# NSPS OOOOa LDAR Compressor Station Case Study Results

**Terence Trefiak P.E.**

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www.targetemission.com

# DETECTION

# MEASUREMENT

# MANAGEMENT

- **OFFICES**– Houston, TX, Pittsburgh PA, Calgary AB
- **EXPERIENCE** – currently perform LDAR and GHG services for over 550 facilities across USA, approx. 800 assessments/year
- **EXPERTISE** – Optical Gas Imaging and Method 21 Alternative Work Practice for Subpart W GHG and LDAR (OOOO, OOOOa) monitoring using OGI

TARGET
EMISSION SERVICES

# OVERVIEW

- Review OOOOa requirements
- Present Case Study data
- Explore results, cost/benefits of program

# NSPS OOOOa

## Midstream

- No change for LDAR

## Compressor Station

- new or modified after September 18, 2015 - when a compressor is added or if one or more compressors is replaced with a greater total horsepower
- conduct OGI within 60 days after startup and quarterly

## Wellsite

- Semiannual wellsite OGI inspections

# NSPS OOOOa

## MONITORING PLAN

- monitoring plan must be developed and implemented within a company-defined area (22 well sites, 210-mile radius of a central location)

## DATA REQUIREMENTS

- survey date, technician names
- observation path (one time)
- ambient T, sky conditions, maximum wind
- instrument used
- # of leaks, # of DTM, UTM
- # of DOR and reasons
- resurvey instrument
- one or more digital photographs or OGI video (GPS)
- dates of first attempt

# NSPS OOOOa

- LEAK REPAIRS
  - Leaks repaired within 30 days up to 2- year DOR extension for certain repairs
  - ~~if an unscheduled or emergency shutdown components would need to be fixed at that time~~ (just changed to planned shutdown)

- REPAIR CONFIMRATIONS
  - resurvey within 30 days of the repair using OGI, Method 21 **including bubble tests when applicable**
  - Additional 30 days for confirmation

# QUESTIONS

1. What are the results of current OOOOa compressor station monitoring?
    1. # and volume of leaks
    2. Duration and cost of monitoring
2. From quarter to quarter what are the differences in results
3. What is the repair performance and costs?

# CASE STUDY SCOPE

- Companies: 5 (large transmission companies)
- # of Facilities: 104
- # of Monitoring Events: 224 (2017-158, 2018-66)
- Avg. # of Compressors: 2.4
- Duration: OOOOa 2017 Q1-Q4 and 2018 Q1 (4.5 cycles)
- Locations: OK, PA, TN, LA, TX, OH, NY, SC, WV

# TECHNICIAN

- 1-person Crew with min. TARGET Tech L1 (2-10 years experience)
- holds a detailed understanding of the various processes that are involved in the transportation and processing on natural gas.
- is trained (certified) and experienced in the use of fugitive emission detection equipment;
- has a minimum of 1000 hours of experience on the use of optical gas imaging
- maintains required safety training and strong understanding of applicable TARGET Safe Operating Procedures; and
- received performance audits to ensure compliance to our prescriptive fugitive emission assessment protocol

# EQUIPMENT

FLIR GF320


Bubble Test Soln.

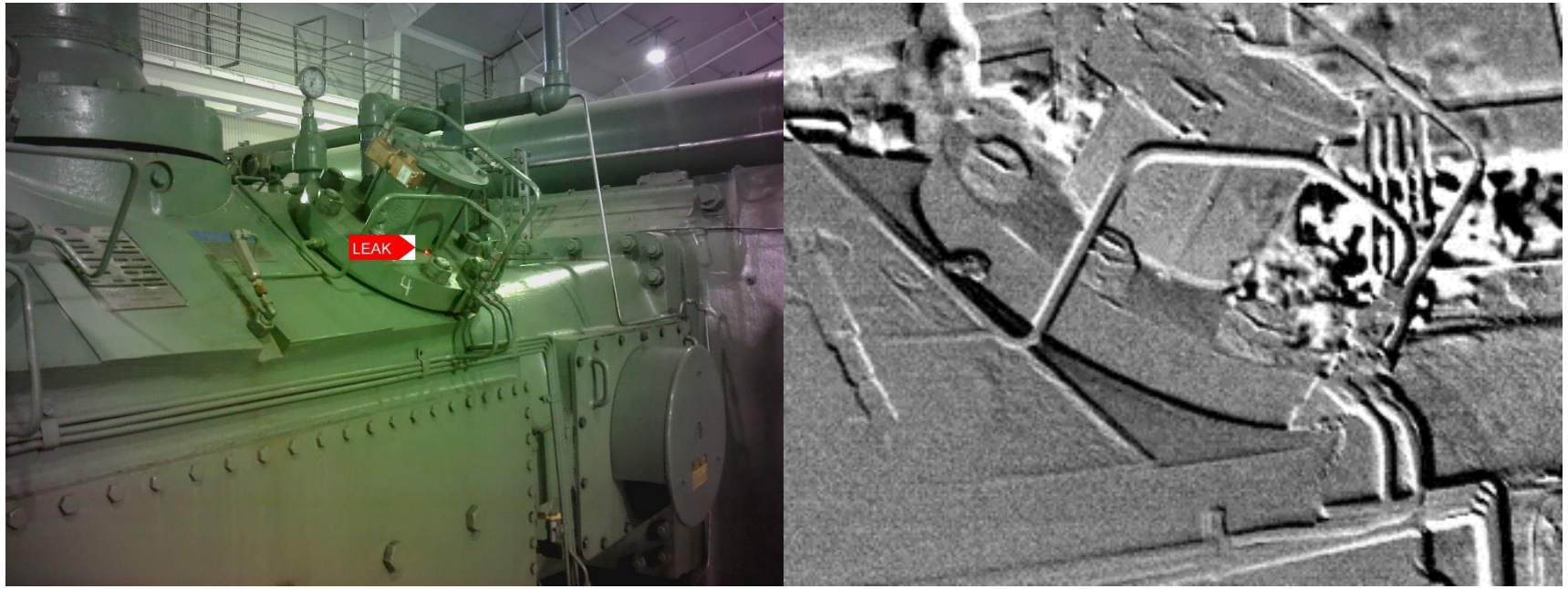

Data Management

# LEAK DATA

- Max Rate: 7.85cfm
- Min Rate: 0.01 cfm
- Mean: 0.12 cfm
- STDev 0.31 cfm
- Quantification: 20% HiFlow Sampler, 80% OGI Estimate

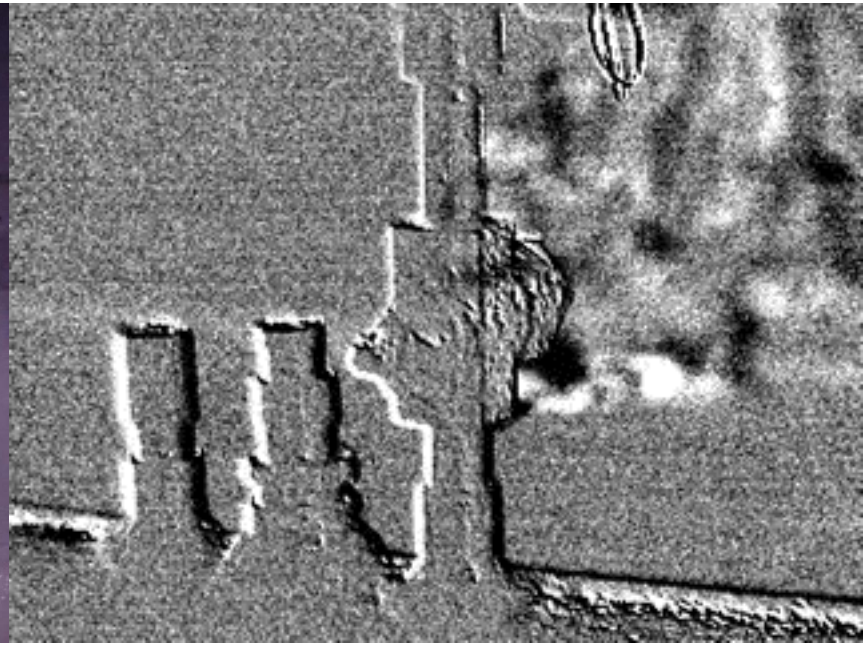
| Severity | | # of Leaks | % Count | Volume (cfm) | % Volumne |
|---|---|---|---|---|---|
| HIGH | over 0.5 cfm | 56 | 3% | 67 | 27% |
| MEDIUM | 0.1 cfm - 0.5 cfm | 630 | 32% | 111 | 45% |
| LOW | less than 0.1 cfm | 1291 | 65% | 68 | 27% |
| TOTAL | | 1977 | 100% | 246 | 100% |

# LEAK SAMPLES




RATE: 0.67 cfm

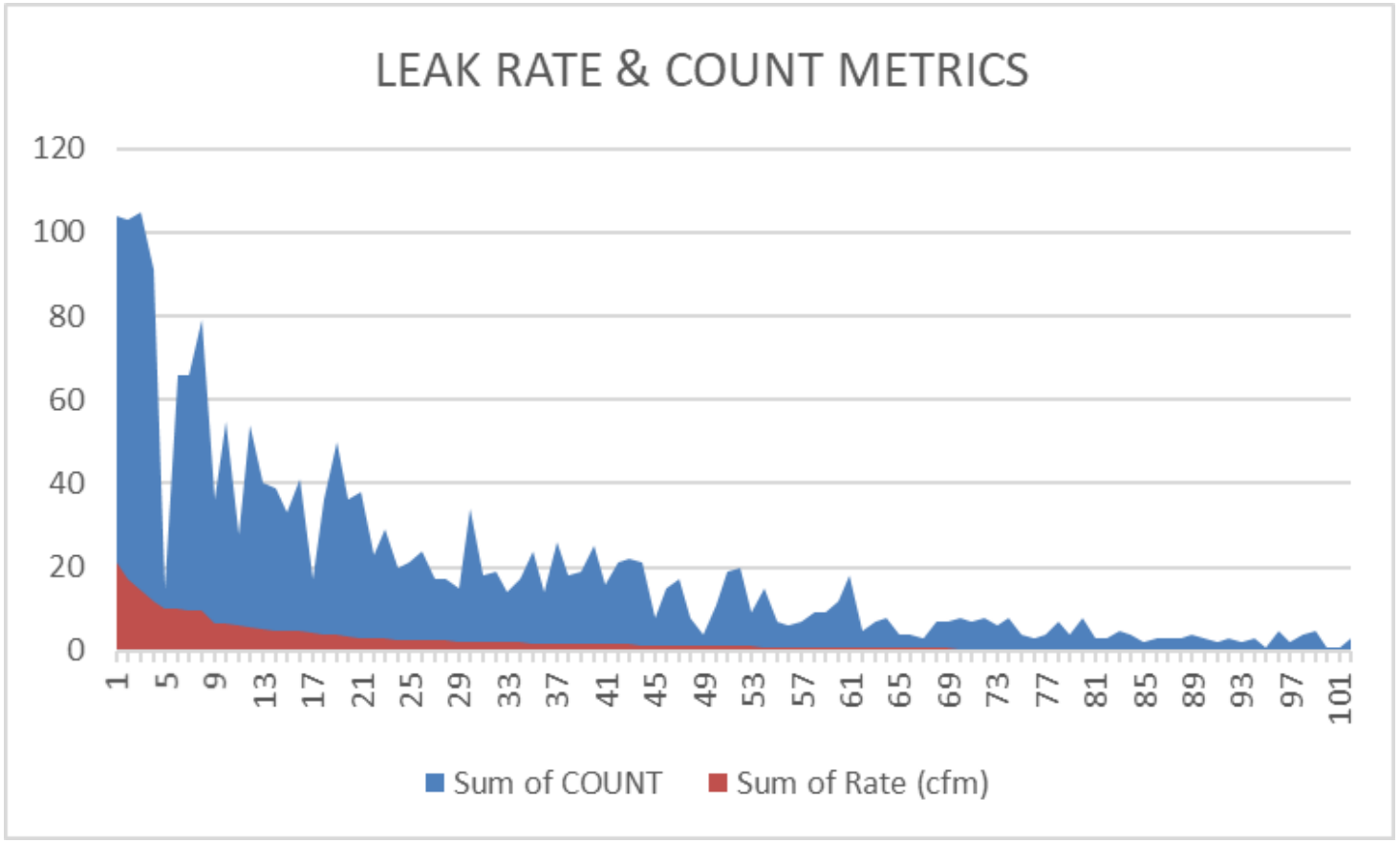
# LEAK SAMPLES

RATE: 0.09 cfm

# COUNT & RATES

| METRIC | AVERAGE | TOTAL |
|---|---|---|
| # of Facilities | 1 | 104 |
| # of Monitoring Events | 2.2 | 224 |
| # of Leaks per Facility | 19 | 1977 |
| # of Leaks per Survey | 9 | |
| Leak Rate (ft3/min.) | 2.4 | 246 |



# QUANTITATIVE COST/BENEFIT

| METRIC | PER SURVEY | TOTAL |
|---|---|---|
| Annual Gas Savings ($/year) | $1,609 | $360,484 |
| Repair Costs | $450 | $100,800 |
| Monitoring Cost | $1,220 | $273,280 |
| Net Present Value of Program | $1,122 | $251,328 |
| Program Payback Period (Months) | 12 | |

- The Net Present Value using 10% discount rate and 2-year average repair life
- Avg. monitoring time: 3.1 hours
- Avg. costs fully inclusive (onsite monitoring, travel expenses, reporting)
- Repair costs estimated based on leak component/type

# QUALITATIVE COST/BENEFIT

- SAFETY
  - 22 leaks identified as potential safety hazard
    - 12  Moderate
    - 7 High
    - 3 Extreme
- EXPOSURE
  - Approx. 60% of leaks found in buildings and common work areas
- ENVIRONMENT
  - 59,000 tonnes CO2e per year emissions

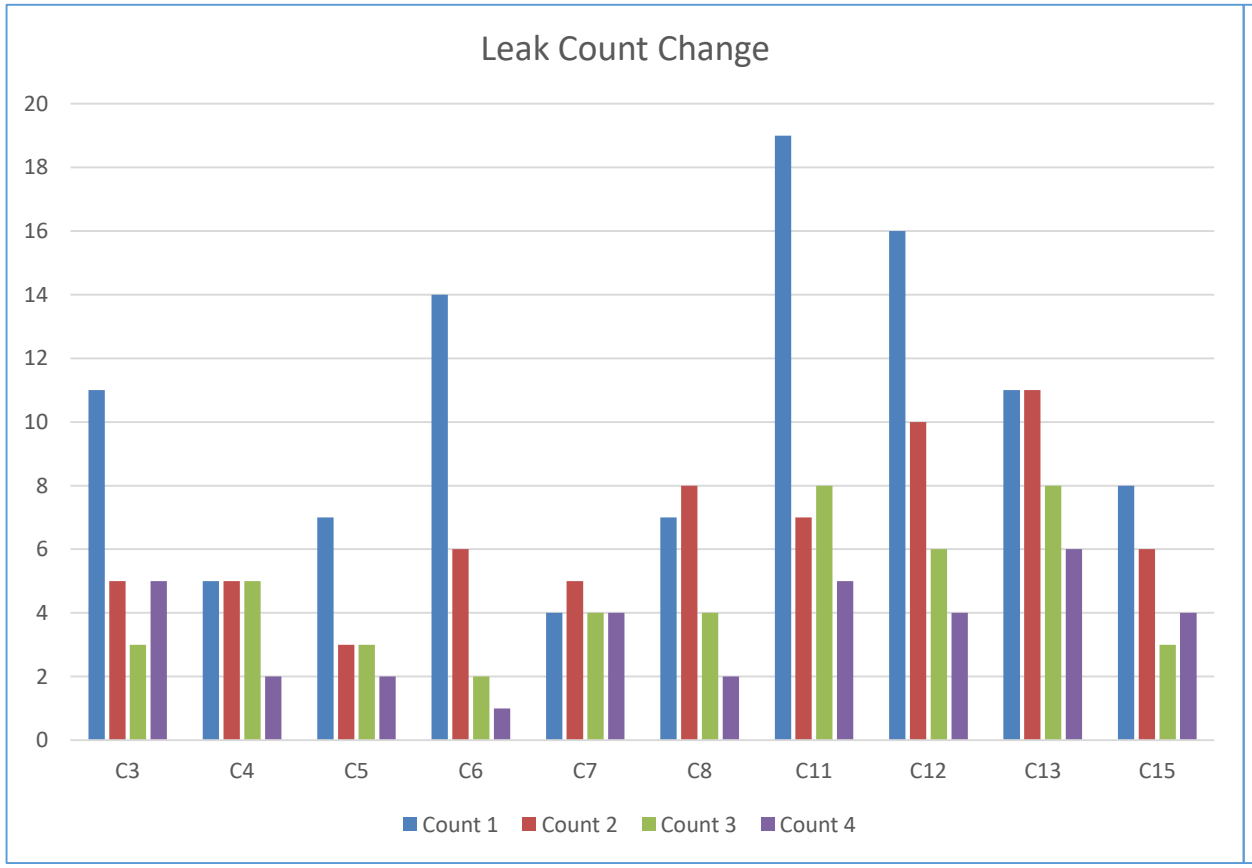
# FREQUENCY ANALYSIS

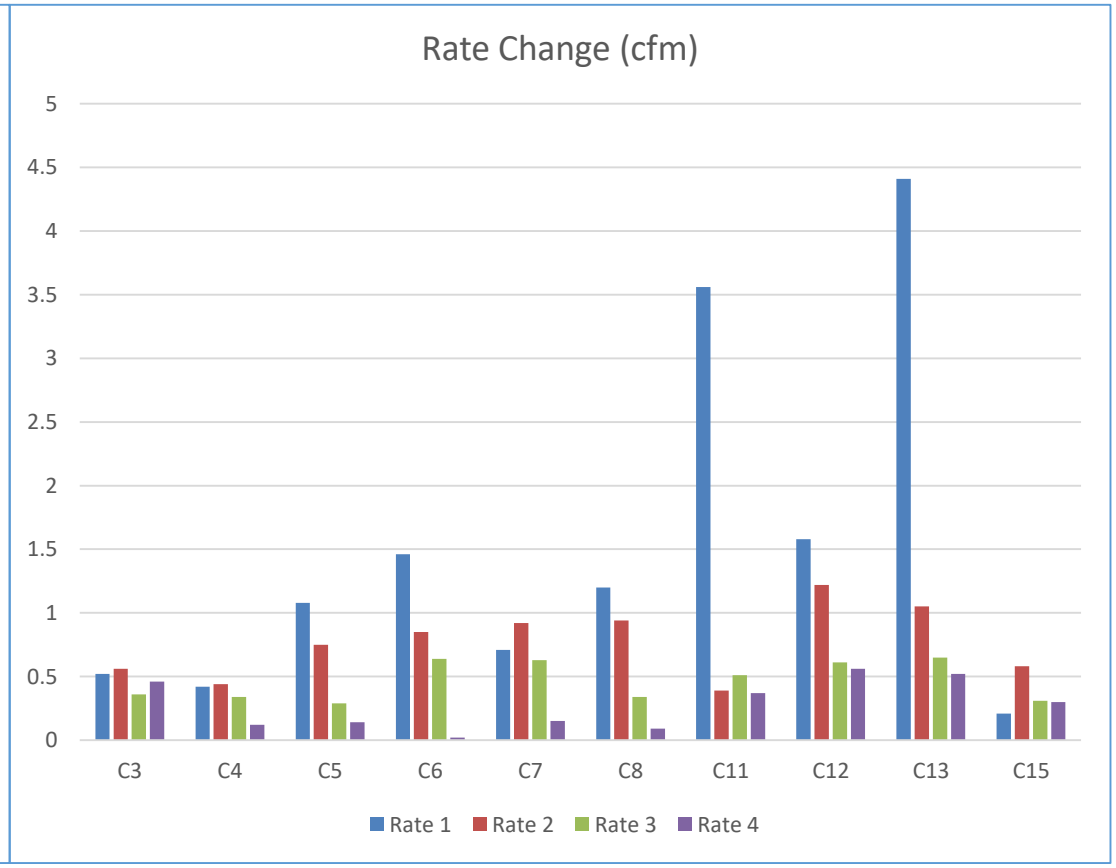
- Average change in leak count between surveys: -18%
- Average change in leak rate between surveys: -23%
- Largest Count Increase: 1066%
- Largest Rate Increase: 3800%
- Largest Count Decrease:-90%
- Largest Count Decrease: -96.9%
- Reoccurring Leaks: 5%

**Factors Affecting Changes/Variations**

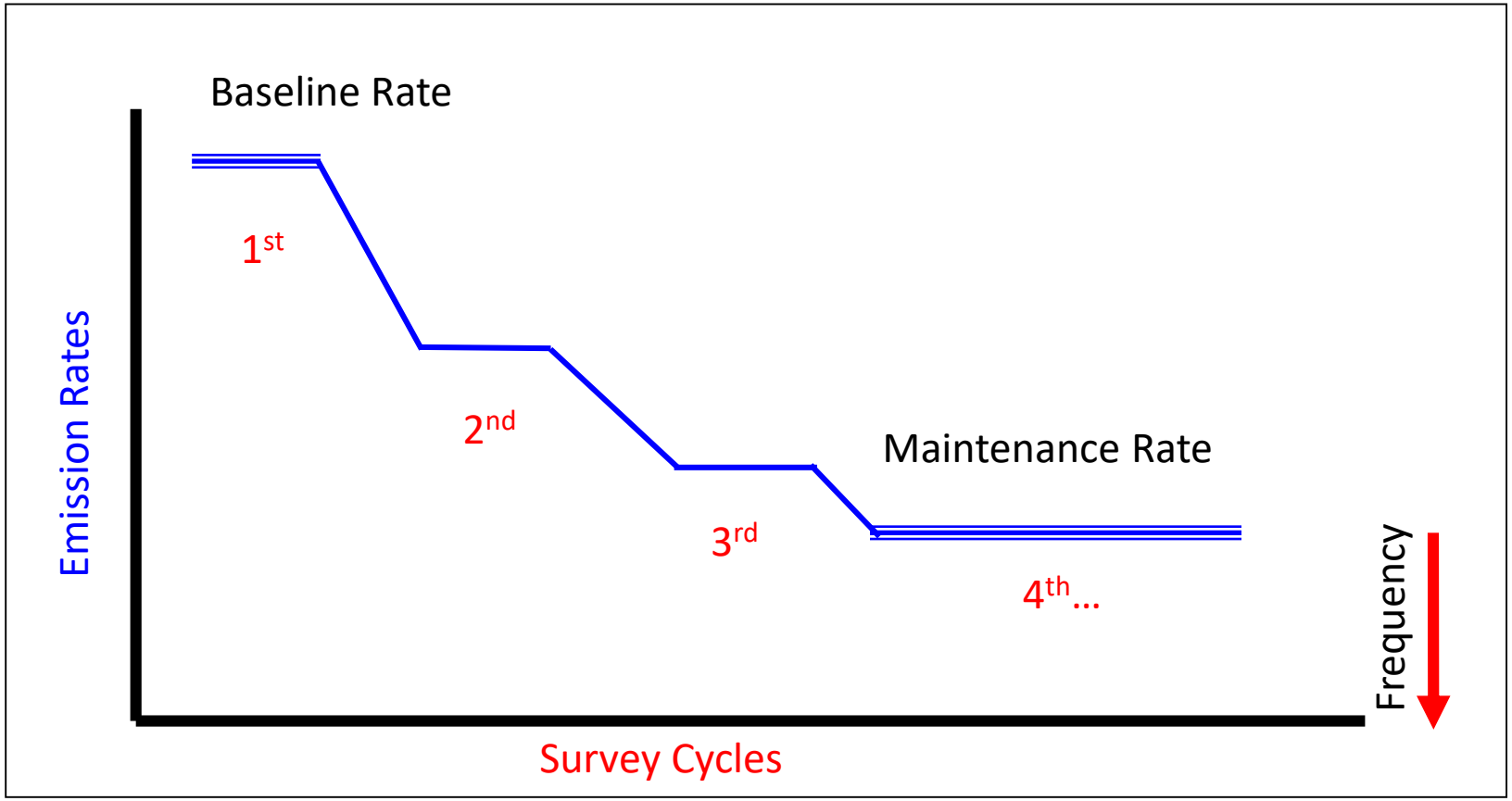
- Turn around
- Weather Conditions
- Operating mode

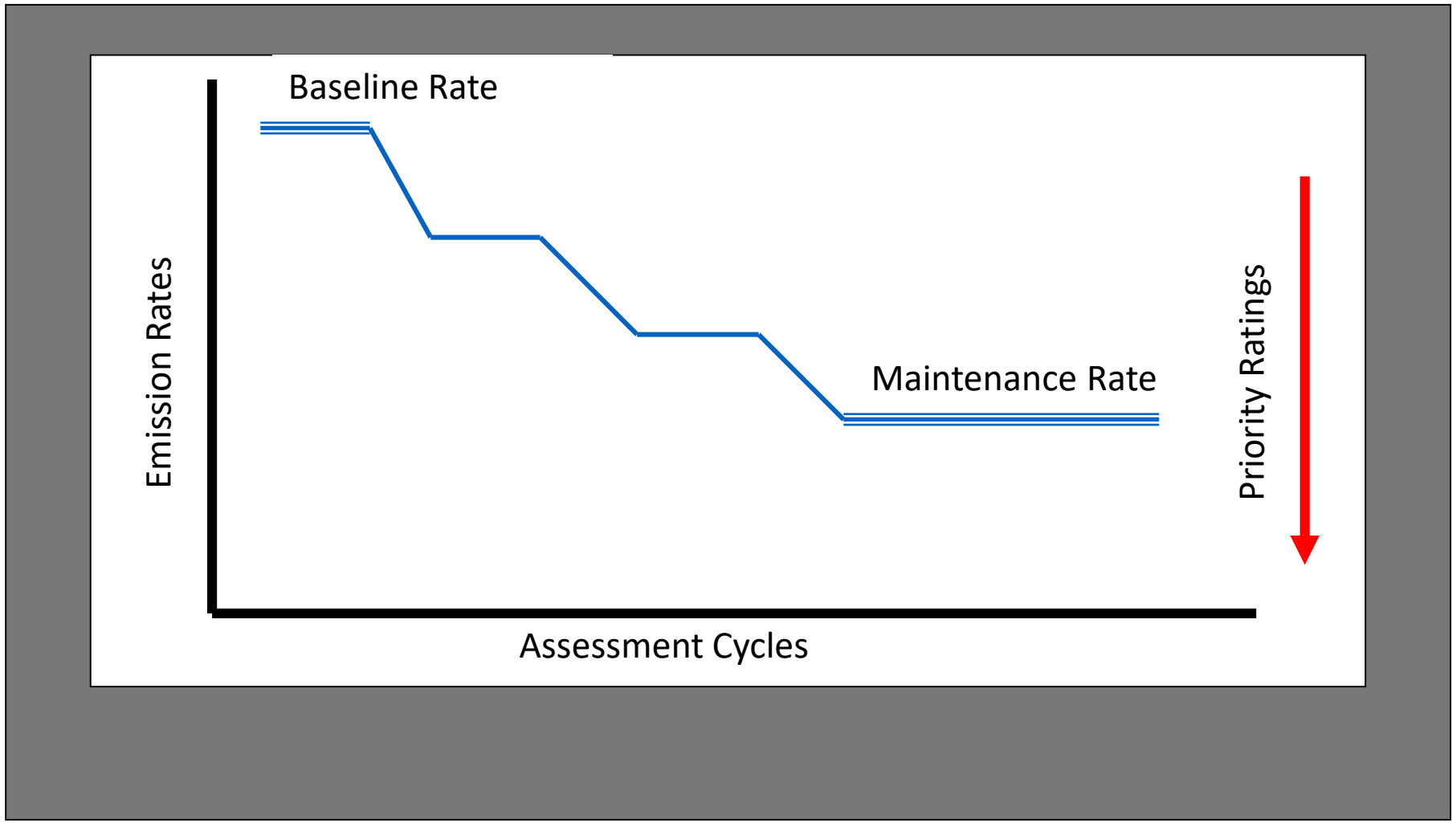
# FREQUENCY ANALYSIS



# LDAR PROFILE




Baseline Rate
Maintenance Rate
Emission Rates
Priority Ratings
Assessment Cycles

# REPAIR METRICS

| OVERDUE | DOR | REPAIRED ONSITE | WITHIN 5 DAYS | WITHIN 15 DAYS | 16-30 DAYS |
|---|---|---|---|---|---|
| 3% | 3% | 10% | 9% | 21% | 54% |

- Repair tracking quite active across numerous companies
- Many repairs done near due date
- Overall impressive responses

# CONCLUSIONS

- Significant economic benefit in terms of saved gas
- Auxiliary benefits (safety, environmental)
- Negligible reoccurring leaks
- Repair activities were responsive and tracked well
- Decrease in Leak and Rate amounts consistent with expected LDAR program evolution profile
- Data would tend support quarterly leak inspections to increase the probability of monitoring each compressor in full operation mode when most leaks would be present with a possible reduction in frequency when steady state leak profile is reached

# THANK YOU

**TERENCE TREFIAK, P.E. President**
**TARGET EMISSION SERVICES**
300, 800 Town and Country Blvd, Houston, TX  77024
O: 1-855-225-8755 x 701  M: 713-377-3135
E: trefiak@targetemission.com