

Leak Detection Program Management (RP 1175)

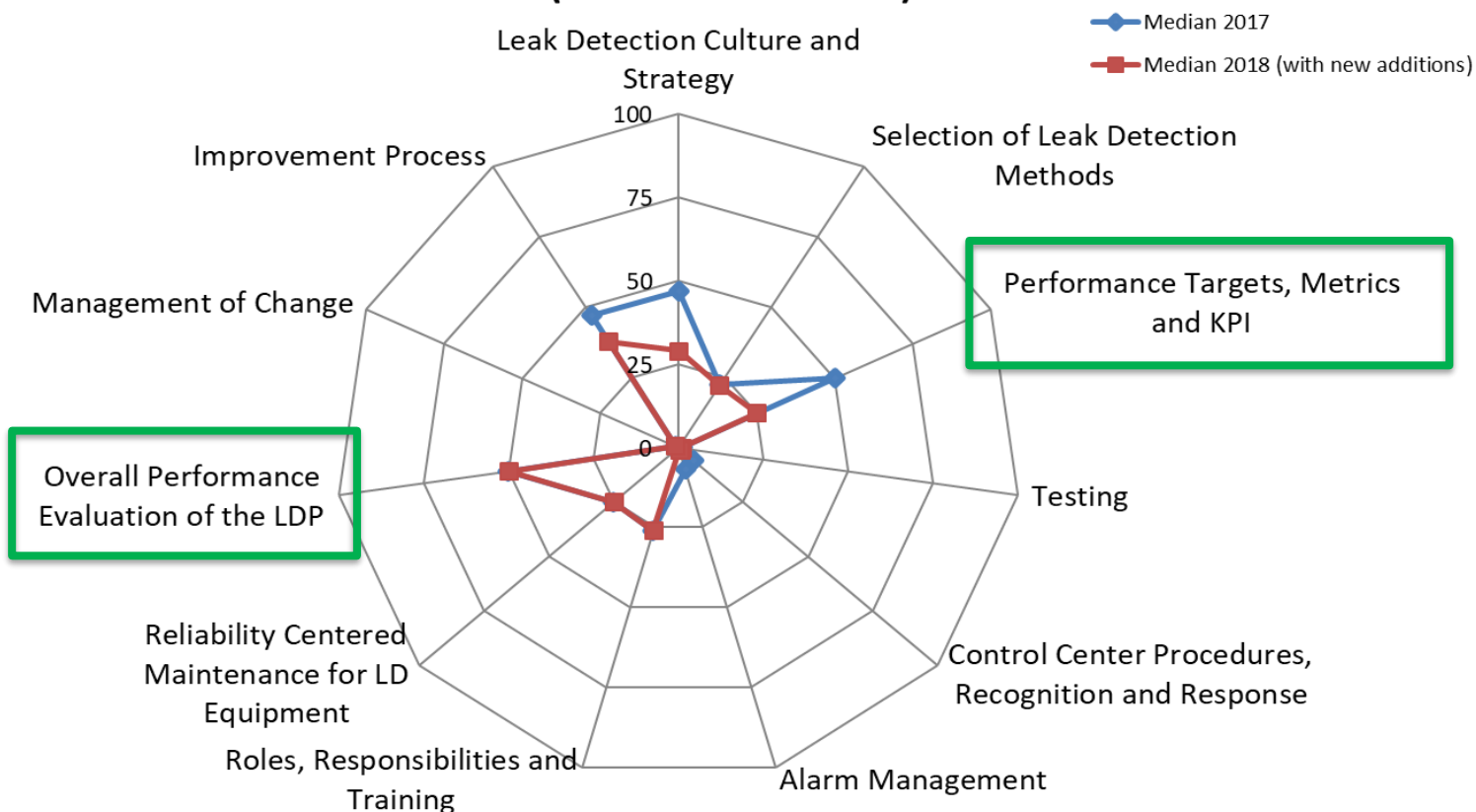
April 24-26, 2018 | St. Louis, Missouri

Agenda

- Introduction
- Part 1 - Presentation from Chris Hoidal (*PHMSA*)
Audience Q/A (~5 minutes)
- Part 2 - Presentation from Christine Frazier-Hollins (*Chevron*)
Presentation from Marieli Romero (*TransCanada*)
- Part 3 - Audience Q/A (~15 minutes)
- Conclusion

Gap Assessment Industry Results

2017 and 2018 (with new additions) Median

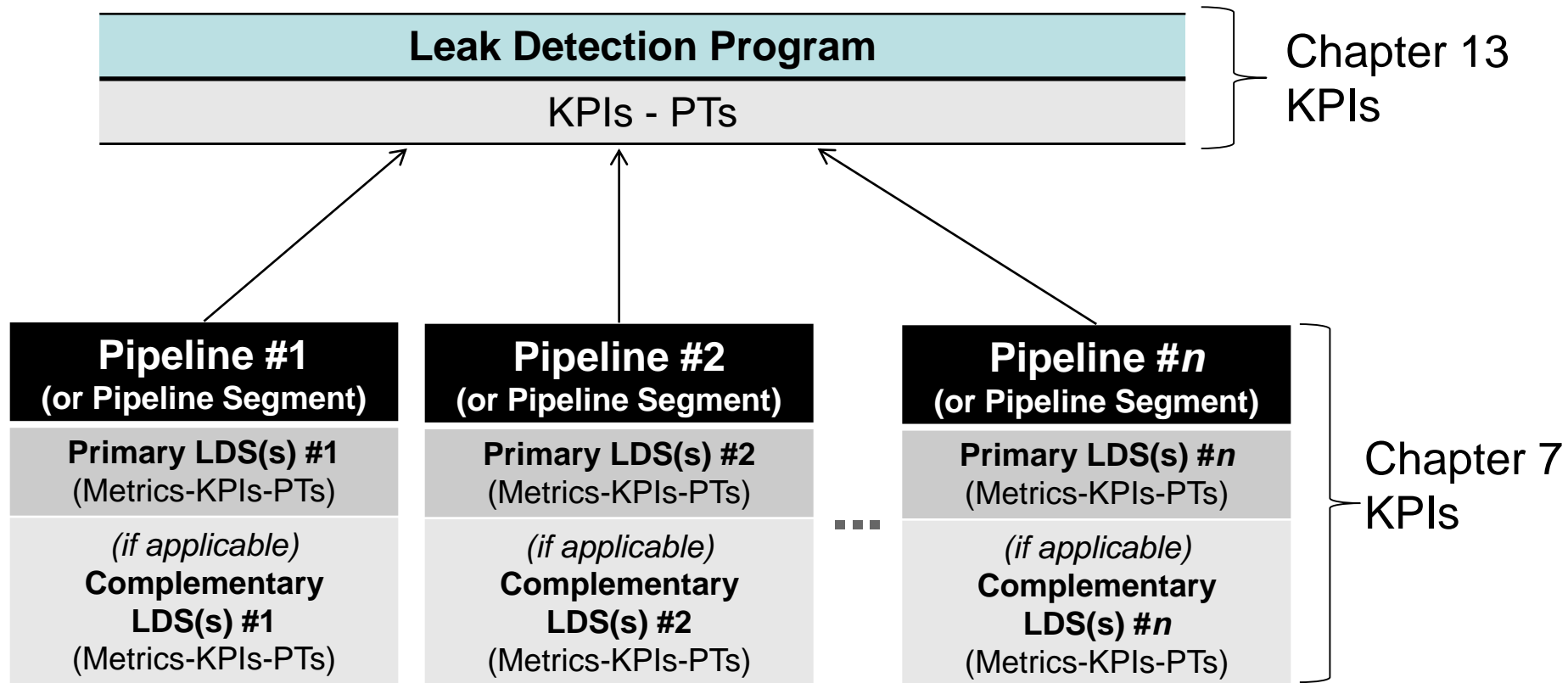


Performance Targets, Metrics, and KPIs (Chapter 7)

- Relationship of the terms
 - Metrics - defines the overarching qualities desired from the leak detection system (LDS)
 - KPIs - specific measure(s) of the metric
 - Performance Targets - Values used to measure KPIs that determine if the metric goals are being achieved
- Example (*tying it together*)

Metric	KPI	Performance Target
Accuracy	Leak Location	+/- 5 miles

LD System(s) KPIs vs LD Program KPIs



Update on Leak Detection Regulations, 1175 Metrics and Enforcement

2018 API Pipeline Conference
April 25, 2018

By
Christopher Hoidal
PHMSA Senior Technical Adviser



PHMSA Final Rule

OQ Rule Issued 1/23/17 – Control Room Staff Training
- § 195.446/192.631 Control room management

- team training for both controllers and others who would reasonably be expected to interact with controllers (control room personnel) during normal, abnormal or emergency situations
- roles, responsibilities, qualifications of others who have the authority to direct or supersede technical actions of the controller



Regulatory Developments

- Hazardous liquid final rule posted January 2017 was pulled back
 - Version posted included the Expanded Use of Leak Detection System for Non HCA areas
 - Did not include specific performance metrics
- Considering an NRPM to address rupture detection, spill/release mitigation, and valve placement to reduce spill volume
 - It would have some performance metrics



Continue Use of Standards

- API RP 1175 (Leak Detection Program Management)
- API RP 1168 (Control Room Management)
- API RP 1130 (Computational Pipeline Monitoring)
- API TR 1149 (Pipeline Variable Uncertainties and Their Effects on Leak Detectability)
- External Sensors - External sensing is touched on in 1130 & 1175



Areas for Improvement “Front End”

- Use API 1175 to guide further LD improvement through Pipeline System and Management Changes (Use Metrics)
 - More Accurate & Repeatable Instrumentation
 - Add Instrumentation – Meters, Pressure, External, etc.
 - More “lock ups” to verify pressure holds
 - Adjust operating parameters for more settled flow regimes - Continue to enhance modeling



PHMSA Opinion on 1175 Metrics

Keep Metrics for both Individual P/L System and Program KPIs separated

- System KPIs should focus on Reliability, Accuracy, Sensitivity, and Robustness
- Robustness strategy is lacking with respect to lack of pressure sensors in hilly terrain and both sides of valves, valve vaults external leak detection, ground patrols in hard to fly areas.
- All about complementary coverage for different operating leak detection profiles!

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PHMSA Opinion on 1175 Metrics

Segregate System and Program KPIS & Metrics

- Program KPIs and Metrics should focus on Level 3/4 or Leading Indicators on system
 - Non leak alarms (cause identified?), Abnormal Operations, and loss of communication.
 - Conduct Lock up tests or find static leaks – Non steady state conditions.
 - Percentage of Pipeline covered, e.g. external, sensors in low lying areas – Where are you blind?
- Program KPIs and Metrics– Level 4
 - Are centralized Control Rooms providing better training, leak recognition, and response? How many MOCs are they dealing with each year? Are alarm setting reviewed annually?

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Enforcement Strategy

- Validate – Does the leak detection system meet the unique characteristics of the pipeline, e.g. are there sufficient sensors in hilly areas to monitor the line during an idle state.
“Adequacy Easily Determined after Spill”
 - **Note: we frequently use Industry Standards for guidance even if not IBR**
- Verification – Does the LDS comply with minimum Federal requirements.



Questions?

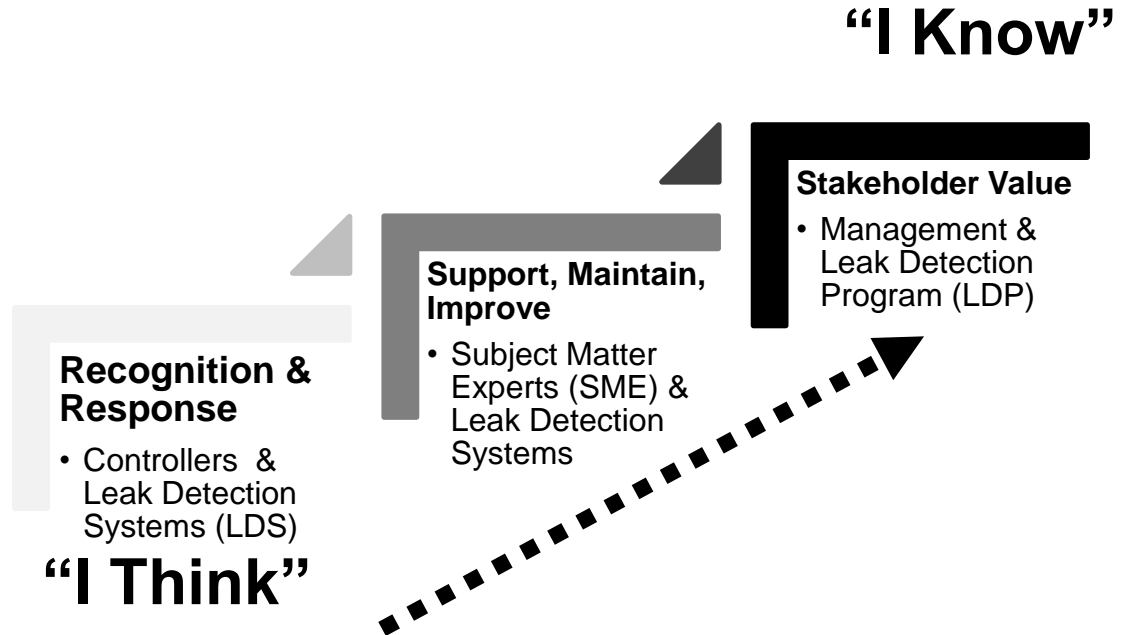


Chevron Pipe Line KPI Overview: Leak Detection Systems & Program

April 24-26, 2018 | St. Louis, Missouri

Chevron Pipe Line Journey

- Moving from “I Think” to “I Know”
- Tiered approach – building on existing systems and interactions with stakeholders to align and form a comprehensive Pipeline Leak Detection Management System



KPI for Recognition & Response

- Type: **Program Level** - *Reliability & Sensitivity*
- Audience: ALL
- Leak Detection Systems Included:
 - Physical Inspection
 - Manual Observations
 - Computational Pipeline Monitoring (CPM)
- What is being tracked:
 - Controller response to Leaks and Incidents (inclusive of False Positives)
 - Quantifies controller response through evaluation of time started, time found, and time ideal
 - Self-reported by controllers
 - Evaluation/quantification via an impartial cross functional team

KPIs for SMEs: Support, Maintain, & Improve

- Types: **System Level** for CPM *Robustness, Reliability & Sensitivity*
- Audience: SMEs – Leak Detection Engineers
- Leak Detection Systems Included: CPM
- What is being leveraged:
 - Total CPM System(s) Alarm Count
 - Alarm Count vs. Tuning Threshold & Tuning Frequency
- Other Considerations for continuous improvement
 - Staff Trained in Leak Detection (%)
 - Operations, SME, Management
 - MOC Items Impacting Leak Detection (%)
 - Pipelines Covered by CPM (%)

KPIs for Stakeholders

- Types: **Program Level** for CPM *Accuracy, Reliability & Robustness*
- Audience: LDS and LDP Stakeholders
- Leak Detection Systems Included: CPM
- What is being leveraged:
 - API 1130 Test Results
 - CPM Performance relative to API TR1149 design curve
 - False Positive Indications per Month
 - Tracked by operation state/type, e.g. transient, batching
 - % Time a pipeline is shutdown due to leak alarms
 - CPM system(s) availability during pipeline operations (uptime/downtime)
 - Loss of CPM tracked by cause

KPIs Utilized & Being Developed

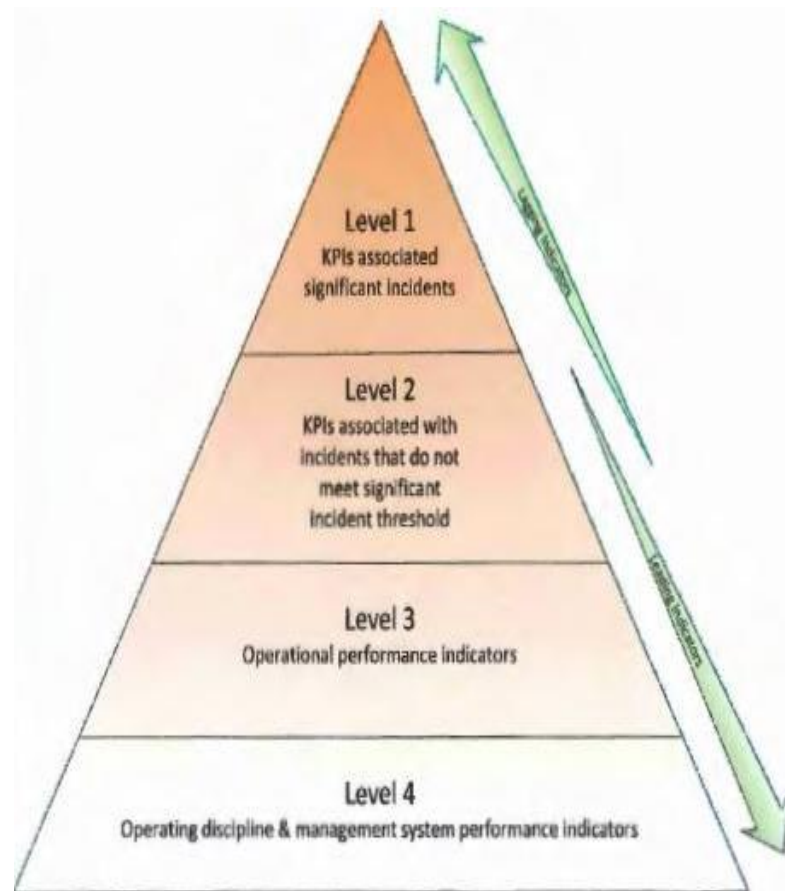
Key Performance Indicator (KPI)	Level	Category
Leak Indication Recognition & Response (CCEM)	Program	Reliability Sensitivity
Total CPM System Alarm Count	System	Reliability Sensitivity
Alarm Count v Tuning Threshold & Frequency	System	Reliability Sensitivity
Withdrawal Test Results	Program	Accuracy
Performance relative to API 1149	Program	Accuracy
False Positive Indications/Month	Program	Reliability
Pipeline Shutdown due to leak alarms (% Time)	Program	Robustness
CPM System Availability (Uptime/Downtime)	Program	Robustness Reliability

TransCanada Pipelines Leak Detection System and Program KPIs

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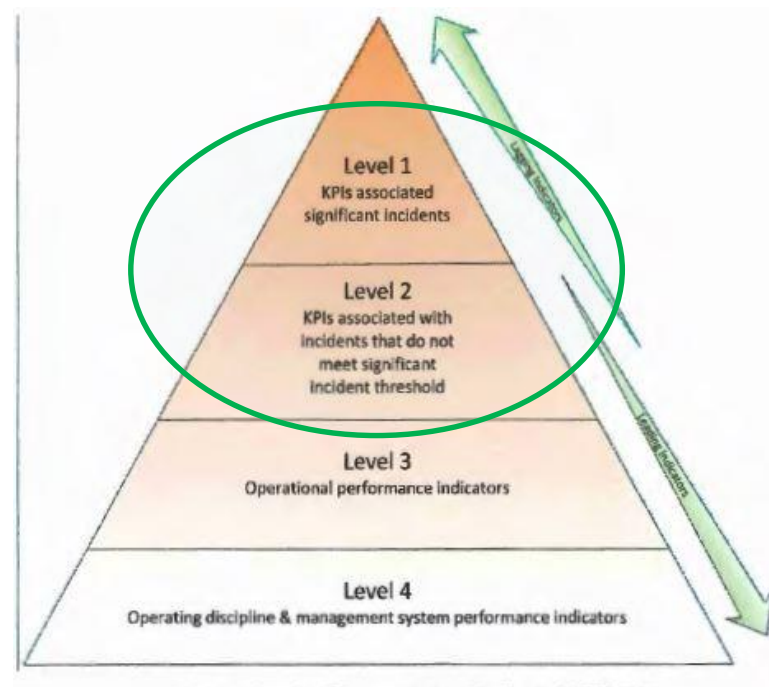
Agenda

- TC Lagging KPIs when LOC or Testing (Level 1-2)
- TC Leak Detection Systems KPIs
- TC Leading Leak Detection Program KPIs (Levels 3-4)
- TC Leading LP Control Centre Program KPIs (Level 4)



TransCanada Leak Detection Program KPIs (Lagging Level 1 and 2 measured when testing as mentioned on API RP 1175)

- Time between LOC and leak alarm
- Number of large leaks where continuous LD method alarmed
- Percentage error in identifying the leak location by the LDS



Note: where continuous LD method was designed to identify leak

TransCanada Leak Detection Program Goals & Objectives

1. Ensure high performing Leak Detection Systems

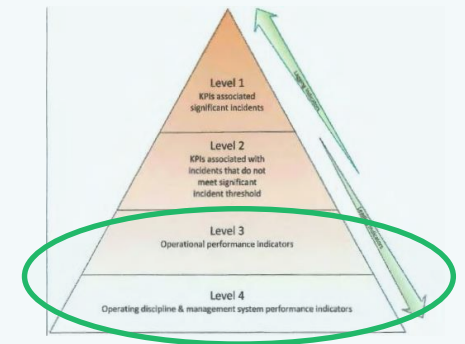
1.1 Maintain and improve LDS performance ➡ LDSs KPIs

1.2 Manage LDS issues and associated risks properly

2. Ensure Leak Detection Regulatory Compliance

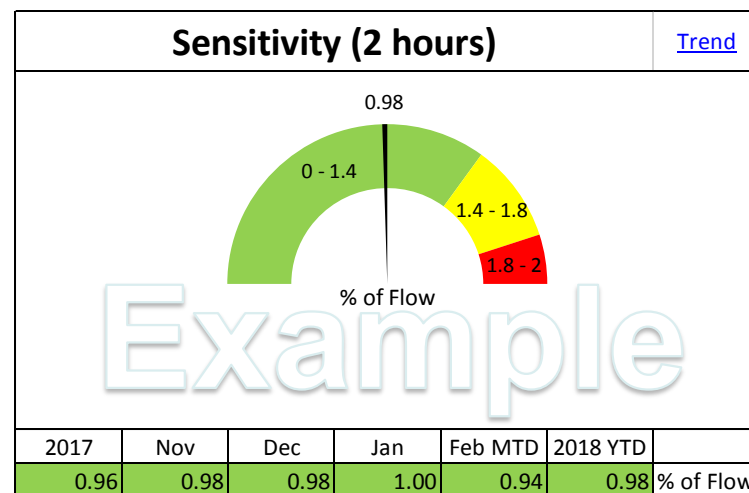
3. Implement innovative Leak Detection solutions

4. Lead continuous improvement of Leak Detection



TransCanada Leak Detection System KPIs (as defined on API 1130)

- Metrics: Reliability, Sensitivity, Accuracy and Robustness
- Metrics measured per Pipeline System and LDS (CPMS – Primary and Secondary)
- Performance Targets measured Daily, Monthly and Quarterly



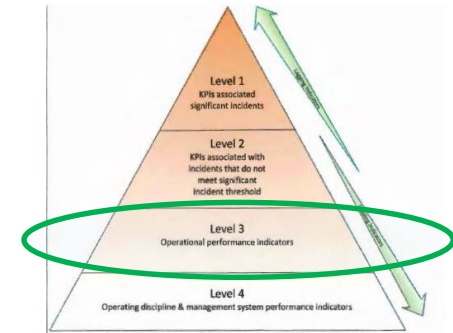
TransCanada Leak Detection System

KPIs Definitions

- Reliability: the total number of false alarms per day on the leak detection systems
- Sensitivity: the 120 minute averaging window sensitivity ((Threshold / Flow) expressed as a %) for an active flowing leak section
- Accuracy: the 120 minute averaging window absolute imbalance for active flowing leak sections
- Robustness: the total reduction in capacity impact (throughput) due to a LDS event (expressed as a %)

TransCanada Leak Detection Program KPIs (Leading Level 3 – Operational Performance)

1. Ensure high performing Leak Detection Systems



1.2 Manage LDS issues and associated risks properly

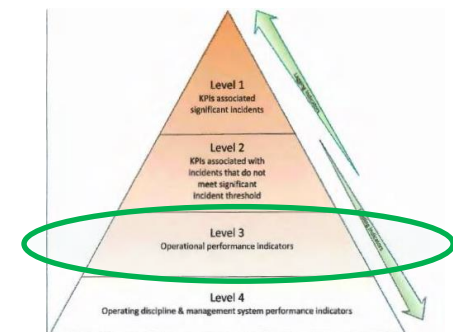
1.2.1 Number of high priority LDS issues addressed

1.2.2 Number of high risk defects detected before deployed

1.2.3 Number of LDS issues addressed and closed on time

TransCanada Leak Detection Program KPIs (Leading Level 3 – Operational Performance)

2. Ensure Leak Detection Regulatory Compliance



2.1 Meet LD regulations and follow industry recognized standards and practices

2.1.1 Number of Non-compliances from external audits

2.1.2 Number of high priority non-conformances addressed assessed, prioritized and scheduled within X days

TransCanada Leak Detection Program KPIs (Leading Level 4 – Operating discipline and management system performance)

3. Implement innovative Leak Detection solutions



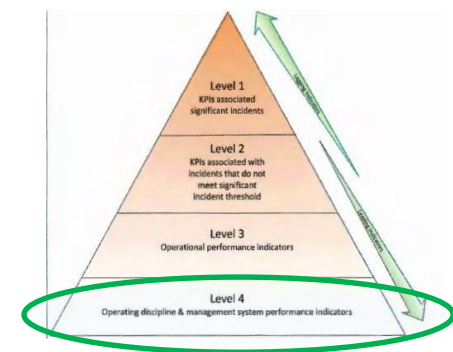
3.1 Provide LD Project Engineering Support to Major Projects

3.1.1 % of projects where LDE was engaged early on

3.1.2 % Punch list items closed on time

TransCanada Leak Detection Program KPIs (Leading Level 4 – Operating discipline and management system performance)

4. Lead continuous improvement of Leak Detection



4.1 Maintain effective and efficient LD Technology Management Portfolio

4.1.1 Number of successful implemented initiatives

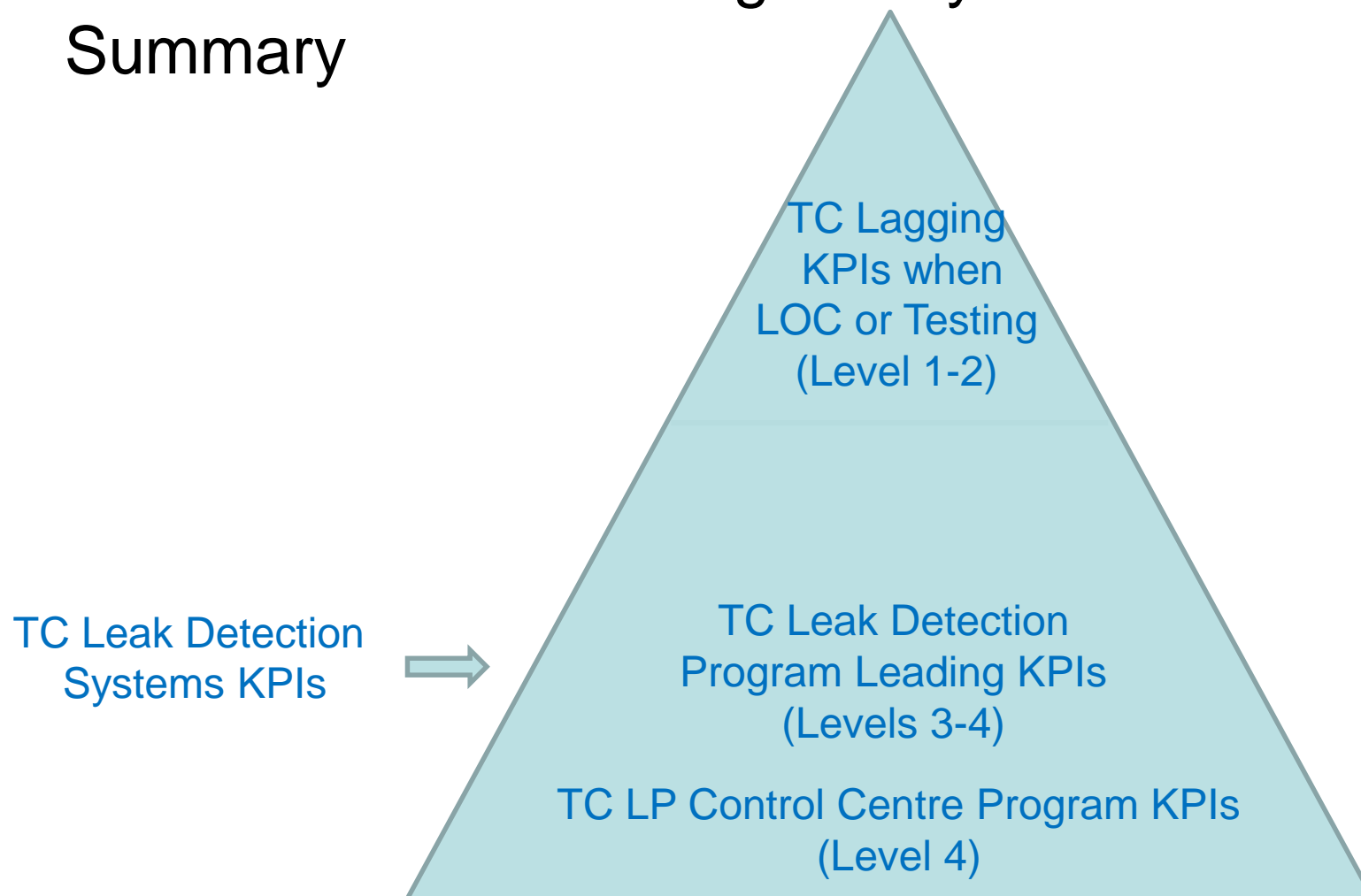


TransCanada LP Control Centre Program KPIs (Leading Level 4 – Operating discipline and management system performance indicators)

- Number of controllers trained on the LDS console
- Number of controllers cross trained
- Number of changes performed to the Leak Detection System
- Number of MOC notifications pushed to controllers



TC Leak Detection Program/System KPIs Summary



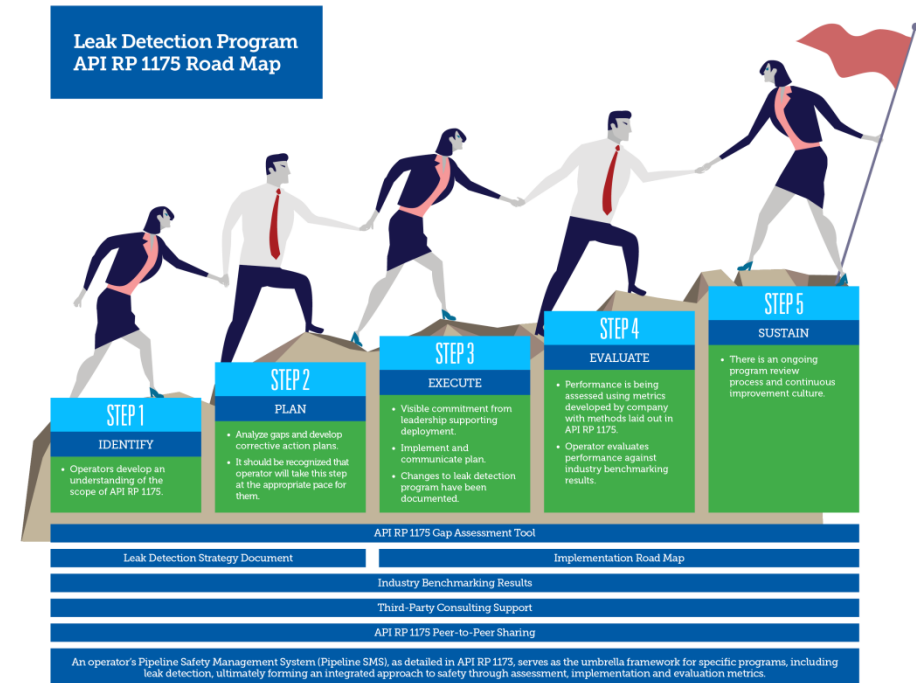
“If you can't measure it, you can't improve it”.
Peter Drucker

Part 3 - Audience Q&A

- Please raise your hand if you have a question and wait for a microphone
- Provide your name and company

How to Implement and Sustain?

- Leak Detection Program Roadmap Handout
- Help guide companies with the implementation & sustainability
- Follows the Plan-Do-Check-Act approach (*from API 1173 – Pipeline Safety Management Systems*)



Additional Resources



- Remaining brochure's from last year's leak detection workshop
- API SMS Website
<http://www.pipelinesms.org>
 - Go to “*Get Started*” Menu
 - Go to Leak Detection Program

RP 1175 Implementation Team's Mission is Completed

Team Lead:	Phillips 66 Pipeline	Doug Sauer
Team Members:	API	Stuart Saulters
	Buckeye Pipeline	Rick Bishop
	Chevron Pipe Line	Robert Morgan
	Enbridge	Rick Barlow
	LOOP	Donny Chiasson
	Marathon Pipe Line	Jason Dalton
	TransCanada	Marieli Romero