatives. The evaluation of the tritium supply alternatives focuses, therefore, on the three environmental impacts that differentiate among the tritium supply alternatives: spent fuel generation, low level radioactive waste generation and risks from severe accidents. For all three of these area of environmental impact, the no action alternative would not change the status quo, i.e., no tritium would be produced. Therefore, it has the lowest environmental impact. This section presents the evaluation of tritium supply technology alternatives which are not site dependent. The following section presents the evaluation of the sites.

3.1 Spent fuel. Spent fuel is measured by the cubic yards of radioactive spent fuel rods produced during reactor operations in one year. The third column of Table 1 shows the annual amounts of spent fuel generated by the reactor supply alternatives. The new reactors generate spent fuel amounts ranging from 7 cubic yards to 80 cubic yards. The options to purchase an operating reactor or to purchase irradiation services would create up to 40 cubic yards of additional spent fuel (if only one reactor were utilized) due to shorter refueling cycles. If there were no change to the refueling cycles, no additional spent fuel would be generated. The option to purchase an incomplete reactor would create amounts of spent fuel comparable to those of the large ALWR. The APT does not generate any spent fuel. No additional spent fuel would be produced by virtue of the use of fuel fabricated from excess plutonium for the ALWR, MHTGR, or purchase commercial reactors options.

3.2 Low level radioactive waste. The fourth column of Table 1 shows the annual amounts of low level radioactive waste produced by the supply alternatives. For the new facility alternatives the HWR creates by far the most low level radioactive waste (5,200 cubic yards), followed by the other new rectors. The APT generates the least amount of low level radioactive waste (57 cubic yards) when using the helium-3 target, and 544 cubic yards when using the SILC target. The options to purchase an operating commercial reactor or to purchase irradiation services would create 160 cubic yards of additional low level radioactive waste due to the use of additional fuel rods and to handling additional radioactive materials. The option of purchasing an incomplete reactor would produce amounts of low level radioactive wastes that are similar to those of the large ALWR. A multipurpose reactor would generate about the same amount of low level radioactive waste as the reactor when used for tritium production alone. However, the plutonium Pit Disassembly and Conversion and Mixed-Oxide Fuel Fabrication Facility for the ALWR and commercial reactor options would generate approximately 540 cubic yards of low level radioactive waste annually. The plutonium Pit Disassembly and Conversion Facility for the MHTGR would generate approximately 10 cubic yards of low level radioactive waste per year.

3.3 Severe accidents. Risk is the probability of an accident occurring times the consequences of the accident if it occurred. Cancer risk to a population within a 50-mile radius of a facility is influenced by the size of the population within the radius. However, technologies can be compared if the same 50 mile radius is used for the analysis. For the purposes of comparison the SRS is used. The annual cancer risk from a severe accident to the population within 50 miles of the facility for the new reactor technologies is very low, ranging from $5.1x10^{-5}$ to $2.6x10^{-7}$ at the SRS. The APT would have the lowest annual cancer risk ($2.8x10^{-11}$) for all the new facility alternatives. The options to purchase an operating reactor or to purchase irradiation services would pose no significant additional severe accident risks because of adding tritium production. The option to purchase an incomplete commercial reactor would have severe accident risks that are comparable to that of a large ALWR.

The use of plutonium as mixed oxide fuel in an ALWR or the purchase of commercial reactor options would not significantly affect the consequences of radioactivity releases from severe accidents though there would be some small changes in the source term release spectrum and frequency. The MHTGR would have twice as many reactors when operated in the multipurpose mode, and therefore, while extremely small, the accident risk for the MHTGR would double if used in this mode compared to the risk if used for tritium production alone.

An accident at a plutonium Pit Disassembly and Conversion and Mixed-Oxide Fuel Fabrication Facility for the ALWR and purchase of commercial reactor options would result in a small additional cancer risk from a severe accident if located at the SRS. A severe accident at the plutonium Pit Disassembly and Conversion facility for the MHTGR would also result in a small additional cancer risk.

In summary, the no action alternative has no additional environmental impacts. The APT and the commercial options to purchase an operating reactor or to purchase irradiation services, if the fuel cycle is not changed, generate no additional spent fuel, and have the lowest amounts of additional low level radioactive waste and cancer risks from a severe accident. The new reactor alternatives and the completion of a partially complete commercial reactor produce spent fuel and low level radioactive waste, and they present a very small additional cancer risk from a severe accident.

4. Affordability (Cost). For each action alternative, a range of costs, and the probability distributions over the range, were developed for Total Life Cycle Cost (TLCC), Total Project Cost (TPC), and Operation and Maintenance (O&M). The O&M costs included decontamination and decommissioning. No costs were developed for the no action alternative. For the action alternatives, results were calculated for both undiscounted and discounted cost. The discount rate used was 4.9% per year in accordance with Office of Management and Budget guidance. The ALWR, MHTGR, and purchase commercial reactor options can produce revenues through electricity generation. The TLCC was calculated with and without revenues for these alternatives. Costs were estimated both for steady-state and maximum production rates.