

Introduction

Refiners must be able to measure the precise amount of sulfur and/or nitrogen in order to optimize their products and get them as close to the specification while protecting expensive catalysts. Meeting these requirements is costly for many reasons. The amount of sulfur in the crude is increasing, which requires more processing. Regulations that apply to final products have become more stringent. Improved process monitoring of sulfur and/or nitrogen can help produce the most cost-effective blends that meet regulatory compliance.

Primary Test Methods

ASTM D5453, D6667 and D4629 are the primary test methods utilized for process monitoring and Tier III regulations of final products including: diesel, gasoline, ethanol, and butane.

Lab Analyzer



Process Analyzer



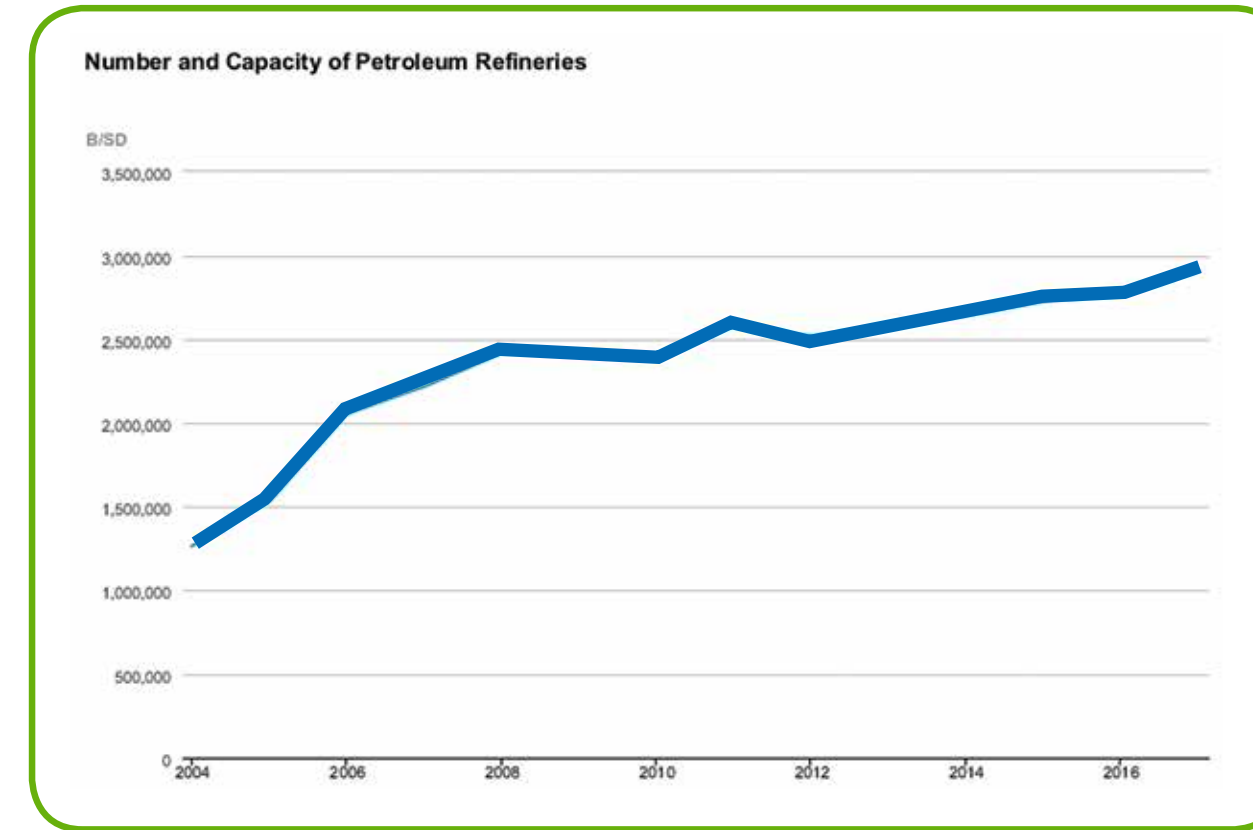
Tier III PBMS

QC 1		
Ref. Value	1.20	
Mean	1.19	
STDEV	0.06	
RSD %	5.04	
Max. STDEV	0.31	
Passed?	passed	

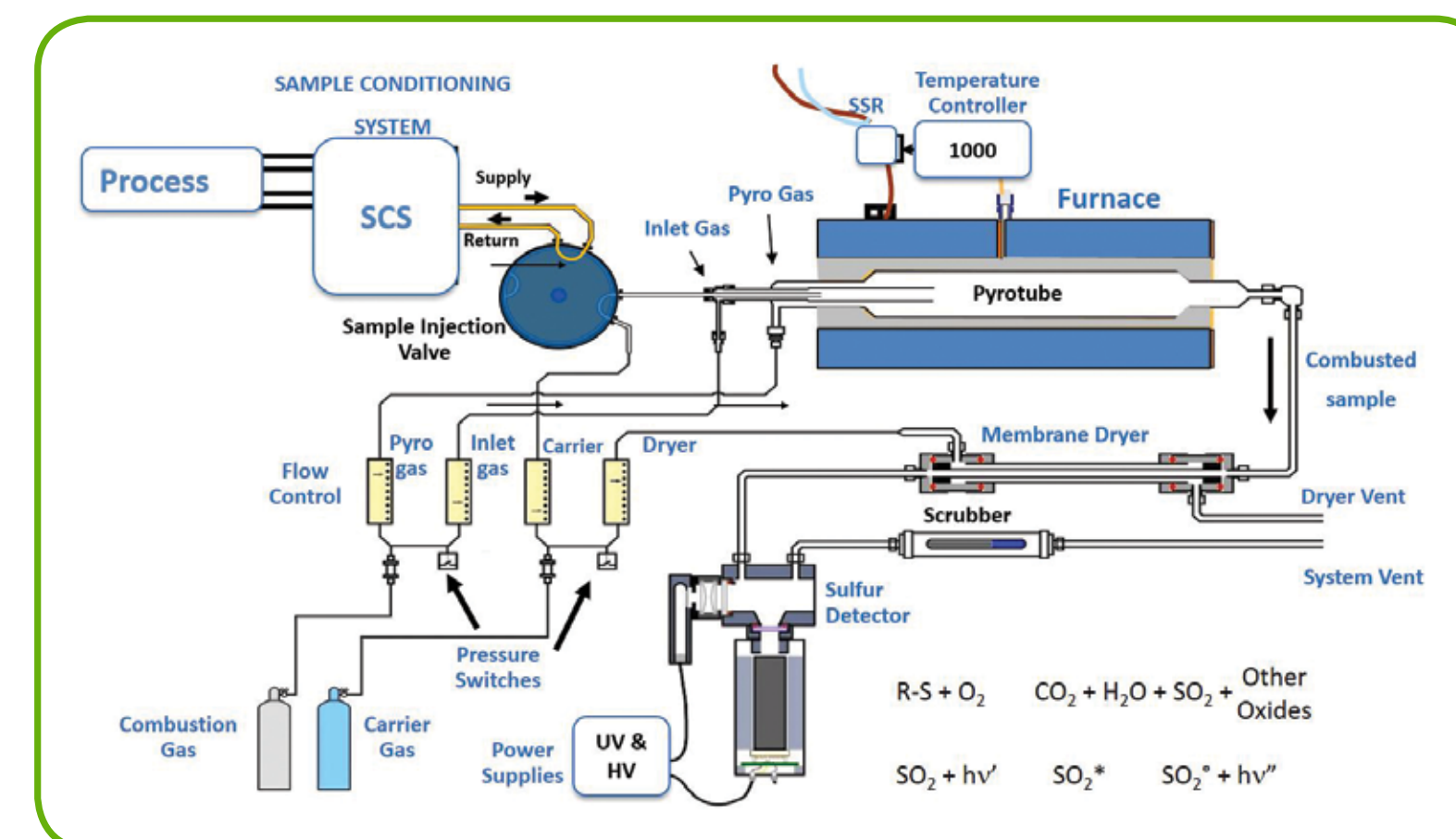
ASTM D5453 can be used to meet Performance Based Measurement System (PBMS) Tier III precision and accuracy requirements in the laboratory or in the process environment.

ACCURACY						
Replicate	QC 1	Δ	QC 2	Δ	QC 3	Δ
1	1.227	0.027	5.054	0.054	7.904	0.296
2	1.266	0.066	4.973	0.027	8.058	0.142
3	1.146	0.054	4.925	0.075	7.792	0.408
4	1.102	0.098	4.957	0.043	7.682	0.518
5	1.153	0.047	4.951	0.049	7.883	0.317
6	1.334	0.134	4.945	0.055	8.022	0.178
7	1.170	0.030	4.965	0.035	7.863	0.337
8	1.167	0.033	5.030	0.030	7.839	0.361
9	1.225	0.025	5.092	0.092	7.852	0.348
10	1.176	0.024	5.038	0.038	8.224	0.024
Mean Δ	0.054		0.50		0.293	
Max. Δ	0.224		0.88		0.632	
Ref. Value	1.20		5.00		8.20	
Passed?	passed		passed		passed	
PASS Criteria	if Δ CoA ≤ Max. Δ					

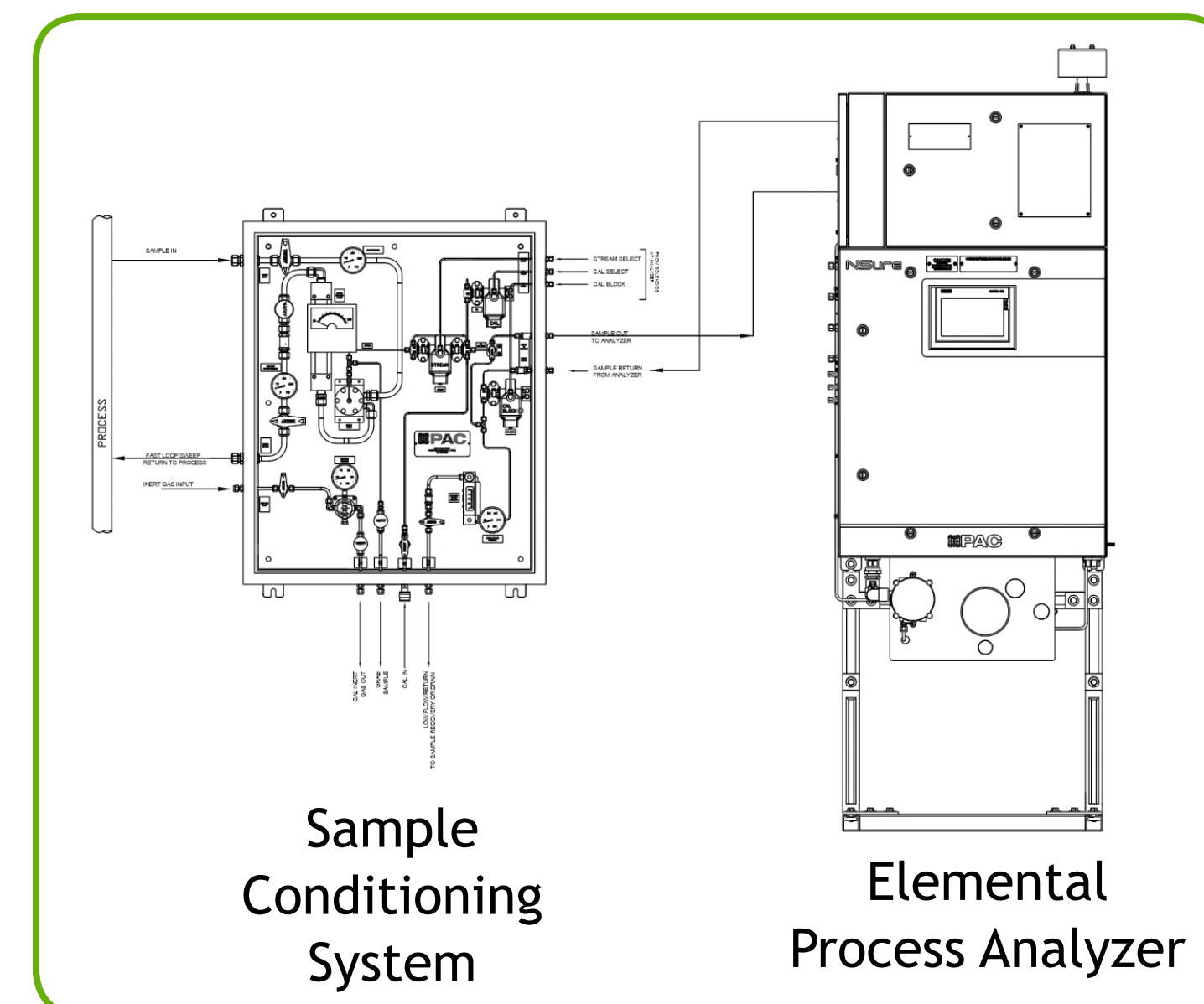
U.S. Market Growth



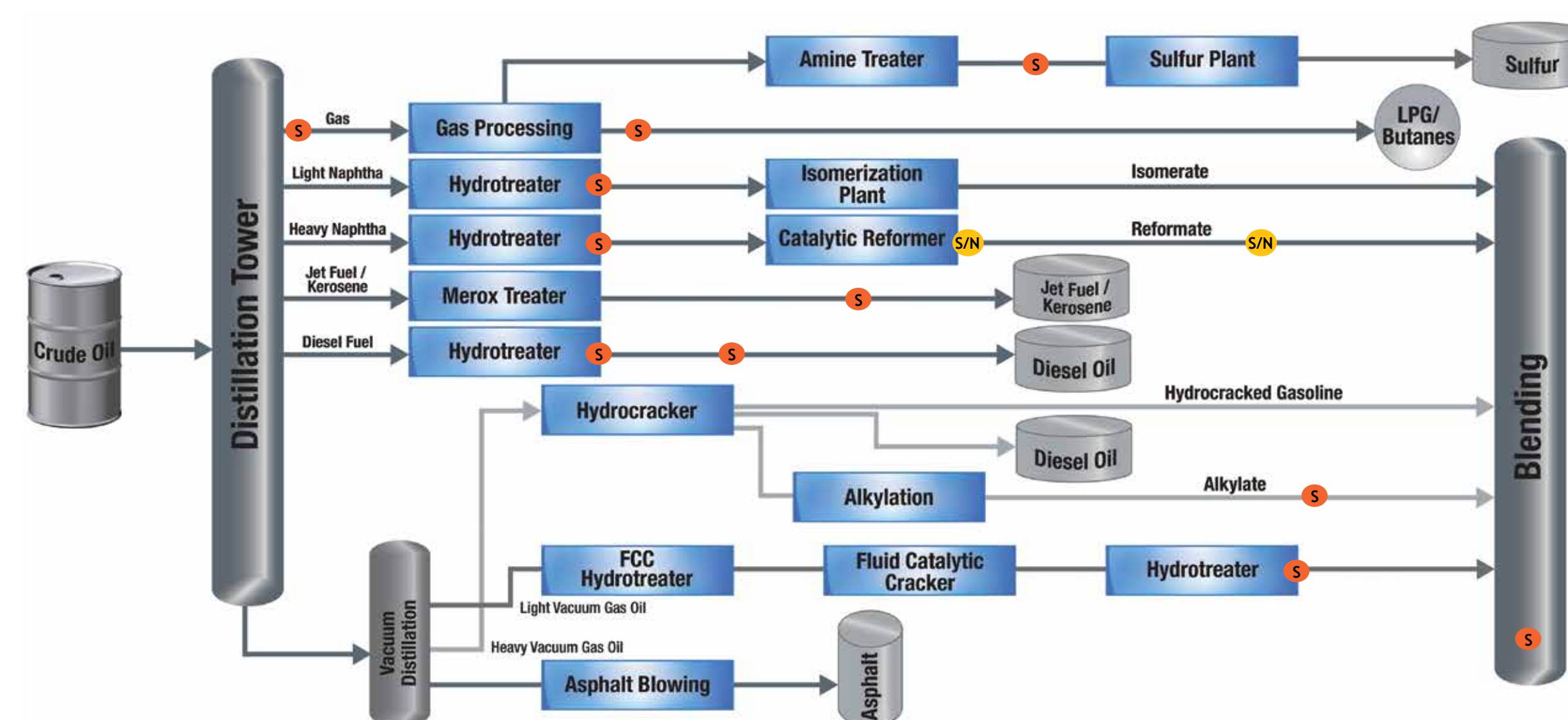
Analytical Process Flow Path



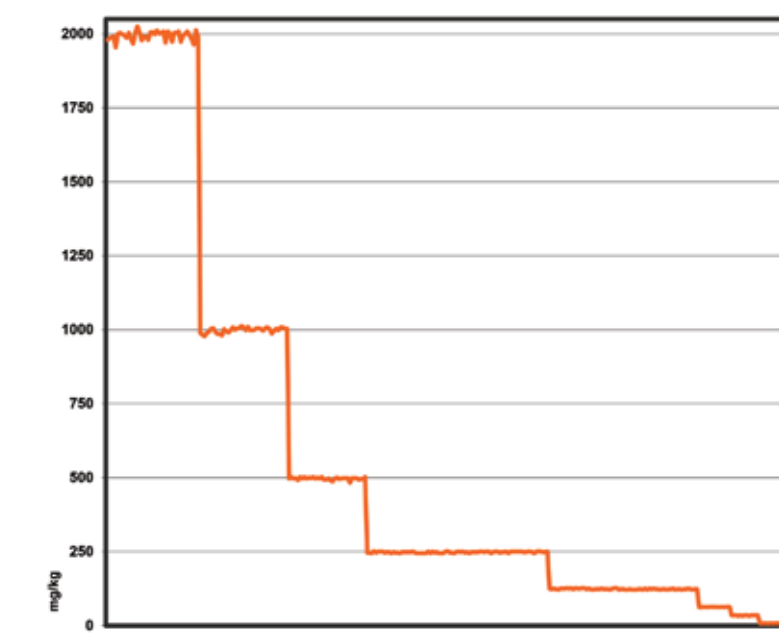
Piping and Installation Diagram



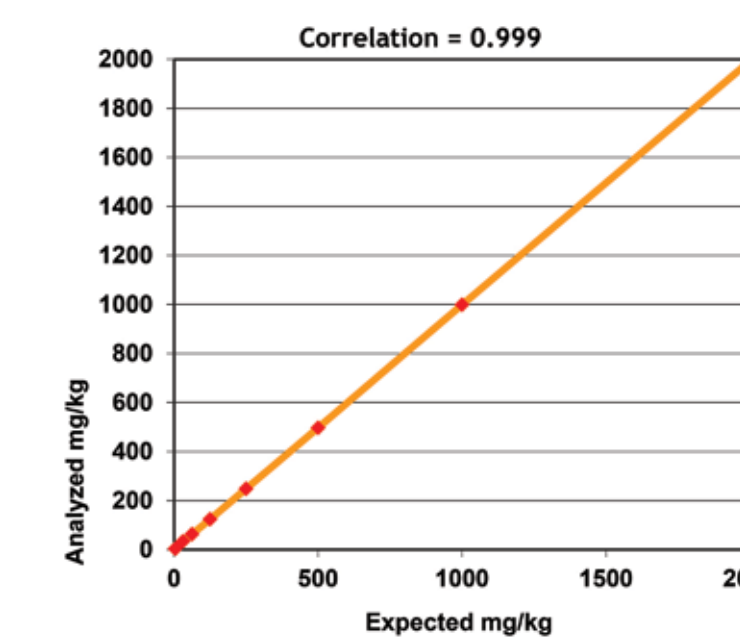
Refinery Solutions



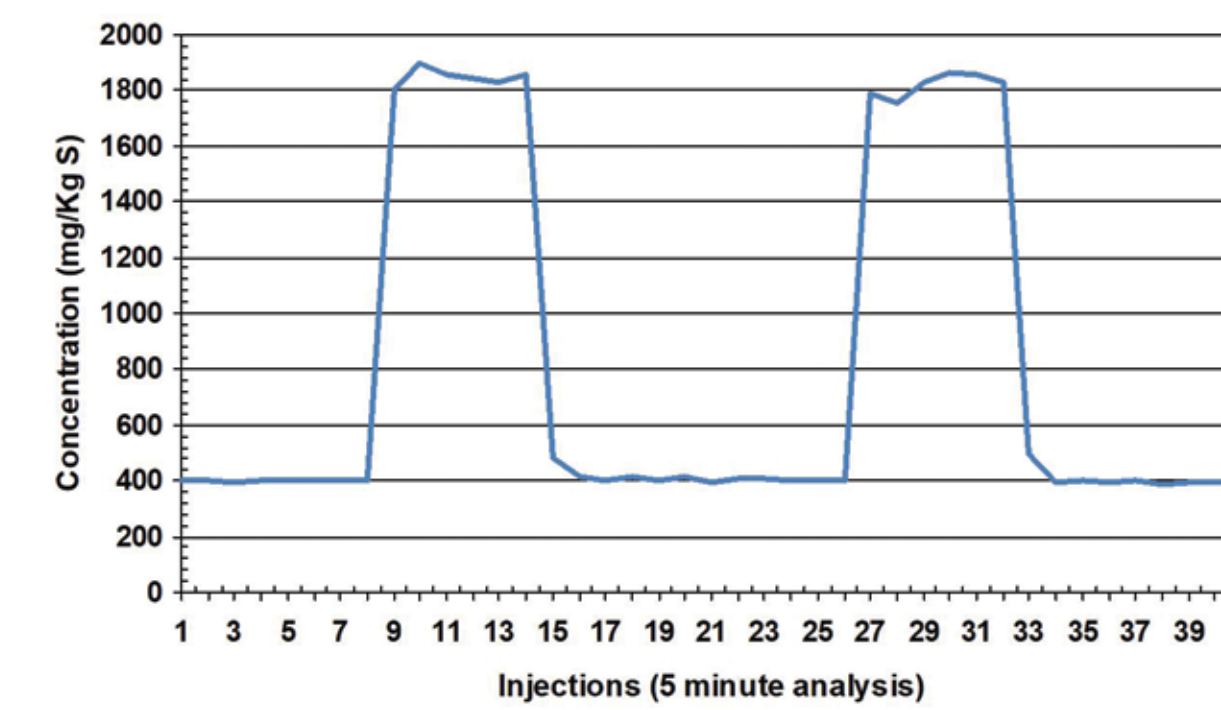
Linearity Study



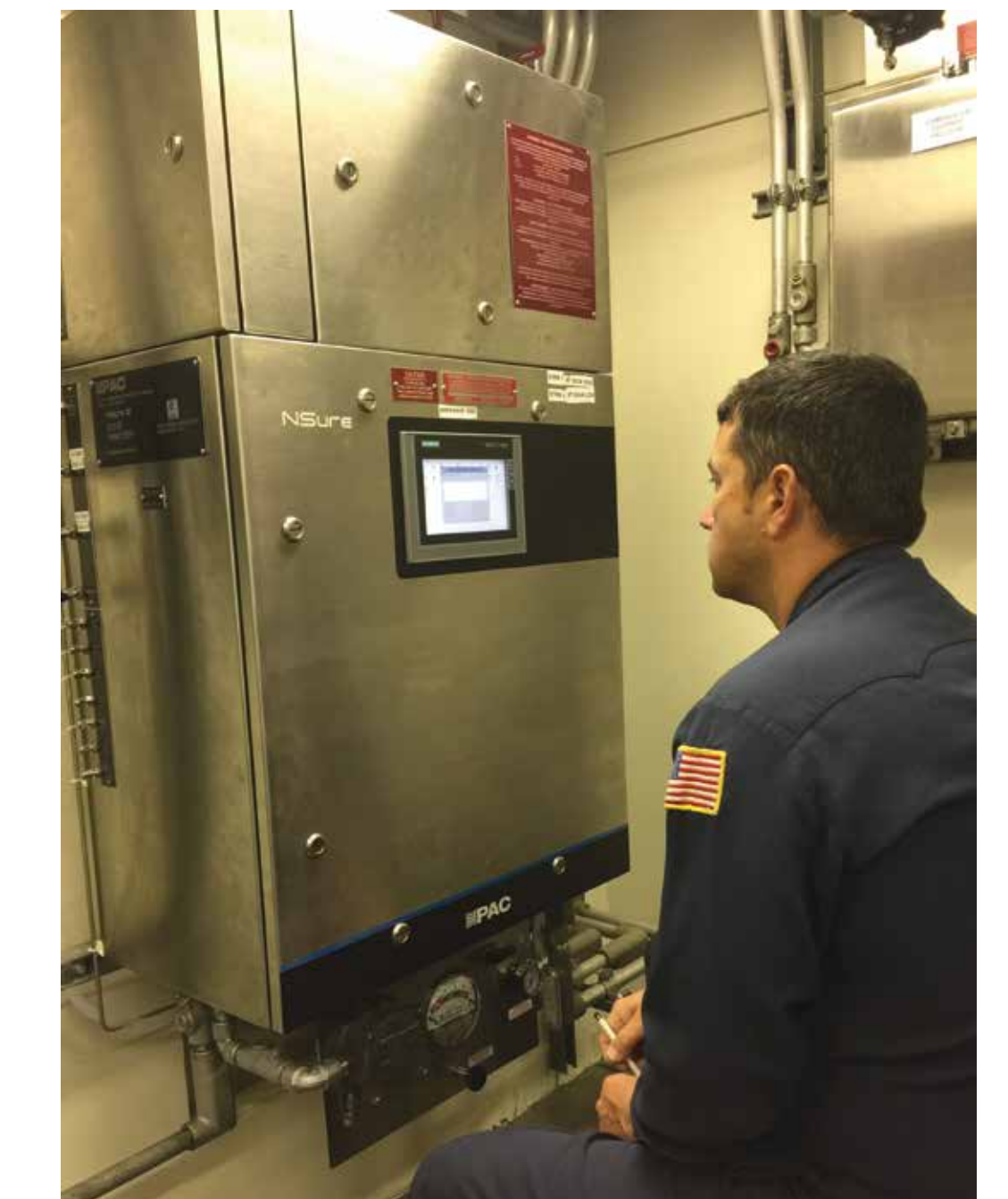
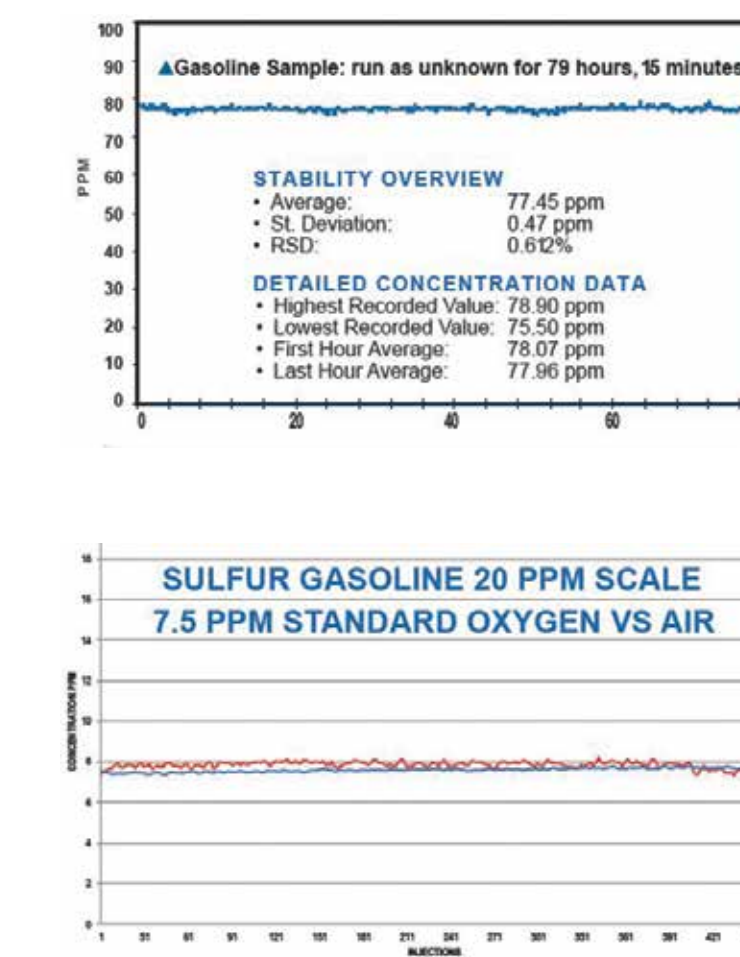
Lab-Process Correlation



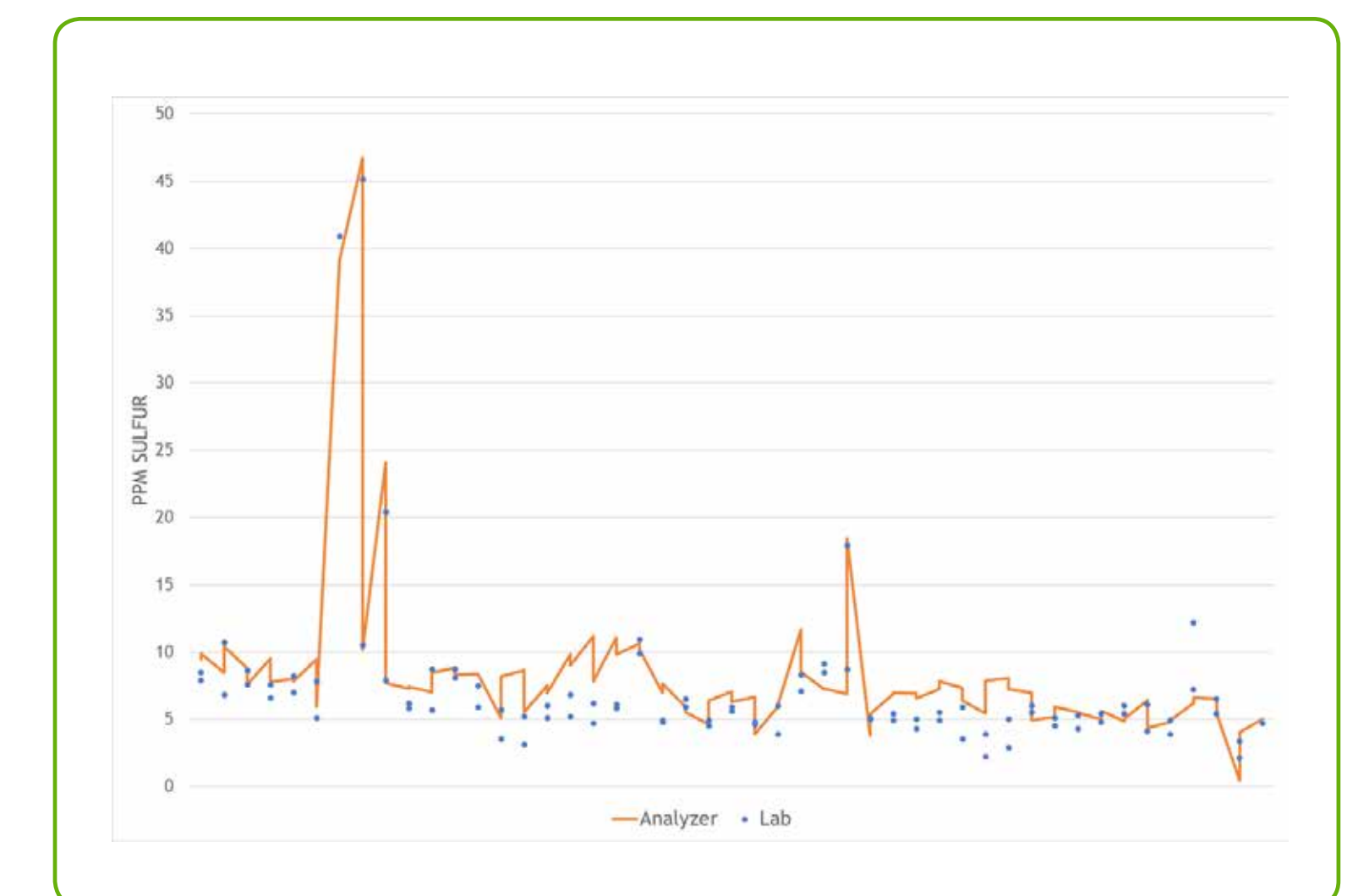
Rapid Response To Product Turnover



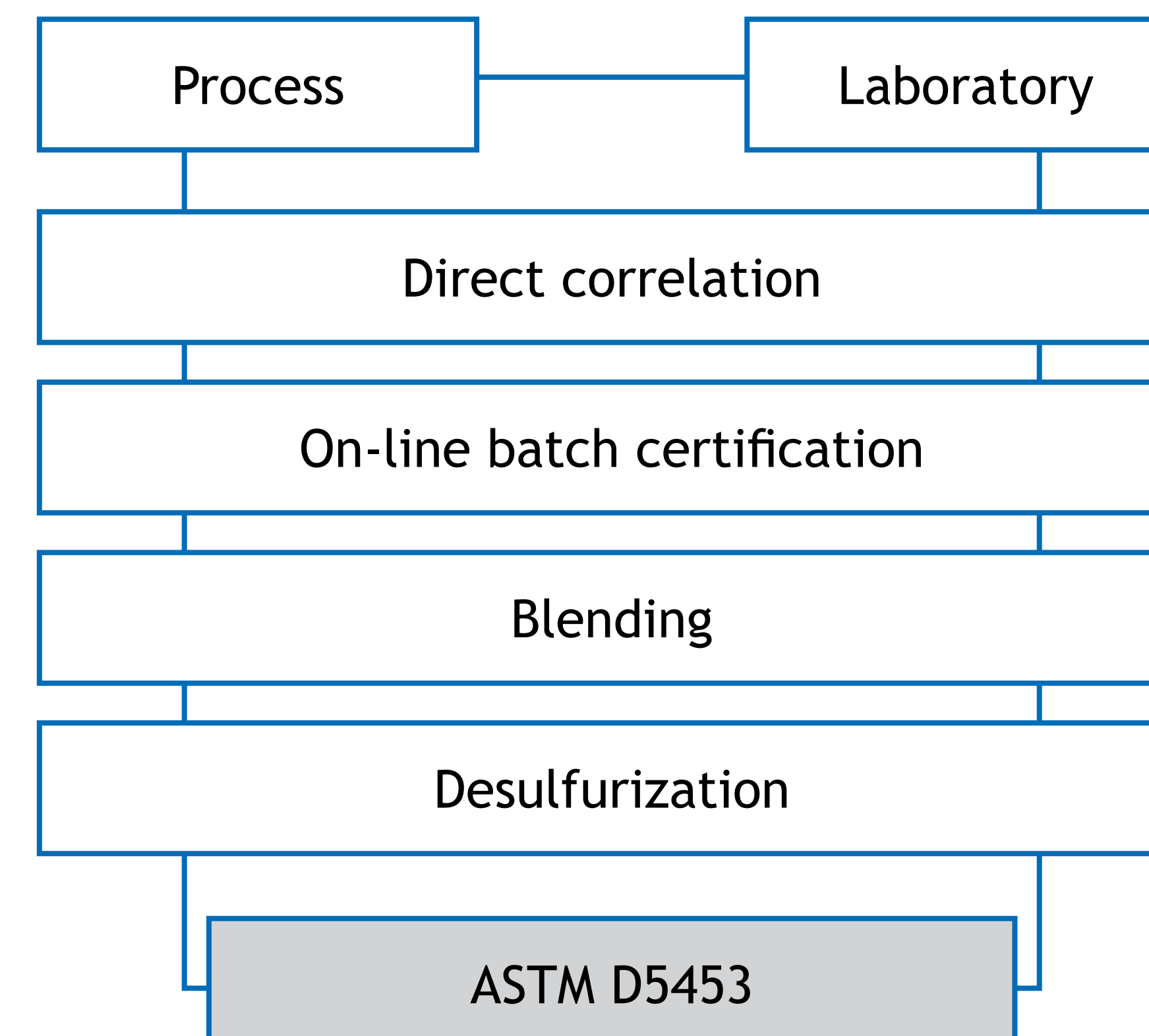
Stability Study



Process-Lab Correlation



Application Flexibility



Conclusions

- Meet strict regulatory standards for sulfur and/or nitrogen content in your high-value products**
- Measure sulfur, nitrogen, or both in a single analyzer
 - Precise measurement of gas, liquid, and LPG
 - Direct injection system capable of measuring heavy gas/oil products

- Optimize the process by keeping as close to the specification limits as possible**
- Fast response time to process changes
 - No carry over
 - Enables process control by easy integration with the plant's Data Control System

- Produce lab accuracy with process robustness**
- Proven Antek technologies running 24/7 in process and labs worldwide
 - Correlates to ASTM D5453, D6667, and D4629
 - Flexible combustion system performs under various process conditions
 - Built to withstand process disruptions, and recovers quickly for minimal downtime