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Accelerated Site Technology Deployment (ASTD):

A Vehicle to Expedite Cleanup through the Use of Innovative Technology

Analysis, Lessons Learned, and Recommendations

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This report was prepared on behalf of the U.S. Department of Energy (DOE) by Concurrent Technologies Corporation and Science Applications International Corporation. DOE Office of Science and Technology Headquarters Deployment Assistance Team Staff, Focus Area Managers, and DOE Field Office representatives were given the opportunity to review this document prior to printing. The authors appreciate the reviews that were received and incorporated comments as practicable.

This report was prepared to document Accelerated Site Technology Deployment (ASTD) efforts, since it began as the Technology Deployment Initiative in 1998. Information is provided on both the process for selection of ASTD projects and the accomplishments of the projects. Projects are described in terms of deployment successes: original, subsequent, and potential subsequent deployments. The projects have been analyzed to determine what the key components of successful projects are, as well as what factors caused problems in other projects that are behind schedule or perhaps did not perform as anticipated. The project selection process is also analyzed to seek critical components that should be maintained and to determine required changes to improve the process.

The ASTD portfolio is also analyzed so that recommendations for improvements can be made. The target audience for the recommendations is DOE senior management. This information may also be helpful to those managing and overseeing ASTD projects or those seeking more information about ASTD.

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EXECUTIVE SUMMARY

The Problem and a Solution

The U.S. Department of Energy (DOE) Office of Environmental Management (EM) was created in 1989 to manage the legacy of the nation's nuclear weapons program. To address the numerous technical difficulties associated with cleanup, Congress directed DOE-EM to establish the Office of Technology Development, since renamed the Office of Science and Technology (OST). The intent of Congress was to "…establish and carry out a program of research for the development of technologies useful for (1) the reduction of environmental hazards and contamination resulting from defense waste, and (2) environmental restoration of inactive defense waste disposal sites." OST conducts this work through "Focus Areas" that are aimed at DOE's five major environmental problem areas.

While EM has made significant progress in the use of new technology, obstacles to technology deployment, including regulatory approval, stakeholder and user acceptance, and perceived business and technological risks, have slowed the widespread application of innovative technologies. To overcome some of the barriers, EM proposed a new approach to this problem, called Accelerated Site Technology Deployment (ASTD). ASTD was authorized by Congress in fiscal year 1998 (FY98) and has been funded annually since then to promote multisite deployment of new technologies with a focus on the rapid delivery of technologies to meet specific site needs. By meeting these needs, the sites can accelerate cleanup schedules and/or fill gaps in project baselines. ASTD projects are proposed by the EM user organizations, require senior management commitment, and are jointly funded by OST and the EM user organizations.

An Analysis of ASTD

Sixty ASTD projects were initiated between FY98 and FY00 at 22 DOE sites, managed by ten Field Offices. Life-cycle funding for these projects is $255.8M. Over one-third of that investment ($88.8M) has been provided by OST; site-leveraged EM user-organization funds account for the remainder ($167.0M). After three years of ASTD project funding, the 60 projects have resulted in 113 technology deployments at DOE sites (Figure ES.1). More than 180 planned or potential

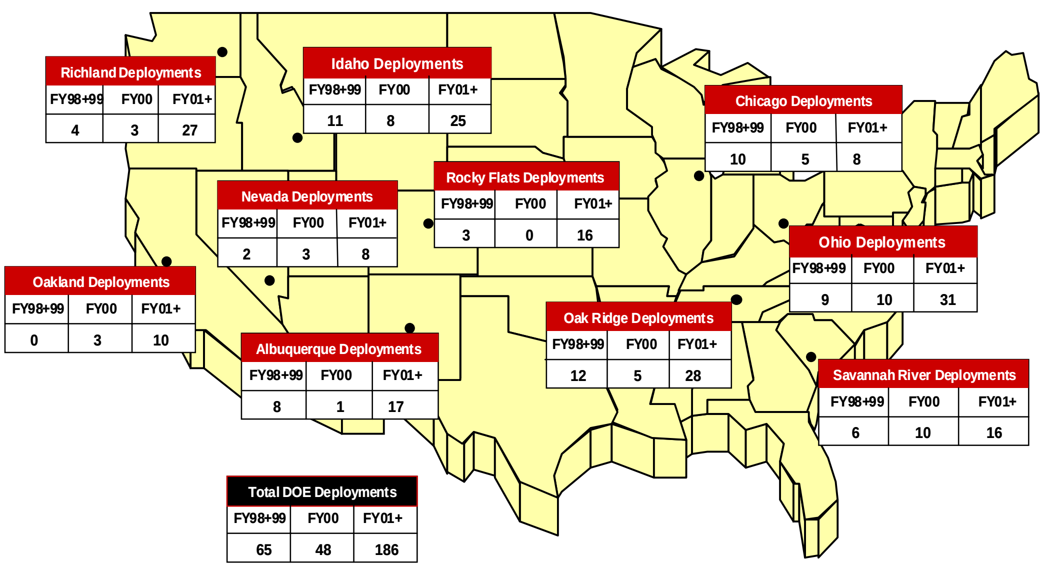

Figure ES.1 ASTD Deployments by Field Office, Actual and Planned/Potential by Fiscal Year

deployments have been identified for FY01 and beyond. In FY98 and FY99, ASTD deployments were a significant percentage of Focus Area deployments. Site cleanup projects have built 18 ASTD-sponsored technologies into site baselines as the innovative technology has become the preferred cleanup method.

Major Observations and Recommendations

After three full years of ASTD operations, much has been learned about the management and impact of the ASTD process and projects. Tracking performance of the ASTD projects has enabled DOE to identify the critical factors that determine the level of success of both the overall portfolio and the individual projects. While ASTD activities conducted to date have resulted in many benefits to EM, there are changes that would improve future efforts. The following observations and recommendations focus on ways to improve ASTD as a tool for accelerating deployment and expediting the EM cleanup program.

ASTD Is an Effective Tool for Accelerating Deployment on a Complexwide Basis

ASTD has been an effective tool for accelerating deployment of new technologies that have expedited cleanup at multiple sites within a short timeframe, i.e., two to four years (Figure ES.2). In addition to meeting the overall programmatic goal of accelerating cleanup, 65% of the ASTD projects are on track to meet or exceed project proposal deployment goals. ASTD has proven its performance as one tool in the EM cleanup toolbox. However, it is not appropriate to solve all EM problems. ASTD is best applied to problems that have near-term implementation schedules with little or no regulatory hurdles to overcome.

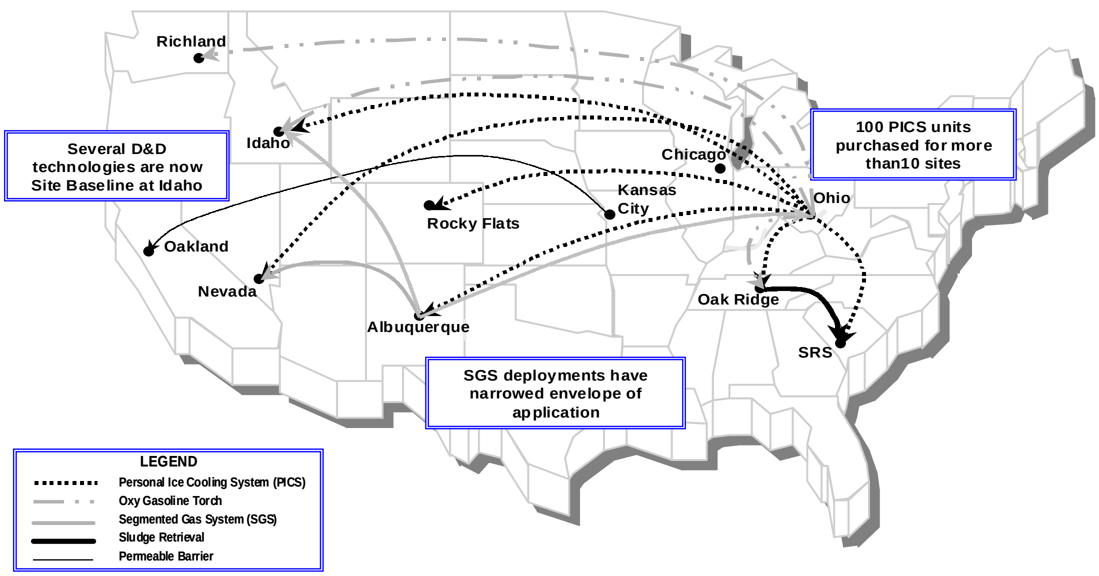

Figure ES.2 One Goal of ASTD is to Accelerate the Use of New Technologies on a Complexwide Basis

Two recommendations that would help to further accelerate multisite deployment of ASTD-sponsored technologies include use of a portion of project funding for (1) training personnel and providing technical support to subsequent deployment sites and (2) monitoring and reporting on, the effectiveness of the technology after its deployment. The ability to have personnel from multiple sites work together in an integrated fashion during the implementation of the technology is critical to accelerating the occurrence of subsequent deployments. The monitoring and reporting functions would provide information on implementation, which would build confidence in successful technologies and enable more rapid and widespread use.

Successful ASTD Projects Have a Number of Common Attributes

Highly successful ASTD projects have a number of common attributes. As previously stated, the more successful projects tend to address needs common to multiple sites that have near-term site cleanup schedules. ASTD projects that integrated mature technologies into a system to address a specific problem were generally more readily accepted, because they were seen as a proven enhancement to the baseline. Sites that built good relationships early on with the regulators showed a higher success rate. A competent, enthusiastic, flexible team that worked to bring together the technology vendor and the end user is also critical to success. Finally, projects that included funding for subsequent deployments or for training and provision of “seed units” at subsequent deployment sites have been more successful at promoting widespread deployment.

Establishing Ownership by Site Customers is Critical to Success

There are several factors associated with the ASTD approach that have contributed to project success. The first is the requirement that senior site managers formally submit the site proposals. This has generally improved project visibility and ensured Headquarters and Field management support. The second is the decision to manage the ASTD projects within the structure of an existing cleanup project. This has helped to ensure the required planning and integration necessary for the insertion of new technologies within the baseline of a cleanup project. The third notable factor is the requirement for leveraged funding. Leveraged funding continues to be a significant indicator of site commitment to the project (Figure ES.3).

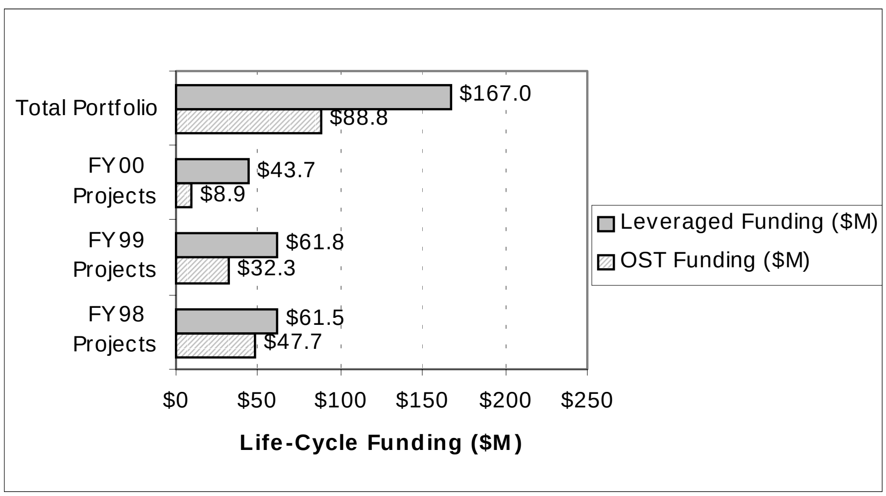

Figure ES.3 Successful ASTD Projects Result from Leveraging OST and Site Funding

One indicator of Field Office support for ASTD is that, each year, more project proposals are submitted than can be funded. While proposal preparation has significant value and, in fact, a number of projects have been funded without OST support by the Field Offices, EM would benefit from a smaller number of higher-quality proposals. To reduce the administrative resources associated with generating and reviewing proposals, future solicitations should limit the number of proposals submitted by a site or Field Office. This approach would also encourage an early field screening, project prioritization on a site level, and greater support for the selected projects.

Full Integration with the Focus-Area Centered Approach Is Required for Success

Historically, EM's Focus Areas were focused on the development and demonstration of new technology. In 1998, EM continued to evaluate performance using technology development and demonstration as measures, but defined corporate success as the deployment of technology. In FY00, EM added a goal for baseline use of new technology in addition to the number of deployments. As a result, EM is now evaluating its ability to incorporate technologies into site baselines and deploy successful technologies on a broader, complexwide basis.

ASTD was originally created as a separate program within OST and managed by DOE's Idaho Operations Office (DOE-ID). While this arrangement enabled ASTD to be initiated more quickly, it led to a lack of integration with EM's Focus Areas. For the last two years, Headquarters, DOE-ID, and the Focus Areas have shifted more responsibility for oversight of the ASTD projects and the project selection process to the Focus Areas (Figure ES.4).

The Focus Areas should continue to play an active role in the proposal review and selection process and the management of projects. In this regard, the ASTD approach is consistent with overall Focus Area efforts to allocate funds for complexwide deployment. Finally, Focus Areas should work closely with the deployment sites for each of the ongoing projects to review performance and to recommend changes when the site is not meeting the proposal objectives.

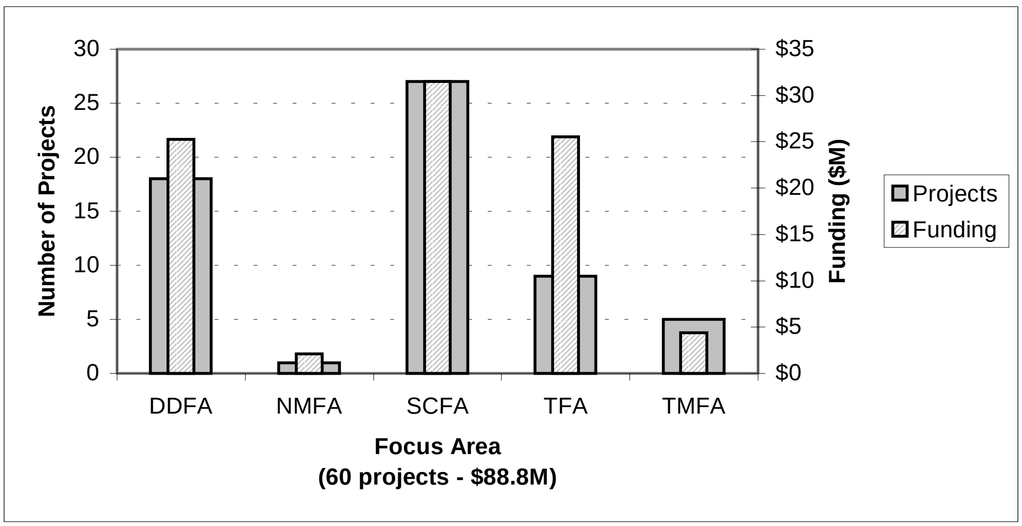

Figure ES.4 A Substantial Percentage of ASTD Projects Address D&D or Subsurface Remediation Problems

Improved Scheduling and a Commitment to Annual Funding Are Needed

The *EM Research and Development Program Plan* calls for EM to manage a balanced portfolio from basic research to deployment. A commitment to a minimum annual level for ASTD supports the goal of a balanced portfolio. A multiyear commitment to funding ASTD projects would enable better planning of ASTD solicitations and the preparation of project proposals by the Field. A multiyear commitment to ASTD would also enable a multiyear strategy for portfolio management. This would allow EM to balance ASTD calls to particular sites or problem areas with competitive calls on a complexwide basis. OST should also consider using a portion of annual funding to start projects aimed at subsequent deployments of previously deployed technologies.

Since inception, ASTD funding has been provided to the sites in midyear. This procedure is primarily the result of uncertainties in funding for ASTD in a given year. The result has been that

ASTD has primarily supported cleanup project managers by supplementing and accelerating existing schedules and plans. ASTD's impact could be greater if a more structured program were instituted. A regular schedule for solicitations prior to the start of the fiscal year, linked to the EM planning and budgeting process, would improve the effectiveness of ASTD. By using this approach, more cleanup project managers would be able to commit to leveraged funds. A call for proposals conducted prior to the start of the fiscal year would enable cleanup projects to build in ASTD projects from the start.

The Project Selection Criteria Are a Sound Basis for Prioritizing Individual Projects

An analysis of ASTD projects demonstrates that projects generally performed better if they were well defined; had procurement plans, preliminary designs, risk and contingency plans; and specified technical requirements. This was especially true for those that identified a technology vendor(s) in the proposal. This analysis shows (1) that the current selection criteria are sound and (2) that systematic use of the review panel's findings would improve the potential impact of the individual ASTD projects.

While individual project scores are an important component of project review and selection, they are not the only consideration. Historically, EM has applied programmatic goals to the construction of the overall ASTD portfolio, e.g., an emphasis on closure sites or decontamination and decommissioning projects. Program-level management of the overall portfolio needs to continue; changes resulting from programmatic considerations to the review panel's priority list should be documented.

The ASTD proposal review process can be enhanced by including technical and business experts from the Focus Areas and site end users and on-line interviews with the proposal project leads. The ASTD selection process could be improved by having the Focus Areas endorse and award the new projects and actively negotiate the detailed terms of the agreements.

Tracking and Reporting of Deployment and Cost Savings Must Be Improved

Each year more data are available to evaluate the success of ASTD. A large portion of the success is dependent on the achievement of deployments at subsequent sites. Subsequent deployments for successful projects generally occur within 6–18 months after the initial deployment although some have occurred within a few weeks. While the number of deployments provided in this report are indicative of the success of the ASTD program, they do not provide a complete reporting of the impact of this investment. The Field Offices continue to underreport the deployment of innovative technology. There are at least 25 additional deployments that have occurred within the DOE complex that have not been reported to date in EM's corporate information system (IPABS-IS). While a number of changes have been made to improve the process, EM should continue to identify and implement mechanisms to improve the reporting of deployment information in IPABS-IS.

Another indicator of ASTD success is the reduction in the cost of cleanup projects, i.e., cost savings. The projected life-cycle cost savings of the ASTD projects funded through FY00 is more than $1B (Figure ES.6). The life-cycle cost savings is predicated in part on the anticipated number of subsequent deployments. As a result, the impacts of the ASTD investments won't be fully realized for several years. However, cost savings are not being accurately reported through the EM corporate information system. Despite 30 technologies incorporated into the baseline, only $350M cost savings have been reported.

EM has taken a number of steps to improve the reporting of cost savings. These include funding independent third-party calculation of cost savings, the adoption of the pollution prevention methodology for calculating cost savings, and the establishment of a corporate performance measure for technology-based cost savings. These actions have increased the reported cost savings, but there is still room for improvement.

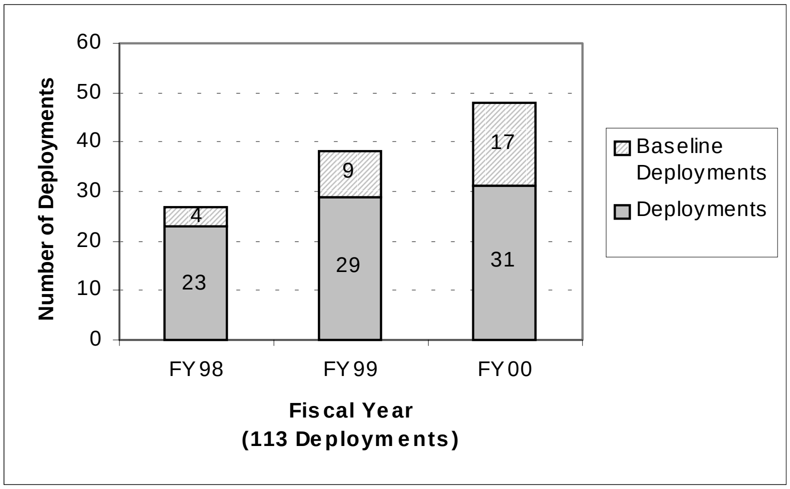

Figure ES.5 ASTD Projects Are Still Relatively New with the Number of Subsequent Deployments Increasing Each Year

EM must take further action to improve Field Office reporting of cost savings from ASTD projects. First, a portion of each ASTD project's funding should be used to support the analysis of cost savings resulting from the project. This work must be conducted in close cooperation with the cleanup project manager. Results of the analysis should be documented in both the ASTD project report and in the EM corporate information system. Second, the ASTD proposal criteria should be modified to include the Field Office's historical reporting of deployment and cost savings information in the EM corporate information system. The information reported by the Field Offices would be used as the primary basis for the criterion that evaluates the Field Offices' ability to successfully manage ASTD projects.

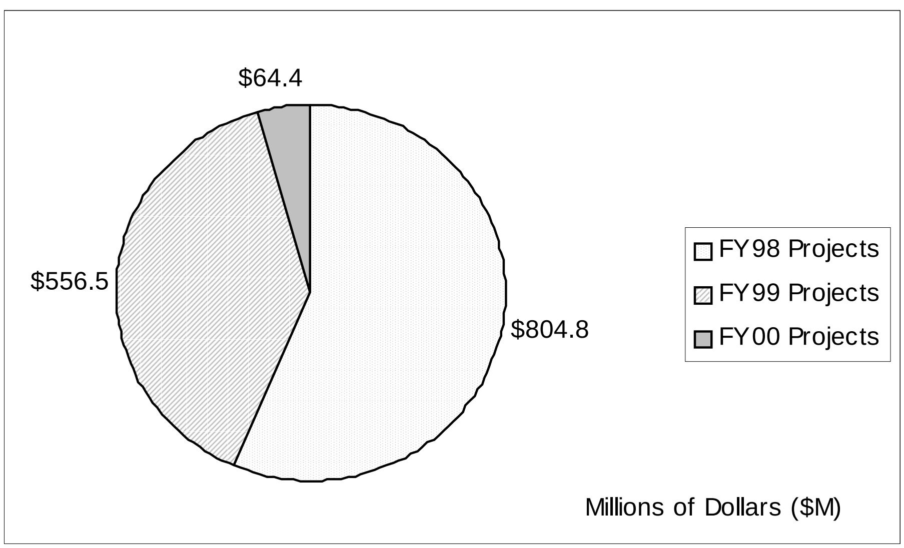

Figure ES.6 The ASTD Project Proposals Identified over $1B in Potential Cost Savings

Headquarters Should Take a More Active Management Role

In November 1999, EM reorganized the Headquarters organization and formed the Deployment Assistance Team. Management of ASTD was placed within the Deployment Assistance Team's responsibility, but was not adequately resource loaded. The Deployment Assistance Team should provide a dedicated point of contact whose primary responsibility is management of ASTD as a tool for accelerating deployment. This point of contact should provide ASTD information to senior DOE management, maintain responsibility for calls for new proposals, coordinate the development of ASTD policies and procedures with the Focus Areas, and support Focus Area efforts to facilitate subsequent deployments.

In addition, OST should explore expanding the role of EM-20, the Office of Integration and Disposition, in the selection, integration, and communication of successful ASTD projects on a complexwide basis. Active involvement by EM-20 could improve the rate and breadth of communication of successful ASTD projects on a complexwide basis.

Finally, EM should continue to investigate innovative contracting mechanisms that encourage subsequent deployments of technologies across the DOE complex. A number of Field Offices have been fairly aggressive in the use of contract incentives to accelerate deployment. However, these approaches are not being taken on a complexwide basis. Pursuit of innovative contract mechanisms and incentives should be closely coordinated with EM's Office of Policy, Planning, and Budget and DOE's Office of Procurement through development of EM policies and guidance to the Field Offices.

Accomplishments

ASTD has been a successful program that will continue to be improved with careful modifications over time. While we tend to measure ASTD success by the number of deployments and the level of success by individual projects, on-the-ground cleanup accomplishments have been extensive and are worth noting. Accomplishments through September 2000 include treatment of over 190 million gallons of groundwater and over 3,600 cubic yards of soil; inspection of 7,500 linear feet of pipe; retrieval of 300,000 gallons of tank waste; removal of 5,600 curies of radioactivity; and the removal of more than nine buildings. Further information on ASTD, including individual project success stories, is available on the web at http://id.inel.gov/astd.

Table ES.1 Selected Accomplishments, by Field Office, of ASTD Projects

DOE Field Office	Cleanup Accomplishment	Associated Project
Albuquerque	7.4 million gallons water treated (U + TCE)	Monticello and Kansas City Permeable Walls
	3,000 cubic yards soil treated (explosives)	Pantex Composting of High Explosives
Chicago	180 million gallons water treated (TCE)	Brookhaven In Well Air Stripping
Idaho	30,000 square feet metal cut and 30,000 square feet buildings removed and 3.8 million pounds waste contained	Integrated D&D
Nevada	3,735 square meters floor surface surveyed	Position Sensitive Radiation Monitoring System
Oak Ridge	825 pounds TCE removed from groundwater	Dynamic Underground Stripping at Portsmouth
	300,000 gallons waste retrieved	Enhanced Sludge Retrieval System
	5,600 curies removed	Out of Tank Modular Evaporator and Cesium Removal System
	10,668 cubic feet debris encapsulated	Macroencapsulation
Ohio	687 cubic yards soil processed	Segmented Gate System (eight deployments)
	740 acres soil surveyed	Integrated Technology Suite
	9 buildings removed	Integrated D&D
Richland	188,000 gallons of waste monitored	Slurry Monitoring
Rocky Flats	2.3 million gallons water treated (U + TCE)	Permeable Reactive Barrier
	94,000 square meters surface surveyed	Position Sensitive Radiation Monitoring System
Savannah River	7,500 linear feet pipe inspected	Integrated D&D (Pipe Explorer)
	1.2 million gallons water treated	Nuclide Removal System

1.0 WHAT IS ACCELERATED SITE TECHNOLOGY DEPLOYMENT AND WHY WAS IT INITIATED?

1.1 Background

The U.S. Department of Energy (DOE) Office of Environmental Management (EM) was created in 1989 to manage the legacy of the nation's nuclear weapons program. To address the numerous technical difficulties associated with cleanup, Congress directed DOE-EM to establish the Office of Technology Development, since renamed the Office of Science and Technology (OST). The intent of Congress was to "…establish and carry out a program of research for the development of technologies useful for (1) the reduction of environmental hazards and contamination resulting from defense waste, and (2) environmental restoration of inactive defense waste disposal sites." OST was assigned the responsibility to develop new technologies to facilitate the DOE cleanup program by accelerating schedules, lowering costs, and providing safer conditions for the public and environment.

Since 1989, OST has invested in over 800 projects focused on development of innovative technologies within DOE or commercially available from vendors. DOE defines a deployment as "the use of a technology or technology system toward accomplishment of one or more site-specific DOE-EM program cleanup objectives as applied to the actual waste requiring management at the site." Figure 1.1 illustrates the deployment of OST's technologies at DOE's sites. The number of deployments has increased significantly since 1996.

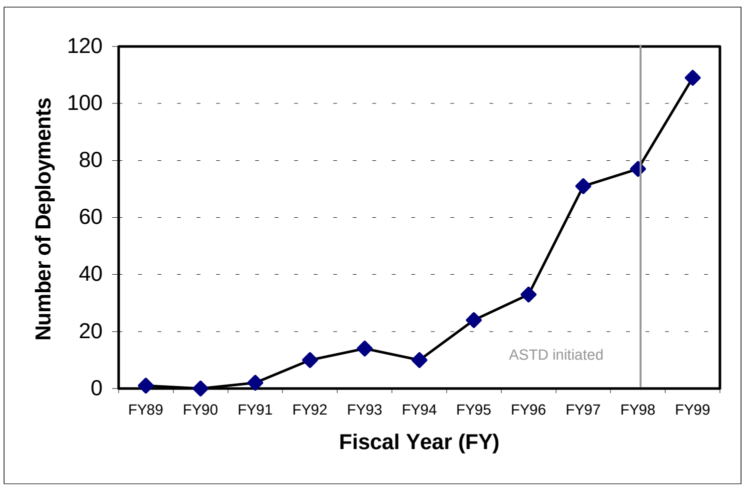

Figure 1.1 OST Deployment Trends (FY89-FY99)

During the early 1990s, EM identified a number of obstacles to the use of innovative technology. These obstacles included regulatory approval, stakeholder acceptance, user acceptance, and perceived business risks associated with new technologies. During the early to mid 1990s, EM funded an aggressive effort to overcome stakeholder and regulatory barriers. EM supported efforts by the Western Governors' Association and the Interstate Technology Regulatory Cooperation Working Group to develop new approaches, including regulatory guidance, that would accelerate the use of innovative technologies. EM also sponsored the Rapid Commercialization Initiative (RCI), a multistate, multiagency effort to expedite deployment in federal and private markets. RCI was designed to complement the actions of state regulators by focusing their efforts in a set of pilot projects to obtain multistate acceptance that would support faster commercialization of new technologies. Finally, in addition to the State and Tribal Governments' Working Group and the Site-Specific Advisory Boards, EM supported the Community Leaders Network, a group of stakeholders from across the nation focused on assisting with the acceleration of the DOE cleanup program through the use of innovative technologies.

In the mid to late 1990s, OST worked to improve its understanding of customer needs; efforts were made to get cleanup project managers more involved in the technology development program. EM created and funded Site Technology Coordination Groups to help identify critical science and technology needs and to act as site advocates for the use of new technology and advances in science. OST worked to integrate science and technology information into EM's cleanup projects and focused its funding on user-approved work scope. EM also formed Focus Area User Steering Groups to build customer involvement and support on a complexwide basis.

During the late 1990s, DOE shifted contracting efforts away from asset-rich manufacturing firms to project-driven engineering firms and performance-based contracts. These shifts made it increasingly important for EM to build incentives into site contracts that would encourage the use of new technology. They also made it necessary for OST to strengthen its efforts to ensure that the technologies being developed were both competitive and commercially available. OST funded a number of efforts to improve the commercial availability of its technologies. These efforts included the use of cooperative research and development agreements, direct calls to industry for technology development work, commercialization assistance, and outreach efforts to the private sector. These efforts are paying off, as there are more than 150 companies today with commercially available products that were supported by OST funding. The majority of these products have been used at a minimum of one DOE site.

1.2 Formation, Scope, and Management of Accelerated Site Technology Deployment

DOE-EM established ASTD in 1998 to provide a means and incentive to promote multisite deployment of new technologies to accelerate cleanup at DOE sites.

In 1997, despite the numerous and varied efforts to overcome the barriers to the deployment of new technology, only a limited number of new technologies were incorporated into EM's cleanup projects. After careful deliberation, EM approached Congress with a request for an investment fund of $50M. The fund would be used to deploy technologies that were mature and successful but had experienced only isolated use. The fund, called the Technology Deployment Initiative, would be aimed at accelerating deployments by working in parallel across operable units and sites. The outcome, multiple deployments in a reduced timeframe, had the potential to significantly increase OST's return on investment.

In 1998, Congress authorized funding for Accelerated Site Technology Deployment (ASTD). Congressional support for ASTD enabled EM to provide a means and incentive to promote multisite deployment of new technologies. ASTD was designed to support site needs to accelerate cleanup schedules and fill gaps where current technologies did not exist to accomplish specific cleanup actions.

1.2.1 Managing the ASTD Investment Portfolio

EM's investments in science and technology are managed by five Focus Areas. Each Focus Area addresses a major environmental problem area: decontamination and decommissioning (D&D), transuranic (TRU) and mixed waste, nuclear materials, subsurface contaminants, and radioactive waste tanks.[1] ASTD was created as a separate program within OST and managed by DOE's Idaho Operations Office (DOE-ID). While this approach enabled ASTD to be initiated more quickly, the approach led to a lack of integration with EM's Focus Areas. In FY99, EM's Focus Areas became responsible for technology-related activities through all stages of development, basic science through deployment, including ASTD. ASTD is a tool that bridges between innovative technology demonstration and deployment to accomplish cleanup through improved schedules and cost effectiveness. Many of the ASTD-supported technologies were previously developed and demonstrated with OST funding. For the last two years, Headquarters, DOE-ID, and the Focus Areas have shifted more responsibility for management of the ASTD projects and the project selection process to the Focus Areas.

1.2.2 ASTD Requirements

The ASTD investment portfolio has resulted from a series of annual calls for proposals to DOE's Field Offices. The calls have been issued complexwide, creating competition among the sites of the DOE weapons complex for a supplementary source of funds. Requirements in the calls for proposals include (1) a commitment for multisite deployment, thus promoting intersite cooperation and communication and improving DOE's return on investment, and (2) leveraged funding from site EM budgets. ASTD projects are customer driven (endorsed by the DOE site managers for EM) and thus meet site needs for improvements to the baseline or as enabling technologies. ASTD acts as a catalyst for site managers to work closely with technology owners to provide innovative solutions that can expedite their cleanup program.

What is ASTD?

- ASTD provides incentives for the use of new technologies to improve baseline methods
- ASTD is customer driven
- ASTD promotes coordination across EM organizations
- ASTD encourages sites to share lessons learned

[1] DDFA = D&D Focus Area, NMFA = Nuclear Materials Focus Area, SCFA = Subsurface Contaminants Focus Area, TMFA = TRU and Mixed Waste Focus Area, and TFA = Tanks Focus Area.

2.0 THE ASTD PROJECT SELECTION PROCESS AND RESULTS

2.1 Call for Proposals Review Process

Since 1998, EM has issued three competitive calls for proposals for ASTD projects, and DOE site managers' offices have submitted numerous proposals. The proposals have focused on new, but generally proven technologies that can accelerate schedules, provide improved alternatives to the existing baseline, and reduce cost. The field proposals are reviewed and ranked by a broad panel of federal and contractor employees using a structured, criteria-driven process. DOE's Environmental Management Advisory Board (EMAB) has periodically reviewed ASTD activities and found the competitive project-selection process to be fair and well orchestrated. There have been changes to the proposal process for each of the competitive calls. The changes and associated rationales are described in this section of the report. Details of the individual proposal processes can be found in Appendix A.

2.1.1 Increased Involvement of the Focus Areas and Site Representatives

In FY98, the ASTD call was coordinated between Headquarters, DOE-ID, and the DOE sites; EM's Focus Areas were not involved in the proposal review and selection activities. The EMAB review of ASTD recommended that, in the future, Focus Area representatives should be formally involved in the proposal call and review process. EM agreed with this recommendation, and the Focus Areas were requested to participate in these activities in later years. Although their involvement was somewhat limited for the FY99 call, Focus Area representatives were more actively involved in the FY00 call preparation and proposal review process. In addition, a FY00 call criterion required a letter of support from the pertinent Focus Area to help ensure that the sites were coordinating with the Focus Area that would provide oversight for OST.

The most significant change in the call for proposal-review process from FY98 to FY00 in addition to increased Focus Area involvement was the inclusion of site representatives from the DOE Field Offices and from EM Headquarters line programs to provide input on site priorities. The addition of representatives from the user program has added an operational viewpoint that was previously missing.

Criteria for Project Selection

- Demonstrated improvement over existing baseline
- Demonstrated technology performance and maturity
- Commitment by the site manager
- Leveraged funding between OST and the site
- Confidence of schedule demonstrating baseline acceleration or cost savings
- Cost benefit
- Ability to obtain the necessary regulatory permits
- Demonstrated ability to integrate site stakeholders

2.2 Call for Proposals Process and Criteria

Each year, there have been changes to improve the project-selection process (Table 2.1). In addition, changes to the selection criteria, organized by year, are outlined and summarized in Table 2.2.

Table 2.1 ASTD Call for Proposals Selection Review Process by Year

	FY98	FY99	FY00
Review Process	• Phase I: Screening	• Phase I: Screening and Relevance Review	→
	• Phase II: Evaluation and Ranking	→	→
	• Evaluated by Review Teams and Selection Committee	• Evaluated by Selection Committee only	• Evaluated by Review Teams and Selection Committee
	• Selection Committee made final recommendations to the OST Deputy Assistant Secretary	→	→
	• No Focus Area involvement	• Limited Focus Area involvement	• Focus Area involvement
	• No site representatives involvement	→	• Site representatives provided comments on site priorities for ranked portfolio

Table 2.2 ASTD Call for Proposals Selection Review Criteria by Year

	FY98	FY99	FY00
Review Criteria	• Overall scientific/ technical merit	→	→
	• Supports EM mission	→	→
	• Detailed cost-benefit analysis	→	→
	• Improvement over baseline reduces costs or accelerates schedule	→	→
	• Funds requested for technology deployment and not demonstration	→	→
	• Leveraged funding	• Leveraged funding of 50% with 25% in first year	→
	• Commitment letter from original deployment site and letters of interest from one or more potential subsequent deployment sites required	• No subsequent deployment requirement	• Commitment letter from original deployment site and *two* subsequent deployment locations required; letter of support from the relevant Focus Area also required
	• Written commitment from proposing DOE-EM site manager	→	→
	• Soundness of schedule	→	→
	• No limit on project duration	• Period of performance limited to two years	• Period of performance limited to one to three years
	• No closure site requirement	→	• Relevant to EM activities at closure sites

2.2.1 Multisite Deployment as a Goal

A key goal of ASTD is multisite deployment. With this goal in mind, the FY98 call required that each proposal contain multisite use of the technology or process. To meet this requirement, the proposals needed to contain letters of commitment from the implementing site and letters of interest from potential subsequent deployment sites. In FY99, the requirement for multisite use was changed from a selection criterion to a ranking factor. Thus, projects without multisite use could be accepted, but projects with multisite use would rank higher, all other factors being equal. This change was made in response to site concerns that commitment letters for subsequent deployments were difficult to obtain during the short proposal time frame allowed.

In FY00, the formal criterion requiring multiple deployments was reinstated, and the proposal preparation schedule was extended. The criterion requested commitment letters from the original deployment site and two subsequent deployment locations. Experience had shown that these documents encouraged coordination with other sites, but did not guarantee a commitment.

2.2.2 Leveraging Funding Improves Site Commitment to Deployment

The FY98 call included a requirement for leveraged funding. The goal of this requirement was to ensure user commitment to the project and increase the probability that technologies would be deployed. The EMAB review supported this approach, stating that the ASTD concept was greatly strengthened by the requirement for the sites to be the project proposers and provide cofunding. As a result, the FY99 and FY00 calls also required leveraged funding.

While the FY99 and FY00 calls required leveraged funding, the requirements were more prescriptive. The latter calls specified the amount of leveraged funding required (mandating a minimum of 50% leveraged funding for the life cycle of the project and a minimum of 25% leveraged funds during the first year). One additional change was made in the FY00 call—the leveraged funding needed to be provided for the life of the project. The purpose of this change was to help ensure that OST and the sites were sharing the costs fairly and throughout the project duration.

2.2.3 Placing Limits on the OST Contribution to Project Funding Level

Funding limitations coupled with the large number of proposals drove EM to place restrictions on the amount of OST funding for individual ASTD projects. The restrictions enabled OST to continue to leverage funding with the sites and maintain a reasonable number of projects. While the FY98 call had no limitations on ASTD project funding levels, OST placed a cap on funding requests at $2.5M for the FY99 call. OST continued use of project caps in the FY00 call, limiting the size of projects to $2M unless the proposal showed exceptional cost savings, schedule acceleration, and/or other significant benefits.

2.2.4 Controlling Project Duration and Sharpening Problem Focus

In the FY98 call, there were no limitations on project duration. The result was that several projects chose technologies that were not ready for deployment, leading to extended project schedules. In these cases, ASTD did not achieve the goal of rapid, multisite deployment. Consequently, EM placed schedule requirements on the subsequent calls. The FY99 call limited the period of performance to two years, and the FY00 call allowed a duration of one to three years. In addition, the FY00 call was the first “targeted” ASTD call. It sought proposals to accelerate cleanup at closure sites with an emphasis on D&D activities. Proposals addressing high-priority needs from other sites were considered, but ranked lower, assuming all other factors were equal.

2.3 Call for Proposals Results

EM received a total of 177 proposals for ASTD projects in response to the three calls. Seventy-six of those proposals were selected for funding and combined into 65 projects. Of those original 65 projects, 60 projects were active or completed as of 9/30/00. As shown in Figure 2.1, there is a difference between the number of proposals selected and the number of projects initiated. This is due to several factors: proposals were combined to make a single project; some projects were cancelled due to changing priorities; and limited funding in FY99 resulted in postponement of several projects. The average life-cycle funding provided by OST per project has decreased from $3.63M in FY98 to $0.99M in FY99 and $0.54M in FY00.

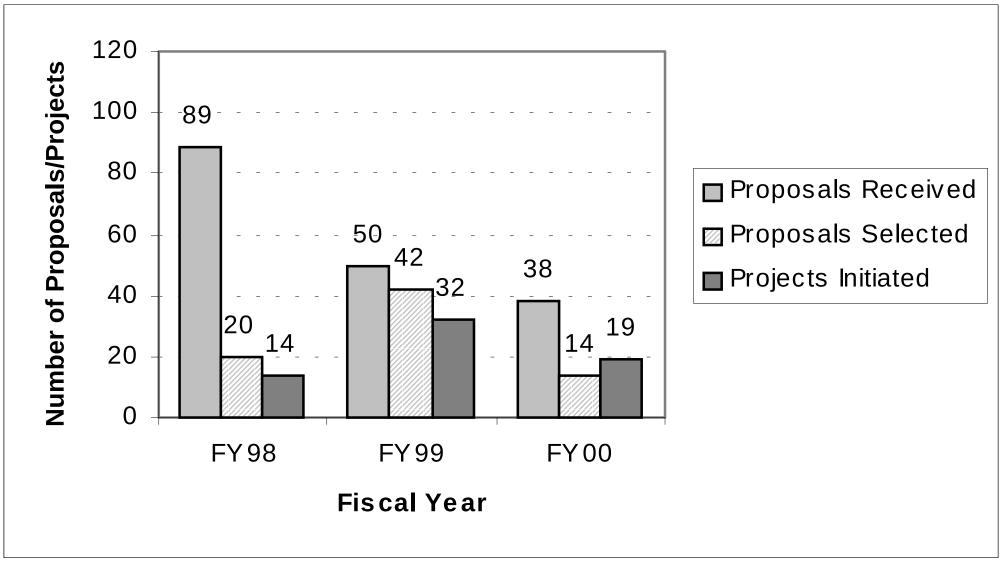

Figure 2.1 ASTD Calls for Proposals by Fiscal Year

The FY98 call was the most competitive of the three calls with 14 projects funded from 89 proposals. The second year, the sites were better organized to respond to the call and limited the number of proposals prepared. As a result, the quality of the second-round proposals was vastly improved, and a much higher percentage of proposals were funded in FY99. In FY00, the funding available to OST for ASTD was decreased and fewer new projects were initiated, making the awards more competitive. In both FY98 and FY00, there was a requirement for letters of support for subsequent deployment sites. This requirement might have limited the number of proposals selected for funding, but the selection process was based on multiple factors.

2.3.1 The FY98 Call for Proposals

Eighty-nine proposals were received from across the country for the initial call for proposals in FY98. Twenty proposals, integrated as 14 projects, consisting of 40 technologies, were initiated with OST funding of $25.7M. Seven of the new projects solved problems dealing with subsurface contamination of soils and groundwater, three projects addressed D&D problems, and four projects focused on radioactive tank waste remediation. Figure 2.2 shows the distribution of projects by Focus Area for each year. FY98 projects were proposed to last from one to three years.

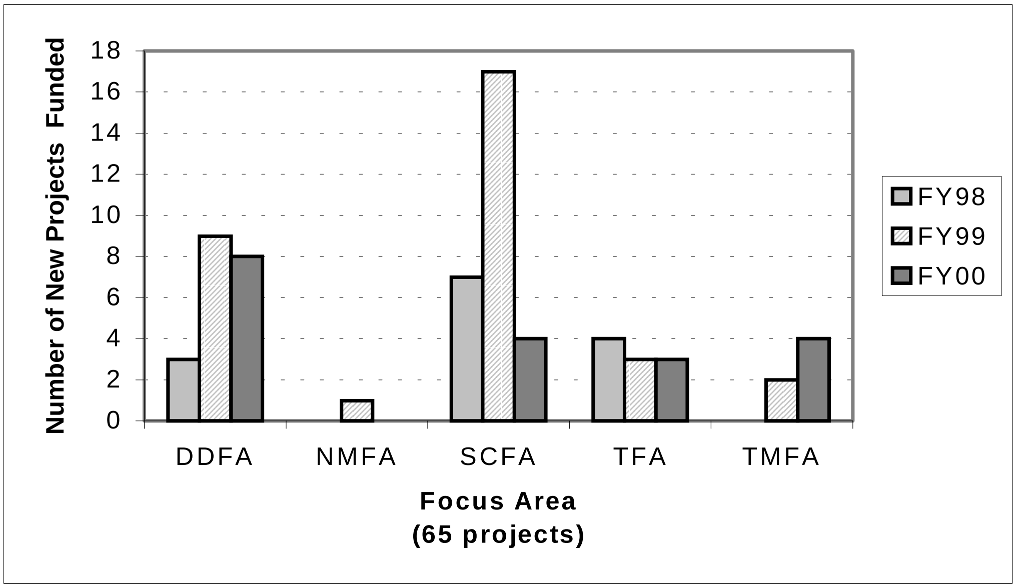

Figure 2.2 Focus Area Distribution of ASTD Projects

2.3.2 The FY99 Call for Proposals

Fifty proposals were received from across the DOE complex for the FY99 ASTD call for proposals. Forty-two proposals, consisting of over 60 technologies, were finally selected for funding by the reviewers. Due to OST funding constraints, eight projects were delayed to FY00, two projects were cancelled, and 32 projects were selected for FY99 funding of $16.7M. These projects fell within the following Focus Areas: 17 projects addressed subsurface contaminant problems, nine projects addressed D&D issues, three projects solved underground storage tank problems, two projects targeted mixed-waste problems, and one project targeted nuclear materials problems. Projects were scheduled for completion within one to two years.

2.3.3 The FY00 Call for Proposals

Thirty-eight proposals were reviewed for the FY00 ASTD call. Fourteen proposals, integrated as eleven projects, were selected. Sixteen new projects were funded for $10.8M of OST support. These projects included five of the eight projects (with three being cancelled) deferred from FY99. These new projects include seven projects that address D&D issues, three projects that target the TRU and mixed-waste area, four projects solve subsurface contaminant problems, and two projects that address underground storage tank problems.

2.3.4 Analysis of ASTD Projects by Focus Area

DDFA significantly increased its percentage of projects in FY00, because the call for proposals targeted D&D activities. In FY98, there were three D&D projects, whereas in FY99, there were eight and in FY00, there were seven projects initiated. In FY98 and FY99, the SCFA typically managed the largest number of ASTD projects in a given year (seven and 17, respectively).

3.0 HOW ASTD PROJECTS ARE IMPLEMENTED

3.1 Introduction

The management and implementation of ASTD projects require a flexible approach. The projects are diverse in terms of technical scope, schedule, and funding levels. ASTD projects range from simple, single-function technologies (e.g., Personal Ice Cooling Suit) to a suite of multifunction technologies. Other ASTD projects consist of an integrated system of technologies (e.g., Dynamic Underground Stripping, Hydrous Pyrolysis, and Electrical Resistivity Tomography) deployed in a complex setting to treat contaminated groundwater within a specified regulatory structure. In addition, the projects are distributed over 22 sites, no two of which are alike in terms of cleanup activities, schedules, or operational approaches.

Deployments are implemented by the site's operating contractor, often using vendors who "own" the technology and perform the work under subcontract. Specific management activities vary depending upon the complexity of the deployment scenario and whether or not the deployment is accomplished through a competitive procurement/contract. A number of participants have been involved in ASTD activities and contributed to the success of this approach. The diverse and active interest in ASTD has contributed a level of management complexity that is commensurate with other national programs. Because ASTD projects are funded with money leveraged from multiple DOE organizations, each organization provides project management support associated with its contribution to the project. Table 3.1 describes the roles and responsibilities for each participant.

Table 3.1 Summary of ASTD Programmatic Roles and Responsibilities

Organization	Primary Roles And Responsibilities
OST	• Program guidance, oversight, and policy decisions • Project selection and funding authorization to Focus Areas • Reporting to EM and Congress
DOE Field Offices/ Contractors	• Project management and project implementation • Reporting of project status, issue resolution, change control, and preparation of cost-benefit data • Provision of leveraged funding • Incorporation of project into site plans and project schedules • Preparation and submission of proposals
Focus Areas	• Proposal review • Management and distribution of OST funding, including funding allocation, change control, tracking/reporting, issue resolution, and project reviews
DOE-ID (including Subsequent Deployment Team)	• Preparation of proposal solicitation (in accordance with OST guidance) • Management of proposal selection process and preparation of project-selection recommendations • Identification and facilitation of subsequent deployments • Supports reporting of project status and results • Analysis of program metrics
EMAB	• Review of program guidance and project-selection process • Independent assessment

3.2 Roles and Responsibilities of Organizations Involved in ASTD Projects

The remainder of this section provides a discussion of the roles and responsibilities of the various organizations that play an active role in the selection, implementation, and review of ASTD projects.

3.2.1 Headquarters Establishes Policy and Provides Programmatic Guidance

Headquarters' role in ASTD has been to provide programmatic guidance and oversight, authorize funding, make policy decisions, perform final project selection, and report to EM and Congress. Each year EM decides whether to conduct a call for proposals, the focus of the call, and the criteria for project selection. For example, in FY00, Headquarters determined that the department needed to more aggressively pursue the use of new technology in D&D projects at closure sites. That programmatic decision drove the selection process and criteria. Headquarters also presents and defends funding requests to the Office of Management and Budget and to Congress. Because the appropriations bills have specified funding for accelerated deployment of new technologies, EM has made a special effort to report on ASTD activities as a set of projects rather than components of the Focus Area investment portfolios.

3.2.2 Field Offices Actively Integrate and Manage ASTD Projects

Ultimately, the DOE Field Offices are responsible for achieving the goals of their specific cleanup projects. Often, technology deployments are only components of an overall system dedicated to accomplishing a specific cleanup goal within a project. Integration of a technology solution into the overall project must be managed by the DOE Field Office and site contractor organization. This integration is done within a defined management structure used for projects. The DOE Field Offices provide oversight for these projects and also handle the interface with Headquarters and Focus Area offices.

Management of a typical project that includes technology deployment(s) is through a project manager, who has responsibility for cost, scope, and schedule. A lead engineer with specific expertise typically reports to the project manager to provide technical assistance. Complex deployments may involve several engineers and/or scientists with specific expertise. The project manager and the technical support team develop and manage the project schedule, track the project budget, interface with the site-operations organization, interface with the Focus Area, manage all technical aspects of the project, and initiate the change-control process as needed. These activities include, but are not limited to:

- developing system flow sheets;
- preparing design specifications;
- obtaining proper regulatory approvals;
- defining a procurement approach, interfacing with procurement personnel, and selecting subcontractors;
- overseeing construction activities;
- developing operating plans and procedures;
- conducting training of operating personnel;

- leading the start-up and optimization of the project; and

- preparing cost and performance reports.

Project management and control systems, and information and reporting functions are the responsibility of the field project manager. The project manager ensures compliance with all quality assurance and conduct-of-operations policies, DOE orders, and applicable regulatory requirements. Completion of a technology deployment usually requires a turnover from those performing the deployment to an operating organization. The turnover includes providing operating procedures, operational training, safety training, and links to other support functions such as maintenance and technical support. The training and turnover to operations is the responsibility of the project manager and technical support team. In some instances, the technical support team performs the remediation, in which case, the project closeout would occur under the direction of the project manager and his/her team. The Oak Ridge Modular Evaporator and Ion Exchange System is an example of a successful project where the technical support team became the core technology-transfer team responsible for training operations staff to assume responsibility for continued operations and eventual decommissioning of the systems.

3.2.3 Focus Areas Work Closely with Field Staff to Ensure Project Implementation

The Focus Areas have become an integral component in the entire spectrum of ASTD-related activities. They provide input for the call for proposals and provide reviewers during the selection process. They begin oversight of the projects after funding is identified, integrating them into day-to-day Focus Area business operations. They play a key role in ensuring the success of ASTD projects by maintaining contact with project managers, providing mechanisms for issue resolution during project implementation, and tracking deployment progress within the integrated reporting system.

3.2.4 DOE Idaho Is Focused on Subsequent Deployments, Communication, and Project Selection

DOE-ID supports ASTD by coordinating the selection process, preparing communication products, and facilitating subsequent deployments of technologies. As the overall field manager for ASTD activities, DOE-ID is responsible for executing the annual call for proposals in accordance with Headquarters guidance. DOE-ID also serves as the ASTD Information Center, managing and updating the ASTD web page http://id.inel.gov/astd. The office updates ASTD information and provides analysis to communicate ASTD activities. Finally, DOE-ID is responsible for facilitating subsequent deployments through the Subsequent Deployment Team (SDT).

The SDT was established in early 1998 to support the original ASTD goal of multisite deployment. For DOE to obtain the best return on investment, OST-supported technologies need to be deployed multiple times at multiple sites. A dedicated team to provide assistance to the Focus Areas has shown to be effective for the continuing success of OST. The SDT works closely with the DOE Field Offices and contractor organizations to define and understand their needs for new technologies and then works closely with the Focus Areas to match ASTD technologies to meet the needs within the required timeframe.

The SDT acts as a liaison and communication link that provides information about performance and cost of the technologies to the end users considering the use of a new technology. To accomplish this, the SDT builds one-on-one relationships with the end users and the vendors of the technologies to enhance communication between them. In working with the vendors, SDT helps them target and coordinate deployment opportunities and identify end users that have a specific need for their technology. SDT also assists with telephone conferences and site visits for end users to improve their understanding of what has been done and the lessons learned. In addition, the SDT works closely with the end users and Focus Areas to document the successes of these projects.

3.2.5 The EM Advisory Board Provides Recommendations for Program Improvement

EMAB has provided a critical role in the success of ASTD through independent assessment and communication of results. EMAB reviewed the ASTD project selection process in 1998 and made recommendations for process improvements. In addition, EMAB conducted interviews with field personnel responsible for site cleanup to obtain lessons learned. In late 1997, after the initial project selection process was completed, a report of findings and recommendations was issued. Some of the important findings and recommendations that remain significant to ASTD include the following:

- State and local regulators were positively impressed by ASTD goals and process.
- Stable, predictable funding is a critical requirement for success.
- The schedule for proposal submission should be adequate to ensure submission of quality proposals.
- Performance-based incentives to implement new technologies should be broadly applied for DOE management and operations (M&O) contractors.
- Multisite deployment criteria should be emphasized.
- Documentation and promulgation of ASTD successes are necessary to ensure continued DOE and Congressional support.

4.0 ASTD ANALYSIS

4.1 Introduction

This chapter provides an analysis of the ASTD projects funded between FY98 and FY00, current through September 30, 2000. The analysis is organized into five sections: (1) funding, (2) deployments by Focus Area, (3) deployments by Field Office, (4) subsequent deployments, and (5) impacts.

4.2 ASTD Project Funding Is Broadly Distributed and Highly Leveraged

During the last three years (FY98–FY00), 65 ASTD projects have been funded by OST in collaboration with ten DOE Field Offices; projects have been implemented at 22 DOE sites. Because several projects were cancelled, 60 projects were either active or had been completed as of September 30, 2000. Figure 4.1 shows the distribution of numbers of projects and funding by DOE Field Office. In FY00 and FY01, OST has made assistance to sites within the Office of Site Closure a priority.

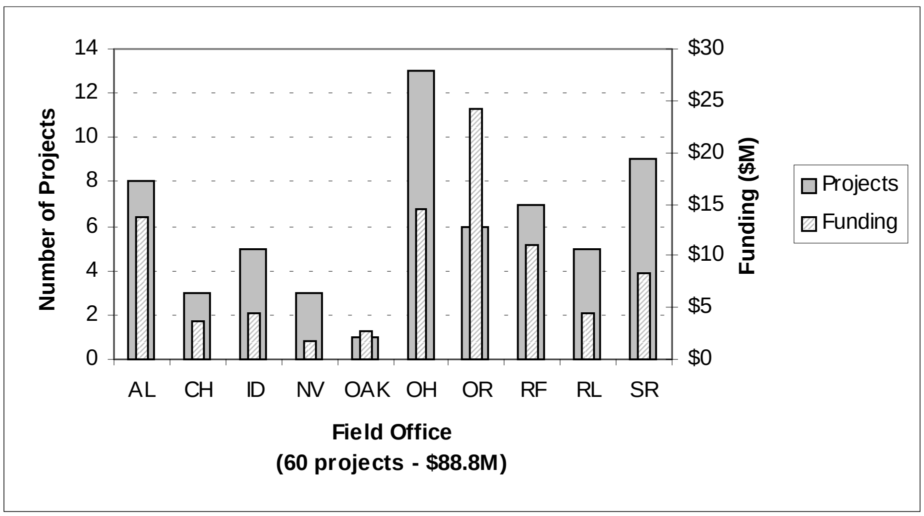

Figure 4.1 FY98 - FY00 ASTD Projects and Life-Cycle Funding by Field Office

4.2.1 ASTD Project Funding Ranges From <1% to Almost 9% of Site Cleanup Budgets

The amount of ASTD project funding, relative to overall site funding varies considerably by site. Sites with small EM budgets, such as those associated with the Albuquerque, Chicago, and Nevada Field Offices, have expended the largest amount of ASTD funding (4%–9%) as a percentage of their budget. Sites associated with the Rocky Flats, Ohio, and Oak Ridge Field Offices have received and expended less than 5% of their EM budget for ASTD project funding. The larger DOE sites—Idaho, Savannah River, and Hanford—have received and expended less than 1% of their EM funding for ASTD projects. Although ASTD funds generally represent a small portion of site cleanup budgets, the projects' impact can be significant because the funding is utilized for actual cleanup, not for site infrastructure or management.

4.2.2 ASTD Leverages OST and Site Cleanup Funding

From FY98 to FY00, OST has provided a total of $88.8M for ASTD projects, shown by year in Figure 4.2. This funding represents new starts and mortgaged funding. The figure shows the trend of increased funding over time, although new starts decreased significantly between FY99 and FY00.

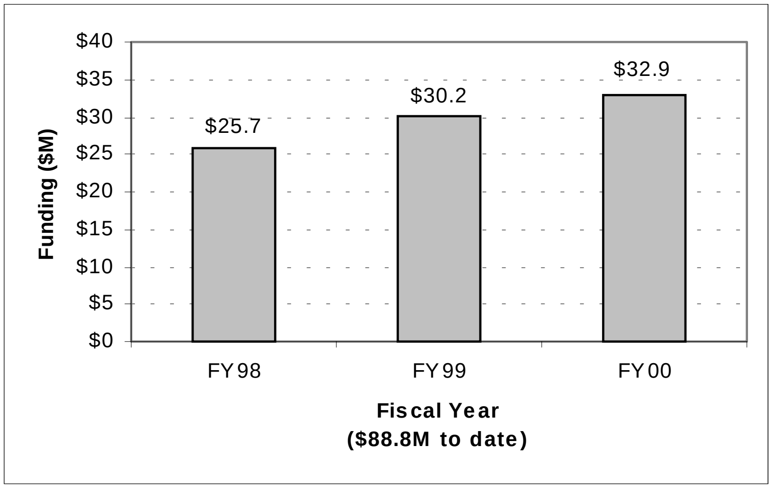

Figure 4.2 ASTD Funding Provided by OST by Fiscal Year

This OST funding has been leveraged with $167.0M from the DOE sites (Figure 4.3). The percentage of leveraged funding from EM sites has increased from FY98 to FY00 at a rate of 20% per year. It is likely that early ASTD successes experienced by DOE site organizations have provided the encouragement for them to more fully participate in the partnership with OST.

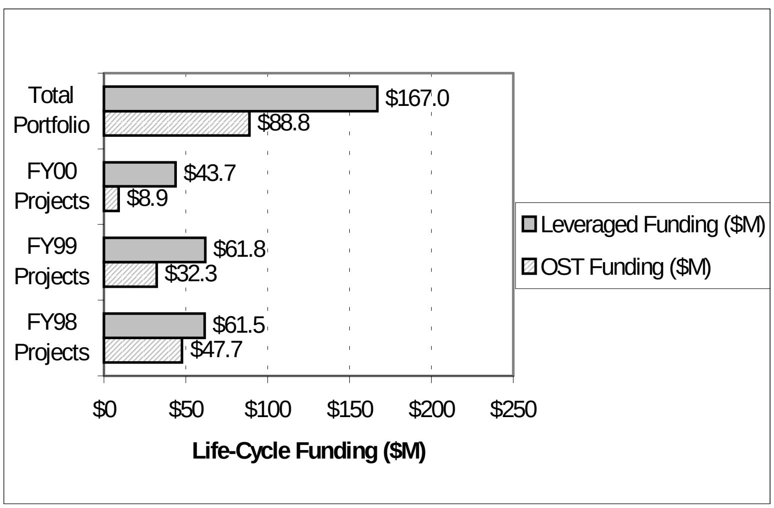

Figure 4.3 OST and Leveraged EM Funding as of September 2000

4.3 ASTD Projects Represent a Significant Portion of Focus Area Deployments

Through FY00, the 60 ASTD projects managed by EM's Focus Areas are distributed as follows: DDFA, 18 projects; NMFA, one project; SCFA, 27 projects; TFA, nine projects; and TMFA, five projects. Figure 4.4 shows the distribution of projects and funding across the Focus Areas by fiscal year. This figure shows that projects are distributed across all Focus Areas, but strongly weighted towards D&D and subsurface contaminants. TFA, on the other hand, had fewer projects, with larger amounts of funding per project. SCFA manages many more projects that the other Focus Areas. When examining total funding by Focus Area (Figure 4.4) disparities among DDFA, SCFA, and TFA are smaller.

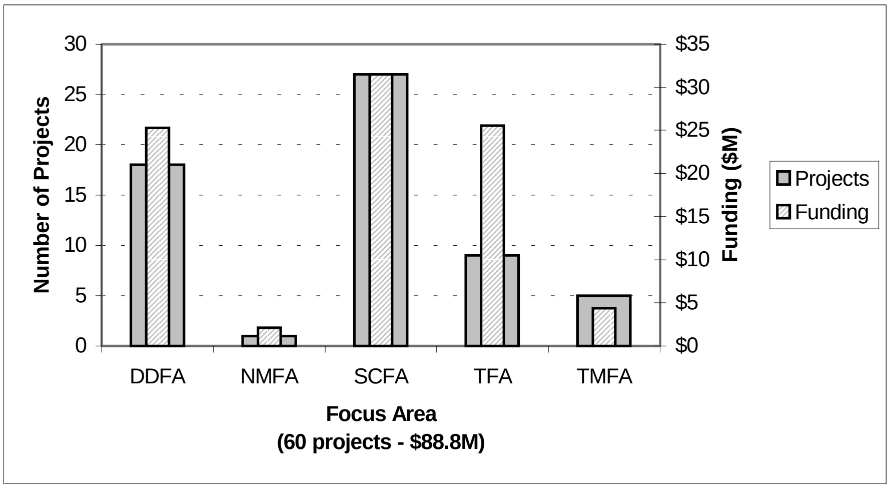

Figure 4.4 ASTD Projects and Life-Cycle Funding by Focus Area (NMFA is a Relatively New Focus Area)

Analysis of the impact of ASTD as part of the overall OST program shows that ASTD deployments are a significant percentage of the Focus Area deployments, ranging 39%–42% for three of the Focus Areas in FY98 and FY99 (Figure 4.5). This fact suggests that OST investment in ASTD is providing a good return on investment. Of course, the ASTD investment is actually benefiting the overall EM program, even though the dollars invested represent a small percentage of the overall EM budget.

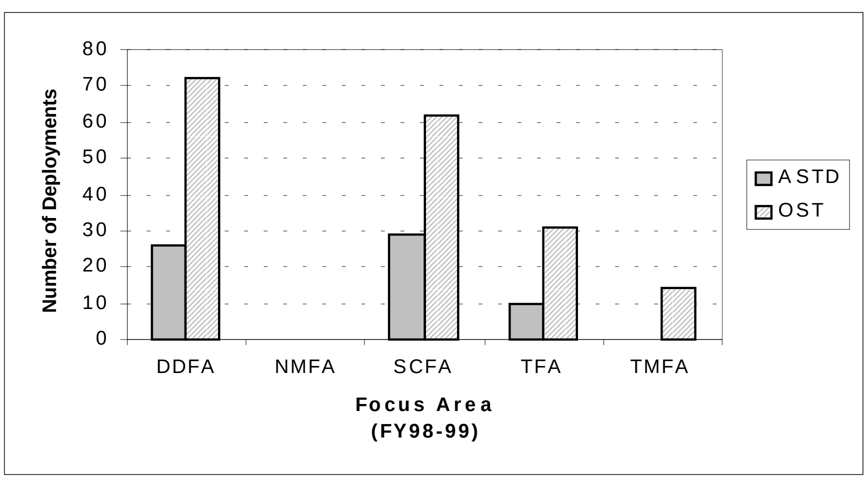

Figure 4.5 ASTD vs. Total OST Deployments by Focus Area (FY98–FY99)

Table 4.1 summarizes the number of projects, number of technologies, number of deployments completed, and number of technologies deployed by Focus Area. In Appendix B, a table of all FY98–FY00 ASTD projects shows the technologies and deployments (original and subsequent) completed and planned as of September 2000.

Table 4.1 ASTD Deployments Completed as of September 30, 2000

Focus Area	Total Number of Projects	Total Number of Technologies	Number of Projects with Deployments	Number of Deployments Completed	Number of Technologies Deployed
DDFA	18	30	8	54	18
NMFA	1	1	0	0	0
SCFA	27	30	20	39	25
TFA	9	16	9	17	12
TMFA	5	5	4	4	4
Totals	60	82	41	113	59

A more detailed discussion of FY98 and FY99 ASTD projects, organized by Focus Area, is provided in Appendix C. The discussion includes an analysis of both obstacles and factors that contributed to project success.

4.4 ASTD Projects Are Having an Impact at the Majority of Field Offices

ASTD projects are managed at ten Field Offices and conducted at 22 sites. While the recent emphasis within ASTD has been on the sites associated with the Ohio and Rocky Flats Field Offices, most Field Offices are receiving some benefit from ASTD. Figure 4.6 illustrates the complexwide impact of ASTD projects by fiscal year, showing actual deployments for FY98 through FY00, and potential or planned deployments for FY01 and beyond. A potential deployment is one where a need has been identified and an ASTD technology has been matched to that need, but no site commitment has been made.

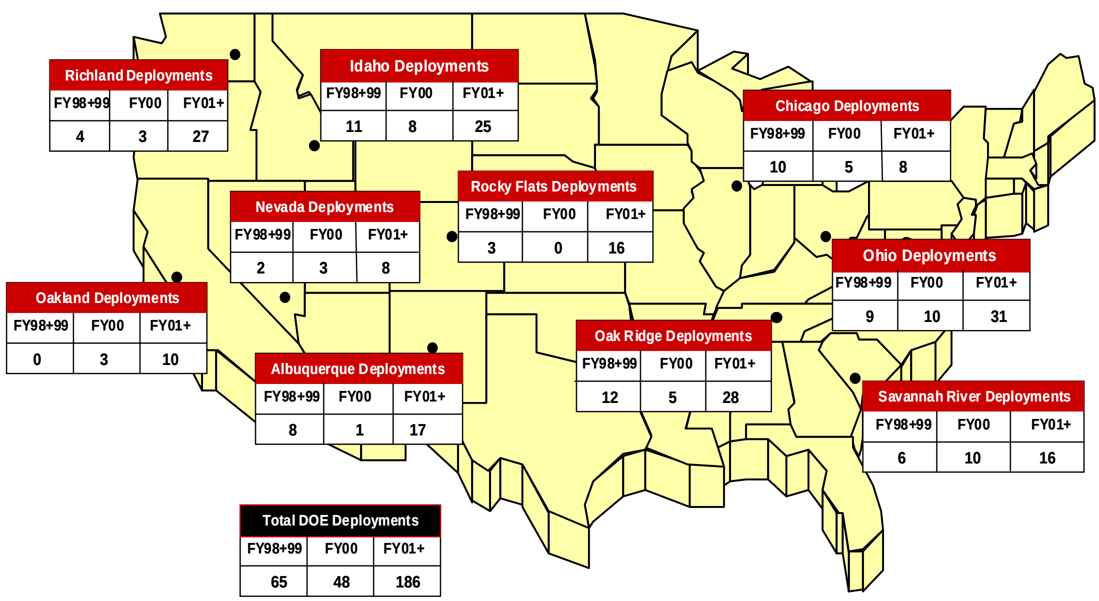

Figure 4.6 ASTD Deployments by Field Office, Actual and Planned/Potential by Fiscal Year

As of September 2000, original deployments for 12 of the 13 FY98 ASTD projects are under way or completed, and original deployments for 21 of the 36 FY99 projects are under way or completed. Figure 4.6 shows that after three years of ASTD project funding, there have been 113 technology deployments at DOE sites, and numerous subsequent deployments are planned. In addition, a number of potential deployments have been identified. The number of potential deployments is one indicator of the potential size of the DOE market for the technology or project.

4.4.1 Reaching the Full Potential: An Analysis of Planned Versus Actual Deployments

An analysis of project performance can be conducted by comparing the actual deployment dates for ASTD projects to the proposed deployment dates as stated in the deployment plans. These data can then be compared to other EM and OST project performance.

Sixty-two percent of ASTD projects showed deployment on schedule, i.e., in the originally proposed fiscal year. This figure is comparable to the performance of the majority of EM or OST projects. Of the delayed projects, most were deployed in the next fiscal year. However, there are at least four projects (8%) that are currently projecting a two-year or more delay. Two projects were entirely rescoped and thus deployment is occurring later than originally proposed.

4.5 Subsequent Deployments Are Critical to Ensuring ASTD Success

4.5.1 Many Subsequent Deployments Have Been Completed and More Are Planned

The ASTD SDT is assisting with facilitating subsequent deployments for many of the ASTD projects. Often its assistance is provided in terms of identifying potential customers, sending information on the specific ASTD technology or project of interest, supporting visitor days in terms of identifying potential attendees, etc. One of the keys to success here is improved communication and a dedication to providing support specific to subsequent deployment. Experience has shown that subsequent deployments do not occur without significant interaction between the problem holder and the technology provider.

The time required to deploy a technology or system of technologies varies from a few months to many years, depending upon its complexity and how it is integrated into site-based project planning. Subsequent deployments for many of these projects have been initiated or completed. Figure 4.7shows that the total deployments for FY99 and FY00 are comparable, but the number of subsequent deployments more than doubled. As the ASTD investment continues, more subsequent deployments are being realized.

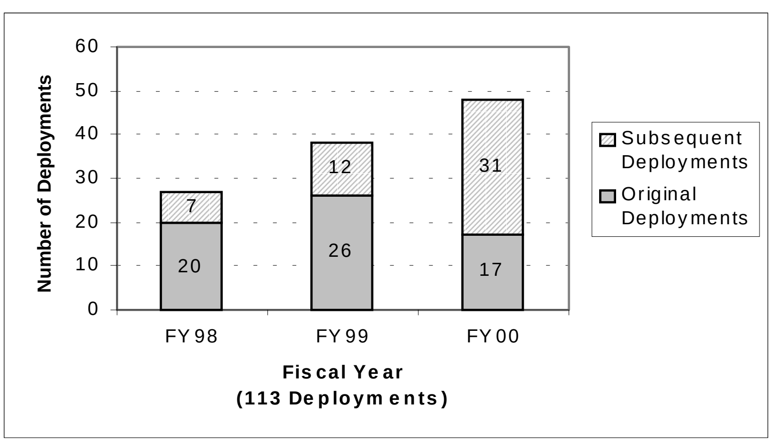

Figure 4.7 ASTD Deployments by Fiscal Year

For some of the projects, such as Integrated D&D and Segmented Gate System (SGS), subsequent deployments were funded in the original proposal. These subsequent deployments, planned before the project was initiated, could and did happen relatively quickly. Subsequent deployments not included in the original proposal take more time. They must be integrated into the site schedule, which may occur several years in the future. Nevertheless, 50 subsequent deployments have been completed by FY98–FY00 projects through FY00; more than 180 are either planned or potential.

Figure 4.8 depicts actual completed and planned/potential deployments by DOE Field Office and indicates the great potential for subsequent deployments. These projections reflect the cleanup schedules of the sites. For example, the Ohio Field Office, managing sites currently scheduled for near-term closure, has accomplished 19 deployments and has only 31 potential or planned deployments identified, whereas the Richland Field Office has completed only seven deployments, but has identified 27 potential or planned deployments.

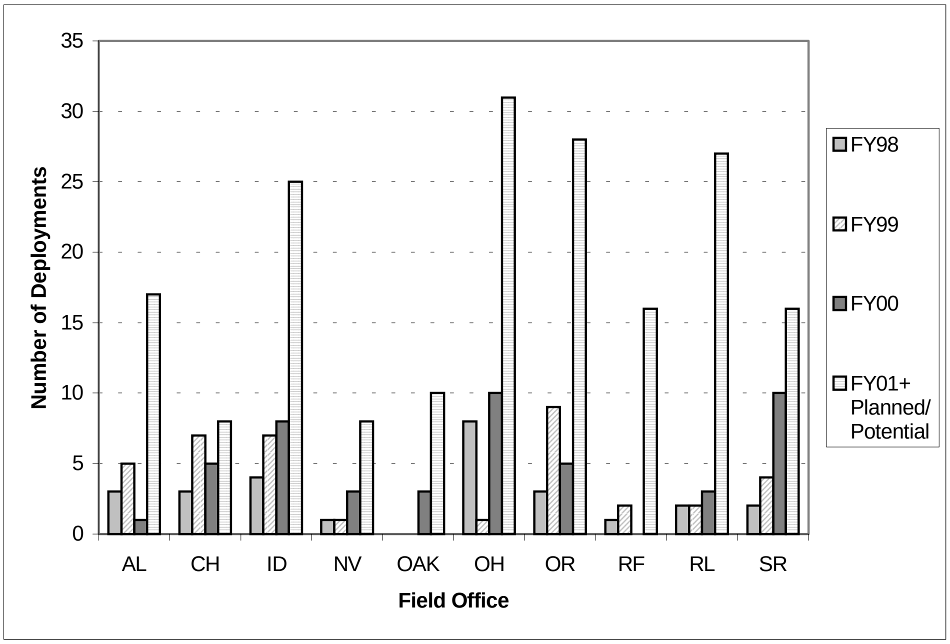

Figure 4.8 Actual and Potential Deployments by DOE Field Office by Fiscal Year

Table 4.2 shows the numbers of subsequent deployments completed and planned or potential for each of the Focus Areas.

Table 4.2 ASTD Subsequent Deployments Completed and Planned

Focus Area	Number of Subsequent Deployments Completed (IPABS)	Number of Subsequent Deployments Planned/Potential
DDFA	35	85
NMFA	0	3
SCFA	14	61
TFA	1	18
TMFA	0	19
TOTALS	50	186

Fifteen technologies have already undergone subsequent deployments: eight technologies from DDFA, six from SCFA, and one from TFA. Figure 4.9 shows some of the subsequent deployments that have occurred, with an arrow emanating from the original deployment site. This map depicts the process of an original deployment at one site and subsequent deployments at other sites.

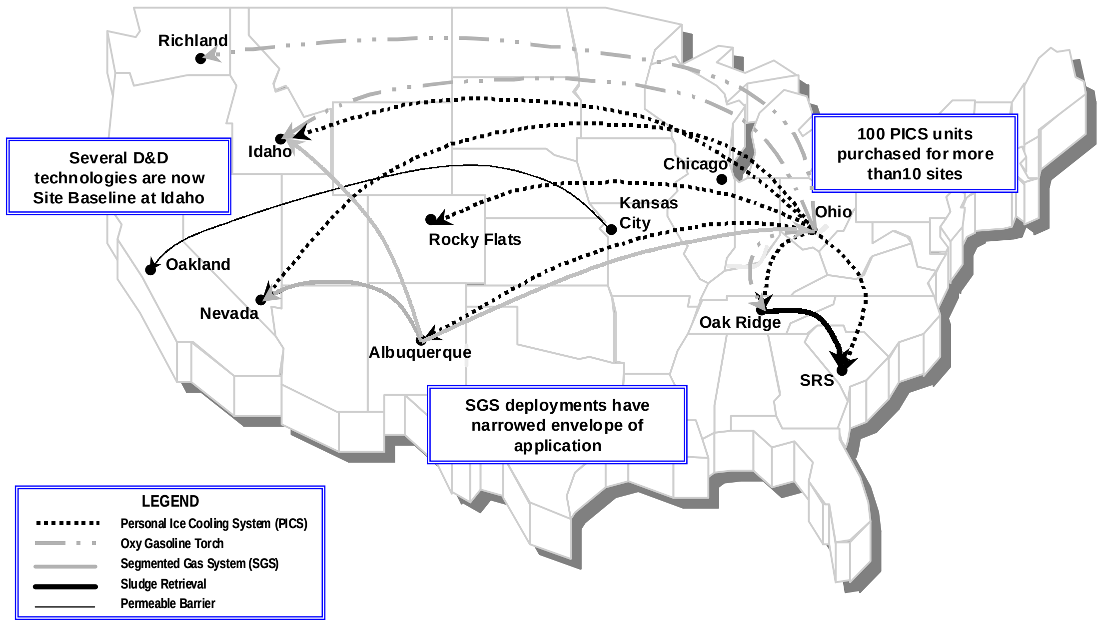

Figure 4.9 Examples of ASTD Subsequent Deployments

4.5.2 Taking Action to Achieve Rapid MultiSite Use Is a Key Focus of ASTD

Because one of the major goals of ASTD is technology deployment at multiple DOE sites to enhance OST's return on investment, a number of projects included the subsequent deployments as part of the original proposal. These projects have been most successful in rapidly achieving widespread deployment. The Personal Ice Cooling Suit leads in the number of sites where a technology has been deployed—more than 10 sites (Figure 4.9). The SGS has now been deployed at seven sites since ASTD was initiated. Both of these projects built the multiple deployments into their project plan. Both the vendor and project personnel worked closely together to find additional opportunities for deployment.

Subsequent deployments where OST funding has not committed funding up front are more difficult to engage rapidly. Appendix B highlights subsequent deployments completed and those that are planned or potential for deployment in future years.

4.6 Understanding the Impacts of ASTD Projects

4.6.1 Project Success Factors

An analysis of FY98–FY00 ASTD projects demonstrates that many of the original goals of ASTD have been met. New technologies have been deployed to replace the baseline, reducing schedule or cost. New technologies have been deployed to enable a process where no previous method existed, and new technologies have been deployed at multiple sites, enhancing DOE's return on investment in technology development.

Sections 4.3 and 4.4 provided an analysis of the 60 FY98–FY00 ASTD projects in terms of the number of deployments. Project success can also be defined in terms of project management and performance-related factors:

- the project is implemented within scope, schedule, and budget;
- technologies are deployed to replace the baseline, reducing schedule or cost; or
- an enabling technology that fills a gap in the existing site baseline is deployed.

4.6.2 Commercially Available Solutions Are Critical to Widespread Deployment

A key element of the most successful ASTD projects is the commercial availability of the technology by a viable vendor. The capability of the commercial vendors can be a big factor in determining the rate at which technologies can be deployed across the DOE complex. More than 105 commercial vendors from 34 states have and are participating in ASTD projects. The locations of those vendors are identified in Figure 4.10. Appendix D provides a detailed listing of ASTD project vendors, with contact information.

Figure 4.10 ASTD Vendors Are Located Across the U.S. and Beyond

4.6.3 Evaluating ASTD Projects Through Analysis of Cost Savings

Performance of ASTD projects can also be analyzed in terms of cost avoidance or cost savings. ASTD has always required an analysis of projected cost savings or costs avoided, if the technologies were deployed under "some scenario" in the proposals. This may include the original deployment at the proposer's site or may include subsequent deployments, at either the same

DOE site or other DOE sites. As a result, there has been a lack of consistency in the assumptions used to calculate cost savings for the various projects.

These estimates do not imply any anticipated reduction in the near-term site budgets, but only provide order-of-magnitude estimates either of potential impact that a particular project or technology can have at a single site or at multiple sites. Total projected cost savings or cost avoidance for the 60 active FY98–FY00 ASTD projects is more than $1B in present-day dollars.

Per-project cost-savings estimates range widely. Tanks-related projects typically forecast significantly higher cost savings than D&D projects. Projected cost savings for one of the tanks-related projects was approximately 25% of the total. Subsurface contaminants projects typically show cost savings in the $30–80M range, as the innovative technology replaces the baseline of pump and treat. The estimated project lifetime is extremely uncertain and that uncertainty alone can cause significant differences in projected cost savings for similar projects.

Independent analyses of projected cost savings have also been conducted for approximately 16 of the ASTD projects by MSE in Butte, Montana. These cost analyses have shown some differences between the original projected cost savings and the MSE-projected cost savings, for example:

- The Permeable Reactive Treatment Wall Project in Monticello, Utah projected an original cost savings of $83M, while the MSE analysis projected cost savings of $38M. This difference exists partly because the MSE analysis conducted a net-present-value analysis that converts the dollars into 2000 dollars, whereas the proposal estimate did not. This example demonstrates the issue of nonstandardized methods.

- An independent cost savings analysis was done at Los Alamos for the Decontamination and Volume Reduction System (DVRS). Projected cost savings for DVRS was originally $167M, but the independent analysis projects $102M. One of the differences between these two projections is a different source volume for treatment, as two years have passed since the original analysis and some of the waste has been treated by the baseline method.

- The SGS projected $45M in cost savings. However, projected performance was not met at all of the deployment sites, and thus actual cost savings are significantly lower. Because of less than anticipated performance, significantly smaller volumes of soil were processed.

These are just a few examples that show the fluctuations in projected cost savings. Cost savings or avoidance in many of the proposals are not being realized as originally predicted for a number of reasons, including significant changes in project scope. Actual cost savings cannot easily be calculated because most of the projects require a number of years to complete and there is much uncertainty associated with that number and with other assumptions. In other cases, it is quite difficult to attribute cost savings from OST deployments, as they are only a small portion of a large project, which often lasts for a number of years. In some cases, cost savings are being realized due to a number of activities that include deployment of alternative technologies, but also may include a number of business and infrastructure factors. Where possible, cost savings are being calculated for the projects as they come to completion.

4.6.4 ASTD Projects Are Having a Tangible Impact on the DOE Cleanup

When analyzing the success of the individual ASTD projects, one must look at the impact they have had on cleanup at DOE sites. Examples of cleanup accomplishments that help quantify the project impacts include gallons of water or number of cubic yards of soil treated, gallons of waste removed or treated, square meters of facility surface decontaminated, feet of pipes cut and dismantled, and number of buildings removed. As of September 2000, cleanup accomplishment information was collected from the DOE sites (Table 4.3). Examples of successful ASTD projects are included in Appendix E.

For many of the projects, these data are continuously changing as the projects continue. For example, for the three permeable reactive barrier projects, groundwater continues to flow through the barriers for treatment. The number of gallons of water treated will continue to increase as long as the barriers are operational. For some of the projects, the numbers are final. For example, the High Explosives Composting Project was completed at Pantex and 3000 cubic yards of soil were treated. However, subsequent deployments of this technology are being planned. For other projects, it is very difficult to report a numerical accomplishment. For example, the value of the Vadose Zone Monitoring System, currently being used at Savannah River, cannot easily be quantified.

Table 4.3 Cleanup Accomplishments of ASTD Projects by Field Office (September 2000)

Field Office	Cleanup Accomplishment[2]	Associated Project
Albuquerque	7.4M gallons water treated (U + [TCE][3])	Monticello and Kansas City Permeable Walls
	3,000 cubic yards soil treated (explosives)	Pantex Composting of High Explosives
Chicago	180M gallons water treated (TCE)	Brookhaven In Well Air Stripping
Idaho	30,000 square feet metal cut, 30,000 square feet buildings removed, and 3.8M pounds waste contained	Integrated D&D
Nevada	3,735 square meters floor surface surveyed	Position Sensitive Radiation Monitoring System
Oak Ridge	825 pounds TCE removed from groundwater	Dynamic Underground Stripping at Portsmouth
	300,000 gallons waste retrieved	Enhanced Sludge Retrieval System
	5,600 curies removed	Out of Tank Modular Evaporator and Cesium Removal System
	10,668 cubic feet debris encapsulated	Macroencapsulation
Ohio	687 cubic yards soil processed	SGS (seven deployments)
	740 acres soil surveyed	Integrated Technology Suite
	9 buildings removed	Integrated D&D
Richland	188,000 gallons of waste monitored	Slurry Monitoring
Rocky Flats	2.3M gallons water treated (U + TCE)	Permeable Reactive Barrier
	94,000 square meters surface surveyed	Position Sensitive Radiation Monitoring System
Savannah River	7,500 linear feet pipe inspected	Integrated D&D (Pipe Explorer)
	1.2M gallons water treated	Nuclide Removal System

[2] Cleanup involved radionuclides, unless noted otherwise.
[3] TCE = trichloroethylene

5.0 LESSONS LEARNED AND RECOMMENDATIONS

5.1 Lessons Learned: Themes for Successful Projects

Analysis of three years of ASTD operation has identified lessons learned that can be expressed as common themes for success that should be applied to future ASTD policy decisions. By examining the most successful projects, what made them successful can be learned and used to build a framework for success of future projects. Problematical approaches, policies, and projects have also been identified and analyzed to determine the root cause and develop recommendations for improvements.

Analysis of ASTD deployment successes has shown that reasons for success are varied, but many are common to multiple projects. A table documenting specific reasons for success for several of the ASTD projects is included as Appendix F. Common themes are grouped into the following categories: (1) personnel, (2) funding, (3) technology, and (4) other.

5.1.1 Dedicated Personnel with Strong Project Management Skills

- ASTD projects must be proposed and managed by site end users that are committed to trying new technology and integrating it into their site operations, ultimately improving the baseline, accelerating schedule, and saving money.

- A competent, enthusiastic, flexible project team is a requisite for a successful project. The team must work closely with the technology developer/vendor to ensure that the technology meets the specific design requirements for the proposed deployment site.

- Projects that are well planned, with detailed scope, cost, schedule, procurement plans, risk and contingency plans, and preliminary designs in place before the proposal is submitted are most likely to be expedited. Sufficient understanding of the problem, including characterization of the waste and the surrounding environment (e.g., tank and groundwater) to design the treatment system, must be achieved before the proposal is written.

5.1.2 Funding

- Leveraged funding from OST is a requisite incentive that reduces the risk of deployment for DOE site cleanup managers.

5.1.3 Technology

- Projects that incorporate new technologies of sufficient maturity with demonstrated performance data that (1) match well-defined site-specific needs and requirements and (2) demonstrate a “step-change” improvement in performance over baseline or fill a gap will be most successfully and easily implemented.

5.1.4 Other

- If regulatory and stakeholder approval is required before deployment can occur, early interactive involvement is critical.

- Projects that identified and funded multisite deployments in the original proposal accelerated the multisite deployment goal. Multisite teams communicating regularly enhanced the transfer of the technology from site to site.

- Provision of training and/or "seed units" promoted more widespread deployment.

- Post-deployment analysis of benefits, e.g., cost avoidance and/or health and safety related, enhances project value and impact.

5.2 Recommendations

While ASTD activities conducted to date have resulted in many benefits to EM, there are changes that would improve future efforts. The following recommendations focus on improving ASTD successes and OST's return on investment, with an overall goal of expediting the EM cleanup program.

5.2.1 ASTD Policy and Portfolio Management

- ASTD should focus on problems that have near-term implementation schedules with little or no regulatory hurdles to be overcome to ensure quick wins.

- ASTD should maintain its current policies related to proposal criteria/requirements (e.g., leveraged funding, subsequent deployment site identification), project-selection process, and project management (e.g., integration into cleanup projects).

- DOE site managers should be required to prioritize their needs by limiting the number of proposals submitted by a DOE Field Office.

- OST should coordinate a regular solicitation schedule that is consistently integrated with the EM planning schedule, i.e., prior to the start of the fiscal year, so that EM leveraged funding can be best applied.

- New ASTD proposal requirements should include a portion of the proposed funding to support training of personnel from the subsequent deployment sites during the original deployment and to support the original deployment site project manager to provide technical assistance during the subsequent deployment.

- OST should set aside a dedicated percentage of new-call funding to support proposals for subsequent deployments of already deployed technologies. The percentage of OST funding for subsequent deployments should be less than that provided for original deployments.

- Because the *EM Research and Development Program Plan* calls for a balanced portfolio from basic research to deployment, a commitment to a minimum annual funding level for ASTD projects should be made. A multiyear commitment to funding ASTD projects would enable better planning of ASTD solicitations and preparation of project proposals by Field Offices in addition to a multiyear strategy for portfolio management.

5.2.2 ASTD Project Management

- New ASTD proposal criteria should include a requirement for monitoring and reporting of the effectiveness of the technology. This will build user confidence and ensure more rapid, widespread deployment of the technology at subsequent sites. Monitoring and reporting requirements should also include data entry in IPABS-IS.

- EM must take further action to improve Field Office reporting of cost savings from ASTD projects. First, a portion of each ASTD project's funding should be used to support the analysis of cost savings resulting from the project. This work must be conducted in close cooperation with the cleanup project manager. Results of the analysis should be documented in both the ASTD project report and in the EM corporate information system. Second, the ASTD proposal criteria should be modified to include the Field Office's historical reporting of deployment and cost savings information in the EM corporate information system. The information reported by the Field Offices would be used as the primary basis for the criterion that evaluates the Field Offices' ability to successfully manage ASTD projects.

5.2.3 ASTD Roles and Responsibilities

- The Focus Areas should continue to play an active role in the proposal review and selection process and the oversight of projects. In this regard, the ASTD approach is consistent with overall Focus Area efforts to allocate funds for complexwide deployment. Focus Areas should work closely with the deployment sites for each of the ongoing projects to review performance and to recommend changes when the site is not meeting the proposal objectives.

- The Headquarters' Deployment Assistance Team should provide a dedicated point of contact whose primary responsibility is management of ASTD as a tool for accelerating deployment. This point of contact should provide ASTD information to senior DOE management, maintain responsibility for calls for new proposals, coordinate the development of ASTD policies and procedures with the Focus Areas, and support Focus Area efforts to facilitate subsequent deployments.

- OST should explore expanding the role of EM-20, the Office of Integration and Disposition, in the selection, integration, and communication of successful ASTD projects on a complexwide basis. Active involvement by EM-20 could improve the rate and breadth of communication of successful ASTD projects on a complexwide basis.

5.2.4 Proposal Review and Selection Process

- OST should enhance the proposal-review process by (1) including technical and business experts from the Focus Areas and site end users and (2) conducting on-line interviews with proposers to validate the information in the proposals, such as procurement planning, need definition, and site commitment. Focus Area representatives must include a minimum of two staff, including technical experts, who can validate the technology maturity, performance over baseline, and match to the site need.

- The Focus Areas should endorse all new ASTD projects and officially make the awards. They will have responsibility to negotiate the terms of the agreement with the specific site.

5.2.5 Contracting and Incentives

- EM should continue to investigate innovative contracting mechanisms that encourage subsequent deployments of technologies across the DOE complex. A number of Field Offices have been fairly aggressive in the use of contract incentives to accelerate deployment. However, these approaches are not being taken on a complexwide basis.

Pursuit of innovative contract mechanisms and incentives should be closely coordinated with EM's Office of Policy, Planning, and Budget and DOE's Office of Procurement through development of EM policies and guidance to the Field Offices.

Appendix A

Calls for Proposals and Selection Processes

Fiscal Year 1998 Technology Deployment Initiative (TDI)

Call for Proposals and Selection Process

The TDI Call for Proposals was issued by DOE-Idaho Operations Office (DOE-ID) to DOE Operations Offices on March 10, 1997. Three groups provided oversight, planning, decision-making, review, and administrative support to the TDI proposal selection process. These three groups were the TDI Support Team, the Review Teams, and the Selection Committee.

The TDI Support Team consisted of DOE-ID employees with contractor support as required. It was responsible for screening the proposals against the screening criteria; providing logistical, administrative, and other support to the Review Teams and Selection Committee; providing deployment project managers and contractor support reviews of Deployment Plans; and providing results to the Selection Committee.

There were three Review Teams: impact/technical, business management/cost, and stakeholder/regulatory. The Review Teams consisted of federal and contractor employees, representatives from the private sector, and stakeholder and regulatory representations. The Selection Committee consisted of federal employees from across the DOE complex. Selection Committee members had final authority over proposal selection.

A two-phased evaluation process was used for selecting proposals for funding. Phase I evaluated the proposals against screening criteria, and proposals had to meet all criteria to advance to Phase II. Phase II involved review, evaluation, and ranking against selection criteria, which included impact/technical approach, business/management approach, stakeholder/ regulatory, and cost.

Following proposal selection, project managers were required to submit Deployment Plans. These Deployment Plans were considered “best and final” proposals. They established and documented performance specifications and associated criteria. In February 1998, as directed by Mr. Gerald Boyd, Deputy Assistant Secretary, these projects, their management, and out-year funding responsibilities were transferred to the Focus Areas.

Call Results

Eighty-nine proposals were received from across the country for the TDI Call for Proposals during May 1997. The proposals were developed in conjunction with DOE’s five Focus Areas: DDFA, NMFA, SCFA, TFA, and TMFA. Twenty proposals were finally selected. Some proposals with similar technologies were combined into one project. Eventually, 14 projects, consisting of 40 technologies, were initiated for a total OST funding value of $25.7M. Six of the projects solve problems dealing with subsurface contamination of soils and groundwater. Three projects address D&D problems, and four projects focus on problems associated with the cleanup and closure of the high-level radioactive waste underground storage tanks. Deployments are occurring or have occurred at 14 DOE sites, located in 12 states. Projects were scheduled to last from one to three years.

Fiscal Year 1999 Accelerated Site Technology Deployment

Call for Proposals and Selection Process

The ASTD call for proposals was issued by DOE-ID to the Operations Offices and Focus Areas on May 1, 1998. The requirements for an ASTD project were more defined than the requirements for a TDI project. The period of performance for a funded ASTD project was not to exceed two years nor request to exceed $2.5M per year unless significant benefit to the EM program could be shown. In addition, all proposals had to identify leveraged funding of at least 50% of the total project costs, with at least 25% leveraging in the first year. However, there was no formal requirement for multiple site deployments as was required under TDI.

A Selection Committee consisting of federal employees representing the five Focus Areas, DOE sites, EM-30, EM-40, and EM-60 ultimately selected proposals. The ASTD Program Manager was the Review Team Lead and a voting member of the Selection Committee. Similar to TDI, proposals were selected for funding using a two-phased process. However, there were no Review Teams utilized, and the Selection Committee completed both phases. Phase I reviewed the proposals against screening criteria, and Phase II involved evaluation and scoring of the proposals against selection criteria. The selection criteria were the same as those used to make TDI selections.

Call Results

Fifty proposals were received from across the DOE complex for the ASTD call for proposals during May 1998. Forty-two proposals, consisting of over 60 technologies, were finally selected for funding by the reviewers. Due to OST funding constraints, 32 projects were eventually initiated in FY99 for a total OST funding value of $16.7M. These projects fell within the following Focus Areas: 17 projects addressed subsurface contaminant problems, three projects solved underground storage tank problems, two projects targeted mixed waste problems, and one project targeted plutonium problems. Deployments are scheduled to occur at 15 DOE sites, located in 13 states. Projects are scheduled for completion within one to two years.

Fiscal Year 2000 Accelerated Site Technology Deployment

Call for Proposals and Selection Process

The FY00 call for proposals was issued December 15, 1999, by EM-1, in response to the Defense Environmental Restoration and Waste Management Report that urged EM to "provide up to $10M for technology deployment activities." The call for proposals sought proposals on or before March 3, 2000, from DOE Field Offices to accelerate environmental cleanup at closure sites through the multiple use of new technologies and processes with an emphasis on D&D activities. However, proposals addressing other types of high-priority needs were also considered. There was no prescribed number of awards resulting from this solicitation.

As with previous ASTD solicitations, DOE-ID coordinated this review with DOE Headquarters. DOE-ID and Federal Closure Site Representatives conducted the Phase I proposal screening and relevance review. Senior Site Team and Focus Area representatives from the Field and Headquarters Offices, along with technical experts, conducted the Phase II evaluation.

The call for proposals encouraged sites to submit proposals that did not exceed a total request of $2M from OST funds unless they could show exceptional cost savings, schedule acceleration, and/or other significant benefits. Projects over $2M were required to submit additional documentation or justification as requested by the proposal review teams to more fully substantiate claims. Proposals were to include innovative technologies or processes that have been demonstrated or have produced sufficient performance data proving that they are capable of full-scale, widespread deployment. Life-cycle cost savings, consistent with those provided in the proposals, were to be reported as a change in the life-cycle cost or the associated Program Baseline Summaries upon successful deployment of the technology.

Call Results

Of the 38 proposals received in the FY00 ASTD call for proposals, five did not meet the screening criteria in the Phase I review. Hence, from the 33 proposals, 14 proposals clustered into 11 projects that were finally selected for funding, for a total FY00 OST funding value of $7M. The 11 projects included nine projects at the Ohio site and two projects at the Rocky Flats site. Letters were distributed to submitters of proposals not satisfying the screening or selection criteria that their proposals were eliminated from any further consideration and providing them the general basis for the determinations. Letters were also sent to proposal submitters whose projects were selected for funding. Those proposals were then given to the relevant Focus Areas to negotiate and finalize deployment Technical Task Plans with the appropriate sites.

Through FY00, projects funded through ASTD will have accomplished 66 original technology deployments and 62 additional subsequent deployments. More importantly, the sites have estimated life-cycle cost savings for these projects of nearly $1.5B because of schedule acceleration and/or use of less expensive, innovative solutions.

APPENDIX B

ASTD Projects, Technologies, and Deployments

Appendix B. FY98, FY99, and FY00 ASTD Projects, Technologies, and Deployment Status as of September 30, 2000

FOCUS AREA	PROJECT TITLE (TECH ID)	TECHNOLOGIES	ORIGINAL DEPLOYMENTS COMPLETED*	SUBSEQUENT DEPLOYMENTS COMPLETED*	ORIGINAL DEPLOYMENTS PLANNED	SUBSEQUENT DEPLOYMENTS PLANNED OR POTENTIAL
DDFA	A Position-Sensitive Radiation Monitoring System for Surveying Floors in Industrial Areas (1942)	Surface Contamination Monitor and Survey Information Management System (SCM/SIMS)	Nevada			Oak Ridge Richland Rocky Flats Savannah River
DDFA	Accelerated Closure of Building 776/777 Using Remote/ Robotic Technology	(A) Remote/Robotic System for Tool Deployment (B) Plasma Arc Cutting			Rocky Flats	Oak Ridge Richland Savannah River
DDFA	Decontamination and Volume Reduction System (2242)	(A) High-Pressure Water Decontamination System (B) High-Capacity Shear/Baler (C) MultiStation NDA System			Albuquerque (Los Alamos) (A)(B)	Idaho Ohio Richland
DDFA	Decontamination of Gloveboxes, Tanks and Equipment for Shipment and Disposal without Size Reduction	A Combination of Three Decontamination Systems				Rocky Flats
DDFA	Deploying Diamond Wire Saw Demolition and Size Reduction of a Reactor Bioshield (3086)	Size Reduction of the JN-3 Reactor Bioshield Using Diamond Wire Saw/Diamond Rope Saw for Size Reduction of Reactor Bioshield and Fuel Pool	Ohio (Columbus)			Ohio (Columbus, Mound) Richland Rocky Flats
DDFA	Deployment of Highly Selective Nuclide Removal System (2937, 1543)	(A) NURES Nuclide Removal System (B) 3M Selective Separation Cartridges	Savannah River			Idaho Oak Ridge

* Source = IPABS-IS

Focus Area	Project Title (Tech ID)	Technologies	Original Deployments Completed*	Subsequent Deployments Completed*	Original Deployments Planned	Subsequent Deployments Planned or Potential
DDFA	Enhanced Deactivation and Decommissioning of Gloveboxes (2241, 2324)	(A) Decommissioning In Situ Plutonium Inventory Monitor (B) Enhanced Mechanical Cutting Tools (C) Standard Waste Box Counter	Rocky Flats			Idaho Nevada Oakland (Livermore) Richland Savannah River
DDFA	Improved Measurement and Monitoring (2983, 2104, 2984)	(A) Remote Prismless Total Station (B) Wireless Data System for Radon Monitoring (C) Real-Time Physiological Monitoring System			Ohio (Fernald) (A)(B)(C)	
DDFA	Innovative Characterization Technologies and Implementation of the MARSSIM Process at Radiologically Contaminated Sites (2098, 70)	(A) Canberra ISOCS In Situ Gamma Spectroscopy (B) Beta Scint	Chicago (Brookhaven)	Chicago (Brookhaven) Richland		Chicago (Argonne East) Chicago (Brookhaven) Nevada Savannah River

FOCUS AREA	PROJECT TITLE (TECH ID)	TECHNOLOGIES	ORIGINAL DEPLOYMENTS COMPLETED*	SUBSEQUENT DEPLOYMENTS COMPLETED*	ORIGINAL DEPLOYMENTS PLANNED	SUBSEQUENT DEPLOYMENTS PLANNED OR POTENTIAL
DDFA	Integrated Decontamination and Decommissioning (2100,1840, 2304, 1847, 1898, 74, 2303, 2322, 2240, 2320, 2317, 2397, 2977, 2098, 2321)	(A) BROKK 250 Demolition Robot with scabbler, hammer, grapple, bucket and hydraulic shears (B) Gamma Cam Radiation Scanning Device (C) Hand-held Shear (D) Oxy-Gasoline Torch (E) PICS Cool Suit (F) Pipe Explorer (G) Track-Mounted Shear (H) Decontamination, Decommissioning, and Remediation Optimal Planning (I) Soft-Sided Waste Containers (J) Snap Together Scaffolding (K) Lead Paint Analyzer (L) Niton 800 Multielement Spectrum Analyzer (M) Surveillance and Measurement System (N) In situ Object Counting System (O) En-Vac (P) Global Positioning Radiometric Scanne	Idaho (A)(B)(D)(E)(H)(I)(J)(K)(M)(O) Ohio (Fernald) (C)(D)(G) Savannah River (F)	Idaho (D)(2) Chicago (Argonne East)(A)(D) Idaho (I) Nevada (E) Oak Ridge (D)(E) Ohio (Mound) (D) Ohio (Fernald) (C)(D)(G) Ohio (West Valley)(B)(D) Richland (D) Savannah River (F)		Albuquerque (Pantex) (SFIA) Chicago (Argonne, 4) Idaho (12) Nevada (E) Oak Ridge (4 reactors, 70 buildings) Oak Ridge (Paducah) (E) Ohio (Ashtabula) Ohio (Fernald) Richland Rocky Flats (8) (F) Savannah River (4) (D)

FOCUS AREA	PROJECT TITLE (TECH ID)	TECHNOLOGIES	ORIGINAL DEPLOYMENTS COMPLETED*	SUBSEQUENT DEPLOYMENTS COMPLETED*	ORIGINAL DEPLOYMENTS PLANNED	SUBSEQUENT DEPLOYMENTS PLANNED OR POTENTIAL
DDFA	Intrusive and Non-Intrusive Characterization through Concrete Wall and Floors (162, 2098, 74, 1148, 316, 2153)	(A) Smart Sampling (B) In situ Object Counting System (C) Pipe Explorer (D) Ground Penetrating Radar (E) Time Domain Electromagnetics (F) Innovative Directional and Position Specific Sampling Technique (G) Compact Subsurface Investigation System				Ohio (Ashtabula) Ohio (Columbus) Ohio (Mound) Ohio (West Valley)
DDFA	Oversize TRU Waste Laser Cutting	TRU Waste Laser Cutting			Albuquerque (Los Alamos)	Idaho Oakland (Livermore) Richland Rocky Flats
DDFA	Providing the Personal Ice Cooling System (1898)	PICS	Ohio (Fernald)	Albuquerque (Carlsbad) Albuquerque (Los Alamos) Albuquerque (Pantex) Albuquerque (Sandia) Oak Ridge Oak Ridge (Paducah Ohio (Ashtabula) Ohio (West Valley) Rocky Flats Savannah River		Chicago (Argonne East) Idaho Nevada Oakland Oak Ridge (Portsmouth) Ohio (Mound) Richland

Focus Area	Project Title (Tech ID)	Technologies	Original Deployments Completed*	Subsequent Deployments Completed*	Original Deployments Planned	Subsequent Deployments Planned or Potential
DDFA	Reducing, Reusing, and Recycling Concrete and Segmenting Plate Steel and Tanks Utilizing a Universal Demolition System (2303)	(A) Concrete Pulverizer (B) Concrete Cracker (C) Plate Shear Jaw Sets (D) Track-Mounted Carrier			Ohio (Fernald)	Ohio (Fernald)
DDFA	Release of Concrete for Recycle from D&D Projects (2373)	Handbook			Idaho	Chicago (Argonne-East) Idaho Oak Ridge
DDFA	Remote In situ Size Reduction of Plutonium Contaminated Gloveboxes and Equipment	(A) Remote Cutting and Material Handling System (B) Plutonium and Americium Content Estimation System (C) Heating, Venting, and Air Conditioning and Dust Control (D) Contamination Control (E) Decon for Large Containment Structures			Rocky Flats	Idaho Oakland (Livermore) Oak Ridge Richland Savannah River
DDFA	Remote Size-Reduction and Decontamination in Large Hot Cells by Deploying Robotic Technologies	Robotic Work Station with Capability for Debris Collection, Remote Viewing, Size Reduction, and Decontamination			Richland	Idaho Oak Ridge
DDFA	Upgrade Instrumentation at Rocky Flats Environmental Technology Site	(A) Portable Cams (B) Neutron Survey Meters (C) Automated Waste Inspection (D) Portable Neutron-Gamma Instruments			Rocky Flats	

Focus Area	Project Title (Tech ID)	Technologies	Original Deployments Completed*	Subsequent Deployments Completed*	Original Deployments Planned	Subsequent Deployments Planned or Potential
NMFA	Advanced Technologies for Stabilization of Pu-238 Contaminated Combustible Waste (3010)	(A) Molten Salt Oxidation (B) Aqueous Chemical Separation for Pu-238 Recovery			Albuquerque (Los Alamos)	Savannah River
SCFA	Alternative Landfill Cover System (10 and 2924)	(A) Evapotranspiration Cover (B) Fiber-Optic Monitoring System			Albuquerque (Sandia)	Albuquerque (Los Alamos) Albuquerque (Pantex) Albuquerque (Sandia)
SCFA	An Alternative Cover and Monitoring System for Landfills in Arid Environments (10 and 2924)	(A) Evapotranspiration Cover (B) Fiber-Optic Monitoring System			Nevada	Idaho Richland Rocky Flats
SCFA	Bioremediation and Natural Attenuation for In situ Restoration of Chloroethene Contaminated Groundwater (7720)	In situ Anaerobic Bioremediation/Natural Attenuation	Idaho			Oakland (Livermore) Oak Ridge Oak Ridge (Paducah) Oak Ridge Portsmouth)
SCFA	Deep Permeable Treatment Zone for Groundwater Contamination (1917)	Horizontal/Vertical Fracturing System and Reactive Media Injection System			Oak Ridge (Paducah)	
SCFA	Deployment of Phytoremediation in the 317/319 Area at Argonne National Laboratory-East (2188)	Phytoremediation	Chicago (Argonne-East)	Chicago (Argonne-West)		

Focus Area	Project Title (Tech ID)	Technologies	Original Deployments Completed*	Subsequent Deployments Completed*	Original Deployments Planned	Subsequent Deployments Planned or Potential
SCFA	Dynamic Underground Stripping (7, 1519, 17)	(A) Dynamic Underground Stripping (B) Hydrous Pyrolysis (C) Electrical Resistance Tomography	Savannah River (A)(B)(C)			Oak Ridge (Paducah) Savannah River
SCFA	Dynamic Underground Stripping and Hydrous Pyrolysis Oxidation at X701B Plume Site (7, 1519, and 17)	(A) Dynamic Underground Stripping (B) Hydrous Pyrolysis/Oxidation (C) Electrical Resistance Tomography	Oak Ridge (Portsmouth) (A)(B)(C)			Oakland (Livermore)
SCFA	Enhanced Site Characterization System	System to Integrate Multiple Geophysical Data Sets and Map in 3D	Richland (618-4 Burial Ground)			Idaho Oak Ridge Richland
SCFA	Full-Scale Permeable Treatment Wall at the West Valley Demonstration Project (137)	Permeable Reactive Treatment (PeRT) Wall using Clinoptilolite Media			Ohio (West Valley)	Ohio (Mound)
SCFA	High Explosives Composting Technology Deployment (1529)	Composting of Soils/Sediments and Sludges Containing Toxic Organics including High Energy Explosives	Albuquerque (Pantex)			Albuquerque (Los Alamos) (2)
SCFA	Implementation of Smart Sampling (162)	Smart Sampling/Geostatistical Model and Economic Based Decision Analysis		Rocky Flats Chicago (Brookhaven)	Ohio (Mound)	Idaho Oakland (Livermore) Oakland (Separation Process Research Unit) Richland Rocky Flats
SCFA	Improved Surface Water Monitoring System (1543)	(A) ISCO Sampler (B) Empore Filters	Savannah River	Chicago (Brookhaven)		Albuquerque (Los Alamos) Idaho Oak Ridge

Focus Area	Project Title (Tech ID)	Technologies	Original Deployments Completed*	Subsequent Deployments Completed*	Original Deployments Planned	Subsequent Deployments Planned or Potential
SCFA	In situ Redox Manipulation for Groundwater Remediation 100D Area (15)	In situ Redox Manipulation	Richland			Albuquerque (Pantex) Richland
SCFA	In situ Sampling of Trichloroethylene at TAN (2930)	In situ Sampler Probe with Permeable Membrane	Idaho			Idaho Oakland (Livermore) Oak Ridge Oak Ridge (Paducah) Oak Ridge (Portsmouth)
SCFA	Integrated Technology Suite for Delineating Radioactive Contaminants in Soils (2361, 2157, 2362)	(A) Mobile Radiation Tracking System (RTRAK) (B) Portable High-Purity Germanium Sensors (C) Radiation Scanning System (RSS) deployed as one system	Ohio (Fernald)			Chicago (Brookhaven) Idaho Oak Ridge (3 sites) Ohio (West Jefferson) Richland Savannah River
SCFA	In-Well Stripping to Remediate an Offsite Organics Plume (6)	In-Well Air Stripping	Chicago (Brookhaven)			Chicago (other Brookhaven sites) Oak Ridge
SCFA	Passive Reactive Barrier Collection and Treatment of Groundwater (2156)	Zero-Valent Iron Passive Treatment			Rocky Flats	
SCFA	Permeable Reactive Barrier: Iron Treatment Wall for VOCs in Groundwater (2156)	Iron Treatment Wall	Albuquerque (Kansas City Plant)	Oakland (Livermore)		
SCFA	Permeable Reactive Treatment Wall for Radionuclides and Metals (2155)	Permeable Reactive Treatment (PeRT) Wall	Albuquerque (Monticello, Utah)			Albuquerque-Grand Junction (Gunnison Colorado, Rifle Colorado)

Focus Area	Project Title (Tech ID)	Technologies	Original Deployments Completed*	Subsequent Deployments Completed*	Original Deployments Planned	Subsequent Deployments Planned or Potential
SCFA	Phased Source Area Contamination (2923)	Phased Source Remediation System (Electro-osmosis)	Oakland (Livermore)			Oakland (Livermore)
SCFA	Purge Water Management System (2920)	Purge Water Management System	Savannah River	Oakland (Livermore)		Albuquerque (Sandia) Idaho Richland
SCFA	Remediation of Uranium Contaminated Soils (596)	Phosphate Induced Metal Stabilization	Albuquerque (Los Alamos)			Nevada Oak Ridge
SCFA	Segmented Gate System (2158)	Segmented Gate System	Albuquerque (Sandia)	Albuquerque (Los Alamos) Albuquerque (Pantex) Albuquerque (Sandia) Idaho Nevada Ohio (Ashtabula) Ohio (West Valley)		Chicago (Brookhaven) Rocky Flats Ohio (Fernald) Ohio (Mound)
SCFA	Savannah River Vadose Zone Monitoring System (647)	(A) Advanced Tensiometers (216) (B) Time-Domain Reflectometers (C) Porous-Cup Lysimeters	Savannah River	Idaho (A)(B)		Albuquerque (Los Alamos) Nevada
SCFA	Subsurface Disposal Area Integrated Geophysical Debris Characterization System (1206, 1995)	(A) Rapid Geophysical Surveyor (B) Geophex Gem2 (C) Geonics EM61	Idaho			
SCFA	Under Building Contamination (650, 8)	(A) Directional Drilling (B) Environmental Measurement While Drilling			Rocky Flats	Chicago (Brookhaven) Richland
SCFA	Well Injection Depth Extraction (2172)	Well Injection Depth Extraction (WIDE) Soil-Flushing	Ohio (Ashtabula)		Ohio (Columbus)	

FOCUS AREA	PROJECT TITLE (TECH ID)	TECHNOLOGIES	ORIGINAL DEPLOYMENTS COMPLETED*	SUBSEQUENT DEPLOYMENTS COMPLETED*	ORIGINAL DEPLOYMENTS PLANNED	SUBSEQUENT DEPLOYMENTS PLANNED OR POTENTIAL
TFA	AEA Fluidic Sampler (2007)	AEA Fluidic Sampler	Savannah River			Richland
TFA	Deployment of a Mobile Tank Retrieval System for Emptying Small Waste Tanks (2947)	Mobile Retrieval System (Power Fluidics Mixing/Pumping System [AEA Technologies])	Oak Ridge			Idaho (2) Richland
TFA	Improved System for Tank Sludge Retrieval, Conditioning, and Transfer (2085, 2086, 1510, 2232, 350)	(A) Houdini II (B) SCARAB-III (C) AEAT Bulk Sludge Retrieval System (D) Pulsair Mixer (E) Flygt Mixer (F) Sludge Conditioning System (G) Solid/Liquid Separation (H) Ultra-High Pressure Pump (I) Hose Management Arm II	Oak Ridge (A)(B)(C)(D)(E)(F)(G)(H)(I)			Idaho Ohio (West Valley) Richland Savannah River
TFA	Increased Tank Waste Processing (1985)	Electrochemical Noise Corrosion Monitor System	Savannah River			Richland
TFA	Maintenance-Free Mixer for Active Process Tanks (2408)	Savannah River Pump Tank Mixer	Savannah River			Idaho Oak Ridge Richland Savannah River
TFA	Modular Evaporator and Electrochemical Ion Exchange for Waste Reduction in Tanks (20, 21, 350)	(A) Modular Out of Tank Evaporator (B) Cesium Removal Ion Exchange System (C) Solid/Liquid Separation System	Oak Ridge (A)		Oak Ridge (B)(C)	Idaho (B) Oak Ridge (A) Savannah River (B)
TFA	Processing of Vitrification Expended Materials at West Valley (2383)	(A) Mobile Remote Cutting Work Station (B) Chemical Based Decontamination System (C) Radiological Survey Capability (D) Remote Handling Fixtures and Equipment	Ohio (West Valley)			Richland Savannah River

Focus Area	Project Title (Tech ID)	Technologies	Original Deployments Completed*	Subsequent Deployments Completed*	Original Deployments Planned	Subsequent Deployments Planned or Potential
TFA	Slurry Monitoring (2935, 2388)	(A) Lasentec Particle Size Analyzer (B) Red Valve Pressure Transducer (C) Ultrasonic Densimeter	Oak Ridge (A)			Oak Ridge Richland
TFA	Sodium Minimization in Hanford High-Level Waste Tanks (1985)	Electrochemical Noise Based Corrosion Monitoring Probe	Richland			Idaho Oak Ridge Ohio (West Valley) Richland Savannah River
TMFA	Combined Thermal Epithermal Neutron (CTEN) (1568)	CTEN TRU Waste Assay	Albuquerque (Los Alamos)			Idaho Oak Ridge Richland Rocky Flats Savannah River
TMFA	Deploying an Alternative Remote-Handled TRU Waste Transportation System (2975)	An Alternative Remote Handled TRU Waste Transportation System/Remote-Handled TRU Waste Loading-Shipment Unloading-Storage System Utilizing Commercial Licensed Cask-Modified CNS 10-160B Cask	Ohio (Columbus)			
TMFA	Deployment of the Microchip Memory Button and Internal Pressure Sensing Technology (2976)	Microchip Memory Button and Internal Pressure Sensing Technology			Ohio (Fernald)	Ohio (Ashtabula) Ohio (Columbus) Ohio (Mound) Ohio (West Valley)
TMFA	Dissolvable Anti Contamination Materials Processing System (2929)	Hot-water Dissolvable Polyvinyl Alcohol Process			Nevada	Richland Idaho
TMFA	Mixed Waste Debris Macroencapsulation (2159 and 2927)	Arrow-Pak	Oak Ridge			Idaho Ohio (Fernald) Richland Rocky Flats Savannah River
Totals	**60**	**83**	**63**	**50**	**22**	**186**

Appendix C

ASTD Project Highlights by Focus Area

Deactivation and Decommissioning Focus Area

Through FY00, DDFA has funded 18 projects, 10 of which have had deployments. Fifty-four deployments of 30 technologies have occurred (Table 4.1). Eighty-five potential or planned deployments have been identified related to these projects (Appendix B).

The many successful deployments, targeted for a broad range of applications at a number of DOE sites, have occurred either at a single site or at multiple sites. Technologies funded under ASTD include:

- characterization of radionuclide-contaminated surfaces, focusing on nondestructive evaluation, using various gamma, beta, and alpha measuring tools (e.g., Position-Sensitive Monitor, Multi-Agency Radiation Survey and Site Investigation Manual [MARSSIM], GammaCam, Global Positioning Radiometric Scanner, Surveillance and Measurement System, and Pipe Explorer);

- characterization of surfaces for metals (e.g., Lead Paint Analyzer and Niton 800);

- decontamination and dismantlement of radioactively contaminated materials (e.g., gloveboxes); many different cutting tools are being deployed for various applications (e.g., handheld shear, oxy-gasoline torch, track-mounted shear, laser cutting, and plasma arc); various platforms are being constructed (at Los Alamos, Rocky Flats, and Hanford); and

- miscellaneous technologies (e.g., Snap-Together Scaffolding, Personal Ice Cooling Suit (PICS), Soft-Sided Waste Containers, camera viewing system, and treatment of D&D-associated waste for radionuclides).

Many of these technologies have been brought to DOE off-the-shelf from commercial vendors. Wide applications are easily pursued as many sites have common problems, and no regulatory approvals are generally required. Therefore, rapid deployment is possible, if funding is available. D&D projects have ranged from those that include a "toolbox" of multiple technologies to single technology projects.

The D&D Toolbox of Technologies

DDFA-related projects typically involve a toolbox of multiple technologies designed to accomplish various, specific tasks, such as characterization of surface contamination or cutting of metal-piping systems. Multiple technologies have been deployed under many of these projects, and the technologies have been deployed at multiple sites. For example, PICS (over 100 suits) has been deployed at more than ten sites. Under the Integrated D&D Project, 16 technologies, utilized either as a stand-alone or with other technologies, have been deployed from the D&D toolbox at ten different DOE sites. Fourteen of these technologies have become the new baseline. This project is an outstanding example of EM Operations' commitment to using new technologies and applying them for subsequent deployments at their sites.

Single Technologies Are Rapidly Deployed

Single technologies can often be easily deployed, as complex regulatory requirements do not exist. For example, the Position Sensitive Radiation Monitoring System has been successfully deployed at both Nevada and Rocky Flats. The small business that developed this technology, originally through a Small Business Innovative Research grant, is now awaiting broader application. The MARSSIM Project at Brookhaven has been a real success; the technology is currently being applied at two other sites at Brookhaven. Hanford and Nevada are also interested in using this approach.

Projects that have suffered from delays usually were developing a D&D platform where specific technical requirements were not well defined and, consequently, procurements were delayed.

Poor Definition of Technology, Facility, and Procurement Requirements Causes Delays

- The DVRS Project at Los Alamos has suffered a significant delay due to changes in site safety requirements dictating a fire-resistant facility to house the DVRS operations. However, the project is now on track and is estimated to save $102M.

- The TRU Waste Laser Cutting Project was delayed when the original deployment site was changed to Los Alamos, because Nevada realized it did not have an existing facility where the deployment could take place. Nevada is currently working on obtaining approval to move its TRU waste to Los Alamos for processing with the laser cutting system.

- The Accelerated Closure of Building 776/777 at Rocky Flats has been delayed due to procurement difficulties.

- The Enhanced D&D of Gloveboxes Project at Rocky Flats has also suffered from changing requirements and vendor delays.

- The Remote Size Reduction and Decontamination Project at Hanford, which originally had an unrealistic schedule, has been delayed due to procurement difficulties.

Two examples of project successes are included in Appendix E.

Nuclear Materials Focus Area

NMFA has funded one project, the Advanced Technologies for Stabilization of Plutonium-238 at Los Alamos, for which a deployment has not yet occurred. This project has been delayed for a number of reasons; the main one is that the vendor cannot currently supply the technology in the required configuration. Three subsequent deployment sites have potential for this project.

Subsurface Contaminants Focus Area

SCFA has funded 27 projects, 20 of which have had successful deployments between FY98 and FY00. Thirty-nine deployments of 25 technologies have occurred (Table 4.1). Sixty-one potential or planned DOE deployments have been identified related to these projects (Appendix B). SCFA projects typically consist of large remedial systems that must be deployed at a site with complex subsurface conditions and with significant regulatory requirements. Project planning requires significant integration of numerous activities with complicated scheduling requirements. All DOE sites have similar types of groundwater and soils contamination. As a result, there is significant opportunity for subsequent deployments of ASTD-supported technologies at many DOE sites. A large effort to communicate the successes of these projects is under way to accelerate the deployment of ASTD technologies at multiple sites. A number of SCFA ASTD projects have had relatively rapid subsequent deployments. Some of these rapid successes occurred because multiple deployments were included in the original plan and budget for the project.

Projects funded under ASTD include technologies for:

- characterization of the subsurface using geophysical and statistical methods;

- characterization of soils contaminated with radionuclides;

- monitoring and sampling of the vadose zone and groundwater contaminated with organics or radionuclides;

- treatment of groundwater contaminated with organics;

- treatment of groundwater contaminated with metals and radionuclides; and

- other projects such as landfill covers, purge water management systems, and treatment of explosives-contaminated soil.

Projects are grouped below into categories where they share common features relating to their success or lack thereof: (1) type of technology; (2) integration with Site Plans; and (3) schedule.

Characterization Technologies Have Been Widely and Rapidly Deployed

Several of the SCFA ASTD projects that have been most widely or rapidly deployed involved characterization technologies for which complex permitting requirements were not a component:

- Integrated Technology Suite at Fernald, because the site had a short-term need for multiple applications;

- Segmented Gate System (SGS) at eight DOE sites, because the proposal was written with multiple site deployments in mind and the sites had committed to the project; and

- Vadose Zone Monitoring System at Savannah River, because the site had an urgent need and the technology had a proven performance at Idaho.

Projects Integrated with Site Plans Have Been Rapidly Deployed

Several of the SCFA ASTD projects that were quickly deployed involved projects where the project was well defined and the sites had committed to integrating the project into their environmental restoration schedule. Examples include:

- Kansas City, Rocky Flats, and Monticello Permeable Reactive Barriers;

- High Explosives Composting at Pantex;

- Bioremediation and Natural Attenuation at Idaho; and

- Dynamic Underground Stripping at Portsmouth.

Slight Delays Have Not Impacted Overall Success for Some Projects

Other projects that were delayed for a short time, but have been quite successful since deployment was initiated include:

- In-Well Air Stripping at Brookhaven and

- Dynamic Underground Stripping at Savannah River.

Long Delays Have Impacted Success for a Few ASTD Projects

Some of the SCFA ASTD projects have been delayed for a significant period, two or more years. One of the projects, the Sandia Alternative Landfill Cover, has had difficulty obtaining regulatory approval within the original schedule. The Los Alamos Remediation of Uranium-Contaminated

Soils project has suffered from a lack of commitment of leveraged funding, change in project manager, and several other factors.

Lessons Learned

Several lessons have been learned from SCFA ASTD projects.

- **The technology niche must be clearly defined.** The SGS project can be called a project management and commitment success, as the technology has been deployed at eight DOE sites under the ASTD-funded project. However, performance of the technology at each site has varied widely based upon specific-site conditions. One of the biggest lessons learned from this project is the need for a better definition of the requirements under which SGS is best applied.

- **Systems of technologies have performed well to solve a problem.** Some of the SCFA deployments have involved remediation systems composed of multiple technologies. As an example, the Vadose Zone Monitoring System consists of three technologies that monitor different subsurface parameters or act as sample collectors. The Dynamic Underground Stripping projects at both Portsmouth and Savannah River have involved the deployment of Dynamic Underground Stripping (steam injection), Hydrous Pyrolysis (in situ destruction), and Electrical Resistance Tomography (to monitor performance of the remedial system). The Savannah River deployment is considered to be a subsequent deployment, although it involves a different vendor.

Several examples of project successes are presented in Appendix E.

Tanks Focus Area

TFA has funded nine projects, eight of which have had successful (in terms of project completion) deployments between FY98 and FY00. Seventeen deployments of 12 technologies have occurred (Table 4.1). There are an additional 18 potential or planned deployments related to these projects (Appendix B). Four sites (Oak Ridge, Hanford, Savannah River, and West Valley) have worked rapidly to integrate new technologies into their tank-cleanup programs.

TFA technologies are typically a component of an overall system designed for a specific function, such as waste retrieval or waste processing. The deployments have been integrated into overall site waste management operations, which are ongoing. These systems are highly complex with many site-specific and tank-specific requirements. Integration of various innovative technology components requires significant planning and scheduling activities. Communication among the six DOE sites with radioactive tank waste problems has been proactively facilitated by TFA.

However, for a number of reasons, most of the TFA ASTD deployments to date have occurred at a single site. Significant interest has been expressed by the other DOE sites with tanks problems, as demonstrated by the list of potential subsequent deployments (Appendix B, arranged alphabetically by DOE Field Office). Each tank-related deployment can have a significant impact in terms of cost savings and schedule acceleration. For example, Savannah River has 49 underground storage tanks containing radioactive waste. The AEA Fluidic Sampler and Maintenance-Free Mixer have been deployed in one of these tanks at Savannah River. The market for additional deployments of this technology at Savannah River is significant; however, the schedule for when the technology will be needed is extended over a long time. This is one example that shows that rapid deployment of TFA technologies is not likely to occur due to the extended schedules at the few sites where this type of waste exists (Hanford, Savannah River, Oak Ridge, and Idaho). West Valley and Fernald have expressed interest in some the tanks-related technologies, as they have related problems that need to be addressed. In summary, tanks-related projects have been very successful at deploying technologies that have shown improved performance. However, the potential for rapid multisite deployment is not great due to prolonged, uncorrelated schedules, differing regulatory requirements, and current funding availability. Single-site deployments that result in significant progress in the challenge of cleanup and closure of underground storage tanks at DOE sites can be as or more important than technologies deployed to solve broader spectrum DOE needs.

TFA Successes

A few of the ASTD tanks-related projects that have shown success are described in more detail below. Tanks-related projects have included a number of technologies to monitor, condition, remove, and treat tank waste.

- Two corrosion-monitoring technologies are being deployed at different sites.
- Three slurry-monitoring technologies are being deployed to measure different waste parameters that are of importance during waste-transfer operations.
- Power fluidics technology is being deployed for waste mixing, retrieval, and sampling in several different applications.
- Nine different waste-retrieval technologies were deployed to clean out waste tanks at Oak Ridge.
- Three technologies comprise a waste-minimization and volume-reduction system that has been deployed at Oak Ridge.

One example of a TFA ASTD success story involves the Improved System for Tank Sludge Retrieval, Conditioning, and Transfer project, which deployed a "toolbox" of nine technologies to assist with the cleanout and closure of the waste storage tanks at Oak Ridge. The deployment of these technologies, many of which were previously funded by TFA for development or demonstration, allowed for successful project completion under budget, saving an estimated $135M and accelerating the schedule by 12 years. The Sludge Retrieval, Conditioning, and Transfer "toolbox" has many potential applications at the other DOE sites that have radioactive tank waste. However, the toolbox can be applied only when the schedule for this type of work is required. Two examples of project successes are included in Appendix D.

TRU/Mixed Waste Focus Area

TMFA has funded five projects; four of which have had successful deployments between FY98 and FY00. Nineteen additional deployments are planned or potential for deployment. The Macroencapsulation Project at Oak Ridge and the Combined Thermal Epithermal Neutron (CTEN) Waste Assay Project at Los Alamos have both been successfully deployed. Much interest exists in taking these technologies to other DOE locations.

APPENDIX D

ASTD Commercial Vendor List

APPENDIX D. ASTD COMMERCIAL VENDOR LIST

VENDOR	SMALL BUSINESS	ADDRESS	PRODUCT/ SERVICE	DESCRIPTION	PHONE/FAX NO.	CONTACT/E-MAIL ADDRESS
ACCELERATED CLOSURE OF BUILDING 776 USING REMOTE/ROBOTIC TECHNOLOGY - ROCKY FLATS						
Oceaneering Technology*	No	501 Prince George Blvd Upper Marlboro MD 20774	Product	Remote/Robotic System	Ph 301-249-3300 Fx 301-249-4022	inquiry@adtech2.oceaneering.com
PaR Systems*	No	899 Highway 96 West Shoreview MN 55126	Product	Remote/Robotic System	Ph 651-484-7261 Fx 651-483-2689	pservice@par.com
ALTERNATIVE LANDFILL COVER DEPLOYMENT - SANDIA NATIONAL LABORATORIES						
Daniel B. Stephens & Associates	Yes	6020 Academy NE Suite 100 Albuquerque NM 87109	Service	Prime Contractor/ Project Design	Ph 505-822-9400 Fx 505-822-8877	Mark Ankeny mankeny@dbstephens.com
Bohannan & Huston, Inc.	Yes	Courtyard 1 7500 Jefferson NE Albuquerque NM 87109	Service	Prime Contractor/ Project Design	Ph 505-823-1000 Fx 505-821-0892	Gordon Walhood, V.P. gwalhood@bhinc.com
TBD		TBD	Service	Cover Construction	TBD	TBD
TBD		TBD	Product	Cover Material	TBD	TBD
TBD		TBD	Product	Monitoring Sensors	TBD	TBD
BIOREMEDIATION AND NATURAL ATTENUATION AT INEEL - IDAHO						
None						
DECONTAMINATION AND VOLUME REDUCTION SYSTEM (DVRS) - LOS ALAMOS						
Nuclear Fuel Services	Yes	6844 S Ivy Way #8-301 Englewood CO 80112	Service	DVRS System Integrator/ Operator	Ph 303-770-5725 Fx 303-770-5162	Steve Best sjbnfs@aol.com
MAC Corp.	No	201 E Shady Grove Rd Grand Prairie TX 75050	Product	Shear - Type Baler	Ph 972-790-7800 Fx 972-790-8733	size-reduction@mac-corp.com
BNFL Instruments, Inc.	No	278 DP Road Los Alamos NM 87544	Product	1) Neutron Area Holdup Monitor 2) Large Item Neutron Counter	Ph 888-648-2814 Fx 505-662-2286	Fred Gardner fgardner@bnflinc.com

* Joint Bidder/Supplier

VENDOR	SMALL BUSINESS	ADDRESS	PRODUCT/ SERVICE	DESCRIPTION	PHONE/FAX NO.	CONTACT/E-MAIL ADDRESS
BNFL Instruments, Inc.	No	278 DP Road Los Alamos NM 87544	Service	Data Analysis and Certification	Ph 888-648-2814 Fx 505-662-2286	Fred Gardner fgardner@bnflinc.com
Merrick*	Yes	600 6th St #103 Los Alamos NM 87544	Product	A/E Service (Design)	Ph 505-662-0606	Loren Ames

DECONTAMINATION OF GLOVEBOXES, TANKS, AND EQUIPMENT FOR SHIPMENT AND DISPOSAL WITHOUT SIZE REDUCTION - ROCKY FLATS

VENDOR	SMALL BUSINESS	ADDRESS	PRODUCT/ SERVICE	DESCRIPTION	PHONE/FAX NO.	CONTACT/E-MAIL ADDRESS
Knight Armour Inc.	Yes	1616 17th Street Denver CO 80202	Product & Service	Chemical Decontamination System/Operation	Ph 03-628-5595 Fx 303-628-5534	Jan Cairns karmourl@aol.com or Info@knightarmour.com
Special Application Robotics	Yes	418 8th Street #C2 Loveland CO	Product & Service	CO_2 Blaster/Operation	Ph 970-663-1431 Fx 970-663-5898	Dan Johnson sarobotics@aol.com

DEPLOYING AN ALTERNATIVE REMOTE-HANDLED TRU WASTE TRANSPORTATION SYSTEM - COLUMBUS

VENDOR	SMALL BUSINESS	ADDRESS	PRODUCT/ SERVICE	DESCRIPTION	PHONE/FAX NO.	CONTACT/E-MAIL ADDRESS
GTS-Duratek	No	140 Stone Ridge Dr Columbia SC 29210	Product	Cask Manufacturing	Ph 803-758-1898	Mark S. Whitaker

DEPLOYING DIAMOND WIRE SAW DEMOLITION AND SIZE REDUCTION OF A REACTOR BIOSHIELD - COLUMBUS

VENDOR	SMALL BUSINESS	ADDRESS	PRODUCT/ SERVICE	DESCRIPTION	PHONE/FAX NO.	CONTACT/E-MAIL ADDRESS
Cutting Edge Services Corp.	Yes	807 Eight Mile Rd Cincinnati OH 45255	Product	Diamond Wire Saw	Ph 513-388-0199 Fx 13-474-2191	Tim Beckman ccbeckman@msn.com

DEPLOYMENT OF HIGHLY SELECTIVE NUCLIDE REMOVAL SYSTEM - SAVANNAH RIVER

VENDOR	SMALL BUSINESS	ADDRESS	PRODUCT/ SERVICE	DESCRIPTION	PHONE/FAX NO.	CONTACT/E-MAIL ADDRESS
Graver Technologies	Yes	200 Lake Dr Glasgow DE 19702	Product	Selective Ion Exchange System for Cs Removal	Ph 302-731-3576 Fx 302-731-1707	Steve Link llink@gravertech.com
Selion OY Finland	No	Rajatorpantie 8 FIN-01600 Vantaa Finland	Product	Ion Exchange Media	Ph 358-9-856-1588 Fx 358-9-5668-593	Jukka Rautakallio Jukka.rautakallio@ivo.fi
3M	No	3M New Products Dept 3M Center Bldg 209-1W-24 St. Paul MN 55144	Product	Absorption Membrane	Ph 651-575-1795	Keith Hoffman kmhoffman@mmm.com

* Services provided by Merrick not unique

Vendor	Small Business	Address	Product/ Service	Description	Phone/Fax No.	Contact/E-Mail Address

Deployment of Mixed Waste Debris Macroencapsulation Technology - Oak Ridge

Arrow Construction Company	Yes	216 Gunn Rd Montgomery AL 36112	Product	Macroencapsulation Arrow-PAK Technology	Ph 334-271-6185 Fx 334-270-3320	James Harrel Steve Tujaque
Decon & Recovery Services of Oak Ridge, LLC	Yes	P. O. Box 5298 Oak Ridge TN 37831	Service	D & D Services	Ph 423-241-0638	Lance Drs.@obg.com
Phillips Petroleum Co. Driscopipe	No	2929 N Central Expwy #300 Richardson TX 75080	Product	Driscopipe	Ph 800-527-0662 Ph 425-806-8297 Fx 425-485-9408	Alex Custin - Northwest Acustin@bvem.com
Boh Environmental LLC	Yes	11020 Solway School Rd Suite 107 Knoxville TN 37931	Product & Service	Application of Arrow-PAK Technology	Ph 703-599-8005 Fx 423-927-5321	Eric Hediger e.m.hediger@worldnet.att.net

Deployment of Mobile Tank Waste Retrieval System for the Emptying of Small Tanks - Oak Ridge

AEA Technology Services, Inc.	No	184B Rolling Hills Rd Mooresville NC 28118	Product	Fluidic Sludge Retrieval System	Ph 704-799-2707 Fx 704-799-6402	Paul Murray paul.murray@aeat.co.uk

Deployment of the Microchip Memory Button and Internal Pressure Sensing Technology - Fernald

None						

Dissolvable Anti-Contamination Materials Processing System - Nevada

Isolizer / MicroBasix	Yes	4320 International Blvd NW Norcross GA 30093	Product	Anti-C Materials	Ph 770-806-0909 Ext 214 Fx 770-806-6560	John Atwood jatwood@orex.com
Frham Safety Products	Yes	171 Grayson Rd Rock Hill SC 29732	Product	Anti-C Materials	Ph 803-366-5131	John "Trip" McGarity jmcgarity@frhamsafety.com www.frhamsafety.com

Dynamic Underground Stripping at Savanna River (321-M-Area) - Savannah River

Integrated Water Technologies	Yes	18 Anacapa St Santa Barbara CA 93101	Service	Prime Contractor/ Project Design	Ph 805-565-0996 Fx 805-565-0886	Norman Brown norm@integratedwater.com

Vendor	Small Business	Address	Product/ Service	Description	Phone/Fax No.	Contact/E-Mail Address

Dynamic Underground Stripping/Hydrous Pyrolysis - Portsmouth

Steamtech Environmental Services, Inc.	Yes	4520 California Ave Suite 210 Bakersfield CA 93309	Service	Prime Contractor/ Project Design	Ph 805-322-6478 Fx 805-322-6552	Hank Sowers, President sowers@steamtech.com

E-Area Monitoring Program for the E-Area Low Level Radioactive Waste Disposal Facility - Savannah River

None						

Enhanced D&D of Gloveboxes - Rocky Flats

BNFL Instruments	No	278 DP Rd Los Alamos NM 87544	Product	DISPM System	Ph 727-791-7259 Fx 727-791-6487	Ron Kapaun rdapaun@bnflinc.com
AMKUS Corp/Rescue Hydraulics	Yes	P.O. Box 744 Lafayette CO 80026	Product	Crimper/Cutter	Ph 303-673-9576	David Friedel djfriedel@aol.com
BNFL Inc.	No	9781 South Meridian Blvd Englewood CO 80112	Product	Plasma Arc/Fume Control System	Ph 303-874-3965 Fx 03-874-1675	Andrew Roberts aroberts@bnflinc.com

Enhanced Site Characterization System - Hanford

None						

Fluidic Sampler - Savannah River

AEA Technology Services Inc.	No	184B Rolling Hills Rd Mooresville NC 28118	Product	AEAT Fluidic Tank Sludge Sampler	Ph 704-799-2707 Fx 704-799-6402	Paul Murray paul.murray@aeat.co.uk

High Explosives Composting - Pantex

None						

Implementation of MARSSIM Process - Brookhaven

Canberra ISOCS	No	800 Research Pkwy Meriden CT 06450	Product & Service	Gamma Spec.	Ph 203-639-2345	Frasier Bronson fbronson@canberra.com
Beta Scint	Yes	415 N. Quay Kennewick WA 99336	Product	Beta Sensor (In situ)	Ph 509-735-7407	Tom Bayha, V.P. www.BetaScint.com

Vendor	Small Business	Address	Product/ Service	Description	Phone/Fax No.	Contact/E-Mail Address

Implementation of SmartSampling - Mound

None						

Improved Measurement and Monitoring - Fernald

Leica Geosystems, Inc.	Yes	4855 Peachtree Industrial Blvd. Norcross GA 30092	Product	Remote Prismless Station	Ph 800-367-9453 Ph 740-363-9453	Susan Crackower
Minimitter, Inc.	Yes	20300 Empire Ave Bldg B-3 Bend OR 97701	Product	Physiological Monitoring System	Ph 800-685-2999	Dr. Jack McKenzie jmckenzie@minimitter.com Dr. Rick Rushton rickrushton@minimitter.com
Kozoman Instruments, Inc.	Yes	34 Grayhawk Trail Rougemonte NC 27572	Product	Physiological Monitoring System	Ph 919-479-9491	Frank Kozoman fek@mindspring.com Don Casner
Campbell Scientific, Inc.	Yes	815 W 1800 N Logan UT 84321-1784	Product	Radon Monitor System	Fx 435-753-2342	Kevin Rhodes kevin@campbellsci.com www.campbellsci.com

Improved Surface Water Monitoring for Radionuclide Discharges - Savannah River

ISCO, Inc	Yes	4700 Superior St Lincoln NE 68504	Product	Sampler	Ph 402-464-0231 Fx 402-465-3064	www.isco.com
3M	No	3M New Products Dept 3M Center Bldg 209-1W-24 St. Paul MN 55144	Product	Absorption Membrane	Fx 612-575-1795	Keith Hoffman kmhoffman@mmm.com

Improved System for Tank Sludge Retrieval, Conditioning & Transfer - Oak Ridge

AEA Technology Services, Inc.	No	184B Rolling Hills Rd Mooresville NC 28118	Product	Pulsed Jet Sludge Retrieval Equipment	Ph 704-799-2707 Fx 704-799-6402	Paul Murray Paul.murray@aeat.co.uk
Alloy Fabrication	Yes	121 Teak Station Rd Clinton TN 37716	Product	Waste Cond. System Containment Module	Ph 423-457-2717 Fx 423-457-2568	Steve Irons sirons8201@aol.com
ITT Flygt	No	90 Horizon Dr Suwanee GA 130024	Product	Flygt Mixers	Ph 770-932-4320 Fx 770-932-4321	Mike Dillard (ext 25) mide_dillard@fluids.ittind.com

VENDOR	SMALL BUSINESS	ADDRESS	PRODUCT/ SERVICE	DESCRIPTION	PHONE/FAX NO.	CONTACT/E-MAIL ADDRESS
John Bouchard & Sons	Yes	1024 Harrison St Nashville TN 37203	Product	Flygt Mixer Stand Assembly	Ph 615-256-0112	John Horst
Disc Flow Corp.	Yes	1817 John Towers Ave El Cajon CA 92020	Product	Retrieval Pump	Ph 619-596-3181 Fx 619-596-3913	Bert Gallegos bert@discflo.com
Orival Inc.	Yes	40 North Van Brunt Englewood NJ 07631	Product	Filter Unit	Ph 800-567-9767 Fx 201-568-1960	Pete Rimassa
Bristol Equipment Company	Yes	210 Beaver Street P. O. Box 696 Yorkville IL 60560	Product	Automatic Samplers	Ph 630-553-7161 Fx 630-553-5981	Craig Johnson/Kon Phalen info@bristolequipment.com
Redzone Robotics	Yes	2425 Liberty Ave Pittsburgh PA 15222	Product	Houdini II	Ph 412-765-3064 Fx 412-765-3069	Todd Simonds simonds@redzone.com
ROV Technologies, Inc.	Yes	Franklin Rd, P.0. Box 10 Vernon VT 05354	Product	Scarab III	Ph 802-254-9353 Fx 802-254-9354	Jack Judge mail@rovtech.com
Steel Plate Fabricators	Yes	3703 Papermill Rd Knoxville TN 37909	Product	Containment for Scarab III	Ph 865-522-5177 Fx 865-673-8360	John Turner john.turner@worldnet.att.net
Pulsair Systems, Inc.	Yes	P.O. Box 562 Bellevue WA 98009	Product	Sludge Retrieval Equipment	Ph 425-455-1263 Fx 425-451-7312	Dick Parks mixers@pulseair.com
NLB, Inc.	No	29830 Beck Rd Wixom MI 48393-2824	Product	Ultra High Pressure Pump	Ph 248-624-5555 Fx 248-624-0908	Steve Thoms nlbsales@aol.com
Tennessee Tool & Engineering	Yes	741 Emory Valley Rd Oak Ridge TN 37830	Product	Hose Management Arm	Ph 865483-6334 Fx 865-483-5632	Larry Palmer
Providence Group	Yes	11020 Solway School Rd Knoxville TN 37931	Service	Testing and Scarab Operational Support	Ph 865-927-5519 Fx 865-927-5519	Butch Morrow rmorrow@providencegroup. com
XL Associates	Yes	Rockville MD	Service	Testing and Operational Support	Ph 301-770-0090	
M K Ferguson	No	Oak Ridge TN	Service	Oak Ridge Site Construction Center		
NUMET Engineering Ltd.	No	P.O. Box 1776 678 Neal Dr Peterbourgh, ON Canada K9J7X6	Product	Solid/Liquid Separations System (Skid Mounted)	Ph 705-743-2708 Fx 705-743-3216	Harry Lowe numet@numet.com

VENDOR	SMALL BUSINESS	ADDRESS	PRODUCT/ SERVICE	DESCRIPTION	PHONE/FAX NO.	CONTACT/E-MAIL ADDRESS

IN SITU REDOX MANIPULATION FOR GROUNDWATER REMEDIATION - HANFORD

None						

IN SITU SAMPLING OF TCE AT TAN - IDAHO

None						

INTEGRATED DECOMMISSIONING & DECONTAMINATION - FERNALD, IDAHO, AND OTHER SITES

Petrogen	Yes	P.O. Box 1592 Richmond CA 94804	Product	Oxy-Gasoline Torch	Ph 510-569-7877	Milt Heft, GM petrogen.com
Bosch Tools	No	120 Box Rd Newborn NC 28562	Product	Paint Scaler	Ph 800-334-4151	www.boschtools.com
Delta Temax, Inc.	Yes	320 Boundary Rd Pembroke, ON Canada K8A-6W5	Product	PICS Coolsuit	Ph 613-735-3996 Fx 613-735-3814	Kirk Dobbs, President
Science and Engineering Associates	Yes	6100 Uptown Blvd NE Suite 700 Albuquerque NM 87110	Product	Pipe Explorer	Ph 505-884-2300 Fx 505-246-0642	David Cremer cdcremer@seabase.com
Eagletech	Yes	33610 Solon Rd Solon OH 44139	Product	Platform Shear	Ph 440-542-0440 (Office) Fx 440-542-0455 Ph 440-542-9607 (Shop)	Victor Trast Mike Johns Paul Court eagleody@eagleody.com
Res Q Tek, Inc.	Yes	3333 Foerster Rd St. Louis MO 63044	Product	Hand-Held Shear	Ph 314-692-0065 Ext 891	Bill Latta Bill@RESQTEKINC.com www.resqtekinc.com
BROKK North American Sales	Yes	144 Village Way Monroe WA 98272	Product	Remote Crawler, Concrete Scabbler, Hydraulic Shear, Grapple, Hammer, BROKK	Ph 360-794-1277 Ph 800-621-7856 Ph 425-483-1133 Fx 425-487-2963	Bill Barraugh porbb@aol.com
Duane Associates	Yes	51 Park Street Dorchester MA 02122	Service	Rents and Operates BROKK	Ph 888-273-2511 Fx 781-848-6160	Toby Duane toby@rubblemakers.com www.rubblemakers.com

VENDOR	SMALL BUSINESS	ADDRESS	PRODUCT/ SERVICE	DESCRIPTION	PHONE/FAX NO.	CONTACT/E-MAIL ADDRESS
LaBounty Mfg.	No	1538 Hwy 2 Two Harbors MN 55616	Product	Track Mounted Shear/Crusher	Ph 218-834-2123 Fx 218-526-3370	Betty Blettner bblettner@stanleyworks.com www.stanleyworks.com
ASOMA Spectro Analytical Instruments	No	150 Authority Dr Fitchburg MA 01420	Product	Spectro Analyzer (PCB Analyzer)	Ph 800-598-5809	Meredith Danbie Mmdaniel@spectro-usa.com
AIL Systems	No	455 Commack Rd Deer Park NY 11729-4591	Product	Gamma Cam	Ph 800-944-1180 Ph 16-595-3782 Fx 516-595-5582	Harvey Kreisberg harvey_kreisberg@a1mr.ail. com
Niton Corporation	Yes	900 Middlesex Turnpike Bldg. 8 Billerica MA 01821	Product	Spectrum Analyzer (Lead Paint) and Alloy Analyzer	800-875-1578	John Pesce jpesce@niton.com www.niton.com
TSA Systems	Yes	1830 Boston Ave Longmont CO 80501	Product	Global Positioning Radiometric Scanner	Ph 303-651-6147	Charlie Schnurr Charles@tsasystems.com
En-Vac Robotic Blasting Systems, Ltd	Yes	3003 NE 149th Ave Portland OR 97230	Product	En-Vac Robotic Abrasive Blaster	Ph 503-256-5535	David A. Cheramy Cheramy.mci@worldnet.att.net
Transport Plastics, Inc.	Yes	P. O. Box 12 Sweetwater TN 37874	Product	Soft-sided LLW Disposable Containers	Ph 800-603-8277 Fx 423-337-2184	Al Beale aldonbeale@aol.com
Excel Modular Scaffolding and Leasing Corp.	Yes	P.O. Box 1800 60 Industrial Park Rd Plymouth MA 02360	Product	Excel Automatic Locking Scaffold	Ph 800-225-0385 Fx 860-873-9987	James E. Elkins Jimelkins@prodigy.net www.excelscaffold.com
Tiger Machinery Company, Inc.	Yes	11411 Mosteller Rd Cincinnati OH 45241	Product	Track-Mounted Shear/Crusher	Ph 513-772-3232	J. W. Keperling jkeperling@tigermachinery.com www.tigermachinery.com

INTEGRATED TECHNOLOGY SUITE TO DELINEATE CONTAMINATED SOILS - FERNALD

Perkin Elmer Instruments	No	801 S. Illinois Ave Oak Ridge TN 37831-0895	Product	HPGe Detectors	Ph 865-482-4411 Ext 166 or Ph 865-482-4411 Ext 137 Fx 865-482-0396	Amy Kennedy Amy.Kennedy@PerkinElmer.com Jerry Cox Jerry.Cox@PerkinElmer.com

Vendor	Small Business	Address	Product/ Service	Description	Phone/Fax No.	Contact/E-Mail Address
Perkin Elmer Instruments	No	801 S. Illinois Ave. Oak Ridge TN 37831-0895	Product	Gamma Vision Software, for RTRAK/RSS and HPGe Systems	Ph 865-482-4411 Ext 166 or Ph 865-482-4411 Ext 137 Fx 865-482-0396	Amy Kennedy Amy.Kennedy@ PerkinElmer.com or Jerry Cox Jerry.Cox@ PerkinElmer.com
Alpha Spectra, Inc.	Yes	715 Arrowest Ct Grand Junction CO 81505	Product	Sodium Iodide Detectors for RTRAK/RSS	Ph 970-243-4477 Fx 970-244-6947	Frank Wilkinson fjwxtals@alphaspectra.com
National Instruments Company	No	11500 N Mopack Expressway, Bldg B Austin TX 78759	Product	Linking Software for RTRAK/RSS	Ph 512-794-0100 Fx 512-794-5569	Tammy Schmeisser www.ni.com
GPS Total Station by Trimble	Yes	Trimble Navigation 645 N. Mary Ave Sunnyvale CA 94086	Product	GPS 4800 System for positioning the RTRAK/RSS and HPGe record	Ph 317-770-1616 Fx 317-770-1617	Michael O'Grady mike_ogrady@trimble.com
Swathstar III Excalibur by Satloc, Inc.	Yes	Satloc, Inc. 15990 N Greenway Hayden - Suite 800 Scottsdale AZ 85260	Product	Guidance System for RTRAK	Ph 602-348-9919 Fx 602-752-7450	Shane Grabenstein shaneg@satloc.com www.satloc.com
Aeronet	Yes	Denver CO	Product	Ethernet Transmission	Ph 800-Aironet	Paul Varacali

Intrusive and Non-Intrusive Characterization Through Concrete Walls and Floors - Mound

Hydrogeophysics	Yes	5865 Old Spanish Trail Tucson AZ 85747	Service	Engineering/ Geophysics Consulting	Ph 520-647-3315 Fx 520-647-3428	James B. Fink
Eberline Services	Yes	4501 Indian School Rd NE Suite G105 Albuquerque NM 87110	Service	Gamma Spectroscope	Ph 505-262-2694 Fx 505-262-2698	Mike Kennecott Mkennecott@eberlineservices.com

In Well Air Stripping System - Brookhaven National Lab

P.W. Grosser Consulting	Yes	630 Johnson Ave, Ste 7 Bohemia NY 11716	Design & Equip. Vendor	Air Sparging System Hardware and Design Documentation	Ph 516-589-6353 Fx 516-589-8705	Bob Holzmacher Bobh@pwgc-kg.com www.pwgc-kg.com

Vendor	Small Business	Address	Product/ Service	Description	Phone/Fax No.	Contact/E-Mail Address

Iron Treatment Wall - Treatment of Groundwater VOCs - Kansas City

Vendor	Small Business	Address	Product/ Service	Description	Phone/Fax No.	Contact/E-Mail Address
Heritage Environmental Service	No	7821 West Morris St Indianapolis IN 46231	Service	Project Prime Contractor-Including Trench Construction	Ph 317-486-2828 Fx 317-243-2046	Kevin Hopkins CPG khopkin2@ix.netcom.com
Woodward Clyde Federal Services	No	10975 Elmonte, Ste 100 Overland Park KS 66211	Service	Project Design/Quality Assurances	Ph 913-344-1079 Fx 913-344-1011	Scott Vollink Wcc.com
Aqua Drill	Yes	717 East 2nd Ave Coralville IA 52241	Service	Well Driller - Cable Tool Drilling	Ph 319-338-5052 Fx 319-388-8953	Diane Joslyn 75110.1442@compuserve .com
Envirometal Technologies, Inc.	Yes	47 Arron Rd Guelph, ON, Canada NIK-156	Service	Consultant - Iron Treatment Technology	Ph 519-746-2204	John Vogan

Maintenance Free Mixer for Active Process Tanks - Savannah River

Vendor	Small Business	Address	Product/ Service	Description	Phone/Fax No.	Contact/E-Mail Address
AEA Technology Services, Inc.	No	184B Rolling Hills Rd Mooresville NC 28118	Product & Service	Maintenance Free Mixer	Ph 04-799-2707 Fx 704-799-6402	Paul Murray paul.murray@aeat.co.uk

Modular Evaporator & Ion Exchange System for Waste Reduction in Tanks - Deployed at Oak Ridge

Vendor	Small Business	Address	Product/ Service	Description	Phone/Fax No.	Contact/E-Mail Address
Delta Thermal Systems	Yes	2172 Nine Mile Rd Pensacola FL 32534	Product	Evaporator Equipment	Ph 850-474-1733 Fx 850-453-8589	Howard White hawhite@iem.net
TTI Engineering, Inc.	Yes	1600 Providence Hwy Walpole MA 02081	Product	Ion Exchange Equipment	Ph 508-660-3064 Fx 508-660-3067	Ben Skiar tti1600@aol.com
NUMET Engineering Ltd.	No	P.O. Box 1776 678 Neal Drive Peterbourgh ON Canada K9J-7X6	Product	Solid/Liquid Separations System (SLS) (Skid Mounted)	Ph 705-743-2708 Fx 705-743-3216	Harry Lowe

Passive Reactive Barrier Collection and Treatment of Groundwater - Rocky Flats

Vendor	Small Business	Address	Product/ Service	Description	Phone/Fax No.	Contact/E-Mail Address
Envirometal Technologies, Inc.	Yes	47 Yarrow Rd Guelph, ON, Canada N1K-156	Service	Consultant-Iron Treatment Technology	Ph 519-746-2004	John Vogan

VENDOR	SMALL BUSINESS	ADDRESS	PRODUCT/ SERVICE	DESCRIPTION	PHONE/FAX NO.	CONTACT/E-MAIL ADDRESS

PERMEABLE REACTIVE TREATMENT WALL FOR RADIONUCLIDES AND METALS - MONTICELLO, UTAH

IT/OHM	No	5600 South Quebec Englewood CO 80111	Service	Wall Construction	Ph 303-793-5278 Fx 303-793-5222	Dan Gravelding dgravelding@itcrp.com
Peerless Metal Powders & Abrasive	Yes	124 South Military Detroit MI 48209	Product	Iron	Ph 313-841-5400 Fx 313-841-0240	TBD
MSE, Inc.	Yes	P.O. Box 4078 Butte MT 59702	Service	Iron Wall Construction	Ph 406-494-7330 Fx 406-494-7230	Will Goldberg goldberg@mse-ta.com

PERSONAL ICE COOLING SYSTEM - FERNALD AND OTHER SITES

Delta Temax, Inc.	Yes	PNB No. 313 1232 N. Kemper Rd Forest Park OH 45240	Product	Light Weight, Self-Contained Individual Cooling for Workers (PICS)	Ph 613-735-3996 Fx 613-735-3814 Cell Phone 613-715-3242	Kirk Dobbs kdobbs@med-eng.com www.dtica.com
Delta Temax, Inc.	Yes	PNB No. 313 1232 N. Kemper Rd Forest Park OH 45240	Product	Cool Suit	Ph 513-253-3298 Fx 513-742-0238	Bob Danner ddanner@med-eng.com www.dtica.com

PHASED SOURCE CONTAMINANT REMEDIATION - LAWRENCE LIVERMORE

SteamTech Enviro-mental Services, Inc.	Yes	4520 California Ave Suite 210 Bakersfield CA 93309	Service	Prime Contractor/ Project Design	Ph 805-322-6478	Hank Sowers, President Sowers@steamtech.com

POSITION-SENSITIVE RADIATION MONITORING SYSTEM FOR SURVEYING FLOORS IN INDUSTRIAL AREAS - NEVADA

Shonka Research Associates, Inc.	Yes	4939 Lower Roswell Rd Marietta GA 30068	Product & Service	Radiation Survey Equipment and Services	Ph 770-509-7606 Fx 770-509-7507	Joseph J. Shonka sra@crl.com
Millenium Services, Inc. (MSI)	Yes	709 Courtenay Atlanta GA 30396	Service	Radiation Survey	Ph 770-516-7669 Fx 770-516-7699	Dick Dubieo rleddy@msn.network.com

PROCESSING OF VITRIFICATION EXPENDED MATERIALS AT WEST VALLEY DEMONSTRATION PROJECT- WEST VALLEY

West Metal Works	Yes	201 Dutton Ave Buffalo NY 34211	Product & Service	Fabrication Services and Tooling	Ph 716-895-4900	Jim Kelly

VENDOR	SMALL BUSINESS	ADDRESS	PRODUCT/ SERVICE	DESCRIPTION	PHONE/FAX NO.	CONTACT/E-MAIL ADDRESS
PURGE WATER MANAGEMENT SYSTEM - SAVANNAH RIVER						
American Technologies, Inc.	Yes		Product & Service	PWMS	Ph 803-643-8803 Fx 803-643-0233	Bernie Bessette ATI-Aiken@Mindspring.com
PHYTOREMEDIATION IN THE 317/319 AREA - ARGONNE NATIONAL LABORATORY						
Applied Natural Sciences, Inc	Yes	4129 Tonya Trail Hamilton OH 45011	Product & Service	Prime Contractor/ Project Design	Ph 513-895-6061 Fx 513-895-6062	Edward Gatliff Ans@cinti.net
REDUCING, REUSING, AND RECYCLING CONCRETE AND SEGMENTING PLATE STEEL AND TANKS USING A UNIVERSAL DEMOLITION SYSTEM - FERNALD						
Columbus Equipment Co.	Yes	11512 Gondola St Cincinnati OH 45231	Product	Concrete Pulverizer Concrete Cracker Plate Shear Jaw Sets	Ph 513-771-3922 Cell Phone 513-404-5171	Tim Albright Tim@colsequipment.com www.colsequipment.com
RELEASE OF CONCRETE FOR RECYCLE FROM D&D - IDAHO						
None						
REMEDIATION OF URANIUM CONTAMINATED SOILS - LOS ALAMOS						
None						
REMOTE IN- SITU SIZE REDUCTION OF PLUTONIUM CONTAMINATED GLOVEBOXES AND EQUIPMENT - ROCKY FLATS						
Red Zone Robotics	Yes	2425 Liberty Ave Pittsburgh PA 15222	Product	Robotic System	Ph 412-765-3064 Fx 412-765-3069	Todd Simonds Simonds@redzone.com
REMOTE SIZE-REDUCTION AND DECONTAMINATION IN LARGE HOT CELLS BY DEPLOYING ROBOTIC TECHNOLOGIES - OAK RIDGE						
Cybernetix	No	Technopole de Chateau-rue Albert Einstein-BP94 13382 Marseille Cedix 13 France	Product	Robotic System for Size Reduction, Handling, Decon.	Ph 04 91 21 77 00 Fx 04 91 21 77 01	Group@cybernetix.fr nucleaire@cyberbetix.fr

Vendor	Small Business	Address	Product/ Service	Description	Phone/Fax No.	Contact/E-Mail Address
SDA Integrated Geophysical Debris Characterization System - Idaho						
Sage Earth Science	Yes	2300 N Yellowstone Hwy Idaho Falls ID 83401	Product	Geophysical Surveyor	Ph 208-522-5049 Cell Phone 208-589-4106	Glen Carpenter ses@srv.net
Socorro Geophysics	Yes	P. O. Box 1381 Socorro NM 87801	Service	Geophysical Consulting	Ph 505-838-1610	Dr. Kathy Pfeifer
Geophex, Ltd	Yes	605 Mercury St Raleigh NC 27603	Product	Geophex Gem-2 Geonics EM-61DX	Ph 919-839-8515	Alex Oren oren@geophex.com www.geophex.com
Segmented Gate System - Multiple Sites						
Eberline Services	No	4501 Indian School Rd NE Suite G105 Albuquerque NM 87110	Product	Soil Characterization and Segregation System	Ph 505-254-0935 Fx 505-254-9750	Joe Kimbrel jkimbrel@eberlineservices.com
Slurry Monitoring - Oak Ridge						
Lasentec	Yes	15224 NE 95th St Redmond WA 98052	Product	Particle Count and Geometry Measurement	Ph 425-881-7117 Fx 425-881-8964	Jim Jernigan jimj@lasentec.com LeAnn Wilcox info@Lasentec.com
Red Valve Co. Inc.	Yes	700 N Bell Ave Carnegie PA 15106	Product	Pressure Sensor	Ph 412-279-0044 Fx 412-279-7878	Mike Duer valves@redvalve.com
Sigma Transducers	Yes	8919 Grandridge Blvd Suite B Kennewick WA 99336	Product	Speciality Ultrasonic Transducers/ Instruments	Ph 509-783-9497 Fx 509-783-9655	Jocelyn Langlois Sigmatx@webbworks.com
Sodium Minimization in Hanford High Level Waste Tanks - Hanford						
Hi Line Engineering & Fabrication, Inc.	Yes	2105 Aviator Dr Richland WA 99352	Product	Corrosion Probe, Probe Deployment and Control System	Ph 509-943-9043	Troy Stokes www.hilineeng.com

VENDOR	SMALL BUSINESS	ADDRESS	PRODUCT/ SERVICE	DESCRIPTION	PHONE/FAX NO.	CONTACT/E-MAIL ADDRESS

TRANSPORTABLE OVERSIZE WASTE REDUCTION SYSTEM - LOS ALAMOS

GSI Lumonics	No	19776 Haggerty Rd Livonia MI 48152-1016	Product	Chiller, Laser, Power Supply System	Ph 612-315-1790 Ext. 3430 Fx 612-315-1771	Roger Ackerman ackermanr@gsilumonics.com
GSI Lumonics	No	8401 Jefferson Hwy Maple Grove MN 55369	Service	Trailer System, Robotics Integration	Ph 612-315-1790 Ext. 3430 Fx 612-315-1771	Roger Ackerman ackermanr@gsilumonics.com
ABB Flexible Automation, Inc.	No	P. O. Box 656 Beaver Dam WI 53916	Product	Robotic Arm Subsystem	Ph 920-356-0816 Fx 920-356-0817	Michael L. Sainburg michael.l.sainberg@usfac.mail.abb.com
New Mexico St Univ Physical Sciences Laboratory	No	Box 30002 Las Cruces NM 88003-8002	Service	Installation of the Laser into the Trailer	Ph 505-522-9223 Fx505-521-9600	J. O. Montes jomontes@psl.nmsu.edu

UPGRADE OF INSTRUMENTATION AT ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE - ROCKY FLATS

Safe Sites of Colorado	No	Rocky Flats Environmental Technology Site Building 124A Golden CO 80401	Service	Instrumentation Operation Procedures	Ph 303-966-2534	Carl Cox carl.cox@rfets.gov
Shonka Research Associates, Inc.	Yes	4939 Lower Roswell Rd Suite 106 Marietta GA 30068	Product	Plutonium Detector	Ph 770-509-7606 Fx 770-509-7507	Debbie Shonka Dbshonka@shonka.com
Berkeley Nucleonics Corporation	Yes	3060 Kerner Blvd #2 San Rafael CA 94901	Product	Hand-Held Gamma Spectrometer	Ph 800-234-7858 Fx 415-453-9956	Info@berkeleynucleonics.com
Ludlum Measurements, Inc.	No	501 Oak St Sweetwater TX 79556	Product	Data Logger System Components	Ph 800-622-0828 Fx 915-235-4672	Ludlum@camalott.com or www.ludlums.com
Bicron	Yes	6801 Cochran Rd Solon OH 44139	Product	Data Logger System Components	Ph 440-248-7400 Fx 440-349-6581	Gail Marlowe www.bicron.com

APPENDIX E

Examples of Success

D&D Focus Area Successes

1. Fernald Personal Ice Cooling System (PICS) Deployed Widely across the DOE Complex (Tech ID 1898)

Project Description

The PICS technology is one of the most simple, easy-to-understand and deploy technologies that has met with broad acceptance and applicability across the DOE complex. It is a self-contained core body-heat stress-control system that uses tap-water ice as a coolant and circulates coolant through tubing incorporated into a durable and comfortable shirt or vest.

Keys to Success

The keys to successful deployment of PICS include the following:

- easy to understand technology;
- short training period;
- inexpensive, low risk to deploy;
- demonstrated superior in performance to the baseline;
- excellent vendor relationship and teamwork with site contractor;
- multiple deployment tasks built into the project plan; and
- commitment from project manager.

Subsequent Deployments

PICS has been deployed at more than 10 DOE sites and is the most widely deployed technology in the ASTD program. It is anticipated that more PICS will be purchased by the sites that have already purchased suits and other sites will also utilize this technology.

2. Fernald and Idaho Integrated Decontamination and Decommissioning (ID&D) Project Deploys Many Tools (Tech ID 2100,1840, 2304, 1847, 1898, 74, 2303, 2322, 2240, 2320, 2317, 2397, 2977, 2098, 2321)

Project Description

This project consists of a suite of D&D tools including a self-contained Pipe Cutting Shear, Oxy-Gasoline Cutting Torch, Track-mounted Shear, Demolition Robot (BROKK), Paint Scaler, Gamma Cam Radiation Detection System, Pipe Explorer, PICS, Decontamination, Decommissioning, and Remediation Planning System (DDROPS), Global Positioning Radiometric Scanner System, En-Vac Robotic Abrasive Blaster, PCB Spectral Analyzer, Modular Scaffolding System, Surveillance and Measurement System, In situ Object Counting System and Soft-sided Waste Containers. These tools are used primarily to expedite demolition of concrete and metal structures in a safe, efficient, and secure manner.

Keys to Success

The keys to successful deployment of ID&D technologies include the following:

- strong commitment by Office of Environmental Restoration (ER) D&D project manager to deploy improved technologies that expedite cleanup and reduce costs;

- demonstrated superior in performance to the baseline;
- multiple deployment tasks built into the project plan;
- excellent vendor relationship and teamwork with site contractor;
- excellent coordination and teamwork between Field Office and D&D Focus Area personnel; and
- ER organizations at all three sites (Argonne East, Fernald, and Idaho) have accepted 14 of 16 ID&D Project technologies as their new baseline technologies.

Subsequent Deployments

INEEL will deploy ID&D technologies through FY01. Argonne East has targeted five large structures for D&D (hot cells, 60-inch cyclotron, retention tanks, and zero power reactor buildings).

Subsurface Contaminants Focus Area Successes

1. Fernald's Integrated Technology Suite (ITS) for Characterizing Radioactive-Contaminated Soils (Tech ID 2361, 2157, 2362)

Project Description

ITS comprises a suite of radionuclide (gamma) soil characterization technologies consisting of:

1) Mobile Radiation Tracking System (RTRAK) with Global Positioning System;
2) Radiation Scanning System;
3) Radiation Monitoring System (RMS) with sodium iodide detectors;
4) portable High-Purity Germanium (HPGe) sensor for in situ gamma spectroscopy; and
5) real-time mapping and positioning package.

It has been deployed extensively at Fernald to support soil precertification and excavation activities, reducing the volume of soil to be excavated and disposed as low-level radioactive waste. ITS has been deployed at Fernald to characterize 500 acres for precertification, 40 acres for excavation support, and 200 acres for predesign or alternative characterization activities. Since implementing the ITS in FY98, Fernald has realized a total savings of over $15M through September 2000, primarily related to its application for precertification of soils. Projected total savings upon project completion are expected to reach $34M.

Keys to Success

Successful deployments at Fernald occurred as a result of the following factors:

- demonstrated cost savings by using the technology;
- strong site support, integrating the technology into the cleanup baseline;
- close relationship with regulatory agency; and

- close cooperation and technical integration between Fernald and Idaho, Argonne, and DOE Environmental Measurements Laboratory personnel.

Subsequent Deployments

Subsequent deployments of ITS are planned during FY01 at Oak Ridge. ITS has potential for deployment in the out-years at Idaho, Savannah River, Richland, and other sites.

2. Brookhaven In-Well Air Stripping (IWAS) to Treat an Off-Site Groundwater Plume (Tech ID 6)

Project Description

The IWAS system is a closed-loop system that extracts volatile organic compounds dissolved in groundwater by aerating the water column in a series of seven wells located along the boundary of the Brookhaven National Laboratory (BNL). The system has been in full operation since September 1999, treating over 180M gallons of groundwater as of September 2000, while removing more than 130 pounds of contaminants. It is estimated that a savings of 80% is anticipated when compared to the traditional baseline pump-and-treat method.

Keys to Success

Successful deployment for this project occurred due to the following factors:

- technology matched a high-priority need;
- alternative technology attractive to all stakeholders;
- good project management team; and
- designer is the operator.

Subsequent Deployments

Subsequent deployments within the Brookhaven site are planned through FY04. Applications of the IWAS are being considered at Oak Ridge beginning in FY05.

3. Portsmouth and Savannah River Deployed Dynamic Underground Stripping (DUS) (Tech ID 7, 1519, 17)

Project Description

DUS is an innovative groundwater treatment technology that combines steam injection with soil vapor extraction to accelerate the removal of organic compounds, both dissolved-phase and dense, nonaqueous-phase liquids (DNAPLs), from the subsurface. DUS offers significantly faster and more complete remediation of DNAPLs at substantial cost savings over baseline pump-and-treat technology because of the substantially shorter treatment time. From FY1998 to FY1999, DUS was deployed to treat trichloroethylene (TCE)-contaminated groundwater at the DOE Portsmouth Gaseous Diffusion Plant to remediate the X-701B TCE plume. Approximately 80% of the TCE mass was removed from the treatment area.

Keys to Success

Keys to success for this project include:

- strong site support to utilize an alternative technology to accelerate the cleanup schedule;
- a relatively mature technology that had demonstrated cost and performance data;

- a good vendor to provide the technology.

Subsequent Deployments

DUS is being deployed at the Savannah River in FY00 and FY01 and may also be deployed at Lawrence Livermore National Laboratory (LLNL). Two commercial vendors are licensed to provide this technology and are currently using the technology at both DOE and non-DOE sites.

4. Permeable Reactive Barrier Deployed at Three DOE Sites under ASTD (Tech ID 2156)

Project Description

A Permeable Reactive Barrier (PRB) is an in situ, passive treatment system that treats groundwater contaminated with organics, metals, and radionuclides. A PRB is an engineered structure placed in the subsurface to capture and treat an advancing plume of contaminated groundwater. This type of passive treatment requires no external energy sources and no daily operation and maintenance. It eliminates secondary wastes and reduces the long-term EM mortgage when compared to the baseline technology of pump and treat. PRBs have been installed at the Kansas City Plant, at three sites at Rocky Flats and at the Monticello Uranium Mill Tailings Site for the DOE Grand Junction Office.

Keys to Success

Keys to success for these three projects include:

- strong site support to select an alternative, more passive technology with low operating and maintenance costs;
- good integration into site planning;
- good relationships with the regulators to obtain their timely approval;
- strong project management teams; and
- a relatively mature technology with demonstrated performance information.

Subsequent Deployments

A subsequent deployment of a PRB occurred at Lawrence Livermore in FY00.

Tanks Focus Area Successes

1. Oak Ridge Deployment of the Out-of-Tank Evaporator (OTE) and Cesium Removal Ion Exchange System (CRS) (Tech ID 20, 21, 350)

Project Description

The first deployment of these technologies occurred at Oak Ridge for waste storage tank clean-out and transfer of the radioactive waste to safer interim storage tanks in preparation for treatment. As part of the Bethel Valley Watershed Project, OTE and CRS were deployed in FY97 and FY98, while successfully treating over 200,000 gallons of water, removing greater than 5,600 curies of cesium, and removing over 32,000 gallons of excess water. The OTE and CRS systems continue to operate successfully at Oak Ridge and will significantly reduce the cost of transfer and eventual treatment of the tanks' waste.

Keys to Success

Successful deployments at Oak Ridge were the result of the following factors:

- early demonstration of the technologies' performance as a significant improvement over the baseline and
- strong site support and project management to integrate the technologies into their baseline.

Subsequent Deployments

Subsequent deployments of CRS are being evaluated at both Savannah River and Idaho. CRS is being evaluated for application at Savannah River for the high-level radioactive tank waste-feed to the Savannah River Vitrification Plant and has been recommended at the Idaho Nuclear Technology Engineering Center for tank waste retrieved during the clean-out process.

2. Oak Ridge Deployment of the Tank Sludge Retrieval, Conditioning, & Transfer Technologies (Tech ID 2085, 2086, 1510, 2232, 350)

Project Description

A toolbox of nine technologies were deployed to accomplish bulk sludge removal and final clean-out of the five Bethel Valley Evaporator Service Tanks, eight Gunite and Associated Tanks, and the five Old Hydrofracture Facility tanks. The innovative waste mixing, conditioning, and retrieval technologies are capable of dealing with a variety of tank configurations, sludge consistencies, and waste volumes. The technologies have worked in concert to mix, retrieve, condition, and transfer over 30% of the waste to the Melton Valley Storage Tanks for future treatment, in some cases removing as much as 99% of the waste from a given tank.

Keys to Success

A dedicated project team and technologies that fit the customer need are the two principal reasons for the success of the Tank Sludge Retrieval, Conditioning, and Transfer project.

Subsequent Deployments

The successful deployment of these nine technologies at Oak Ridge is providing the basis for potential use at Hanford, Savannah River, Idaho, West Valley, and Fernald.

Appendix F

Reasons for Success

Appendix F. ASTD Project Reasons for Success

FOCUS AREA	PROJECT TITLE	REASONS FOR SUCCESS
DDFA	A Position-Sensitive Radiation Monitoring System for Surveying Floors in Industrial Areas	• Proven technology • Strong need • Straightforward deployment
DDFA	Innovative Characterization Technologies and Implementation of the MARSSIM Process at Radiologically Contaminated Sites	• Close coordination with vendors (Canberra and Beta Scint) and end users (new baseline)
DDFA	Integrated Decontamination and Decommissioning	• Strong tech development team working closely with end users • Willingness to try new technologies • Strong relationship with DDFA to integrate new technologies • Most are straightforward technologies
DDFA	Providing the Personal Ice Cooling System	• Built multisite team • Inexpensive, easy to understand and use technology • Quick payback, user friendly • Fernald accepted role to "market" technology
SCFA	Bioremediation and Natural Attenuation for In situ Restoration of Chloroethene Contaminated Groundwater	• Regulatory support and acceptance of approach • Good project team • Baseline too expensive • Willingness to try new technology
SCFA	Deployment of Phytoremediation in the 317/319 Area at Argonne East	• Regulators approve • Good vendor • Design ready
SCFA	Dynamic Underground Stripping and Hydrous Pyrolysis Oxidation at X701b Plume Site	• Relatively mature technology • Good project team • Experienced vendor
SCFA	High Explosives Composting Technology Deployment (Pantex Plant)	• Good design/treatability • Simple project • No regulatory obstacles
SCFA	Implementation of Smart Sampling	• Good technology developer and end user relationship • Provides an inexpensive tool with an obvious advantage
SCFA	Improved Surface Water Monitoring System	• Low risk to deployment
SCFA	In situ Redox Manipulation for Groundwater Remediation 100D Area	• Previously demonstrated technology • Regulatory support • Site committed to using technology for full-scale cleanup • Good project team with previous experience
SCFA	Integrated Technology Suite for Delineating Radioactive Contaminants in Soils	• Close relationship with regulator Ohio Environmental Protection Agency • Excellent match between need and technology capability • Teamwork between three sites • Cooperation between technology developed and end users at site

FOCUS AREA	PROJECT TITLE	REASONS FOR SUCCESS
SCFA	In-Well Air Stripping to Remediate an Offsite Organics Plume	• High-priority need • Attractive alternative to pump-and-treat system • Designer is the operator
SCFA	Passive Reactive Barrier Collection and Treatment of Groundwater	• Regulatory deadline accelerated deployment • Mature technology, already deployed at same site • Good project team
SCFA	Permeable Reactive Barrier: Iron Treatment Wall for VOCs In Groundwater	• Design nearly complete for proposal • Project team is innovative • Regulators support
SCFA	Permeable Reactive Treatment Wall for Radionuclides and Metals	• Good planning and project management • Mature technology • Prior experience, bench-scale demo at another site • Assembled right team
SCFA	Purge Water Management System	• Low cost solution • Low risk to deployment • Regulatory approval
SCFA	Segmented Gate System	• Close relationship between technology developer and vendor • Mature technology, previously demonstrated at DOE sites • Built multiple deployments into proposal • Established multisite team to share lessons learned
SCFA	Savannah River Vadose Zone Monitoring System	• Mature technology deployed at INEEL for many years • Filled a critical need
TFA	Modular Evaporator and Electrochemical Ion Exchange for Waste Reduction in Tanks	• Excellent project management • New technologies are superior in performance
TFA	Processing of Vitrification Expended Materials at West Valley	• Good project management • Technology filled a priority need
TMFA	Combined Thermal Epithermal Neutron (CTEN)	• Good project management
TMFA	Mixed Waste Debris Macroencapsulation	• Good project management • Acceptable technical risk

ACRONYM LIST

ASTD	Accelerated Site Technology Deployment
BNL	Brookhaven National Laboratory
CRS	Cesium Removal System
CTEN	Combined Thermal Epithermal Neutron
D&D	decontamination and decommissioning
DDFA	Deactivation and Decommissioning Focus Area
DDROPS	Decontamination, Decommissioning, and Remediation Optimal Planning System
DNAPL	dense, nonaqueous-phase liquid
DOE	Department of Energy
DUS	Dynamic Underground Stripping
DVRS	Decontamination and Volume Reduction System
EM	Environmental Management
EMAB	Environmental Management Advisory Board
ER	Office of Environmental Restoration
FY	fiscal year
GAO	General Accounting Office
HPGe	high-purity germanium
HQ	Headquarters
ID	Idaho Operations Office
ID&D	Integrated Decontamination and Decommissioning
INEEL	Idaho National Engineering and Environmental Laboratory
ISOCS	In situ Object-Counting System
ITS	Integrated Technology Suite
IWAS	In-Well Air Stripping
LLNL	Lawrence Livermore National Laboratory
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
NMFA	Nuclear Materials Focus Area
OST	Office of Science and Technology
OTE	Out-of-Tank Evaporator
PeRT	Permeable Reactive Treatment
PICS	Personal Ice Cooling System
PRB	Permeable Reactive Barrier

RCI	Rapid Commercialization Initiative
RSS	Radiation Scanning System
RTRAK	Mobile Radiation Tracking System
SCFA	Subsurface Contaminants Focus Area
SDT	Subsequent Deployment Team
SGS	Segmented Gate System
TAN	Test Area North
TCE	trichloroethylene
TDI	Technology Deployment Initiative
TFA	Tanks Focus Area
TMFA	TRU and Mixed Waste Focus Area
TRU	transuranics
VOC	volatile organic compound

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