

ETHANE GAS SAMPLING
PROCEDURE REQUIRED FOR
ETHANE ANALYSES

This procedure outlines the steps to be taken in order to draw samples of ethane from trailers parked in the designated remote ethane trailer staging area along Ring Road near A4. For each trailer of ethane delivered, one sample is required in a one liter sample cylinder for an outside analysis and a second sample is required in a one gallon sample cylinder for a Fermilab analysis. The analyses are required before a given trailer of ethane is certified for use.

Editorial Hand-Process Changes Other Than Spelling
Require PPD/CDF Operations Department Co-Head Approval

HPC Number	Date	Section Number	Initials
1.	_____	_____	_____
2.	_____	_____	_____
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6.	_____	_____	_____
7.	_____	_____	_____

Approval:

(PPD/CDF Operations Department Co-Head)

(Date)

1.0 Controlled Copies of This Procedure

Four controlled copies of this procedure will exist.

One at the CDF Department Office.

One on the CDF Web Page.

One on CDF ADMIN. Server.

One at the Test Room #114 Ethane Analysis Stand in the CDF Assembly Building.

All other copies will be marked, "**INFORMATIONAL COPY ONLY**"

2.0 ETHANE SAMPLING PROCEDURE

2.1 WARNINGS:

Before beginning this procedure, the following safety precautions must be taken:

- ___ 1. Be sure that there are absolutely no ignition sources within 10 feet of the area where the sampling will take place. This includes vehicles, pagers, radios, and all other electronics unless rated for NEC Class 1 areas.
- ___ 2. Be sure that combustibles and flammable materials are not present within 10 feet of the sampling area.
- ___ 3. Wear appropriate Personal Protective Equipment for this procedure.
- ___ 4. Only trained personnel are to be within a ten foot radius of the sampling area.
- ___ 5. This procedure is to be performed with two persons. One person shall be designated to keep unauthorized personnel and ignition sources away from the rear of the trailer.
- ___ 6. Rope off the rear end of the trailer and post signs "Danger-Flammable Gas, No Ignition Sources" and "No Smoking".

2.2 PREPARATION

- ___ 1. Record the following information:
 - _____ TRAILER NUMBER
 - _____ DATE SAMPLES ARE TAKEN
 - _____ NAMES OF PERSONS DRAWING THE SAMPLES
 - _____
- ___ 2. With the Main Trailer Supply Valve Closed, Open the trailer tube manifold valves. Open the Pressure Gauge isolation valve.
- ___ 3. Note the trailer pressure and temperature.
 - _____ Pressure (psig)
 - _____ Temperature (F)

2.3 ONE LITER SAMPLE FOR OUTSIDE ANALYSIS

- ___ 1. Obtain the one liter sample cylinder, the Trailer Sampler Apparatus, and the CV-S1 (5 psig setting) attachment. Be sure that the sample cylinder has a burst disc installed on it.
- ___ 2. Attach the Trailer Sampler Apparatus to the outlet of the Trailer Supply Valve. Attach the sample cylinder to the outlet of the sampler apparatus and the CV-S1 attachment at the outlet of the cylinder. See the Ethane Trailer Sampler drawing.
- ___ 3. Verify that all connections are made up correctly and properly tightened.
- ___ 4. Fully close the regulator, PRV-S1, in order to minimize the delivery pressure.
- ___ 5. Open MV-IN; Close MV-OUT and MV-S1.
- ___ 6. Crack open the ethane trailer valve momentarily and then close again.
- ___ 7. Open the regulator slightly in order to supply the sample cylinder with about 10 psig of pressure as read on the downstream regulator gauge, PI-S2.
- ___ 8. Check for leaks at the connections with a hand held Flammable Gas Detector or Snoop. Vent the gas through MV-S1 before any leaks are repaired. If a repair is required, restart this procedure at step 4.
- ___ 9. Crack open the trailer supply valve.
- ___ 10. Set the regulator to deliver 15 psig to the cylinder as indicated by PI-S2.
- ___ 11. Open MV-OUT to purge the cylinder for one minute. Close MV-OUT.
- ___ 12. Set the regulator to deliver 150 psig to the cylinder as indicated by PI-S2.
- ___ 13. Close MV-IN.
- ___ 14. Crack open MV-OUT to vent the cylinder to 5 psig as seen by PI-S3 and determined by the CV-S1 set pressure.
- ___ 15. Close MV-OUT and open MV-IN to again fill the sample cylinder to 150 psig.

- __ 16. Repeat steps 13-15 two additional times (Vent, then Fill).
 Cycle #2 ____
 Cycle #3 ____
- __ 17. Close MV-IN and Open MV-OUT to vent the cylinder to 5 psig.
- __ 18. Keep the CV-S1 attachment connected to the sample cylinder.
- __ 19. Close the trailer supply valve.
- __ 20. Vent the gas in the sampler apparatus through MV-S1. Close MV-S1 after venting.
- __ 21. Disconnect the cylinder and CV-S1 attachment from the sampler apparatus and cap the inlet to the sample cylinder at MV-IN.
- __ 22. Close MV-OUT during transportation of the sample cylinder to Test Room #114. The cylinder should be brought directly to the test room after this procedure is completed. After arriving in the test room, store the cylinder on the Ethane Analysis Bench and open MV-OUT while the cylinder warms to room temperature. The test room exhaust fan must be running while using or storing flammable gas inside this room.

2.4 ONE GALLON SAMPLE FOR FERMILAB ANALYSIS

- ___ 1. Obtain the one gallon sample cylinder and the CV-S2/SV-S2 attachment. Be sure that the sample cylinder has a burst disc installed on it.
- ___ 2. With the main trailer supply valve closed and the sampler apparatus connected to the trailer, attach the sample cylinder to the outlet of the sampler apparatus and the CV-S2/SV-S2 attachment at the outlet of the cylinder. See the Ethane Trailer Sampler drawing.
- ___ 3. Verify that all connections are made up correctly and properly tightened.
- ___ 4. Fully close the regulator, PRV-S1, in order to minimize the delivery pressure.
- ___ 5. Open MV-IN and MV-OUT. Close MV-S1 and MV-S2.
- ___ 6. Crack open the ethane trailer valve momentarily and then close again.
- ___ 7. Open the regulator slightly in order to supply the sample cylinder with about 10 psig of pressure as read on the downstream regulator gauge, PI-S2.
- ___ 8. Check for leaks at the connections with a hand held Flammable Gas Detector or Snoop. Vent the gas through MV-S1 before any leaks are repaired. If a repair is required, restart this procedure at step 4.
- ___ 9. Crack open the trailer supply valve.
- ___ 10. Set the regulator to deliver 10 psig to the cylinder as indicated by PI-S2.
- ___ 11. Open MV-S2 to purge the cylinder for one minute. Close MV-S2.
- ___ 12. Set the regulator to deliver 150 psig to the cylinder as indicated by PI-S2.
- ___ 13. Close MV-IN.
- ___ 14. Crack open MV-S2 to vent the cylinder to about 1 psig as seen by PI-S4 and determined by the CV-S2 set pressure.
- ___ 15. Close MV-S2 and open MV-IN to again fill the sample cylinder to 150 psig as indicated by PI-S4.

- ___ 16. Repeat steps 13-15 two additional times (Vent, then Fill).

 Cycle #2 ___
 Cycle #3 ___

- ___ 17. Close MV-IN and MV-OUT.

- ___ 18. Keep the CV-S2/SV-S2 attachment connected to the sample cylinder and keep MV-S2 closed.

- ___ 19. Close the trailer supply valve.

- ___ 20. Vent the gas in the sampler apparatus through MV-S1. Close MV-S1 after venting.

- ___ 21. Disconnect the cylinder and CV-S2/SV-S2 attachment from the sampler apparatus and cap the inlet to the sample cylinder at MV-IN.

- ___ 22. Disconnect the sampler apparatus from the trailer. Cap its ends and the trailer supply port. Bring the sampler apparatus to its designated storage location.

- ___ 23. Keep MV-OUT closed during transportation of the sample cylinder to Test Room #114. The cylinder should be brought directly to the test room after this procedure is completed. After arriving in the test room, store the cylinder on the Ethane Analysis Bench and open MV-OUT while the cylinder warms to room temperature. Keep MV-S2 closed. The test room exhaust fan must be running while using or storing flammable gas inside this room.

3.0 CHECKLISTS

The checklists for this procedure are included in, and are integral to, the above Procedure section. A copy of this procedure will be kept in the Procedure 320 binder at the Test Room #114 Ethane Analysis Stand in the CDF Assembly Building.

4.0 DEVIATIONS

None are allowed.

5.0 Required Training and Authorized Training Personnel

CDF Gas Systems Engineer
CDF Gas Systems Manager

The training should be documented on a standard Fermilab Training Form and the Training Expiration date should be tied to the end date of the Collider Run (e.g. "the end of Collider Run II"). The completed forms must be inserted in the CDF Department Office copy of this procedure.

6.0 Training Materials

This procedure covering the operation of the ethane sampling apparatus must be read and understood.

One of the authorized training personnel must give a training lecture on the use of the ethane sampling apparatus at an ethane trailer.

7.0 List of Trained People for this Procedure

A list of trained personnel for this procedure should be kept in a separate section at the end of the CDF Department copy of the procedure.

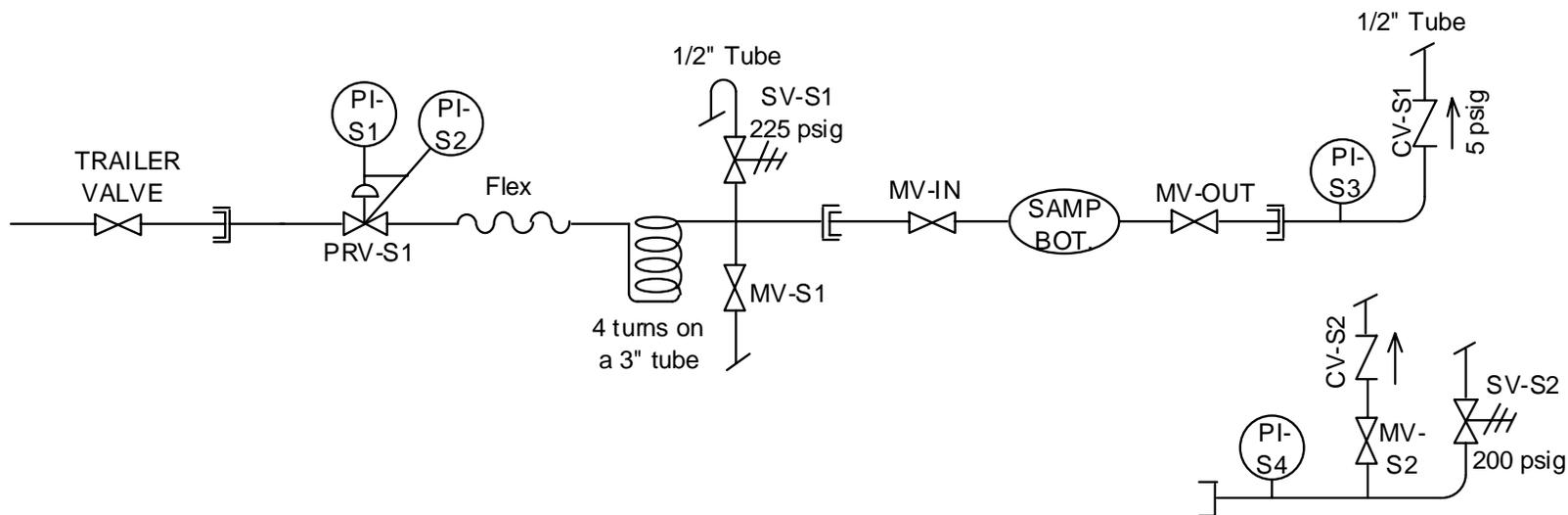
8.0 References and Supporting Documentation

See the drawing of the ethane sampling apparatus at the end of this procedure.

ETHANE TRAILER SAMPLER

D. Allspach

3-8-01



Label	Manufacturer	Part No.	Range	Max Pressure
CV-S1	Circle Seal	259T4PP	6 psig	3000 psig
CV-S2	Circle Seal	259B2PP	0.5-1 psig	3000 psig
MV-IN	Whitey	B-4HK2	-	1000 psig
MV-OUT	Whitey	B-4HK2	-	1000 psig
MV-S1	Nupro	SS-4P4T4	-	3000 psig
MV-S2	Nupro	SS-4P4T4	-	3000 psig
PRV-S1	Scott	51-300C	5-300 psig	3000 psig
PI-S1	Scott	Part of PRV-S1	0-4000 psig	3000 psig
PI-S2	Scott	Part of PRV-S1	0-400 psig	3000 psig
PI-S3	MarshallTown	86800	0-30 psig	30 psig
PI-S4	USG		0-300 psig	300 psig
SV-S1	Circle Seal	5159B2MP	225 psig	2400 psig
SV-S2	Circle Seal	5159B2MP	200 psig	2400 psig

Flex Hose is 1/4" Swagelok