

**TECHNICAL DEMONSTRATION SUMMARY SHEET;  
Mega-Tech Blade Cutting Plunger**



### Summary

The Integrated Contractor Team of the Los Alamos National Laboratory (LANL) Large Scale Demonstration and Deployment Project (LSDDP) demonstrated the Mega-Tech Blade Plunging Cutter (BPC-4) and the Porter Cable's Tiger Saw model # 9737 for metal cutting. The demonstration took place at The Florida International University Hemispheric Center for Environmental Technologies (FIU-HCET) testing facilities to compare the innovative BPC-4 to the baseline technology, a reciprocating saw. Both Unistrut and 3" diameter steel pipe legs were removed from a glovebox mockup during the demonstration. These leg mockups were chosen because they are representative of legs on gloveboxes at Los Alamos National Laboratory (LANL) and Rocky Flats Environmental Technology Site (RFETS).

### The Need

Los Alamos National Laboratory (LANL) is currently retrieving crated oversized metal objects for processing and repackaging to meet the requirements for disposal at the LANL Solid Waste Disposal Area or for shipment to the Waste Isolation Pilot Plant for disposal as transuranic waste. Crates contain items such as gloveboxes, filters and tanks, which were packed in fiberglass-reinforced plywood crates in the early 1970s. To facilitate decontamination and size reduction of these large metal objects, appurtenances such as glovebox legs, electrical conduit, and other metal connections must be removed. Concurrently, the RFETS closure project is removing 8000 m<sup>3</sup> of gloveboxes from their facilities. The Mega-Tech Blade Cutting Plunger is a possible cost and risk reduction tool for use at these facilities and other DOE sites.

### The Technology

The BPC-4 is a portable hydraulic power cutting tool. It has a 4" blade and is a piston-forced plunging cutter that operates through a recess in the anvil, severing the metal in a guillotine fashion during the 8 second stroke. The cutter weighs approximately 28 pounds and is 28 inches in length. It has a "dead man" switch for safe operations. It can be supported with a tension device when working from scaffolding, a lift, or a ladder. The HPU-12 Hydraulic Power Unit is mounted on a cart powers the tool with an operating pressure between 5,000 and 6,000 PSIG. The HPU-12 requires 3 phase 440VAC/ 20 amps, and it weighs 360 pounds and can be located remotely from the cutter in a non-contaminated area.

The Porter Cable variable speed Tiger Saw is a handheld general purpose-reciprocating saw with quick-change blade clamp. The saw requires 120 VAC drawing 9.6 Amps. Saw weighs 9 pounds and is 17" long.

**The Demonstration**

The demonstration was conducted at the FIU-HCET facility simulating a radioactive environment typical of operation in the LANL Solid Waste Operations area. A mockup of a two station glovebox was constructed with options for two types of legs; Unistrut as commonly used at LANL and three inch pipe, as commonly used at RFETS. The mockup legs were positioned to be inconvenient, as common and expected in the LANL crated waste project. The tools were demonstrated by experienced waste management technicians from LANL.

**The Results**

Performance comparison of the innovative technology demonstration versus the baseline technology were as follows:

- The BPC-4 cuts significantly faster than the saw on both 3" pipe and Unistrut legs
- Mobilization of the BPC-4 takes longer than the saw
- BPC-4 produces almost no secondary waste

Technician consensus was that the innovative technology was easy to learn and use, but was heavy and awkward for use in inconvenient positions. Using the weight balance attachment would make the cutter easier to use. Technician remarks on the baseline were mixed. Although the technology was lighter and easier to maneuver, the vibrations during operation made it uncomfortable to operate. The cut material edges were both sharp and represented a cutting hazard. Table 1 & 2 show the corresponding cutting rates and metal shavings produced for the innovative and baseline.

**Table 1. Cutting Speeds**

Type of Leg	Cutting Rate ( inches/minute)	
	BPC-4	Tiger Saw
Unistrut	15.82	9.62
3" Pipe	8.16	4.94

**Table 2. Metal Shavings Produced**

Type of Leg	Metal Shaving (gram/inch)	
	BPC-4	Tiger Saw
Unistrut	0.0	0.357
3" Pipe	0.149	1.682

**Future Applicability**

The Mega-Tech tooling system can increase safety and reduce the time for metal cutting and volume reduction on deactivation and decommissioning projects. The technology can be applied at private and government sites.

**Benefits**

- The operation of the BPC-4 is safer procedure because of the "dead man" switch
- The BCP-4 shielded blade reduces the potential of cuts to personnel and PPE
- The BPC-4 cuts faster than baseline
- The BPC-4 produces almost no metal shavings.

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