INTERNAL CHEMICAL CLEANING OF STEEL PIPES
In-situ application

1493

May 1998
reprint of 8-1988

GENERAL ASPECTS

The "in situ" cleaning process for new and old, often corroded, pipe lines should be started with a thorough inspection of the pipe line. The internal diameter of the pipe line has to be checked and samples of rust and debris have to be collected to confirm that the cleaning operation will give the desired results.
Because the total cleaning procedure will consist of a number of pig runs, a lot of information can be collected about the vertical head and elevation profile of the pipe line which knowledge is of great importance for the final coating operation.
Besides that it is critical, it is very important that all pig trains containing water, chemical liquids and drying liquids are being launched solid, travel solid and are being received solid in order to clean the pipe line with success. Any condition that might impose a significant under pressure in any liquid train can cause air intrusion resulting in inadequate surface preparation and transfer of liquids to a position behind the train.
The improvement in cleanliness should be continuously monitored by analysing the cleaning and pretreatment liquids, followed by, if available, inspection through a camera pig.

New in situ blast cleaning methods have been developed (sand jetting system) which may be very useful also to recoat previously coated pipe lines.

Removal of Dirt
Dirt, sand, loose rust, loose mill scale, bolts, parts of welding rods, corrosion debris, loose scale and remainders of products previously transported to be removed by mechanical cleaning with wire brush pigs and scraper pigs followed by line washing with fresh water and solvents.

Degreasing
Degreasing is extremely important as the presence of oil or grease will interfere with the subsequent acid cleaning.
Detergent/water flushing requires a number of passes until analysis of the degreasing agents proves that all oil and grease is removed.

Chemical cleaning
All mill scale and rust has to be removed completely also from corrosion pits by several passes of prescribed strength inhibited acid solutions until the internal surface is near to white metal. The spend chemicals used for cleaning have to be monitored by analysis, the degree of surface preparation has to be checked by usual inspection.

Passivating
After the chemical cleaning all soluble salts have to be removed (often chlorides). To prevent flash rust formation a run with a prescribed concentration of inhibiting or passivating solution is to be carried out followed by rinsing the pipe line with fresh water until the water reach neutrality.

Drying
All moisture in the pipe line has to be removed in order that a dry steel surface is available for coating by sending selected drying solvents through the pipe line followed by pigging with foam pigs together with dry air or nitrogen ventilation. In this way a clean and dry surface is achieved, together with a dehumidified atmosphere within the pipe line giving optimal conditions to coat the pipe line in situ.