



LDS system in NG Pipeline

TOMY ZACHARIA

GM (PJ-T&I)

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Leak Detection System in NG P/L

Statutory requirements

Procurement specifications

Theory of operation

Our installations – DPPL, DKPL and ETBPNMTPL

Statutory Requirements

OISD-STD-226 - Natural gas transmission pipelines and city gas distribution networks – Cl 14.7 - System should be available for detecting leaks of pipeline system. The capability of the leak detection system shall be evaluated and modified if necessary

G.S.R. 808(E) – (PNGRB) Technical Standards and Specifications including Safety Standards for Natural Gas Pipelines

- 7 (3) The continuation of operation of existing natural gas pipeline network shall be allowed only if it meets the following requirements, namely:-
 - (ii) The natural gas pipeline system has leak detection system in position compressor station, gas receiving and terminal station and is operative;
- Schedule 1D - Pipeline system should be equipped with following:
 - b. Leak detection system with provision for identification / location of leak and isolation of affected section.

Procurement Specifications

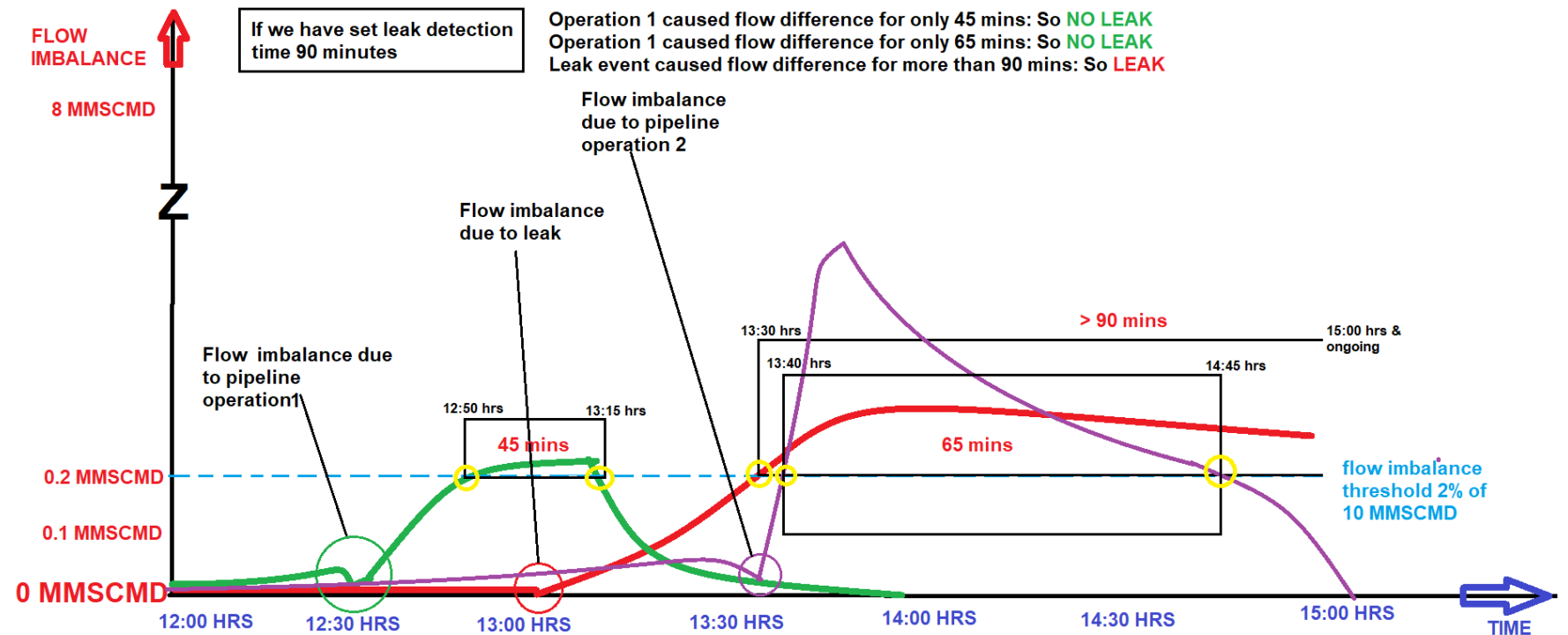
The following models (modules) are available:

- Real Time Pipeline Model – Simulation system
- Leak Detection and Leak Location – Detection system.
- Shut-in Leak Detection – Detection during shutdown of pipeline
- Pig Tracking – Tracking of Scrapper movement and arrival times
- Inventory Analysis – Line pack. Volume, mass and energy reports – Daily, monthly basis.
- Survival Analysis – Time for which Gas can be supplied post an interruption.

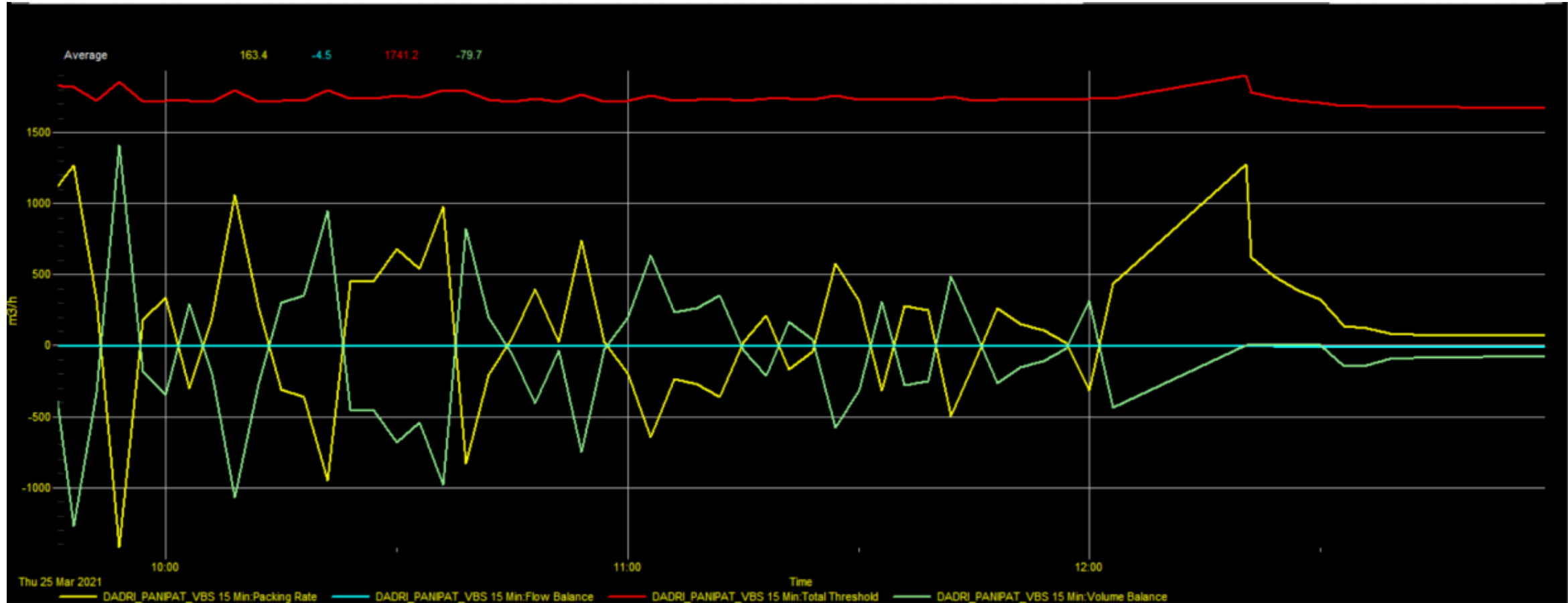
Sensitivity study to be done at 2%, 3%, 4%& 5% leak size. Study involves section wise, leak location accuracy vs leak size.

Theory of Operation - VBS

Pipeline is divided into VBS. Each VBS is bound by flow meters. The volume flow imbalance (measured net flow into the model minus output flow). This has to be corrected for meter errors, packing time differences due to elevation, compression or other pipeline operations. Injection and withdrawal causes transient differences in volume/packing.



Theory of Operation – VBS - contd



Theory of Operation

Vendor 1

- Leak quantity – Imbalance flow. Difference of input and output flows corrected for packing.
- Leak location – Leak location is worked out using Pressure balance model. LDU (Leak detection units are bound by Pressure transmitters or closed valves) are designation for each VBS. Leak location is worked out using pressure gradients from actual values.

Vendor 2

- Leak quantity - Imbalance flow. Difference of input and output flows corrected for packing.
- Leak location – Leak location is worked out based on flow discrepancy. The leg having the leak is assumed to be the leg with the largest volume imbalance. Leak location is worked out using flow discrepancy gradients.

Leaks are always referenced from Section start. Chainages are subsequently incorporated for easy reference of O&M.

System is tuned to get a balance between false alarms and detection thresholds. Very small leak detection will require long averaging cycles and large leak detection will require short averaging cycles.

Our installations

DPPL – 132 km. Operational since 2006. 6 SVs and 9 RTs. Single Volume balance section.

DKPL – 165 km. Commissioned in 2022. 4 SVs and 1 RT. Single VBS

ETBPNMTPL – 1269 km. Operational since 2019. 165 km in service, balance under construction. 2 Nos. Dispatch terminals, 25 RTs. 12 VBS.

Data is updated at 10 second interval on Optic Fiber. At 2 min. interval on GSM APN Network.

Products – Emerson ESI PLM and Atmos SIM.



Discussion
