

Y-12 Purification Facility

Pro2Serve designed the new Purification Facility for producing a Special Material critical to meeting DOE/NNSA program needs at the Y-12 National Security Complex. The Purification Facility is integrated with the strategic footprint for Y-12, and it supports the national security mission by reestablishing and validating the purification process and supplying the production capability for this Special Material.

The facility is a one-story, steel framed building with internal reinforced concrete walls for explosion mitigation, and it was designed to performance Category 3 requirements. The facility has a footprint of approximately 2500 square feet of process space and another approximately 1200 square feet of space for administrative and other support activities. In addition, a tank storage area for hazardous process materials is located adjacent to, but outside the facility. The facility has heating, ventilation, and air conditioning (HVAC); fire protection; and electrical, instrumentation and security systems matched to the operating safety requirements, nature of the processes involved, and the security implications of the facility.

The Purification Facility is a complex, hazardous process facility with safety fully integrated into its planning and design. It incorporates engineered controls to meet environment, safety, and health (ES&H) requirements and minimize the need for administrative controls and personal protective equipment to meet ES&H requirements during operation.

The Facility was integrated with the site utility and security systems, and access roadways and parking were integrated with the site plan and to facilitate emergency response. A perimeter security fence was designed to enclose the Purification Facility for both the construction and operating phases and was integrated with the site security plan and strategic long-range site plan.

This \$30 million line-item project was executed in accordance with DOE Order 413.3. The facility was planned, budgeted and executed according to the US Department of Energy Office of Management, Budget and Evaluation's Critical Decision Process. This process requires formal determinations to be made at specific points in a project's life cycle. These points or critical decisions cover the approval of mission need; alternative evaluations, performance baseline, construction start and project close out. Pro2Serve was also responsible for providing the estimating and scheduling services to support this process.

Critical Decision 1 required the development of cost estimates and schedules for various project alternatives as proposed by the project design team. Evaluation of these alternatives and estimates enabled a design basis and a project cost range to be established. From this point a complete cost estimate and schedule was developed using schematic design information and coordination with the complete design team. This estimate underwent external independent cost reviews before being approved in the Critical Decision 2 process as the project cost and performance baseline.

Several estimating challenges were encountered on the Purification Facility with the first being the unique environment in which the project would be constructed.

As a national security complex, the construction labor force would be subjected to numerous factors which would impact their productivity. These factors included such things as work site security and access restrictions, health and safety issues, material handling concerns. The estimators developed a complete listing of all applicable factors. Numerous discussions were held with onsite construction management, health physics and outside contractors to determine the potential impact of each factor identified. Lost productivity and increased labor effort was calculated for each factor. This enabled a





consistent set of factors to be used as applicable in the estimate and provided a sound basis for the total estimated labor effort and project schedule.

During the design process several changes were prompted by newly introduced project needs. These changes had to be evaluated based not only on cost and schedule impact but also on the total project life cycle cost and operational impact. The cost estimators took the lead in this effort to support project management.

The validation of the Pro2Serve efforts was the successful completion of the Purification Project within the established budget and schedule.

