

ABSTRACT

The Rocky Mountain Oilfield Testing Center (RMOTC) conducted a test of "Buffy" The Pipe Cleaning Machine at DOE's Naval Petroleum Reserve #3. Plan B Pipeline, Inc. manufactures a portable, electric-powered wire-wheel machine that removes coating for pipeline inspection and repair operations. The equipment is designed to provide an alternative to costly reconditioning methods. This report documents the equipment performance and the results of the "Buffy" test.

The purpose of the test was to demonstrate the speed and effectiveness of "Buffy" and to determine if the pipe surface will readily accept new coating. The test showed that "Buffy" does deliver a pipe surface that will accept a new coating without further work having to be done to the surface of the pipe. The speed at which "Buffy" operates varies with the type of coating to be removed.

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INTRODUCTION:

When production facilities were installed they were designed to last for 20 to 30 years. Some of these facilities are now reaching or surpassing their original lifetime expectations. The producing/pipeline companies are now faced with the decision of recoating or replacing their pipelines. Recoating operations require the removal of damaged coating and the application of new coating in its place.

Traditional coating removal methods include sand-blasting, hydro-blasting, or manual removal of existing coating and the application of new coating in its place. Replacing the pipeline is very expensive. Sand-blasting and hydro-blasting require specialized equipment and a continuous supply of sand or water as the stripping medium. Both of these methods require the disposal of large quantities of sand or water. Sand blasting can have a detrimental effect on the surface of piping. Manual removal of the coating is very labor intensive. These traditional methods are all expensive or labor intensive and in some cases impractical.

"Buffy" the pipe cleaning machine is a compact, portable, electric-powered unit that requires a generator to run, but no stripping medium is brought in to remove the old coating from the pipe. "Buffy" is comprised of motorized wire brushes that are mounted in a rigid band that hinges and locks around the pipe. "Buffy" was also equipped with a push-button "Deadman" type shut-down safety switch that would shut the machine down immediately if the operator released it. The equipment is manually rotated and moved along the pipe for coating removal.

PROCEDURE:

This test was carried out in the Used Parts Warehouse located at the Naval Petroleum Reserve #3 Oilfield. "Buffy" was connected to an existing electrical supply for the test, but typically is powered by a portable generator with three-phase 480-VAC service. The test was conducted on three - 9' sections of 6" coated pipe, two of which were "flood-coated" and the third was "line-wrapped"; these were standard methods of coating available to industry before the polymer based coatings were in common use. The "flood-coated" pipe coating was 3/16" thick and the "line-wrapped" coating was 1/8" thick. The sections of pipe were secured to pipe stands which were placed inside a containment enclosure, which provided an easy means of gathering and containing the stripped coating for disposal by Plan B, Pipeline, Inc.

THE TEST

1. The first section of "flood-coated" pipe was secured to the pipe stands. Two operators manually positioned "Buffy" on the pipe. "Buffy" was activated, and the coating-removal process began. The tension on "Buffy"s cone-shaped wire grinders were adjustable which allowed the operators to fine-tune it for maximum effect. Project personnel discussed equipment modifications for the addition of ammeters that would indicate loading of each brush and provide a means of troubleshooting power problems. "Buffy" was able to be run in a stationary position with no adverse effect on the pipe.
2. The second section of "line-wrapped" pipe was secured to the pipe stands. Two operators manually positioned "Buffy" on the pipe. "Buffy" was activated, and the coating-removal process began. "Buffy" was able to remove 5'8" of coating in 13 minutes. The process would therefore require 4 hours 12 minutes for 100'. Upon inspection, the pipe did not show any

detrimental effects that were caused by "Buffy" to the surface of the pipe. All of the old coating was removed from the pipe and the surface would readily accept new coating.

3. The remaining section of "flood-coated" pipe was secured to the pipe stands. Two operators manually positioned "Buffy" on the pipe. The coating was first "loosened up" with a hammer, then "Buffy" was activated, and the coating-removal process began. This method greatly increased the speed at which "Buffy" performed. "Buffy" removed 6'0" of coating in 5.18 minutes. The process would therefore require 2 hours for 100'. Upon inspection, the pipe did not show any detrimental effects that were caused by "Buffy". All the coating was removed from the pipe and the surface would readily accept new coating. "Buffy" even removed the coating from mill marks on the pipe without removing any metal portion of the pipe.

CONCLUSIONS:

The test demonstrated that:

- ◆ "Buffy" provides an effective means of removing old coating from the surface of the pipe without detrimentally affecting the pipe.
- ◆ The speed at which "Buffy" operated was greatly increased when hammering of the coating was implemented.
- ◆ "Buffy" is a portable unit that could be easily transported to remote areas that would not be practical for traditional methods.
- ◆ As "Buffy" removes the coating, loose sections of the coating are readily apparent and sometimes even fall off the pipe. When the coating is removed by "Buffy" it leaves a clear distinct stopping point that leaves no doubt that the old coating is adhered to the pipe.

Potential benefits of "Buffy" include:

- ◆ The system could provide economic benefits over traditional coating removal units through reduced material handling, disposal costs, and operator labor.
- ◆ Plan B Pipeline, Inc. intends to market this tool in the petroleum industry. They are currently developing an explosion-proof model and an adapter that would collect all coating in a catch bag for disposal, for application in the asbestos market.
- ◆ The model tested was designed for 6" to 8" pipe and had a total of 4 brushes mounted 900 apart. Larger pipe requires more brushes to be mounted on the rigid band. Each electric harness accommodates two pipe sizes, but the rigid band needs to be changed for each pipe size. The smallest "Buffy" accommodates is 2" and Plan B Pipeline, Inc. is currently developing a 48" model.

- ◆ "Buffy" could be utilized on jobs where a pipeline has been repaired and needs to be cleaned up and coated while still in service.

ACKNOWLEDGEMENTS:

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RMOTC is operated by Fluor Daniel (NPOSR), Inc., the Management and Operating Contractor for the DOE's Naval Petroleum and Oil Shale Reserves in Colorado, Utah, and Wyoming. Project work was directed by Project Manager, Brian L. Meidinger, and supported by Engineering Technician, Dan Kelly.

RMOTC's goal is to partner with the oil and gas industry to improve productivity, by field testing new petroleum technology, evaluating new equipment and techniques, disseminating information to industry, and conducting training. For more information, contact the Rocky Mountain Oilfield Testing Center, 907 North Poplar, Suite 100, Casper, Wyoming 82601; phone (888)599-2200.

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