M21 vs OGI-Appendix K Do You Really Know?

Presenters:
Brett Kriley, TRICORD Consulting
Dustin Haffner, TRICORD Consulting

This presentation is not intended to endorse specific?

- Monitoring Method (M21, OGIK, etc.)
- LDAR Contractor
- Equipment Manufacturer, or
- Software Provider

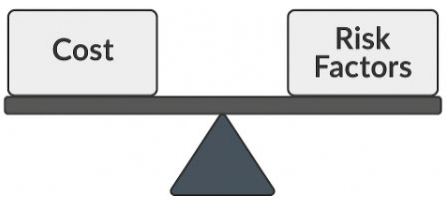
Nor does this presentation evaluate the merits of an "in-house" versus "3rd-party" implementation program.

Objective

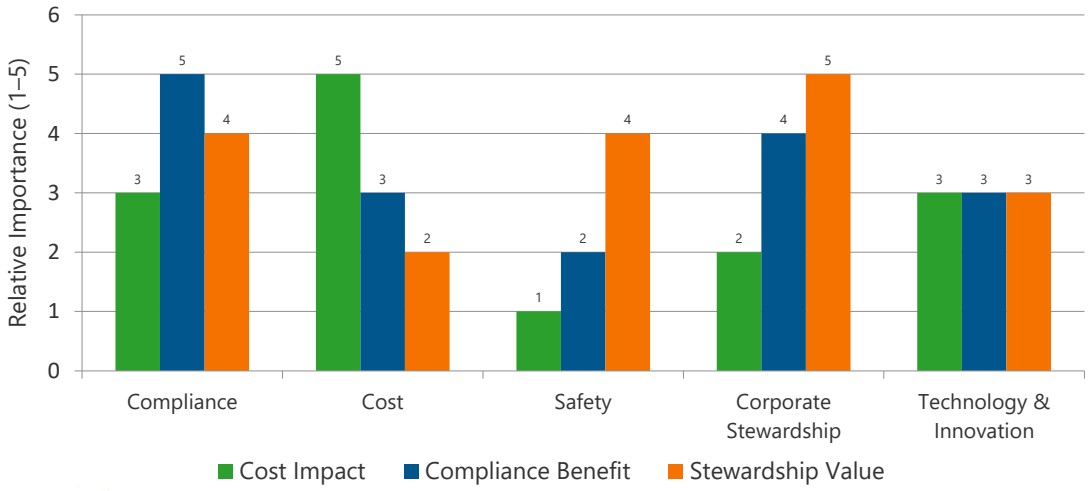
Present the implementation trade-offs between EPA Method 21 and OGI under Appendix K.

Topics Include:

- Program Drivers
- Compliance Considerations
- Method Operational Differences
- Cost
- Risk Factors



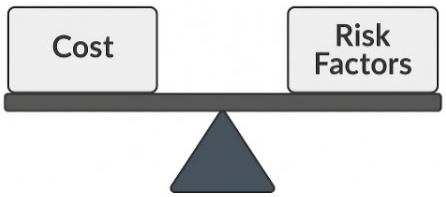
Drivers for Program Implementation



Objective

Present the implementation trade-offs between EPA Method 21 and OGI under Appendix K.

- Program Drivers
- Compliance Considerations
- Method Operational Differences
- Program Cost
- Risk Factors



Compliance Considerations

LDAR – Evolving Monitoring Method Posture from Regulators

Referenced method (M21) → Alternative Work Practice[1] → OGI[2] → OGIK uniform protocol

[1]AWP not broadly adopted due to retained M21 requirements and video recordkeeping.
[2]Compliance demonstration requirements light.

Program Design

Quantitative ppm leak rates vs. Procedure adherence + OGI QA/QC

Detection Approach

Point-source ppm analyzer (M21) vs Imaging with performance protocol (Appendix K)

Demonstration Burden

Calibration, monitoring records vs Training, sensitivity checks, "prove performance[3]" records

*[3]EPA future auditing program unknown – **establish BMPs now!***

Method Strengths and Limitations

Method 21	OGI
Strengths	**Strengths**
• Quantitative	• Rapid screening tool
• Regulatory standard	• Broad area coverage
• Leak rate determination	• Safety advantage
• Versatility	• Effective for intermittent leaks
• Precise leak localization	• EPA-recognized AWP
• Low barrier	• Operational flexibility
Limitations	**Limitations**
• Time and labor-intensive	• Qualitative only
• Accessibility issues	• Environmental sensitivity
• Potential safety risks	• Operator-dependent
• Single-point measurement	• Cost considerations
• Limited field of view	• Regulatory constraints

Equipment Calibration

OGI

- Manufacturer typically performs full calibration/ specification confirmation.
- Daily verification by user required prior to monitoring (Appendix K §9.1).
- Must establish and follow a defined camera operating envelope (Appendix K §8.0).
- Requires operator skill to **interpret imagery** under variable conditions.
- Fewer calibration steps compared to Method 21, lowering field labor but placing more weight on **operator proficiency**.

M21

- Daily calibration before use with certified gas standards (methane or propane).
- Quarterly precision checks to confirm instrument accuracy.
- Drift check required before and after daily monitoring events.
- Calibration gases must meet EPA-specified concentration and quality criteria.
- Requires technician time for setup, verification, and documentation.
- Ensures **high accuracy** and **defensible regulatory data**, but adds operational burden.

Training

Criteria	M21	OGIK
Certification	No formal federal certification	Required Camera Operator Certification
Training Intensity	Basic (8–16 hours typical, facility-led)	Intensive (classroom + ≥32 hrs field)
Regulatory Citations	40 CFR 60.486(e) 63.181 (implied training)	Appendix K, Section 10 (prescriptive)
Advanced Role Requirements	None	Senior Operator: ≥1,400 survey hours +
Ongoing Training	As needed or site-specific	Biennial refresher + performance audits

2025 UNVEILING THE MAGIC OF MIDSTREAM INNOVATION GPA MIDSTREAM CONVENTION
GPA MIDSTREAM ASSOCIATION

Regulated Component Inventory

Method 21

Approach

- Physically tag
- Tied to LDAR software MEL
- Route built into handheld

Strengths/Limitations

- Prescriptive ✓
- Routine compliance demonstration ✓ or ✗
- TcT metric tracking ✓
- Administrative burden ✗

OGI

Approach

- Route mapping observation points
- Geofencing
- Observation point photo/video syncing

Strengths/Limitations

- Performance Based ✓ or ✗
- Unit or system-level coverage ✓
- Video, photo, scan route compliance proof ✓ or ✗
- Recordkeeping burden ✗
- Incomplete scans or observation point coverage risk ✗

Recordkeeping Requirements

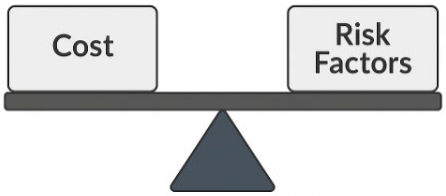
Category	M21[1]	OGIK
Component Inventory	Database	Monitoring Plan
Monitoring/Leak Results	Equip ID, Readings	Leak Video
Equipment Calibration	✓	Verification Check
Operator Performance	Best Management Practices	QA Verification Video
Operator Training Plan	✗	✓
Operating Envelope Limits	✗	✓
Weather Conditions	✗	Start, End, 2-hour Intervals

[1]M21 recordkeeping requirements identified in applicable regulatory standards.

Objective

Present the implementation trade-offs between EPA Method 21 and OGI under Appendix K.

- Program Drivers
- Regulatory Considerations
- Method Operational Differences
- Program Cost
- Risk Factors



Desktop Case Study

Objective

Examine how stakeholder task cycle time (TcT) can influence program cost and method selection bias.

Goal

Identify factors impacting TcT

Assess the variability in identified factors

Determine if a path to method cost equivalency exists

Program Cost Narratives

Category	M21 vs OGIK	Cost Impact
Monitoring Efficiency, comp/ 8-hour TcT	350 to 500 vs 5,000 to 7,000	Higher
Labor and Equipment Cost	Lower	Lower
Route Interruption Events	Lower	Lower
Component Inventory Cost	Higher	Higher
Time on Tools	Lower	Higher

Baseline Monitoring Productivity

(1) Total Task Cycle Time (TcT) = ∑ ToT + NTT (fixed)

Where,

ToT = Time on Tools
NTT = Non-Tool Time

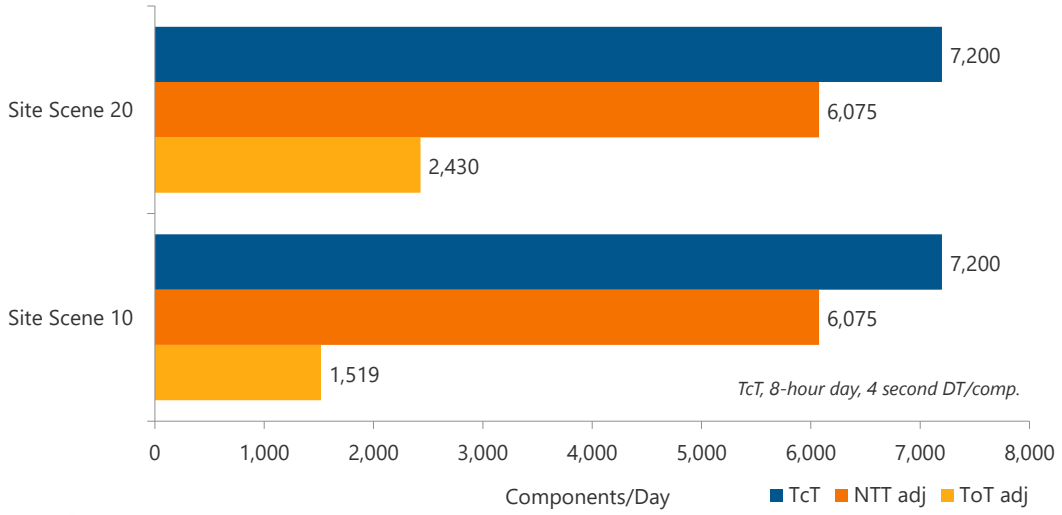
(2) NTT = pre-monitoring prep + monitoring breaks + post-monitoring close out

(3) $\sum ToT = \sum(TT_i + DT_i + RT_i) + \sum RIT_j$

Where,

TT = Travel Time to Component (M21) or Observation Point (OGI)
DT = Start of Monitoring thru Dwell Time
RT = Recording Time of Monitoring (M21) or Observation Point (OGI)
RIT = Route Interruption Time

OGI TcT versus Components Monitored

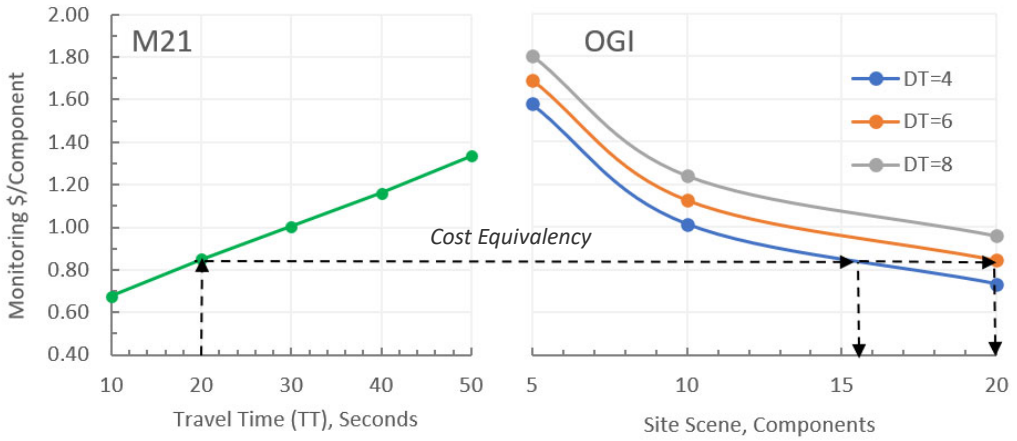


Cost Model Input Parameters

Category	M21	OGIK	Notes
Non-Tool Time (NTT)	120 minutes	75 minutes	
Travel Time (TT)	**10 to 50 seconds**	90 seconds	Avg between monitoring points
Dwell Time (DT)	16 seconds	**4 to 8 seconds**	Per Component
Record Time (RT)	7 seconds	30 seconds	
Route Interruption Time (RIT)	---	---	
Site Scene	NA	**5 to 20 components**	
Labor Cost	$48/hr	$169	
Equipment Cost	$10/hr	----	Included with labor

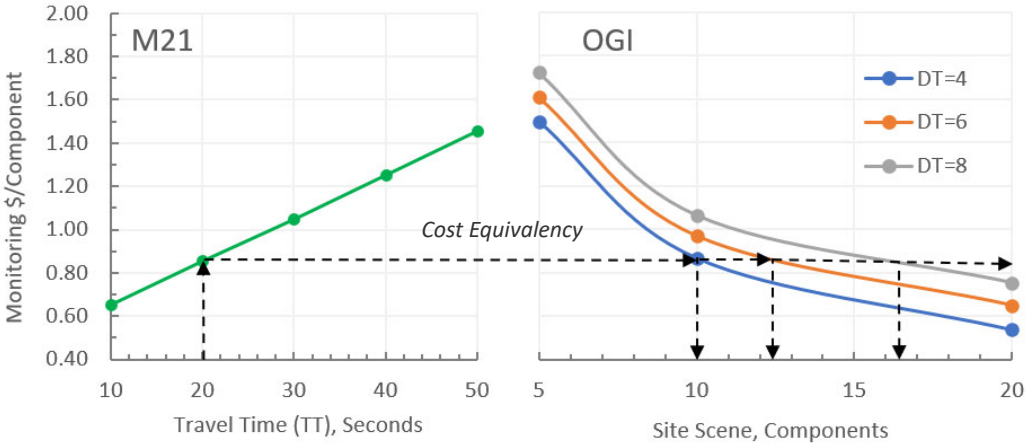
2025 UNVEILING THE MAGIC OF MIDSTREAM INNOVATION GPA MIDSTREAM CONVENTION
GPA MIDSTREAM ASSOCIATION

TcT Cost Equivalency – Case 1



Site requiring 1-day of monitoring

TcT Cost Equivalency – Case 2



Site requiring multi-day monitoring. Capped at 14-days

TcT Route Interruption Events

Category	M21	OGIK
Instrument Issues	Flame-outs, pump failures, filter clogs	Lens fogging, software glitches
Equipment Swaps	Battery	Battery, SD card
Environmental Holds	Wind, moisture	Conditions outside operating envelope
Re-Measurement	Leak recheck, extended dwell time	Re-imaging, changing angle view

Program Cost Considerations

Appendix K standardization of OGI has narrowed the cost advantage over M21.

- There is no direct answer to the question: "Is M21 or OGIK a more cost-effective approach?"
- As shown potential exist for equivalent implementation cost for routine monitoring utilizing M21 or OGIK.
- M21 tagging inventory can be the cost differentiator between the two methods.
- Based on an estimated annualized inventory differential cost between M21 and OGIK of $0.55 to $0.75 /component, tagging cost can fall within the routine monitoring cost differential for some site configurations.

Risk Factor Narratives

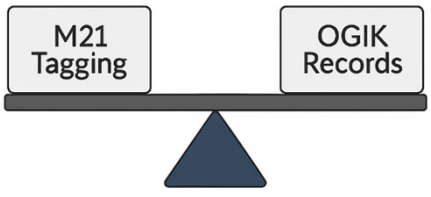
Category	M21	OGIK
Environmental factors introduce opportunity for false negatives.		●
Increased personnel exposure to hazardous conditions.	●	
Performance recordkeeping may present challenges during audits.		●
Relies on visual interpretation of gas plumes.		●
Subjective interpretation during audit/enforcement.		●

Risk-Cost Path Forward

Require TcT assessments as part of program monitoring method selection and, if applicable, site OGI monitoring plans.

- Provides operational efficiency insights not available with a ToT benchmark only.
- TcT benchmarks can be used for measuring program performance metrics and support Appendix K compliance demonstration.
- Creates "good evidence" record when certifying site inspections.

When M21 & OGIK routine monitoring are cost equivalent, facilities should assess the tradeoffs between M21 tagging cost and OGIK recordkeeping audit exposure.



Thank you!