A DEACTIVATION AND DECOMMISSIONING FOCUS AREA'S TRIUMPH: THE OXY-GASOLINE CUTTING TORCH

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ABSTRACT

In the 1990s, the Department of Energy (DOE) had been presented with the costs of the weapons complex environmental cleanup and determined that the cost is too expensive for the country to afford. Consequently, DOE introduced a series of focus areas and crosscutting technology areas that are intended to reduce the cost of the cleanup of the weapons complex. One of these areas, the Deactivation and Decommissioning Focus Area (DDFA) has the responsibility to identify technologies that will make Decontamination and Decommissioning (D&D) "safer, better, faster, and cheaper." To accomplish this task, several Large Scale Demonstration and Deployment Projects (LSDDPs) have been awarded whose sole purpose is to identify and demonstrate in actual D&D field conditions technologies that are innovative or otherwise new to the DOE complex and that will reduce the cost of D&D, or make the work safer for personnel, or reduce schedule. One of the initial LSDDPs was incorporated into the then ongoing Plant 1 D&D Project at the Fernald Environmental Management Project (FEMP) in Fernald, Ohio, just northwest of Cincinnati. It was for this LSDDP that the oxy-gasoline cutting torch was identified, demonstrated, and its success communicated to the overall D&D community.

The oxy-gasoline cutting torch was identified during a search of innovative technologies for the Plant 1 LSDDP. The oxy-gasoline is a "safer, better, faster, and cheaper" cutting technology when compared to the more typical 'baseline' technology, the oxy-acetylene cutting torch. This oxy-acetylene cutting torch is the baseline technology because its use is identical to that of the innovative technology, i.e., cutting and otherwise size reducing metals during dismantlement of nuclear facilities. The oxy-gasoline torch is *safer*, because backflash is eliminated during use by the patented design of the oxy-gasoline torch and because during operation, the generation of metal splatter is reduced. It is *better*, because the proper operation of the torch results in longer tip life, cooler operation, and improved cutting performance. Finally, the oxy-gasoline cutting torch is *faster*, cutting metals up to 300% faster than the oxy-acetylene cutting torch; and *cheaper*, consuming fuel at one-tenth the cost. Each of these aspects was proven during the demonstration as part of the LSDDP and is discussed in this paper.

INTRODUCTION

The environmental remediation of the nation's weapon complex has been the subject of numerous studies and cost estimates for the Department of Energy (DOE). In total, the estimated cost of cleaning up the weapons complex under the conditions required in the 1980s is too expensive and too long for the country to afford. Therefore, efforts had to be made to reduce the cost of the environmental remediation. The cost of environmental remediation can be separated into two parts, the continuing surveillance and maintenance required to maintain the integrity of

the various facilities, commonly called the mortgage cost of the environmental remediation, and the final D&D of the various facilities. Both efforts are extremely expensive, and the longer D&D takes, the more monies are required for maintaining the facilities. Consequently, to make the environmental restoration affordable, the business of remediation has to change. This paper describes in general the DOE's program to reduce the cost of the environmental remediation through several "focus areas" and "cross-cutting technology areas." One of these areas is in the D&D of facilities. The first section of the paper will provide a brief history and overview of DOE's program in this area, followed by a description of the background of the Large Scale Demonstration and Deployment Projects (LSDDPs) that are being performed throughout the complex. The first three LSDDPs produced a series of technologies that are being deployed in the cleanup as well as several unqualified success stories. These success stories are identified in the next section. One of these resounding success stories, the Oxy-Gasoline Cutting Torch, is the subject of this paper and is discussed at length in the following sections. The identification process as well as the operation of the LSDDP is discussed first, followed by a technical description of the benefits of the oxy-gasoline cutting torch. Rounding out the paper are the results of the demonstration, the deployment of this success story, and the future of the communication efforts to advertise this success story.

BACKGROUND OF FOCUS AREAS

In the late 1980s and the early 1990s, the DOE was presented with numerous cost estimates for the environmental restoration of the nation's weapons complex. These cost estimates totaled hundreds of billions of dollars and took over 75 years to accomplish, according to the requirements and dictates of the times.

Given these unaffordable costs and extremely long time frames, the DOE had to revise its method of doing business. DOE began a new approach to environmental research and technology development that is directed towards overcoming major obstacles to the environmental restoration. As part of these changes, DOE initiated the Office of Technology Development, later renamed the Office of Science and Technology, to make the environmental restoration of the weapons complex a "safer, better, faster, and cheaper" operation.

The features of this new approach include:

- Establishing focus areas to address DOE's most pressing problems;
- Identifying, developing, and implementing needed technologies;
- Focusing technology development activities on major environmental problems;
- Involving industry in developing and implementing solutions, including technology transfer; and
- Enhancing involvement of regulators and stakeholders in the implementation of technologies.

In the beginning of the program, DOE instituted a set of five "Focus Areas" to address major remediation and waste management problems and five "Cross-cutting Technologies" that will support the focus areas. The original five focus areas were:

- Contaminant Plume Containment and Remediation,
- Mixed Waste Characterization,
- High-Level Waste Tank Remediation,

- Landfill Stabilization, and
- Decontamination and Decommissioning.

The five original cross-cutting technologies were:

- Characterization, Monitoring, and Sensor Technology;
- Efficient Separations and Processing;
- Robotics;
- Innovative Investment Area; and
- Pollution Prevention.

Since their introduction, the focus areas have been consolidated into only four and the emphasis on two of the cross-cutting programs have changed. The new names for the four focus areas are:

- Mixed Waste, Characterization, Treatment, and Disposal Focus Area;
- Radioactive Tank Wastes Focus Area;
- Subsurface Contaminants Focus Area; and
- Deactivation and Decommissioning Focus Area.

For the cross-cutting programs, the Innovative Investment and Pollution Prevention Areas are now the Industry Programs and Integrated Process Analysis Areas.

The Deactivation and Decommissioning Focus Area (DDFA) is attempting to solve the problems of 5,000 contaminated buildings that require deactivation, 1,200 contaminated buildings that require decommissioning, and 550,000 metric tons of metal and 23 million cubic meters of concrete in contaminated buildings that require disposition. The DDFA was assigned to the Morgantown Energy Technology Center, in Morgantown, West Virginia, as the lead center. Later, the Morgantown and Pittsburgh Energy Technology Centers were combined to form the Federal Energy Technology Center (FETC). The first step in this effort was to convene a workshop with the various DOE sites and commercial vendors of decommissioning services to determine where efforts should be directed. The next steps are to bring about the reduction in the cost of the environmental restoration of the weapons complex. To accomplish this enormous task, the DDFA has commissioned a series of demonstrations of facility decommissioning technologies at various sites within the weapons complex.

BACKGROUND OF LSDDPS

In July 1995, proposals were requested of DOE sites for projects that could support the aims of the DDFA to demonstrate new or innovative decommissioning technologies in a real-life setting, performing the same work that is currently being done in the decommissioning of the contaminated facilities. During these demonstrations, the innovative technology and "baseline" technology would undergo side-by-side comparisons to determine the economics and effectiveness of the new or innovative technology. Eight proposals were received to host such a demonstration project. Three of the eight proposals were selected for immediate action. The three projects were the CP-5 Reactor Decontamination and Decommissioning (D&D) project, located at the Argonne National Laboratory near Chicago, Illinois; the Fernald Plant 1 D&D Project, located at the Fernald Environmental Management Project (FEMP) near Cincinnati,

Ohio; and the 105-C Reactor D&D Project at the Hanford Reservation near Richland, Washington. The three projects began approximately six months apart in the above order.

Following the completion of the first three projects, the DDFA awarded a second series of Large Scale Demonstration and Deployment Projects (LSDDPs) at four more sites. These projects are the 321-M Deactivation project at the Savannah River Site in South Carolina; the Fuel Storage Canals and Underwater and Underground Facilities Project at the Idaho National Engineering and Environmental Laboratory near Idaho Falls, Idaho; the Transuranic Waste Project at Los Alamos National Laboratory near Santa Fe, New Mexico; and the Mound Tritium D&D Project at the Mound Laboratory near Dayton, Ohio. All of these projects are currently underway.

The LSDDPs are managed by an Integrating Contractor (IC) Team made up of representatives from DOE and the United States Army Corps of Engineers (USACE), the site contractor, and various commercial firms that are experienced D&D providers. Each of these organizations bring their specific expertise to the team, and provide conduits for the identification and implementation of technologies for demonstration.

In practice, technologies for demonstration come to the LSDDP from activities by the IC Team itself (such as Commerce Business Daily advertisements) or through individual knowledge and searches. However a technology is identified, a particular team member takes ownership of the technology and becomes its champion. That team member evaluates the technology according to a standardized evaluation form. The technology is evaluated according to its direct applicability to the current LSDDP and its needs. In addition, its applicability to other needs in the DOE complex is noted on the evaluation form. If, in the opinion of the IC Team members, the technology will support the LSDDP goals, then the technology is recommended for further investigation in a technology proposal. The technology proposal is presented to the IC Team, which decides on the merits of the technology. If it appears to be a useful technology, then the team approves the technology for demonstration. At this point, the site contractor (or implementing team member) takes the technology proposal and develops a statement of work or test plan for use in the field for the performance of the demonstration.

Once the technology is scheduled for demonstration, the testing begins. One or more data takers are employed to take a complete set of data for both the innovative technology being demonstrated and the baseline technology against which it is being compared. All of this data is provided to the USACE for development of a cost benefit analysis. This cost benefit analysis shows whether the demonstrated technology is indeed "safer, better, faster, and cheaper" than the baseline.

To document the demonstration, a summary of the technology, its demonstration, alternatives (including the baseline), cost benefit analysis, and other pertinent information are presented in an Innovative Technology Summary Report (ITSR), which is commonly referred to by its cover color—the "green book."

In addition, demonstration summaries are prepared on a one-page format, for distribution between the completion of the demonstration and the publication of the ITSR. Finally, the documents or summaries are included in various Internet web sites for view by anyone with

Internet access. Also, some of the demonstrations have produced a video of the demonstration including its results and debriefing for distribution to interested parties.

SUCCESSES OF LSDDPS

Out of the first three LSDDPs, there have been several unqualified successes. These successes include the Advanced Worker Protection System, STREAM (System for Tracking Remediation, Exposure, Activities & Materials), the Robotic End Effector for Inspection of Storage Tanks, the Personal Ice Cooling System (PICS), and the Oxy-Gasoline Cutting Torch. The Advanced Worker Protection System is a liquid-air-based, self-contained breathing and cooling system. STREAM is a computer software application used as a management tool to plan and track D&D projects. The Robotic End Effector views the interior of underground waste storage tanks without the need to enter the tank. The PICS is a cooling vest that is worn under a workers outer garment that is used to cool the body during hot weather. The Oxy-Gasoline Cutting Torch is a "safer, better, faster, and cheaper" way of cutting metal during D&D projects.

IDENTIFICATION OF OXY-GASOLINE TORCH

As indicated, the Oxy-Gasoline Cutting Torch is one of the major success stories of the DDFA. It was identified for and demonstrated at FEMP's Plant 1 D&D LSDDP. The IC Team for this LSDDP consisted of:

- the operating contractor of the FEMP, Fluor Daniel Fernald (FDF);
- B&W NESI (now B&W Services), the D&D subcontractor for the Plant 1 D&D Project;
- FETC personnel, representing the DOE;
- Huntington District personnel from the USACE;
- Fluor Daniel, one of the parent companies of FDF;
- Jacobs Engineering, a teaming partner with FDF;
- Halliburton NUS, another teaming partner with FDF;
- Foster Wheeler Environmental Corporation, for the USACE as an independent D&D expert;
- Waste Policy Institute, supporting FETC;
- Florida International University; and
- University of Cincinnati.

Discovered through an article in the *Welding Journal* by Foster Wheeler Environmental Corporation personnel, the oxy-gasoline cutting torch was identified as a good candidate for the demonstration as an innovative method of cutting metals during D&D projects. Discussions with the manufacturer occurred and literature was obtained, including brochures, a videotape, and manuals. From this information, a Technology Evaluation Form was prepared including the manufacturer's claims on the torch's speed of cutting and cost savings which recommended pursuit of a technology proposal. At the next scheduled IC Team meeting, this technology was presented and recommended for further investigation. The baseline technology identified for comparison was the oxy-acetylene cutting torch, commonly used at D&D sites for segmenting steel materials.

Upon hearing of the oxy-gasoline cutting torch's fuel, the IC Team's reaction was the same as for all others: disbelief on the use of gasoline as a cutting fuel. However, after hearing the claims by the manufacturer, the IC Team approved the preparation of a technology proposal. A formal six-page proposal was prepared. It included sections on the technology description of both the innovative and baseline technologies, a detail of the claimed benefits of the oxy-gasoline cutting torch, the success criteria to be demonstrated, a description of the demonstration and what pieces would be cut, expected participation by the vendor and B&W NESI and FDF, the expected cost and schedule for the demonstration, and the future applicability of the oxy-gasoline cutting torch. The proposal for demonstrating the torch was reviewed, revised, re-reviewed by the IC Team, and approved for demonstration, which was scheduled for the fall of 1996. As for the other demonstrations, FDF prepared a statement of work for B&W NESI to quote on.

The vendor, Petrogen International, Ltd., provided a demonstration of the oxy-gasoline cutting torch for the laborers (experienced torch cutters) that were to be part of the demonstration. As always done for the LSDDP, the vendor demonstration was videotaped and the video has been used several times since then. The actual work demonstration was performed on four major pieces of equipment, including a 5.08 cm (2-in.) thick shield wall, a Jaw Crusher, a Drum Crusher/Bailer and a pulverizer base, in a side-by-side test with the acetylene torch. The essential result of this demonstration was that the oxy-gasoline torch was considered a success even before the conclusion of the demonstration.

BENEFITS OF OXY-GASOLINE TORCH

The oxy-gasoline cutting torch recommended for demonstration was developed as an improvement on the then existing oxy-gasoline torch. These torches have been around for many years, but have not been widely used due to safety concerns. The original design charged the gasoline while in the tank and this volatile vapor was then pumped to the tip. A clogged tip could cause a backflash, during which the flame ignites the vapor in the nozzle and the flame front travels back down the hose to the tank, resulting in a disastrous explosion. In recent years, Petrogen, a small company in Richmond, California, began working on and improving the technology for the torch. Although use of acetylene torches was the most common method for cutting and segmenting, improvement to the oxy-gasoline was deemed a reasonable undertaking.

Addressing the issue of backflash required the redesign of the fuel delivery and cutting tip system. Gasoline in its liquid state is inert—it does not burn. It is the vapor of gasoline mixed with air that is volatile. By keeping the gasoline liquid until it reaches the tip, the problem of backflash has been mitigated. The Petrogen Oxy-Gasoline Safety Torch accomplishes this by delivering the gasoline to the tip in the form of a confined liquid. The gasoline tank is pressurized by either a self-contained hand pump or by an external source of compressed air. The liquid gasoline then moves through a special hose to the mixer, which is in the head of the torch at the base of the tip. The liquid gasoline travels around the wick on the mixer and this is where the oxygen vaporizes the gasoline. Since the gasoline is liquid to this point, it is virtually impossible to have a gasoline backflash more than the length of the cutting tip. Flame fronts cannot travel back up the gasoline lines because they are blocked by a wall of liquid gasoline. A flame front traveling back up the oxygen line is a possibility with the oxy-gasoline torch, as it is with all oxygen-fuel torches, but this can be prevented by purging the oxygen line (a standard

operating procedure) until emission at the tip is devoid of spray or by the use of oxygen line flame arrestors.

Except for abuse (using the tip for tapping) and accident, the two reasons for failure of conventional tips are clogging and melting. In a typical acetylene torch system, the acetylene torch tip is often damaged when molten steel blows back and lodges in one of the tip holes. The hot steel causes the holes to melt shut and ruin the tip. This occurs because the acetylene flame is only 70% oxidizing, leaving unoxidized molten steel in each cut. Gasoline, however, produces a 100% oxidizing flame. This means that there is no molten steel during or after a cut. The slag is 100% oxidized so the sparks are lightweight, relatively cool and do not lodge in the tip. The force behind the pre-heat flame of the oxy-gasoline torch also allows for cutting with the tip held at a distance from the molten metal pool initially formed during a cut. In addition, the expansion of the gasoline into a vapor, which occurs in the tip of the oxy-gasoline torch, is a refrigeration process. This cooling provides resistance to melting and can contribute to a longer tip life. The expansion of the gasoline into a vapor also results in a significant volume expansion. The force of the liquid to vapor expansion helps remove any molten metal from the cutting area.

The use of gasoline as a fuel also has a few inherent safety advantages over the use of acetylene. Gasoline is a stable compound which cannot explode by shock and does not burn while a liquid. Dropping a gasoline tank does not create a hazard of explosion. Gasoline must have oxygen or air to burn and vapors of gasoline will burn only in a comparatively narrow band of concentrations—between 1.3% and 7.8%. In comparison, a tank of acetylene may explode due to heat or shock without oxygen or air. Acetylene vapors will burn in a much broader band of concentrations than gasoline—between 2.5% and 80%.

In addition, acetylene is an odorless, colorless gas which makes leaks in an acetylene system difficult to detect and locate. A gasoline leak, however, is very visible and odorous. Problems from open valves, pierced hoses or loose hose nuts result in wet spots, which are easily detected. A gasoline leak can generally be found and corrected immediately before it becomes a hazard.

Additional safety features have also been incorporated into the overall oxy-gasoline torch system. Among the features is an automatic gasoline shutoff valve in the tank. When the tank is pressurized, this fast-flow ball check valve senses any sudden surges in the flow of gasoline and will snap shut and cut off flow in the case of a gasoline hose rupture. The filler cap also has two safety features. The first is a pressure relief slot which operates when the cap is being unscrewed. The second feature is a safety relief valve set at 35 psi. This prevents excessive pressure when the tank is exposed to external heat.

Another significant safety advantage of oxy-gasoline cutting is the portability of the tank. Even when full, the tank weighs only 30 lb., and it will do the same amount of cutting as a No. 5 acetylene cylinder weighing approximately 200 lb. This contributes to safety by reducing the hazards of strain and back injury and by speeding up system set-up and movement. The fuel tank is built to ASME code for unfired pressure vessels and carries UL, U.S. Coast Guard and U.S. Navy approvals.

In addition to the safety advantages, the oxy-gasoline torch offers faster segmentation and improved labor productivity. Depending on the thickness and conditions of the material, the

manufacturer states that the oxy-gasoline torch can cut steel 30% to 300% faster than the oxy-acetylene torch.

The 100% oxidation discussed above improves the cutting speed of the oxy-gasoline torch. Because there is no molten metal to re-solidify in the cut, a single pass of the torch is normally sufficient to make the cut. Grinding and chipping are not required to clean out the cut. With an oxy-acetylene torch, workers must frequently go back over a cut to remove the resolidified materials.

Furthermore, gasoline vapor is four times heavier than acetylene vapor. During operation of the torch, the weight of the vapor contributes to the speed of the torch. With the pre-heat flame lit, pressing the cutting oxygen lever reduces oxygen supply to the pre-heat flame. Therefore, some of the gasoline vapor remains unburned in the pre-heat flame but travels down into the cut with the cutting jet oxygen. As the fuel travels down the jet, it continues to burn, giving off more heat while deep into the cut. With acetylene, this secondary combustion is limited in depth, but with the heavier gasoline fuel, secondary combustion goes deep into the steel providing superior performance on thick materials. Oxy-gasoline cutting is well suited for difficult cutting jobs such as laminations, manganese, armor plate, and dirty or rusty metals. The cutting speed of the oxy-gasoline torch is also enhanced because gasoline flames release their heat energy faster than acetylene, and therefore heat the steel to ignition temperature faster. Finally, as the gasoline changes from liquid to vapor, its volume increases over 160 times. This rapid expansion of the gasoline into a vapor increases the velocity of the preheat flame.

"SAFER, BETTER, FASTER, AND CHEAPER" OXY-GASOLINE CUTTING TORCH

The oxy-gasoline cutting torch performed at least as well as the oxy-acetylene torch, in every trial. Tabulated results (Table 1), in terms of lengths and times of cuts and cost of the two technologies, show that despite the oxy-gasoline torch's initial price, it will pay for itself in fuel savings in a short time.

Table 1
Overall Results of Technology Demonstration

Demonstration Summary	Baseline Technology Oxy-Acetylene	Innovative Technology Oxy-Gasoline
Equipment Cost	$299	$845
Overall Length of cut	68 m (225 ft)	76 m (250 ft)
Overall Cut Time	130 min	97 min
Overall Cutting Rate	31 m/hr (104 ft/hr)	47 m/hr (155 ft/hr)
Fuel Consumed, Cost	6 bottles, $192	15 gallons, $18

From the data, one sees that fuel consumption from the oxy-gasoline torch is one-tenth the cost for the acetylene torch. Savings in cutting time, and therefore labor costs, are also realized in using the oxy-gasoline torch. For example, for the 2.54cm (1 in.) thick portion of the drum crusher, the oxy-gasoline torch cut 30% faster than the oxy-acetylene torch. For thicker materials, the speed difference is much greater. For the 11.43cm (4.5 in.) thick axle on the Jaw Crusher, the oxy-gasoline torch took only five minutes to cut while the acetylene torch took 15 minutes, showing that it can cut three times faster. Averages of the demonstration for various

thicknesses of material showed that the oxy-gasoline torch cuts twice as fast as the oxy-acetylene torch. This is shown clearly in Table 2.

Table 2
Examples of Cutting Demonstrations

Item Description	Baseline Technology Oxy-Acetylene Cutting Torch				Innovative Technology Oxy-Gasoline Cutting Torch			
	# Cuts	Length, in	Time, min	Rate, in/min	# Cuts	Length, in	Time, min	Rate, in/min
Shield Wall (2" thick)	1	24	13	< 2	3	72	20	>3.5
Shield Wall (2" thick)	1	48	27	< 2	1	48	13	>3.5
Axle shaft (4.5" diam)	1	4.5	15	< 1/3	1	4.5	5	~ 1
Drum crusher (1" thk)	2	16	8	2	1	16	6	2.67
Drum crusher (1.75")	3	19	12	~1.5	3	19	10	< 2
Drum crusher (2" thk)	3	20	15	~1.33	2	24	8	3
Pulverizer Base (cast)	-	-	-	-	-	-	-	-
Totals	*11*	*131.5*	*90*	*~1.5*	*11*	*183.5*	*62*	*~3*

Another important component of the demonstration was collection of qualitative as well as quantitative data. Debriefing interviews of the laborers involved in the operations of the new technology showed that operators would actually favor the oxy-gasoline torch over the acetylene torch on thicker or more difficult cuts. Operators said there was a learning curve to using the torch because it should not be held as close to the cut as the acetylene torch, but that the speed of the torch was impressive. A ratings system used to help quantify the workers' opinions about the oxy-gasoline torch shows that the results lean toward rating the torch as excellent.

B&W-NESI, the Fernald site subcontractor, reported positive experiences with the oxy-gasoline torch despite their initial skepticism. In fact, during the training session and before the actual demonstration, the subcontractor recognized the potential for the torch and immediately purchased one for use in the specific task of segmenting a massive ammonia tank. The tank had been left until the end of the D&D project at Plant 4 with the idea that it could be cut-up using the track mounted hydraulic shears used to size reduce the building's structural steel. It was discovered that the tank walls, approximately 3.175 cm (1.25 in.) thick, were too thick for the shear to cut. In addition, it had taken an acetylene torch 60 workhours to cut a 91.44 cm (3 ft) diameter hole in the tank to allow for shear-jaw insertion. The oxy-gasoline torch was seen as a possible solution to this difficult problem and the torch, used intermittently over a two week period, successfully segmented the ammonia tank. To quote the subcontractor, "the torch worked as well as the vendor claimed it would and above our initial expectations."

IMPLEMENTATION OF OXY-GASOLINE CUTTING TORCH

On the basis of the demonstration and follow-on papers and presentations at conferences, sales of the oxy-gasoline cutting torch total 120 units sold. Table 3 provides the breakdown of the sales according to the user and location of use (i.e., domestic or foreign). Because of these sales and the success of the torch during the demonstration, the oxy-gasoline cutting torch is considered a resounding success in the DDFA arena.

Table 3
Purchases of Oxy-Gasoline Cutting Torches

Purchaser of Torch	No. Purchased	Domestic User	Foreign User
Commercial D&D Firms	8	7	1
DoD	100	0	100
DOE Sites	12	12	0

COMMUNICATING THE RESULTS

One of the most important efforts following the demonstration is to communicate the results of these unqualified successes. The communication as part of the LSDDP consists of written reports, video tapes, oral presentations and live demonstrations. The major items that have been produced are a technology fact sheet, an ITSR, a home page on the Internet, a technology video, and presentations at Pre-Bid Meetings for future D&D Projects. Each are described below.

Technology Fact Sheet-This is a one page color narrative brochure with pictures that describes the need for a particular technology, a description of the technology itself, the demonstration that was conducted, a summary of the technology demonstration results and contact names and phone numbers for additional information. This is currently available for distribution.

Innovative Technology Summary Report-This report is a document that provides an overview of the innovative technology. Included are a summary, technology description, performance, technology applicability and alternatives, cost, regulatory/policy issues and lessons learned. There also is an appendix with references.

Home Page-The LSDDP Project home page is part of the Fernald Site home page (www.fernald.gov). The home page include a description of the Plant 1 D&D Project, the LSDDP Project Organization, the process for selecting technologies, a list of technology needs, a list of the technologies selected for demonstration and their vendors, results of technology demonstrations, current status, and any upcoming activities. The home page is online.

Technology Video-This video (10–15 minutes) will show the baseline technology in operation, the innovative technology in operation, and will describe the demonstration results, benefits and lessons learned. It also provides contacts and references for additional information.

Presentations at Future Pre-bid Meetings-Fernald is providing information on the oxy-gasoline cutting torch at formal Pre-Bid meetings that provide an overview of the current D&D project. At the last Fernald Pre-bid meeting, for the Plant 5 Complex D&D project, it was found that 70% of the contractors represented at the meeting were not aware of the existence of the oxy-gasoline cutting torch, nor its benefits.

CONCLUSION

The oxy-gasoline torch has been successfully demonstrated as part of the Fernald LSDDP and was considered a resounding success. Not only did the oxy-gasoline torch perform safer, with cooler sparks and minimal metal slag, but it also was better for several other reasons. One

of these reasons was that it cut materials faster, a minimum of 30% in our tests and up to 300% faster than the oxy-acetylene torch, which was considered the baseline technology. It was also used to cut a tank that had not successfully been segmented using conventional techniques. The oxy-gasoline torch is also cheaper, using inexpensive gasoline rather than more expensive acetylene. Indeed, the cost of the fuel for the oxy-gasoline torch used was only one-tenth that of the oxy-acetylene torch. Prior to the LSDDP, B&W NESI did not carry the oxy-gasoline torch in its D&D "tool box." As a result of the LSDDP technology demonstration, it has been added.

The success of the demonstration has been communicated to other "end users," that is, those companies and DOE sites that are involved in D&D activities. But, as was shown by the pre-bid meeting, more communication is required to make this truly a DDFA triumph.