New Field Study Improves GHG Emission Factors for Petroleum Industry

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Environmental Protection
Agency

Office of Air Quality
Planning and Standards
Research Triangle Park NC 27711

EPA-453/R-95-017
November 1995

Air

Protocol for Equipment Leak Emission Estimates

STAR Environmental collected all oil and gas data included in the EPA Protocol

Measured 200,000 Components

Found 5,000 Leaks

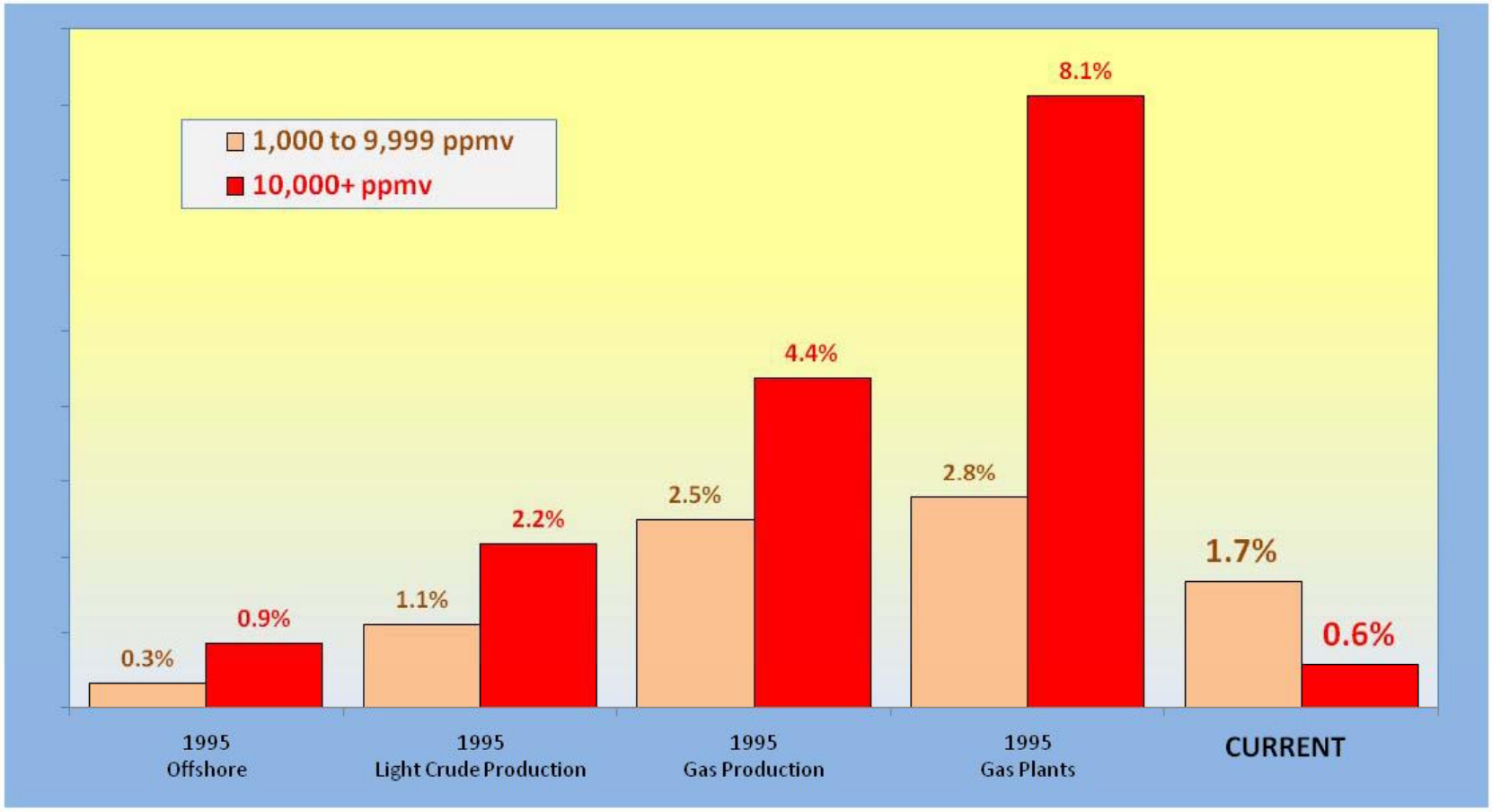
Took 1,000 Samples

The Protocol Contains Four Methods

1. AVERAGE EMISSION FACTORS
2. SCREENING RANGES
3. CORRELATION APPROACH
4. UNIT-SPECIFIC CORRELATION

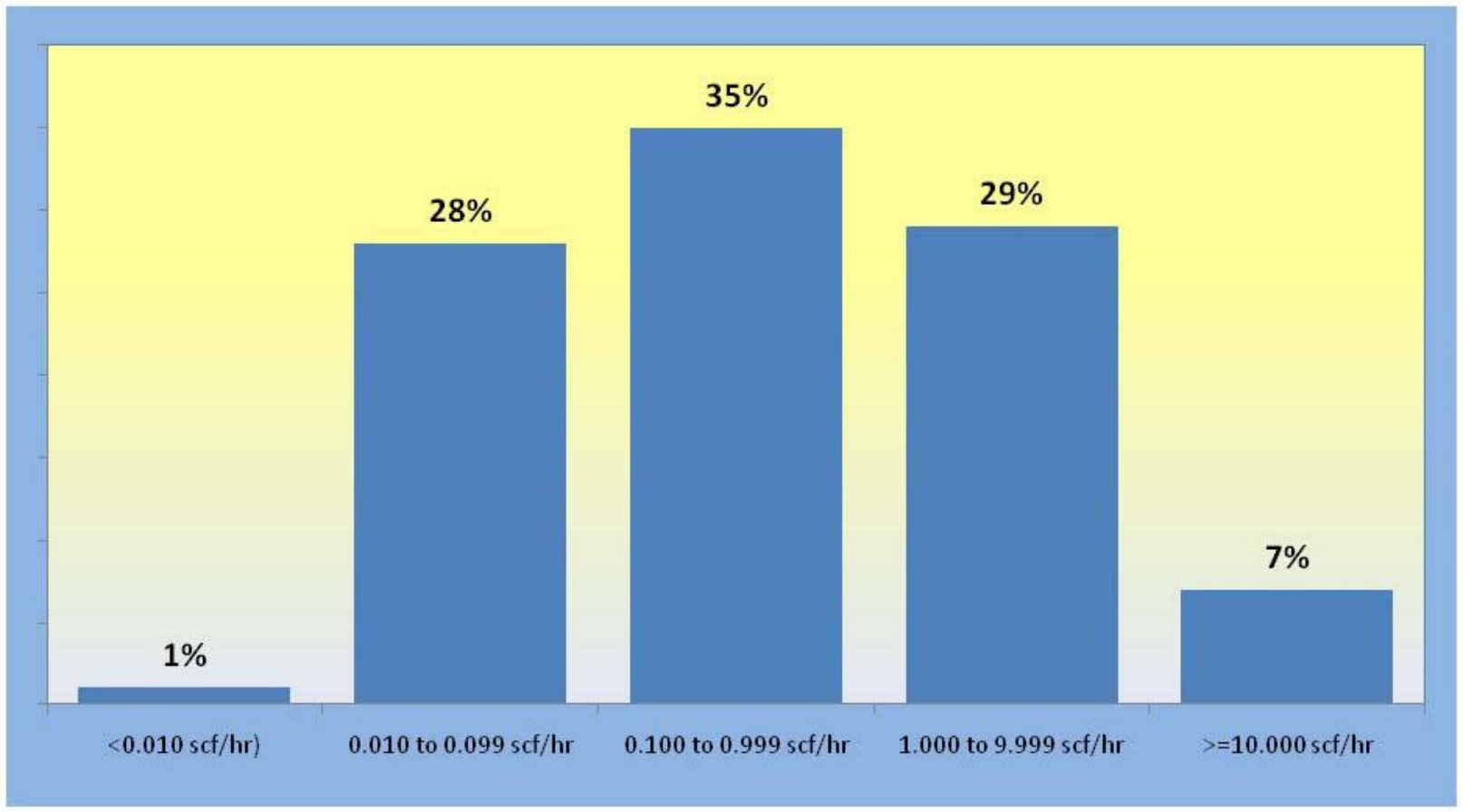
EPA-453/R-95-017 November 1995

Emitter and Leak Frequencies



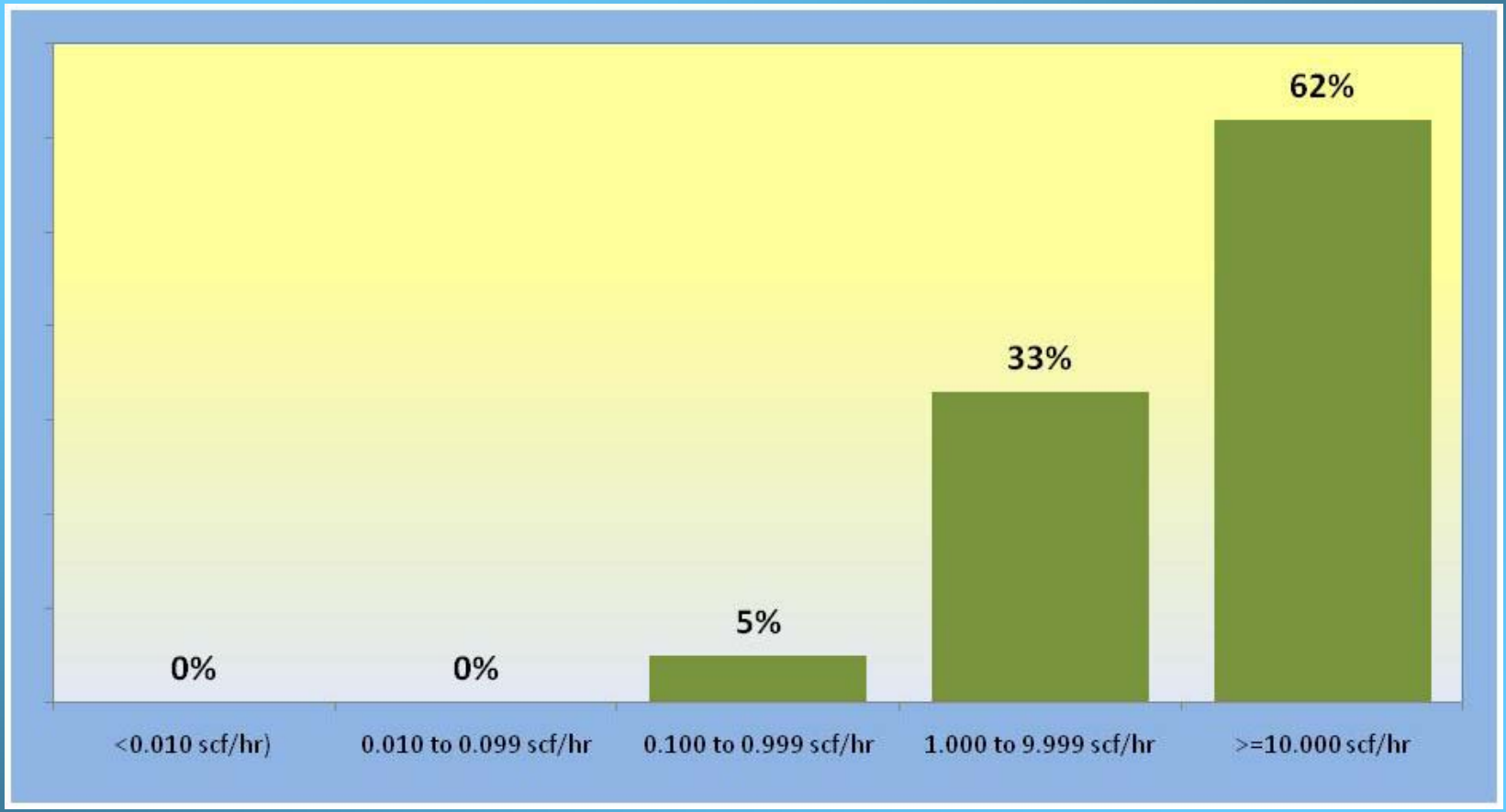
EPA-453/R-95-017 November 1995

Size Distribution of Leaks (10,000+ ppmv)

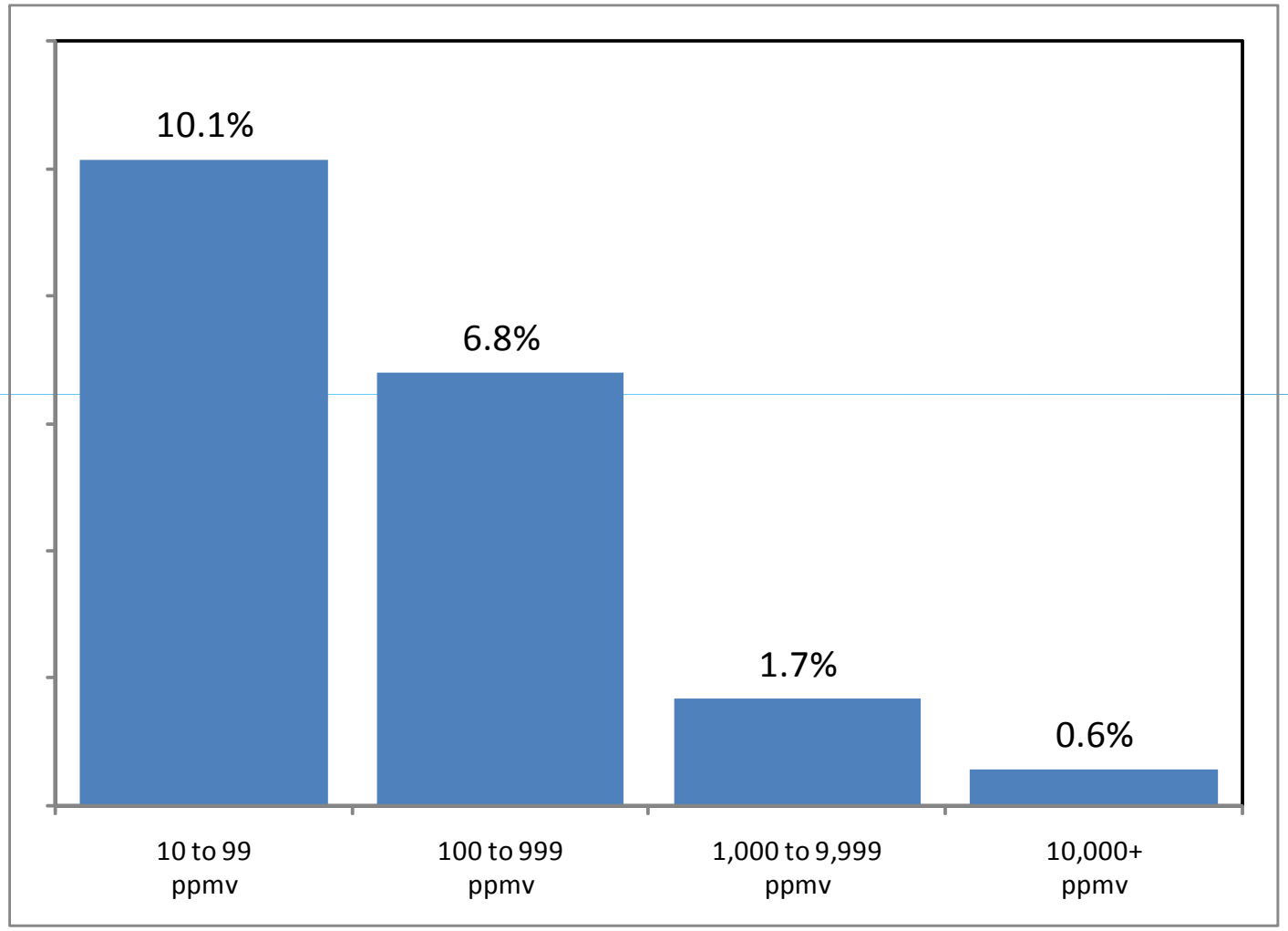


EPA-453/R-95-017 November 1995

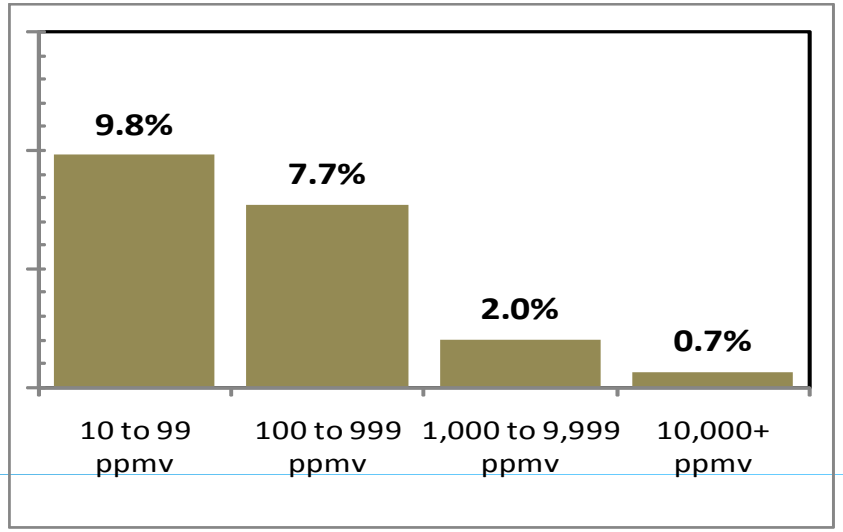
Size Distribution of Emissions (10,000+ ppmv)



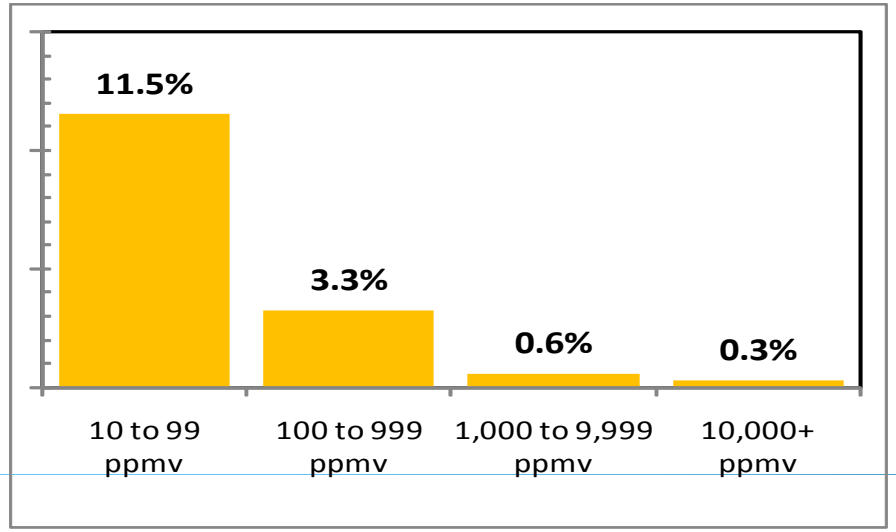
Screening Value Distribution of 32,624 Valves



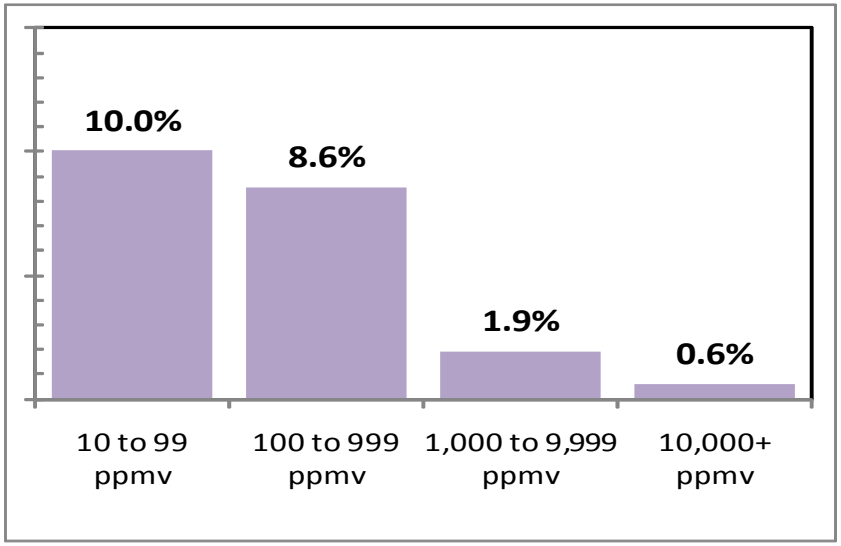
Screening Values of 21,206 LLiq service valves
(9,999 ppmv leak definition)



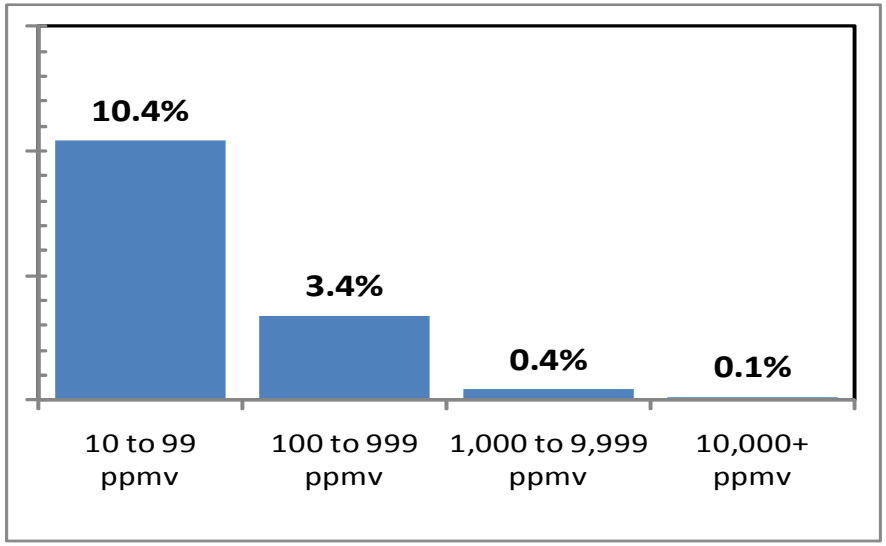
Screening Values of 5,188 LLiq service valves
(499 ppmv leak definition)



Screening Values of 3,835 Gas service valves
(9,999 ppmv leak definition)

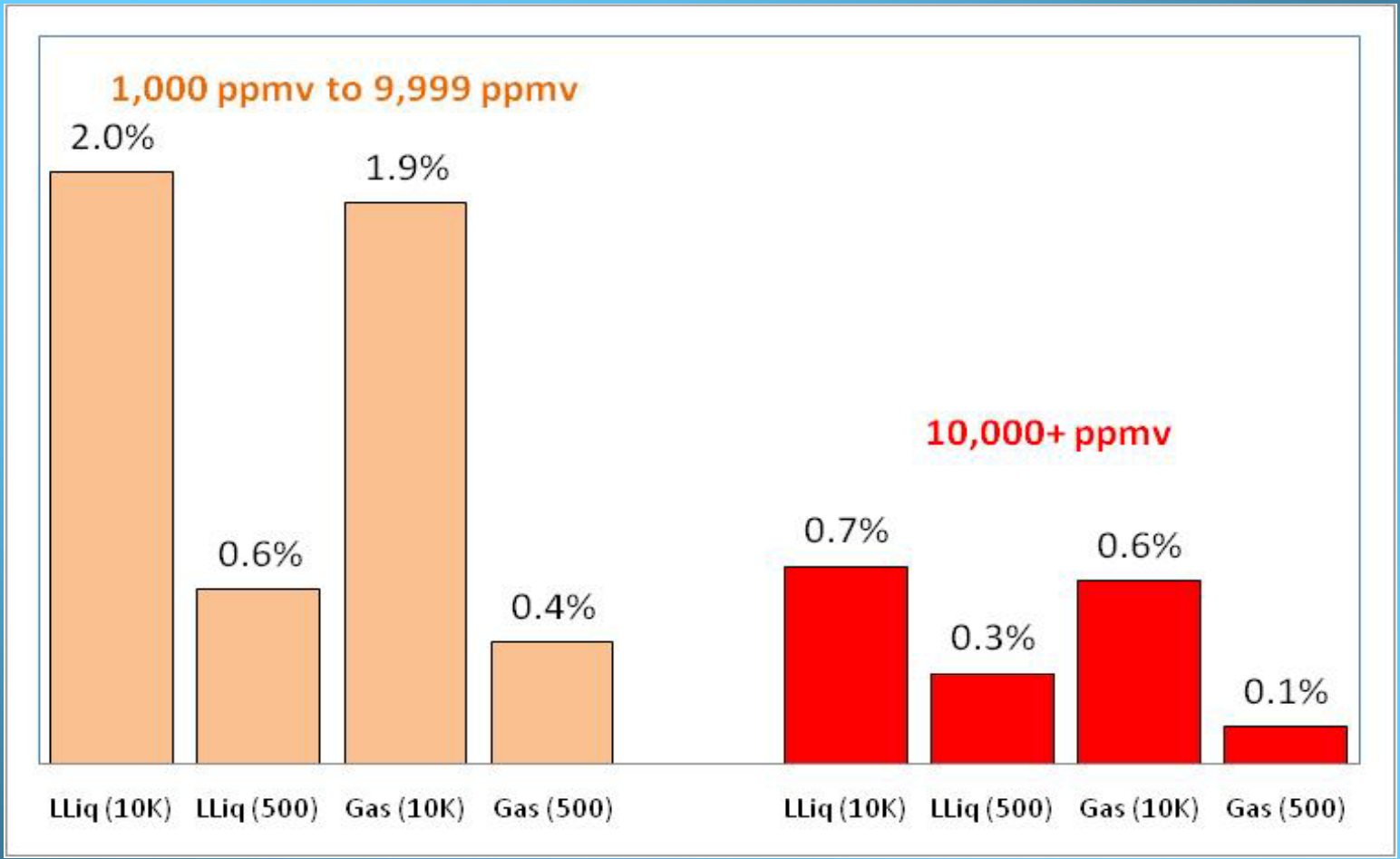


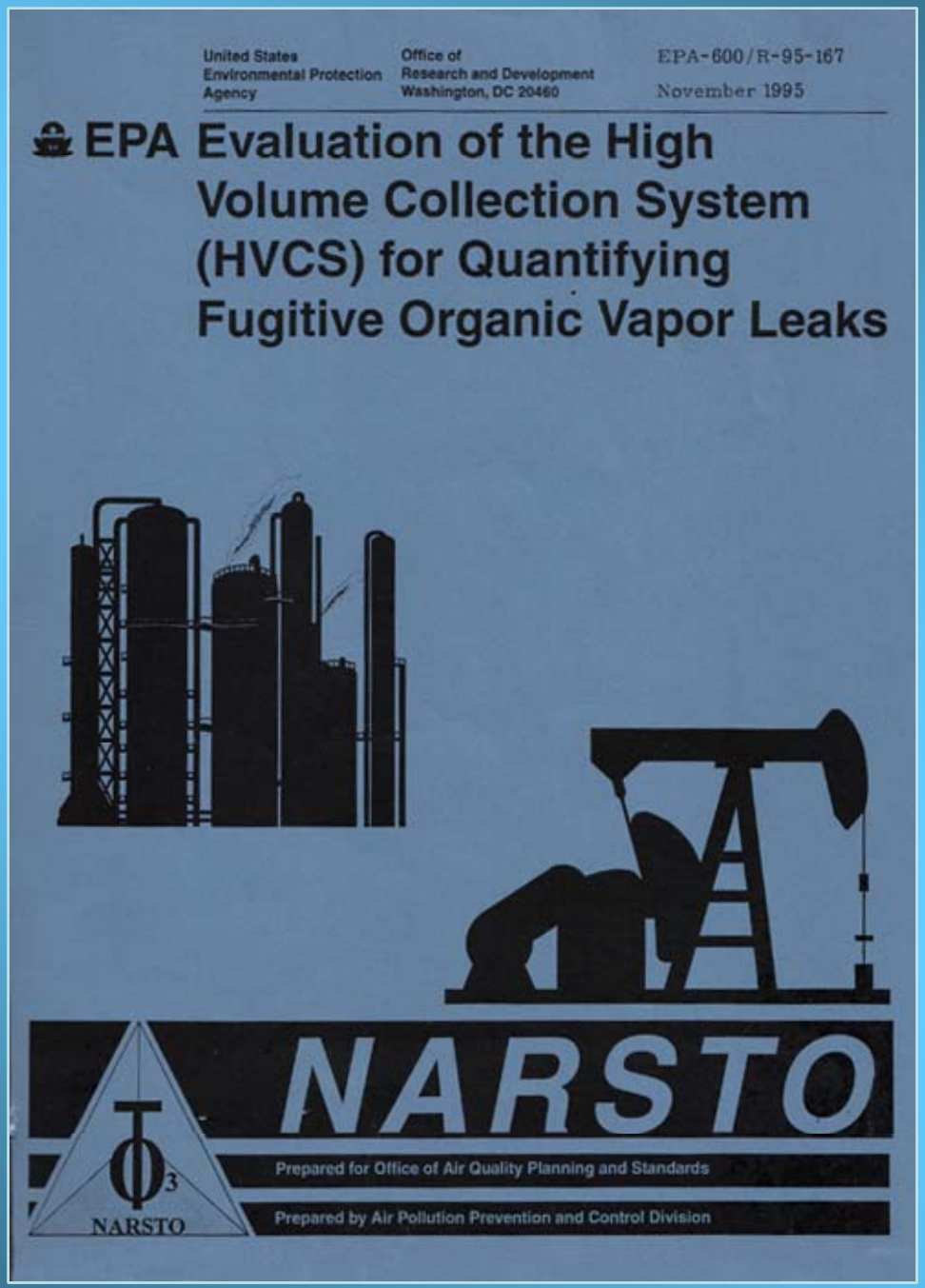
Screening Values of 2,395 Gas service valves
(499 ppmv leak definition)

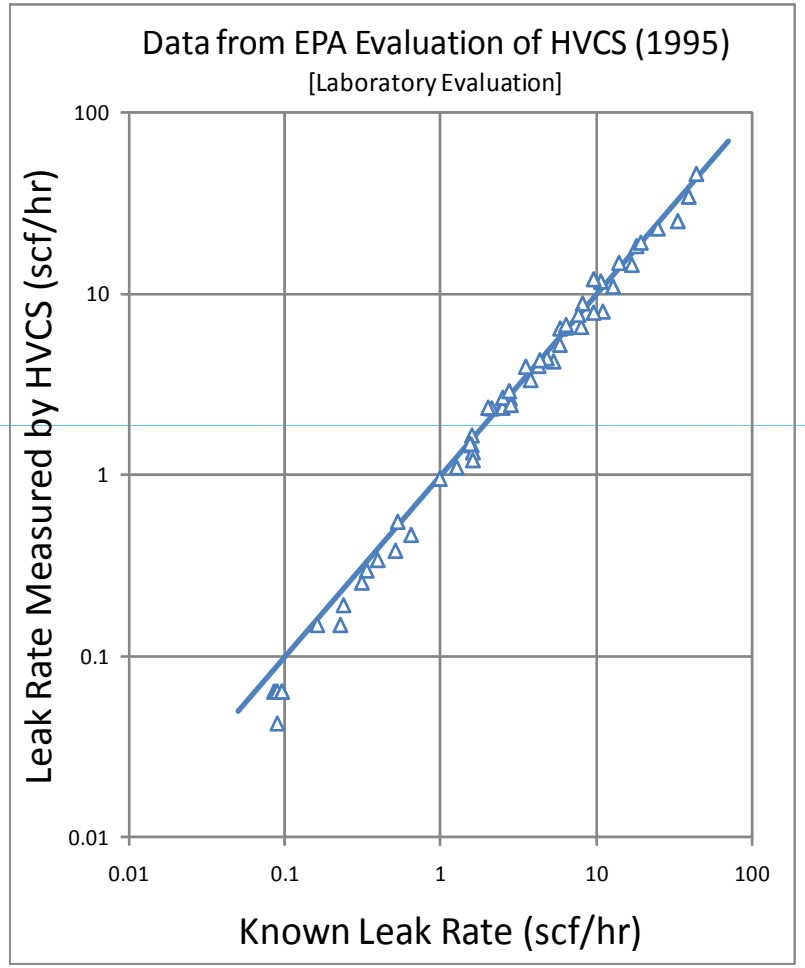


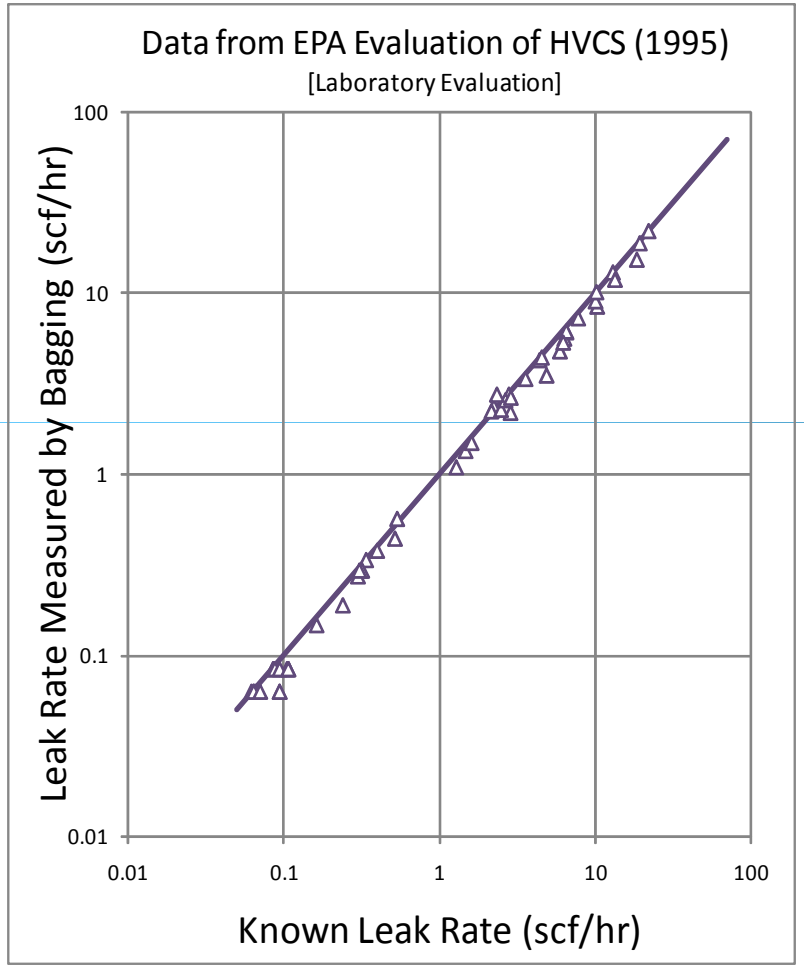
CURRENT MONITORING

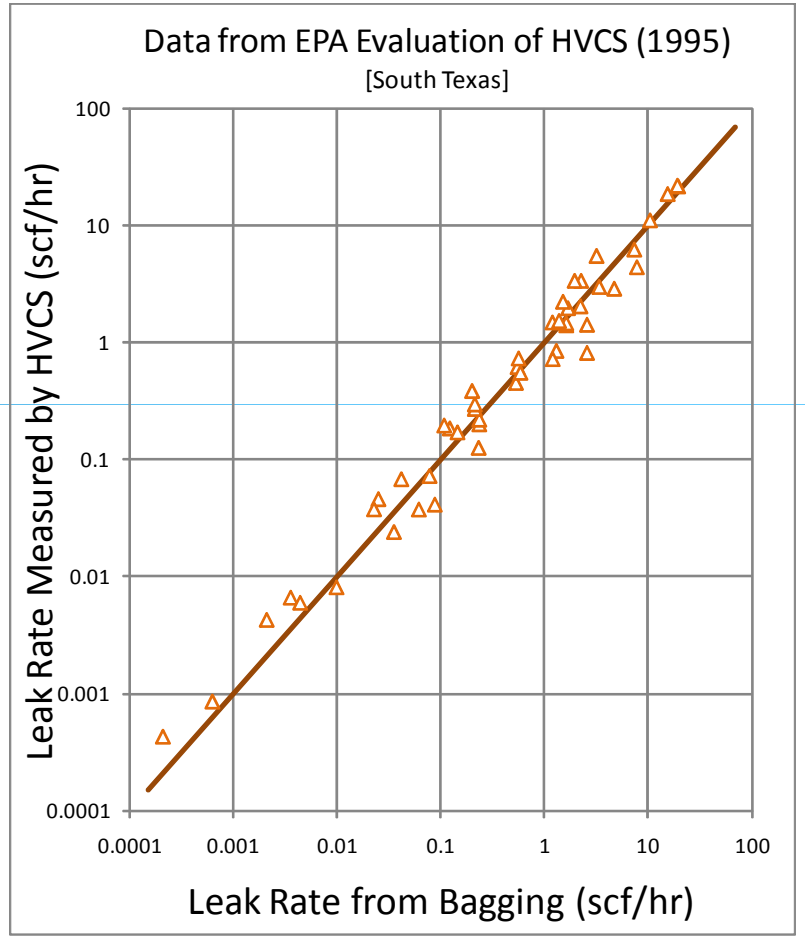
Emitter and Leak Frequencies

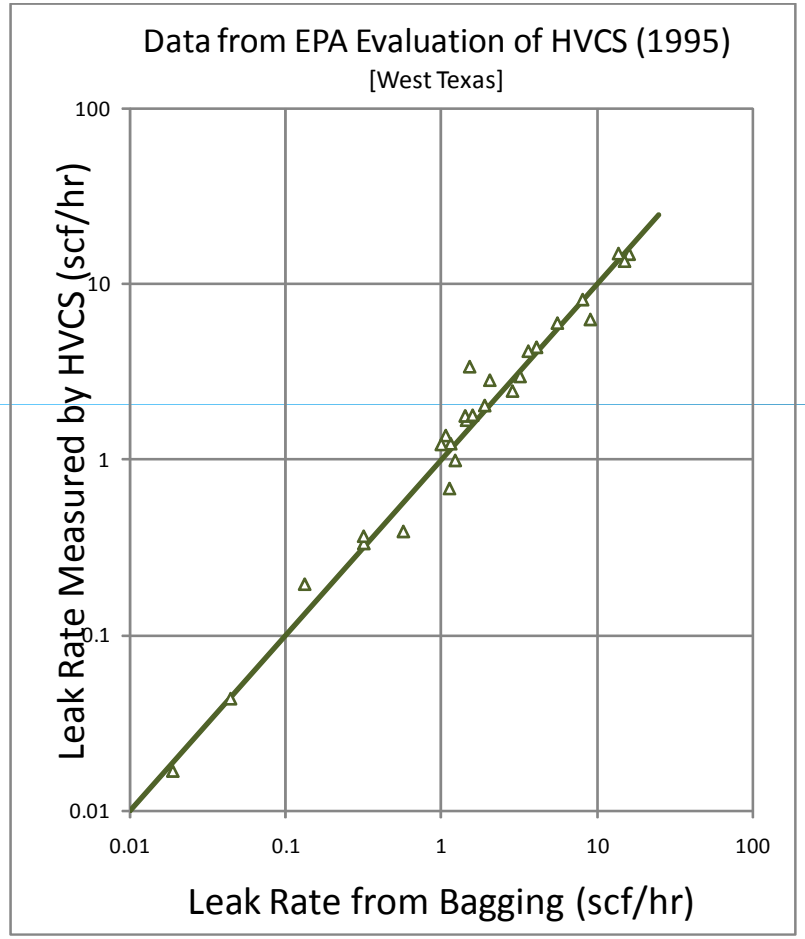


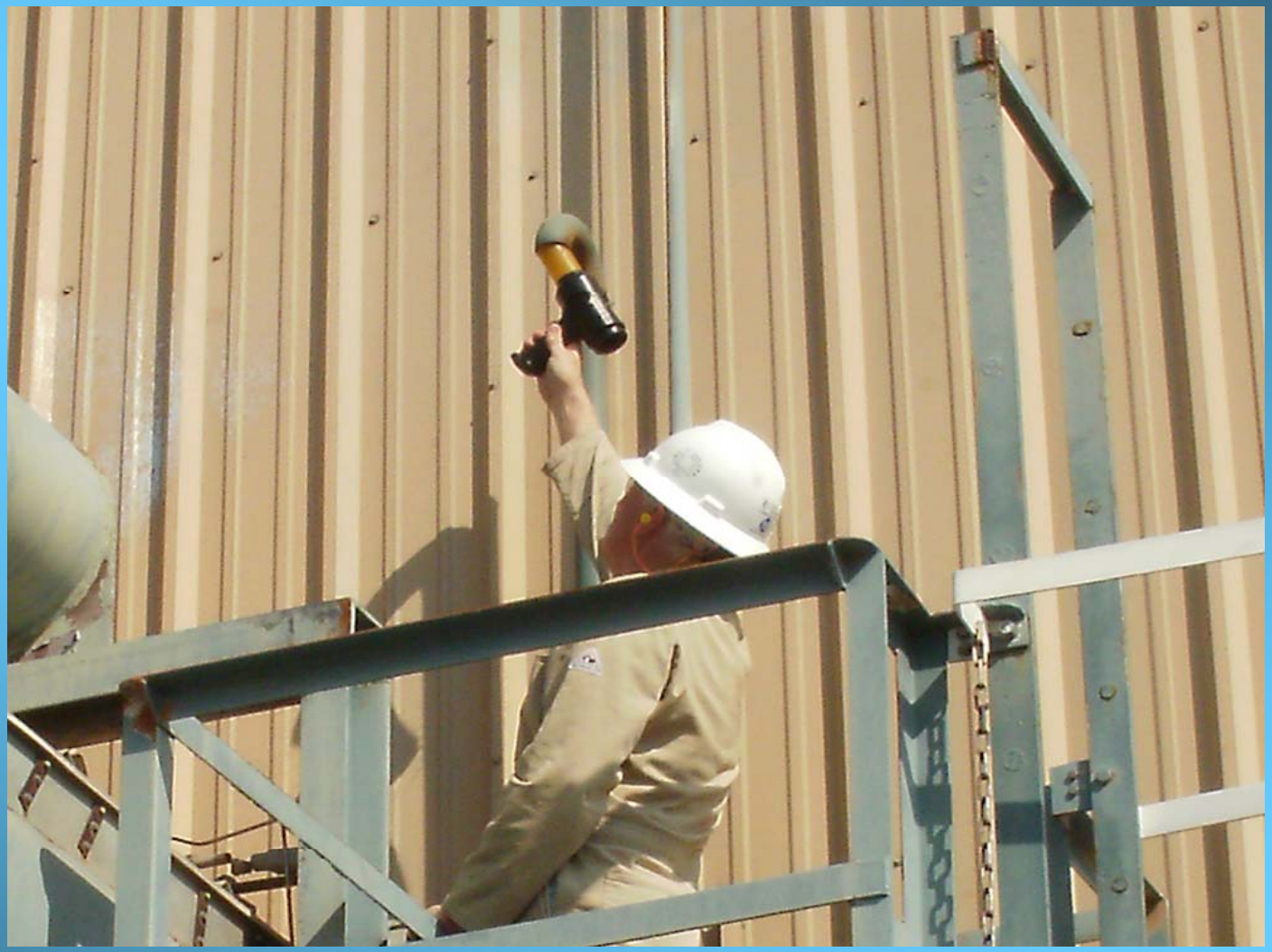

United States Environmental Protection Agency
Office of Research and Development Washington, DC 20460
EPA-600/R-95-167
November 1995
EPA Evaluation of the High Volume Collection System (HVCS) for Quantifying Fugitive Organic Vapor Leaks
NARSTO
Prepared for Office of Air Quality Planning and Standards
Prepared by Air Pollution Prevention and Control Division
NARSTO


Data from EPA Evaluation of HVCS (1995)
[Laboratory Evaluation]
Leak Rate Measured by HVCS (scf/hr)
100
10
1
0.1
0.01
0.01
0.1
1
10
100
Known Leak Rate (scf/hr)


Data from EPA Evaluation of HVCS (1995)
[Laboratory Evaluation]
Leak Rate Measured by Bagging (scf/hr)
100
10
1
0.1
0.01
0.01
0.1
1
10
100
Known Leak Rate (scf/hr)


Data from EPA Evaluation of HVCS (1995)
[South Texas]
Leak Rate Measured by HVCS (scf/hr)
100
10
1
0.1
0.01
0.001
0.0001
0.0001
0.001
0.01
0.1
1
10
100
Leak Rate from Bagging (scf/hr)


Data from EPA Evaluation of HVCS (1995)
[West Texas]
Leak Rate Measured by HVCS (scf/hr)
100
10
1
0.1
0.01
0.01
0.1
1
10
100
Leak Rate from Bagging (scf/hr)



CONCLUSIONS

Frequency of Very Large Leaks today is significantly lower than in early 1990's.

Average emissions from Very Large Leaks today is approximately half of leaks found in early 1990's (1.5 scf/hr vs. 2.75 scf/hr).

EPA Correlation equations are useful for emitters below 9,999 ppmv.

EPA Average Emissions Factors over-predict current emissions by an order of magnitude.

EPA Pegged Source Factors over-predict current emissions by 100% to 200%.