

DCM Direct Contaminant Measurement

On-line Natural Gas Laser Particle Testing



Client: Global Production Company
 Facility: USA Gas Plant

Problem: Plant inlet filter separator was suspected of allowing contaminant carryover into downstream processing equipment.

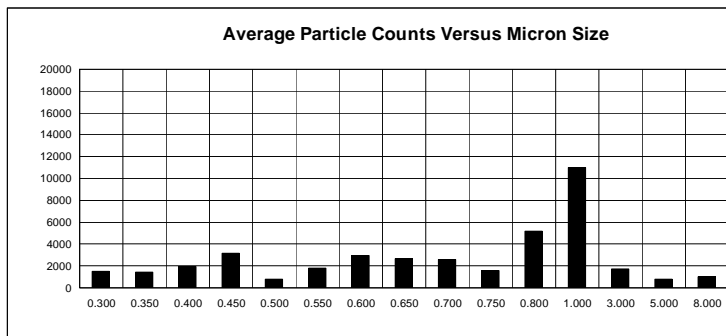
Scope of Work: SPS was contracted to test the performance of the filter separator and to verify that it needed to be replaced with a new filtration vessel.

Testing Protocol: SPS used the DCM or Direct Contaminant Measurement protocol to periodically sample the fuel gas stream. The DCM testing protocol utilizes a sampling probe, on-line laser particle counter, and gas flow meter to isokinetically sample and measure the contaminant in the gas stream. The DCM laser particle counter samples and measures the contaminant in the gas stream at the pipeline velocity, pressure, and temperature. This energy conserving, isokinetic approach to sampling and measurement insures that the contaminant measured is representative of how it exists at pipeline conditions.

Final Results: SPS engineers DCM tested the gas downstream of the filter separator. The SPS engineers were able to identify that an element bypass problem was likely, due to the particle size distribution measured with the DCM laser particle counter. The filter separator was blown down and opened to find that the element seal caps were damaged and were not properly sealing the elements. New element seal caps were ordered and installed correcting the problem, saving the facility the cost of additional filtration equipment that was not needed.

Example Project Data:

Carryover PPM (wt)	0.419810
Carryover gal/day	0.127227



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Client: USA Construction Company
 Facility: USA Power Plant



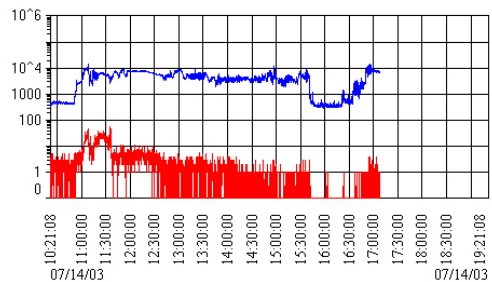
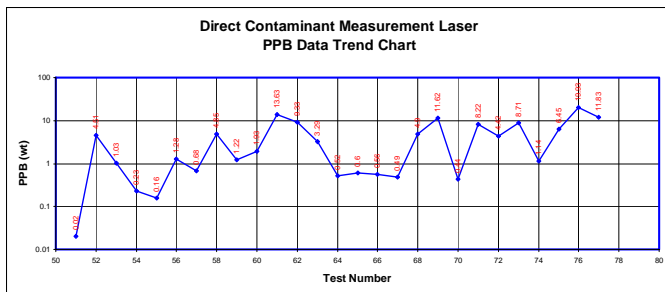
Problem: Fuel gas coalescers allowed lube oil carryover to reach the turbine causing delays, resulting in fines, during reliability testing.

Scope of Work: SPS was contracted to monitor the lube oil content in the fuel gas and to provide consulting services to solve the problem.

Testing Protocol: SPS used the DCM or Direct Contaminant Measurement protocol to periodically sample the fuel gas stream. The DCM testing protocol utilizes a sampling probe, on-line laser particle counter, and gas flow meter to isokinetically sample and measure the contaminant in the gas stream. The DCM laser particle counter samples and measures the contaminant in the gas stream at the pipeline velocity, pressure, and temperature. This energy conserving, isokinetic approach to sampling and measurement insures that the contaminant measured is representative of how it exists at pipeline conditions.

Final Results: After a review of the fuel gas coalescer design, SPS recommended design modifications to enhance the coalescer's performance. The modifications were implemented and put into service. The modifications reduced the lube oil carryover so that the reliability tests could proceed. SPS remained on site for seven weeks, daily monitoring and reporting the lube oil concentration in the fuel gas until the reliability tests were successfully completed, saving the client a reported \$140,000.00 per day in startup fines.

Example Project Data:



Item	Plot	Channels	Plot Data
Gemini Model	Raw Counts	x > 0.30	Value
Gemini Model	Raw Counts	x > 1.00	Value

Iron Sulfide Filtration Optimization Study

Client: Production Company
 Facility: USA Gas Plant



Problem: Iron sulfide contaminant was found in an amine system downstream of the plant inlet coalescer.

Scope of Work: SPS was asked to test the performance of the filter coalescer and to recommend changes to optimize the process.

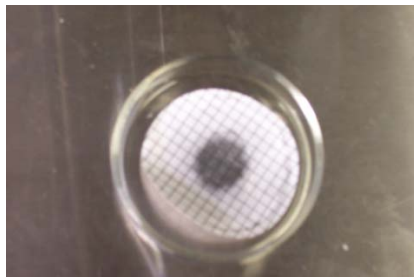
Testing Protocol: SPS used the SCM or Solid Contaminant Measurement protocol to sample and measure the iron sulfide contaminant in the gas stream. The SCM testing protocol utilizes a sampling probe, filter disk holder, and gas flow meter to isokinetically sample the gas. The solid particles are collected on a pre-weighed filter disk over a period of time and later weighed and measured. SPS also used the CCM or Coalescer Contaminant Measurement protocol to pilot test a different coalescing element. The CCM testing protocol utilizes a slip-stream pilot coalescer and gas flow meter to isokinetically sample and measure contaminant in a pipeline.

Final Results: SPS engineers verified that the coalescing element used was not effective in removing the system's iron sulfide particles. A different element design was installed in the CCM test vessel and tested for effectiveness. The CCM pilot test indicated that the new element design would be effective on the system's iron sulfide contaminant. A set of the newly designed elements was installed in the coalescer vessel and SCM tested for effectiveness. The new set of elements were found to more efficiently remove the iron sulfide contaminant.

Example Project Data:

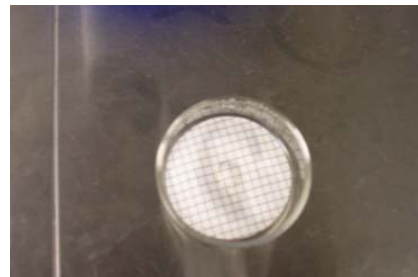
Old Coalescer Element Results

Solids Content (PPM)	0.07163
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New Coalescer Element Results

Solids Content (PPM)	0.00000
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SCM Solids Contaminant Measurement

Client: USA Transmission Company
 Facility: Natural Gas Storage Field
 Problem: Reservoir Protection and Piping Erosion



Scope of Work: SPS was hired to sample the gas streams from 23 different well heads and provide solid contaminant concentration and particle size distribution data.

Testing Protocol: SPS used the SCM or Solids Contaminant Measurement protocol to sample each of the gas streams and to provide the requested data. The SCM testing protocol utilizes a sampling probe, filter disk holder, and gas flow meter to isokinetically sample the gas. The solid particles are collected on a pre-weighed filter disk over a period of time. Once the testing period is over, the filter disk is treated to remove all liquid moisture. The treated disk is then weighed to produce a contaminant mass. The mass of the contaminant is compared with the mass of the gas sampled to produce a solids concentration number. Next, the solids are microscopically analyzed to provide a particle size distribution for the contaminant.

Final Results: A total of twenty three separate reports were generated providing the data needed to prepare purchase specifications for future filtration equipment including the real data for solids concentration values and element micron ratings.

Example Project Data:

Solids Content (PPMwt)	0.11155
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Size	No. of
0.1-0.3	0
0.4-0.7	0
0.8-1.0	0
1-3	87
3-5	11
6-8	11
9-12	11
13-16	6
17-20	5
20-30	5
30-40	1
40-50	3
50-60	0

