APPENDIX L

Auditor SOPs

Meteorological / Air Quality Auditing Procedures

for

Energy Fuels Resources Corporation
Ambient Air Monitoring Plan
Uranium Mill Licensing Support
Pinyon Ridge Mill Site
Montrose County, CO

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PERFORMANCE AUDIT: WIND SPEED/DIRECTION

The procedures outlined below are for an R.M. Young Model 05305 AQ wind vane.

1. Record the appropriate site, date, sensor and calibration device models and serial numbers on the calibration spreadsheet.

2. Prior to lowering the tower, use a magnetic compass, corrected for the local magnetic declination, to determine the orientation of either a sensor alignment rod or a cross-arm used to support the sensor.

3. Record this value on the spreadsheet under "X-Arm Alignment – As Found".

4. Carefully lower the tower and rest the top of the tower on a support to allow the sensor to rotate freely without interference from the ground or other obstructions.

5. Record the time that the data becomes invalid due to the audit.

WIND DIRECTION

Sensor Alignment

6. With the sensor on the tower, align the senor parallel to the X-arm and record the data acquisition system (DAS) value under "Sensor Alignment – As Found" on the spreadsheet.

Bearing Check

7. Remove the sensor from the tower. ENSURE that the "Sensor Orientation Ring" remains on the tower. If there is no "Ring", it will be necessary to mark the tower and sensor base to allow for the proper reinstallation of the sensor.

8. Install the sensor on the Vane Angle Bench Stand without the alignment arm assembly.

9. Install the Vane Torque Gauge on to the sensor body with the gauge leaf spring pointed toward the front of the sensor and the "Bearing Centerline" over the vane bearing.

10. Ensure the Bench Stand is located on a flat surface and no air flow is present.

11. Attach a thread to the end of the torque leaf and apply a steady force perpendicular to the sensor.

12. Observe the amount of torque required to move the vane and to maintain its movement. This should be less than 11.0 gram-centimeters (gm-cm). This check should be performed at least at the four cardinal points. Record the approximate torque required to rotate the vane.

Sensor Continuity Check

13. With the sensor on the Bench Stand (with alignment arm assembly) rotate the sensor to directions around the compass in 30 degree increments. It is advisable to avoid the compass points 355 to 0° since this is a "dead spot" resulting from the deadband region of the potentiometer.

14. Record the DAS values at each compass point.

WIND SPEED

15. Remove the propeller from its shaft.

16. Record the model and serial number of the propeller.

Bearing Check

17. With the sensor on the Bench Stand attach the anemometer torque disk to the propeller shaft.

18. Install a 1.0 gram weight (a silver screw) in the threaded hole adjacent to the propeller shaft.

19. With the threaded holes aligned horizontally, the disk should rotate downward when released. Check the bearing for both the clockwise and counter-clockwise rotation.

Sensor Output Check

20. Attach the calibration device clamp and bar assembly to the sensor housing.

21. Attach the calibration motor to the bar assembly and slide the motor along the bar until the motor shaft coupling can be slid on to the sensor propeller shaft.

22. Ensure the motor and propeller shafts are aligned.

23. Gently tighten the clamp assembly.

24. Set the "Direction Switch" on the anemometer control unit to "CW".

25. Record the DAS value on the spreadsheet with no shaft rotation (0.0mps).

26. Set the control unit to an RPM of 2 (i.e.,200 RPM).

27. Turn the control unit "ON".

28. Ensure there is no binding of the shaft adapter.

29. Allow the unit to operate until a stable DAS reading is obtained. At the low speeds, the DAS value may not be stable beyond 1 decimal place.

30. Record the control unit display (actual input) and the DAS value (to the nearest 0.1) on the spreadsheet.

31. Repeat steps 26-30 for RPM values of 400, 800, 1200, 2400 and 4000 and record the corresponding control unit and DAS values.

32. Calculate the wind speed in meters per second (mps) and the differences between the inputted rpm (speed) and the DAS value.

33. Remove the audit device.

34. Replace the sensor on the tower.

35. Carefully raise the tower if all parameters on the tower have been audited.

36. Record the time that the data becomes valid following the audit.

PERFORMANCE AUDIT: WIND SPEED

SENSOR:
Manuf./Model: RMY/5305AQ
Serial No.:
Range: 0-50m/s

OWNER:
LOCATION:
DATE:
BY:

PROPELLER:
Manuf./Model: RMY/08254
Serial No.:

DATA ACQUISITION:
Manuf./Model:
Serial No.:

CALIB. FACTORS:
WS(mps)=(RPM*0.00512)
WS(mph)=mps*2.2369

AUDIT DEVICE:
Manuf./Model:
Serial No.:

PROPELLER CONDITION:
BEARING CONDITION: (<1.0 gm-cm)

INPUT:	SPEED		DATA ACQUISITION			
RPM	(mph)	(mps)	(mph)	(mps)	DIFF.(mps)	/ %
0	0.00	0.00	0.00	0.00	0.00	-
200	2.29	1.02	2.29	1.02	0.00	-
400	4.58	2.05	4.58	2.05	0.00	-
800	9.16	4.10	9.16	4.10	0.00	-
1200	13.74	6.14	13.74	6.14	0.00	0.00
2400	27.49	12.29	27.49	12.29	0.00	0.00
4000	45.81	20.48	45.81	20.48	0.00	0.00

PSD TOLERANCES (mps)

SPEED	DAS
≤5 mps	±0.25
>5 mps	±5.0% (≤ 2.5)

PERFORMANCE AUDIT: WIND DIRECTION

SENSOR:
Manuf./Model: RMY/05305AQ
Serial No.:
Range: 0-360 Degrees

OWNER:
LOCATION:
DATE:
BY:

VANE CONDITION: GOOD
BEARING CONDITION: GOOD (<11.0 gm-cm)

DATA ACQUISITION:
Manuf./Model:
Serial No.:

SENSOR ALIGNMENT CHECK

	X-ARM ALIGNMENT (Degrees)	SENSOR ALIGNMENT (Degrees)	DIFFERENCE (Degrees)
AS FOUND	180	177.6	-2.4
AS LEFT	180	178.6	-1.4

CONTINUITY CHECK

INPUT: COMPASS POINT (Degrees)	DATA ACQUISITION (Degrees)	DIFFERENCE (Degrees)
5		-5.0
30		-30.0
60		-60.0
90		-90.0
120		-120.0
150		-150.0
180		-180.0
210		-210.0
240		-240.0
270		-270.0
300		-300.0
330		-330.0
355		-355

PSD TOLERANCES (Degrees)

DAS
±5.0

PERFORMANCE AUDIT: VERTICAL WIND SPEED

The procedures outlined below are for the R.M. Young Model 27106T (w/8254 propeller) and the Model 27106 (w/8274 propeller) vertical wind sensors.

1. Record the appropriate site, date, sensor and calibration device models and serial numbers on the calibration spreadsheet.

2. Carefully lower the tower and rest the top of the tower on a support to allow the sensor to rotate freely without interference from the ground or other obstructions.

3. Record the time that the data becomes invalid due to the audit.

<u>Bearing Check</u>

4. Detach the signal wire from the sensor and remove from the tower.

5. With the sensor is a vertical position, measure the force required to start rotation of the propeller at a distance of one cm from the propeller shaft. This should be less than 0.5 gram-cm. (This should be done in an enclosed area.)

6. Remove the propeller from its shaft.

7. Record the model and serial number of the propeller.

8. Place the sensor on a horizontal surface and reattach the signal wire.

<u>Sensor Output Check</u>

9. Attach the calibration motor to the propeller.

10. Ensure the motor and propeller shaft are aligned.

11. Record the DAS value on the spreadsheet with no shaft rotation (0.0mps).

12. Set the "Direction Switch" on calibration motor control unit to "CW".

13. Set the RPM to "20".

14. Turn the motor on.

15. Record the DAS value on the spreadsheet.

16. Turn the motor off.

17. Set the "Direction Switch" on calibration motor control unit to "CCW".

18. Turn the motor on.

19. Record the DAS value on the spreadsheet.

20. Turn the motor off.

21. Repeat steps 11 – 19 for rpm values of 40, 70, 100, 200, 400, 700, and 1000.

22. Remove the calibration motor.

23. Remove the signal wire.

24. Reattach the propeller.

25. Reinstall the sensor on the tower.

26. Reinstall the signal wire.

27. Carefully raise the tower if all parameters on the tower have been audited.

28. Record the time that the data becomes valid following the audit.

PERFORMANCE AUDIT: VERTICAL WIND SPEED

SENSOR:
Manuf./Model: RMY/27106T
Serial No.: CFT
Range: 0-30 mps

OWNER:
LOCATION:
DATE:
BY:

PROPELLER:
Manuf./Model: RMY/08254
Serial No.:

DATA ACQUISITION:
Manuf./Model:
Serial No.:

CALIB. FACTORS:
WS(mps)=(RPM*0.00512)
WS(mph)=mps*2.2369

AUDIT DEVICE:
Manuf./Model: VSI
Serial No.: NSN

PROPELLER CONDITION: GOOD
BEARING CONDITION: GOOD (<0.5 gm-cm)

INPUT: RPM	SPEED (cm/s)	DATA ACQUISITION (CW)	(CCW)	ABS DIFF.(cm/s)	
0	0.0	0.0	0.00	0.0	0.0
20	10.0	-10.4	10.08	0.4	0.1
40	20.0	-20.3	19.56	0.3	-0.4
70	35.0	-34.1	34.38	-0.9	-0.6
100	50.0	-49.2	48.60	-0.8	-1.4
200	100.0	-99.3	99.29	-0.7	-0.7
400	200.0	-201.5	199.17	1.5	-0.8
700	350.0	-345.3	344.40	-4.7	-5.6
1000	500.0	-490.2	498.52	-9.8	-1.5

PSD TOLERANCES (cm/s)

SPEED	DAS
≤500 cm/s	±25
>500 cm/s	±5.0% (≤ 250)

PERFORMANCE AUDIT: VERTICAL WIND SPEED

SENSOR:
Manuf./Model: RMY/27106
Serial No.: EPS
Range: 0-30 mps

OWNER:
LOCATION:
DATE:
BY:

PROPELLER:
Manuf./Model: RMY/08274
Serial No.:

DATA ACQUISITION:
Manuf./Model:
Serial No.:

CALIB. FACTORS:
WS(mps)=(RPM*0.00512)
WS(mph)=mps*2.2369

AUDIT DEVICE:
Manuf./Model: VSI
Serial No.: NSN

PROPELLER CONDITION: GOOD
BEARING CONDITION: GOOD (<0.5 gm-cm)

INPUT: RPM	SPEED (cm/s)	DATA ACQUISITION (CW)	DATA ACQUISITION (CCW)	ABS DIFF.(cm/s)	
0	0.0	-0.3	0.00	0.3	0.0
20	9.8	-9.9	9.58	0.1	-0.2
40	19.6	-18.9	18.29	-0.7	-1.3
70	34.3	-33.4	33.69	-0.9	-0.6
100	49.0	-47.1	48.18	-2.0	-0.8
200	98.0	-98.2	98.43	0.2	0.4
400	196.0	-194.3	194.03	-1.7	-2.0
700	343.0	-334.6	337.48	-8.4	-5.5
1000	490.0	-484.2	480.21	-5.8	-9.8

PSD TOLERANCES (cm/s)

SPEED	DAS
≤500 cm/s	±25
>500 cm/s	±5.0% (≤ 250)

PERFORMANCE AUDIT: AMBIENT/DELTA TEMPERATURE

The procedures that are outlined below have been prepared for an R.M. Young Model 41342 ambient temperature/delta temperature system.

1. Record the appropriate site, date, sensor and calibration device information on the calibration spreadsheet for ambient temperature and for delta temperature.

2. Record the time that the data becomes invalid due to the audit.

3. Carefully lower the tower and rest the top of the tower on a support to prevent damage to any of the tower sensors.

4. Check the operation of the aspirator motors.

5. Remove the temperature/delta temperature probes from their housings. It will be necessary to remove signal wire straps from the tower leg to allow the placement of both the probes in a water bath.

6. Place the probes and thermometer in a water bath of ice together with an NIST-certified thermometer capable of measuring the bath temperature over the range of the audit (i.e., the expected temperature range the probes may experience at this location).

7. Gently agitate the probes and thermometer to prevent the ice from touching either. It is suggested that sufficient water be employed to allow the ice to float on the top of the bath while the probes are below the ice level.

8. Allow the bath to cool to near 32°F. It is not necessary to reach 32°F; a temperature below 35°F is sufficient.

9. Observe the delta temperature and ambient temperature channels on the data acquisition system (DAS).

10. Once the DAS readings are stable, record the bath temperature and the DAS values on the spreadsheets.

11. Repeat steps 7-11 at three additional temperatures equally spaced over the range of temperatures expected at this location.

12. Record the DAS values on the spreadsheets for the ambient temperature and delta temperature.

13. Return the system to its normal configuration.

14. Record the time that the data becomes valid following the completion of the audit.

PERFORMANCE AUDIT: AMBIENT TEMPERATURE

SENSOR:
Manuf./Model: RMY/41342
Serial No.:
Range: -50 to + 50ºC

OWNER:
LOCATION:
DATE:
BY:

CALIBRATOR:
Manuf./Model:
Serial No.:

DATA ACQUSITION:
Manuf./Model:
Serial No.:

INPUT TEMPERATURE (Deg. F)	(Deg. C.)	DATA ACQUISITION (Deg. F)	(Deg. C.)	DIFF. (Deg. C.) (DAS)
32.5	0.3	32.0	0.5	0.2
54.1	12.3	32.0	12.3	0.0
77.4	25.2	32.0	25.2	0.0
95.0	35.0	32.0	35.0	0.0

PSD TOLERANCES (Deg. C.)

DAS

±0.5

PERFORMANCE AUDIT: DELTA TEMPERATURE

SENSOR (Upper):
Manuf./Model: RMY/41342
Serial No.:
Range: -50 to + 50ºC

OWNER:
LOCATION:
DATE:
BY:

SENSOR (Lower):
Manuf./Model: RMY/41342
Serial No.:
Range: -50 to + 50ºC

DATA ACQUISITION:
Manuf./Model:
Serial No.:

CALIBRATOR:
Manuf./Model: ERTCO/1003-3
Serial No.: 7296

INPUT TEMPERATURE (Deg. F)	(Deg. C.)	DATA ACQUISITION (Upper)	(Lower)	DIFF. (Deg. C.) (DAS)
32.0	0.0	0.0	0.0	0.00
32.0	0.0	0.0	0.0	0.00
32.0	0.0	0.0	0.0	0.00
32.0	0.0	0.0	0.0	0.00

PSD TOLERANCES (Deg. C.)

DAS

±0.1

PERFORMANCE AUDIT: TEMPERATURE / RELATIVE HUMIDITY

The procedures that are outlined below have been prepared for a Vaisala Model HMP45C-L relative humidity and temperature sensor (This unit **cannot** be submersed in water to check the temperature probe.)

1. Record the appropriate site, date, sensor, DAS, auditor initials and audit device information on the spreadsheet for temperature and relative humidity.

2. Using a psychrometer, obtain and record the dry and wet bulb temperatures near the sensor.

3. Subtract the wet bulb temperature from the dry bulb temperature; this is the wet bulb depression.

4. Determine the ambient pressure.

5. Using the Psychrometric Lookup Table, determine the relative humidity from the ambient (dry bulb), the wet bulb depression and the ambient pressure.

6. Record the ambient temperature and relative humidity on the spreadsheet.

7. Record the ambient temperature and relative humidity displayed by the DAS on the spreadsheet.

8. Determine the differences observed.

9. The DAS relative humidity should fall within the manufacturer's specifications.

10. The DAS temperature should fall with the PSD guidelines.

PERFORMANCE AUDIT: AMBIENT TEMPERATURE

SENSOR:
Manuf./Model: Vaisala/HMP45C-L
Serial No.:
Range:

OWNER:
LOCATION:
DATE:
BY:

DATA ACQUISITION:
Manuf./Model:
Serial No.:

CALIB. FACTORS:
Deg. C = 0.5556(Deg. F - 32)

CALIBRATOR:
Manuf./Model:
Serial No.:

AMBIENT READING (^{0}F)	DATA ACQUISITION (^{0}F)	DIFFERENCE* (DAS)
56	55.6	0.3

DAS

$\pm$0.5

PERFORMANCE AUDIT: RELATIVE HUMIDITY

SENSOR:
Manuf./Model: Vaisala/HMP45C-L
Serial No.:
Range: 0 to 100%

OWNER:
LOCATION:
DATE:
BY:

DATA ACQUISITION:
Manuf./Model:
Serial No.:

CALIB. FACTORS:
Deg. C = 0.5556(Deg. F - 32)

CALIBRATOR:
Manuf./Model: PSYCHROMETER
Serial No. NSN

AMBIENT READING (%)	DATA ACQUISITION (%)	DIFFERENCE* (DAS)
32	33.5	-1.5

*NO STANDARD

MANUFACTURER'S SPECIFICATIONS:

RANGE	SENSOR ACCURACY
0-10%	±3%
10-90%	±2%
90-100%	±3%

PERFORMANCE AUDIT: SOLAR RADIATION

The procedures that are outlined below have been prepared for a Licor Model LI-200SZ solar radiation sensor.

1. Record the appropriate site, date, sensor, DAS and audit device information on the spreadsheet for solar radiation.
2. Cover the sensor to block all incoming light and record the DAS output.
3. Position a collocated solar radiation sensor near the Licor sensor.
4. Record the collocated and site sensor values on the spreadsheet.
5. Obtain a low and high sun angle value for each.
6. Disconnect the sensor signal wires from the DAS.
7. Record the time the wires were disconnected.
8. Install a DC voltage power supply into the signal wire terminals.
9. Input 5 values over the range of the sensor's output.
10. Record these values on the spreadsheet.
11. Determine the differences observed.
12. The DAS values should fall with the PSD guidelines.

PERFORMANCE AUDIT: SOLAR RADIATION

SENSOR:
Manuf./Model: Licor/LI-200SZ
Serial No.:
Range: 0-2000 W/m^2
Calib. Factors:
mV/Wm-2: 0.005 Date: 5/17/07

COLL. STD:
Manuf./Model: Licor
Serial No.:
Calib. Factors:
mV/Wm-2: Date:

OWNER:
LOCATION:
DATE:
BY:

DATA ACQUISITION:
Manuf./Model:
Serial No.:

1. Place a dark cover over the sensor and record output.

Output (mV)	DAS (W/m2)
0.00	0.0000

2. Record the output of the Collocated Standard and the Sensor.

Sensor	Standard	% Difference DAS
945	941	0.4
220	216	1.9

3. Disconnect the sensor and input voltages listed below to TB5.7(+) and TB5.8(-).

INPUT (W/m2)	Target Voltage (mVdc)	Actual Voltage	Data Acquisition (W/m2)	Diff.(%) (DAS)
444	2.22	2.22	443	-0.32
888	4.44	4.44	886	-0.26
1332	6.66	6.66	1332	0.02
1776	8.88	8.88	1773	-0.17
2220	11.10	11.10	2219	-0.07

PSD TOLERANCES

DAS
±5.0%

PERFORMANCE AUDIT: AMBIENT PRESSURE

1. Record the appropriate site, date, sensor, DAS and audit device information on the spreadsheet for ambient pressure.

2. Determine the ambient pressure using a collocated barometer.

3. Record the collocated and site pressure sensor values on the spreadsheet.

4. Determine the differences observed.

5. The DAS pressure should fall with the PSD guidelines.

PERFORMANCE AUDIT: AMBIENT PRESSURE

SENSOR:
Manuf./Model: Vaisala/CS106
Serial No.:
Range:

OWNER:
LOCATION:
DATE:
BY:

CALIBRATOR:
Manuf./Model:
Serial No.:

DATA ACQUISITION:
Manuf./Model:
Serial No.:

CALIB. FACTORS:
1013.25 mb = 29.92 in. Hg. = 760.0 mm Hg.

AMBIENT PRESSURE (in. Hg.)	AMBIENT PRESSURE (mb)	DATA ACQUISITION (in. Hg.)	DATA ACQUISITION (mb)	DIFF. (mb) (DAS)
24.4	826.4	24.5	828.0	1.6

EPA GUIDELINES (mb)

DAS

±3.0

PERFORMANCE AUDIT: PRECIPITATION

The procedures outlined below are for the MetOne Model 385 precipitation gauge with 12'inch collector.

1. Record the appropriate site, date, sensor, DAS and audit device information on the spreadsheet for ambient pressure.

2. Record the time that the data is invalid due to the audit.

3. Using a graduated cylinder, enter 300 – 400 ml of water into the precipitation gauge.

4. While entering the water, count the number of tips of the gauge.

5. Record the amount of water entered, the number of tips and the DAS value on the spreadsheet.

2. Determine the differences observed.

3. These values should fall with the PSD guidelines.

PERFORMANCE AUDIT: PRECIPITATION

SENSOR:
Manuf./Model: MetOne/385
Serial No.:
Resolution: 0.01 inch

OWNER:
LOCATION:
DATE:
BY:

CALIBRATOR:
Manuf./Model: Graduated Cyl.
Serial No.: NSN

DATA ACQUISITION:
Manuf./Model:
Serial No.:

CALIB. FACTORS:
1 tip = 0.01 inch = 18.53 ml = 0.254 mm

	INPUT		DATA ACQUISITION		DIFF. (inches / ml / %)
No. Tips	(in. H_2O)	(ml H_2O)	(in. H_2O)	(ml H_2O)	(DAS)
18	0.18	333.5	0.18	332.0	0.0 in. / -1.5ml / -0.5%

PSD TOLERANCES (% / mm H_2O))

DAS

$\pm$10% Observed Value / $\pm$0.5 mm (16.2 ml)

PERFORMANCE AUDIT: TSP SAMPLER (VFC)

1. Select a transfer standard (orifice) that has been certified within the last year and record the appropriate orifice calibration information on the calibration form (spreadsheet). Ensure that the appropriate slope (m) and intercept (b) are recorded; i.e., for flows at site conditions (Q_a) and not for flows at standard conditions (Q_{std}).

2. Record the initial ambient temperature and pressure, sampler information, location, date and technician's name on the spreadsheet.

3. Place a clean filter on the sampler and attach the orifice and faceplate on the filter holder; no plates are used with the orifice for the flow check. If an adjustable orifice is used, open the orifice inlet fully. Ensure there are no leaks between the orifice faceplate and the filter holder.

4. Connect a water manometer to the orifice pressure tap.

5. Connect the manometer used during the routine sampling to the stagnation port.

6. Record the beginning ETI reading.

7. Turn on the sampler and allow the unit to operate for at least 5 minutes.

8. After the sampler has operated for at least five minutes, record on the spreadsheet the manometer readings (inches H_2O) from both the orifice and the stagnation port.

9. Turn off the sampler.

10. Remove the orifice and return the sampler to its normal sampling configuration.

11. Turn on the sampler and record on the spreadsheet the manometer reading from the stagnation port.

12. Record the final ambient temperature and pressure.

13. After recording the information for the single flow settings, press F9 on the computer to calculate ΔP, P_1, P_1/P_o, Q_a, Q_{ind}, and the %DIFF's. The equations utilized by the spreadsheet for all but the determination of Q_{ind} are presented at the bottom of the page.

14. Review the Audit % Difference between the actual site flow (Q_a) and the flow from the Look-up Table (Q_{ind}); these values should be less than $\pm 6\%$.

15. Review the Design Flow % Difference between the corrected indicated flow and the design flow rate of 1.13 ccm; these values should be less than $\pm 7\%$.

16. If the % Differences are outside the EPA limits, the sampler must be inspected before further sampling is performed. Check for leaks, low line voltage, etc. Repeat this flow check once the problem is resolved. If it can not be resolved, the manufacturer should be consulted.

17. If the % Differences are within the EPA limits, remove the orifice and return the sampler to its normal configuration.

18. Record the final ETI reading.

PERFORMANCE AUDIT: TSP SAMPLER (VFC)

SAMPLER:

MANUF./MODEL: Tisch/TE-5170V-BL

SERIAL NO: 7151

OWNER:

LOCATION:

DATE:

BY:

			INITIAL	FINAL	AVERAGE
ORIFICE MODEL:	25A	TEMPERATURE (T_0):	16.3	16.3	16.3 ^{0}C
SERIAL NO.:	G73	PRESSURE (P_0):	623.2	623.3	623.25 mmHg
CAL DATE:	7/12/07				
SLOPE (m):	1.22082				
INTERCEPT (b):	-0.01051				
CORRELATION (r):	0.999990				

ORIFICE MANOMETER (in. H_20)			STAGNATION PORT (ΔP)				FLOWS	
LEFT	RIGHT	TOTAL	(in. H_2O)	(mm H_g)	P_1	P_1/P_o	Q_a (cmm)	Q_{ind} (cmm)
2.50	1.70	4.20	25.3	47.3	576.0	0.9242	1.153	1.114
W/O ORIFICE			21.4	40.0	583.3	0.9359	NA	1.165

40 ft^3 = 1.133 m^3

AUDIT FLOW	% DIFF.	DESIGN FLOW	% DIFF.
W/ORIFICE	-3.38	W/O ORIFICE	6.56
GUIDELINE:	± 6%	GUIDELINE:	± 7%

T_0 : Ambient Temperature (^{0}C)

$^0C = (^0F-32)*5/9$

P_0 : Ambient Pressure (mm Hg)

mm Hg = inches Hg * 25.4

$P_1 = P_o - \Delta P$

ΔH = Total Manometer (inches H_2O)

$Q_a = [1/m]*[[(\Delta H*(T_0+273.16)/P_o]^{1/2} - b]$

Audit % Difference = $[(Q_{ind} - Q_a)/Q_a] * 100$

$Q_{corr} = Q_{ind} * [(100 - \text{Audit \% Diff.})/100]$

Design Flow % Difference = $[(Q_{corr} -1.13)/1.13] * 100$

where: Q_a = actual flow (from orifice)

Q_{ind} = indicated flow (from table)

Q_{corr} = corrected flow

PERFORMANCE AUDIT: PM_{10} SAMPLER

The procedures outlined below are for an R&P/Partisol 2000 PM_{10} Sampler.

1. Record the sampler information, location, and date on the spreadsheet.
2. Place a clean filter in the sampler.
3. Remove the size selective inlet.
4. Attach a flow measurement device to the inlet.
5. Turn the sampler on.
6. Allow the sampler to operate for several minutes.
7. Record a minimum of 10 sampler and audit device flow readings.
8. Turn the sampler off.
9. Calculate the average flow value for each and record on the spreadsheet.
10. Remove the filter and measure the sampler's internal temperature.
11. Record the sampler internal temperature and audit internal temperature.
12. Measure and record the sampler external temperature and audit external temperature.
13. Measure and record the sampler ambient pressure and audit ambient pressure.
14. Install the size selective inlet.

PERFORMANCE AUDIT: PARTICULATE MATTER (PM_{10})

SENSOR:
Manuf./Model: R&P/Partisol 2000 - PM_{10}
Serial No.: 200FB208060708

OWNER:
LOCATION:
DATE:
BY:

AUDIT DEVICES:

FLOW:
Manuf./Model: BIOS/DCL-H
Serial Nc 4916

TEMP:
Manuf./Model:
Serial No.:

FLOW AUDIT:

INDICATED FLOW (lpm)	AUDIT FLOW (lpm)	DIFFERENCE (%)
16.6	17.0	-2.41

TOLERANCE: ±5%

TEMP (EXT) AUDIT:

INDICATED TEMP (°C)	AUDIT TEMP (°C)	DIFFERENCE (°C)
16.8	16.3	0.5

TOLERANCE: ±2°C

TEMP (INT) AUDIT:

INDICATED TEMP (°C)	AUDIT TEMP (°C)	DIFFERENCE (°C)
17.6	17.8	-0.2

TOLERANCE: ±2°C

PRESSURE AUDIT:

INDICATED PRS. (mmHg)	AUDIT PRS.(mmHg)	DIFFERENCE (mmHg)
621	623.2	-2.2

TOLERANCE: ±10mmHg