WEDNESDAY, AUGUST 24, 2005, P.M.

SESSION 46: INTERNATIONAL SYMPOSIUM ON PIPELINES FOR THE 21ST CENTURY IN HONOR OF DOUG BOYD

INTEGRITY MANAGEMENT — PIPELINE RISK & INTEGRITY MANAGEMENT
Sponsor: Iron and Steel Section, The Metallurgical Society of CIM
Room: Imperial Ballroom 1
Chairman: A. GLOVER, TransCanada Pipelines Ltd., Canada

PAPER 46.1 — 14:00 (KEYNOTE)
PROGRESSIVE MANAGEMENT AND ENGINEERING EVALUATION OF PIPELINE INTEGRITY.
M. GAO, R. MCNEALY, GE Energy, U.S.A. and
S. KARIYAWASAM, GE Energy, Canada

Pipelines are subject to multiple threats often requiring quantification of pipeline risk and engineering evaluation of in-line inspection and other data to effect discovery of conditions defined by the regulation. Public concern and pressure from regulatory bodies are accelerating the need for pipeline operators to formalize and intensify their approach to integrity management. Most operators need a phased approach to progressively adopt the most relevant and needed assessments. The organized and relevant assessment steps need to be introduced according to data available and maturity of the integrity management program. Each refinement to the quantification offers distinct advantages to the user. In this paper, the progressive integrity assessment solutions using quantitative methods are presented. Methodologies for engineering evaluation of integrity in-line inspection data for immediate and future integrity are summarized. Corrosion is used as an example, but the approach is applicable to any time-dependent defect based hazard. Strategies for pipeline integrity management are discussed.

PAPER 46.2 — 14:30
ADAPTABLE INSPECTION SENSOR FOR UNPIGGABLE PIPELINES.
R. TORBIN, Foster-Miller Inc., U.S.A. and
P. MUNDELL, GE/PII Pipeline Solutions, United Kingdom

There are many physical and operational obstacles in pipelines that make the passage of inspection robots impossible including:

- Small radius bends
- Low operating pressure
- Plug valves
- Large changes in pipe size
- No permanent access to the pipeline

The inspection of unpiggable pipelines requires the marriage of a highly agile robotic platform with NDE sensor technology operating as an integrated system. Foster-Miller and GE/PII are developing a robot that is essentially a battery powered, train-like platform. Both front and rear tractors propel the train in either the downstream or upstream direction. Like a train, the platform includes additional "cars" to carry the required payloads. The cars are used for various purposes including the NDE sensor module(s), the power supply, and data acquisition/storage components. The robot is designed with a slender aspect ratio and the ability to change shape as required by the physical obstacle presenting itself. The MFL sensor module must also morph itself through the physical obstacles, and thus, will require some level of segmentation. The segmented MFL magnetizers and transformable sensor module represent a major advance in the science of sensor technology and pipeline inspection.

PAPER 46.3 — 14:55
GEOTECHNICAL RISKS AFFECTING PIPELINES - THE BOLIVIA-BRAZIL NATURAL GAS PIPELINE EXPERIENCE.
H.R. OLIVEIRA and C. R. ARAGONEZ DE VASCONCELLOS, TBG, Brazil

Pipeline operation and maintenance necessarily involves geotechnical studies at points and areas with deflagrated instabilities or still to map and monitor areas prone to geotechnical problems.

Landslides, erosions and debris flows are some examples of natural hazards, that not rarely, can bring high consequences to pipelines, sometimes leading them to high stresses levels and ruptures. Bolivia-Brazil Natural Gas Pipeline has 2.593 kilometers since Rio Grande City in Bolivia until Canoas City, in south Brazil. The pipeline crosses a lot of types of geological fields and difficult topography. The south spread of the pipeline has the most prone areas to geotechnical hazards because of its hard topography combined with the variety of geological materials, such as, colluvium deposits and debris flow areas.

The aim of this paper is to present the right-of-way geotechnical risks that affect pipelines, presenting some practical remedial works done by TBG at Bolivia-Brazil Natural Gas Pipeline as well as the integrity plan and the adopted actions in way to prevent geotechnical accidents.

COFFEE BREAK — 15:30 – 15:45

PAPER 46.4 — 15:45

ON THE DEVELOPMENT AND USE OF LIFETIME PREDICTION MODELS IN PIPELINE INTEGRITY MANAGEMENT.

J. BEEN, F. KING, NOVA Chemicals Corporation, Canada and
R. SUTHERBY, TransCanada Pipelines Ltd.

With thousands of kilometers of buried oil and gas pipelines throughout the country, carrying flammable, high-energy hydrocarbons, the integrity and safety of this transportation and distribution network are paramount. The pipeline industry has the primary responsibility for pipeline safety and has in many ways taken the lead in dealing with safety issues. Over recent years, regulatory demands have increased, requiring operators to comprehensively evaluate their pipelines through indirect and direct inspections and to manage risk through integrity programs. Mechanistic and correlative models have been developed that assist in the prediction of pipeline integrity and the determination of reassessment intervals. These lifetime prediction models are based on decades of laboratory research as well as pipeline operating data, material data, and field monitoring data pertaining to soil conditions and CP. An overview is presented of an integrated approach towards the development of such models for the evaluation of external cracking and corrosion of transmission lines.

PAPER 46.5 — 16:10

PETROSLEEVE REPAIR TECHNOLOGY.

R. SMYTH, PetroSleeve Inc., Canada

A Steel Compression Reinforcement Repair Technique (PetroSleeve) system has been developed that has the ability to repair pipeline defects such as stress corrosion cracking (SCC) without requiring welding to the operating pipeline.
The Technology has been used to repair active cracking in ERW seam and cracking in the pipe body. All repairs were performed while the pipeline was in operation. This paper will discuss the engineering theory, testing performed to verify the engineering theory, and examples of actual sleeve installations.