

## Freeport McMoRan (FMOG) Utilizes Mobile Pipe to Value Engineer Produced Water Line

The Los Angeles oil basin is characterized by light crude oil and well depths ranging from 2,000 feet to over 10,000 feet. The wells include primary production, as well as mature wells that use the “waterflood” recovery methods for extraction. Producers use this method to push water into underground formations, flushing a large amount of oil into nearby producing wells. The method increases production and recovery of oil from the well itself. The mixture of oil and water extracted from the well is transported by steel pipelines to tanks where separation occurs.

Freeport McMoRan Oil and Gas (FMOG) planned to install a 4,200-foot, 12-inch pipeline to convey oil and high-temperature produced water to holding tanks. Because of the combination of high temperatures and the oil/water mixture, the pipeline needed to be protected using a high-solids, novolac epoxy. Field connections required the use of an insert sleeve and a pre-qualified welding technique to protect the lining. As with most infrastructure projects in L.A., a straight run of pipe would prove impossible. Mobile Pipe Lining and Coating, Inc. helped value engineer the pipeline by proposing pre-fabricated spools for easier installation of the road crossings and bends that ran throughout the property, resulting in substantial cost savings. Each spool consisted of a 40-foot section of pipe connected to a single bend. The use of pre-fabricated fittings reduced from 181 to 119 the number of sleeves and in-field welds. FMOG estimated a reduction of 30 days to its schedule by incorporating the pre-fabricated fittings.

<b>Pipeline Details and Project Summary</b>	
Project:	12” Pool Line
Location:	Los Angeles, CA
Length:	4,200 LF pipe and fittings
Pipe Size:	12” API 5L
Lining:	Enviroline® 405HT
Coatings:	
Buried:	Enviroline® 376-60
Above Ground:	Sherwin Williams Macropoxy® 646 3 coat epoxy urethane system
Owner:	Freeport McMoRan Oil and Gas
Contractor:	PCL Bakersfield

In addition to value engineering fabricated specials, Mobile Pipe provided a web-based project management site (Figure 1 below) for use by FMOG construction supervisors. The site provided FMOG with 24/7 access to review completed work, QA/QC results for finished materials, and weekly updates of completed materials ready to ship. The website facilitated scheduling installation contractors, on-site inspectors, and pickups and deliveries, all without the need for daily phone calls.

As an SSPC-QP3<sup>SM</sup> certified facility, Mobile Pipe has a continuous quality improvement program. Figures 2 and 3 below show the normal distribution curve for machine-applied and hand-sprayed exterior pipe. The data allows Mobile Pipe to adjust procedures accordingly in order to increase efficiency. All of this QA/QC data is available to the customer on the project management website and can be used to create a customized report.

### CUSTOMER QUOTE

“Mobile Pipe was essential in enabling FMOG to succeed on this project. The value of lining fabricated fittings saved us a substantial amount of time in the field and allowed the project to come in under budget and on time. The project management website allowed us to view progress and schedule inspections as needed. The transparency and quality of Mobile Pipe was refreshing for the size and scope of this project.”

– Chris Hardt  
Sr. Construction  
Manager FMOG

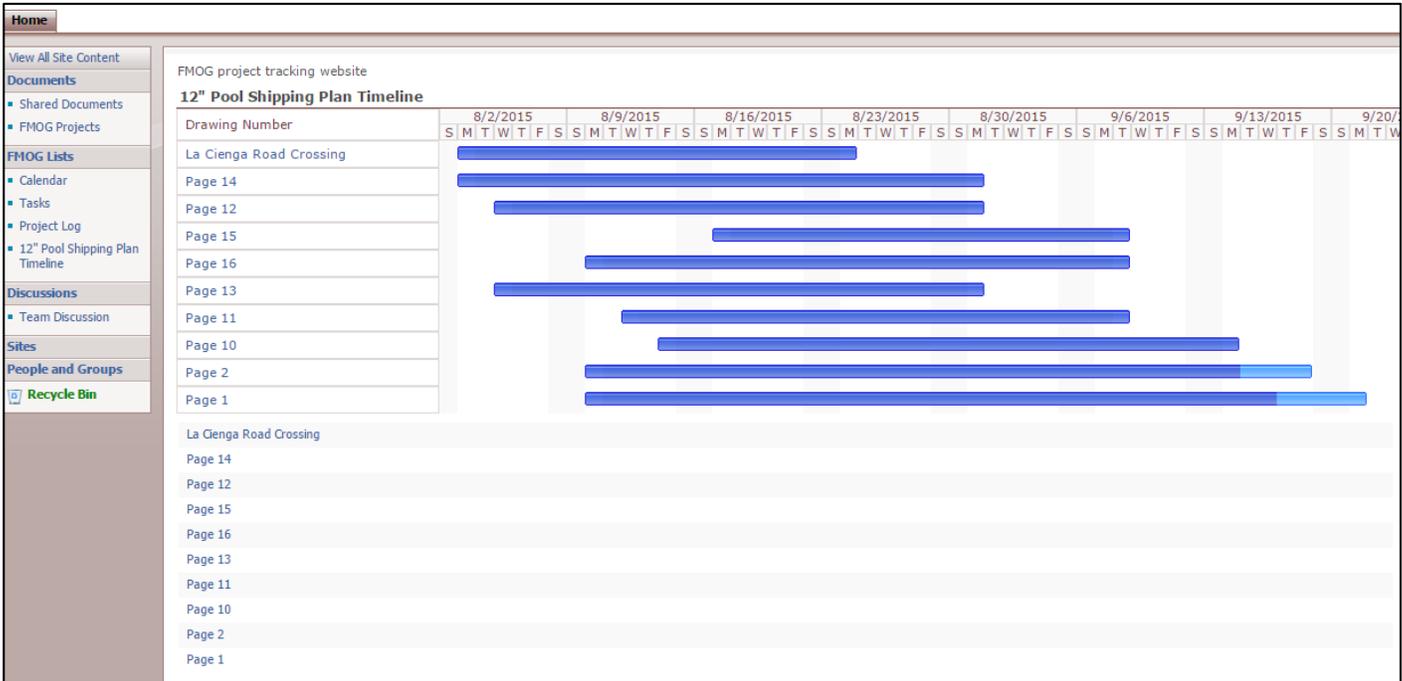


Figure 1: The Mobile Pipe website was customized based on drawing numbers and shipping dates. The site allowed senior construction managers to log-in and view progress of each drawing set to schedule crews, shipping dates, and on-site inspection.



Once FMOG confirmed that the product was ready for shipment, the finished set of spools and specials were shipped for easy installation in the field.



The fabricated specials drastically reduced the amount of field work required. Enviroline® 376-60 was used for road crossings due to its abrasion resistant abilities.

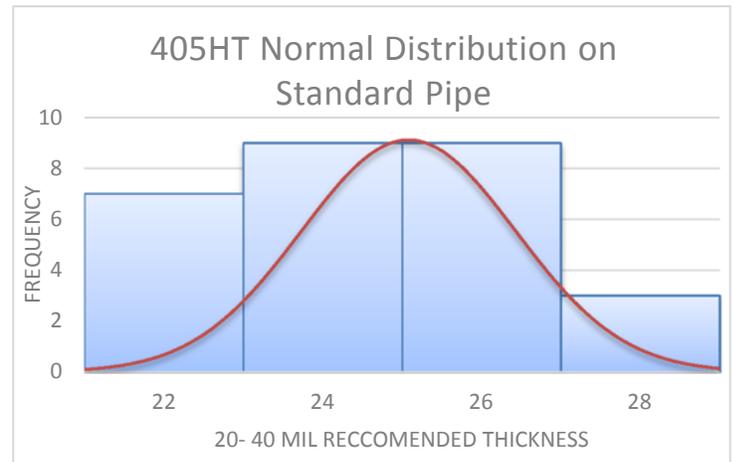
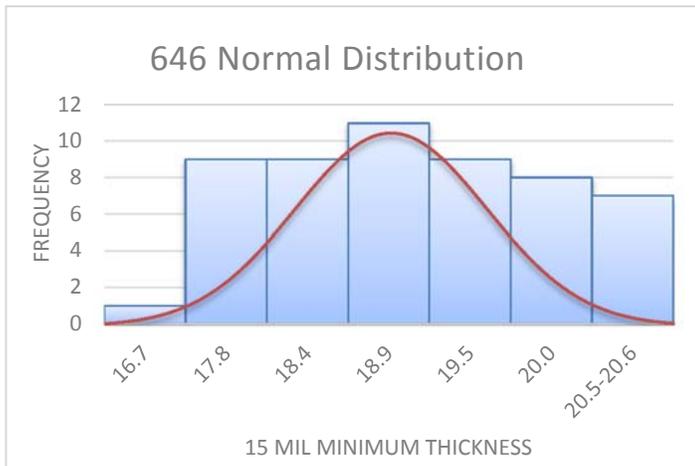
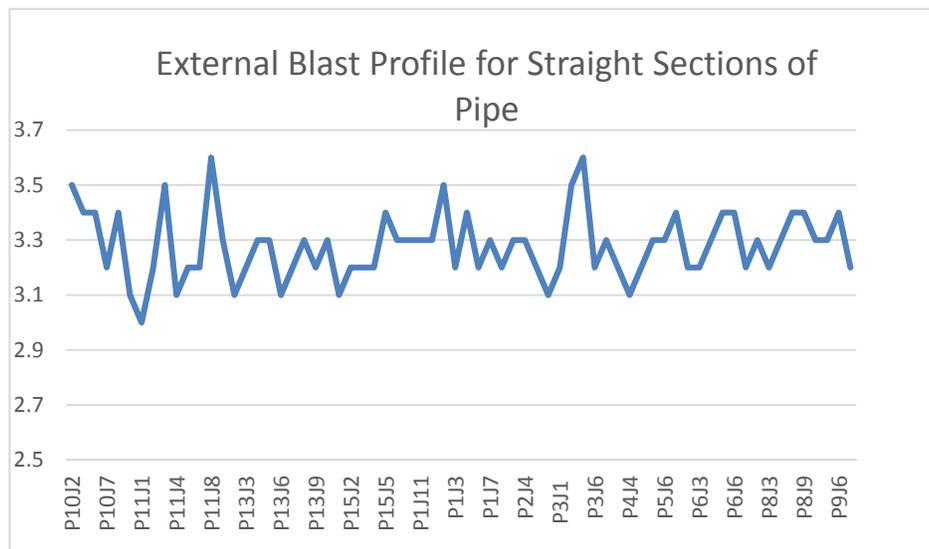


Figure 2: Capturing data for continuous improvement allows Mobile Pipe to adjust its production environment and equipment based on the product sprayed. This graph shows that 95% of the results are between 17.8 mils and 20.0 mils thickness with the minimum spec level of 15 mils.

Figure 3: The normal distribution curve shows the efficiency of lining pipe on automated equipment with 95% of the data between 22.5 and 27.6 mils thick. Automated equipment is a prime contributor to reproducibility, higher production rates, and consistent quality.



Since each piece of pipe or special receives a designated number, quality control can be tracked per piece of pipe or fitting. This allows Mobile Pipe to track data historically, as well as providing useful quality information to the customer in case problems arise in the field.

Enviroline® is a registered trademark of AkzoNobel.  
 Macropoxy® 646 is a registered trademark of Sherwin Williams.