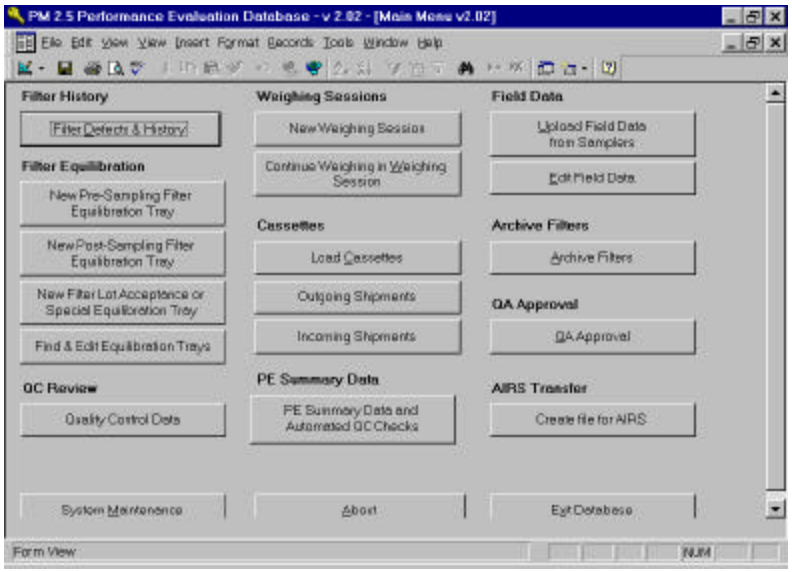
Performance Evaluation Program
Data Management

Tim Hanley
EPA - OAQPS



PEP Data Management

- Background
- Data Validation
- Approval
- AIRS submittal
- Next Steps

PEP Data Management Background

- Implemented Access database in each of two regional quality assurance laboratories in early '99
  - Athens, Georgia
  - Manchester, Washington
- First versions of database focused on acquisition of data
  - matching laboratory SOP's with need to track many types of data
  - acquiring sampler data through electronic data package

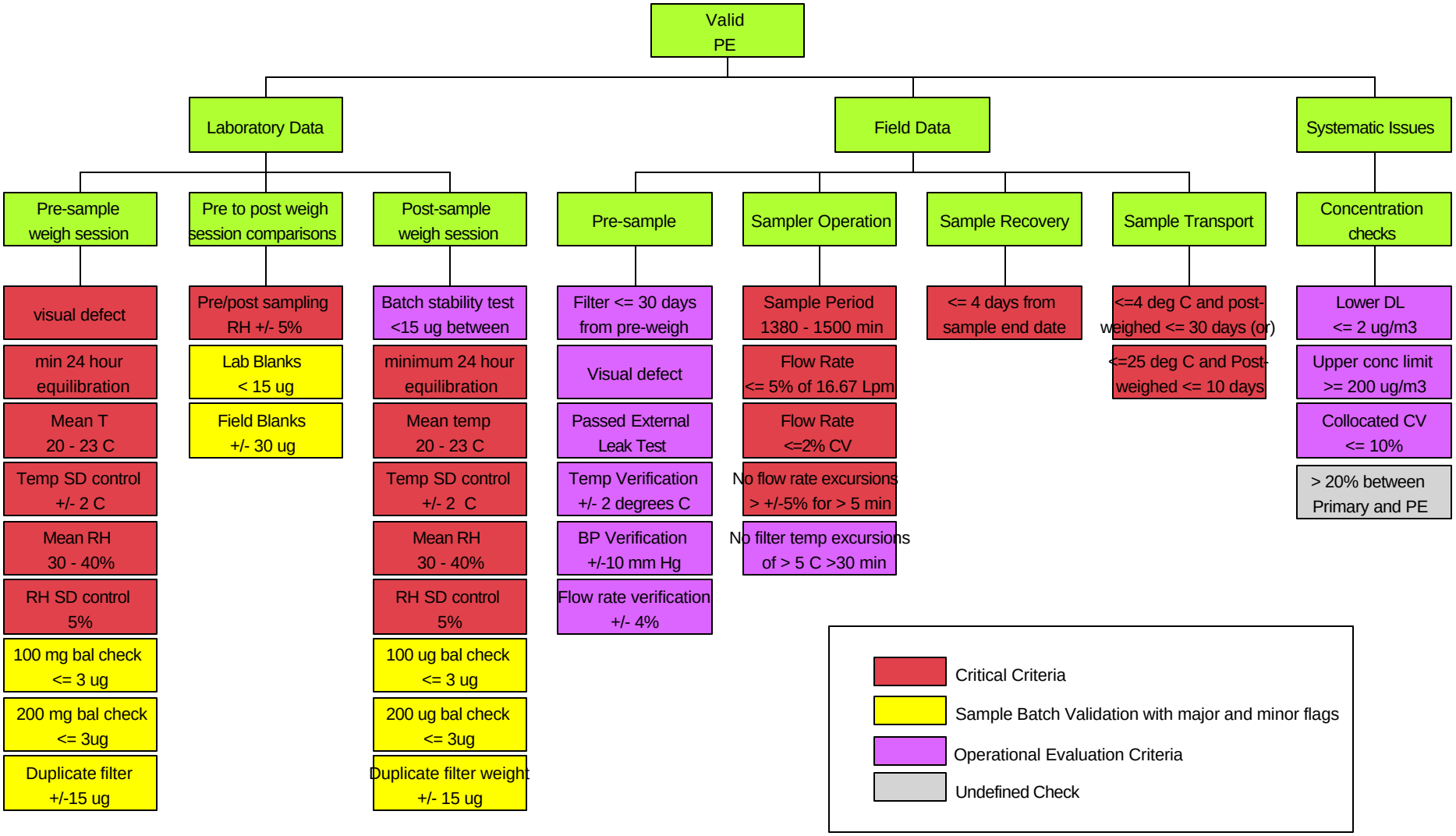
Designing Current Version of PED to incorporate validation

- Need to distinguish Performance Evaluation (PE) data as "valid" or "rejected"
- Need to have appropriate manager approve data as "valid" or "rejected"
- Identify all criteria into a system that can be broken down by:
  - where data is produced
  - when data is produced
  - whether data is part of:
    - Critical criteria
    - Sample batch validation
    - Operational evaluation criteria

PEP data validation

- Used PEP QAPP section on "Validation and verification of methods" as basis for setting up data validation process.
- Setup PED to identify for each performance evaluation the:
  - Critical criteria
  - Sample batch validation criteria
  - Operational evaluation criteria
- Compare associated PE data to acceptable parameters for each criteria

PEP Validation Matrix



Data that feeds into the validation process

- Laboratory data
- Field Data
  - Electronic data package
  - Information from the Field Data Sheets (FDS)
- Systematic Issues
  - Range and CV checks

PEP Data Validation

- If all criteria "pass", PE identified as:
  - "Valid Data" and
  - "complete"
- If one or more criteria:
  - "fail", allow for correction or override:
    - Corrections may be made due to entry errors
    - Overrides may be made when non-critical criteria have minor flags associated with them
  - PE's that have a "fail" are not automatically marked as "complete"

PEP Data Validation *(continued)*

- Re-run validation only for those samples that have not already been completed.
  - PE "Valid" and "Complete"
  - PE "Rejected"
  - PE can be marked "Complete" or more corrections and overrides can take place.

$PM_{2.5}$ Performance Evaluations

Record Last Changed: 5/15/00

PE Filter ID: T127630 **Sampler ID: BGI0217** **AIRS Site Code: 220550005** POC: 1

Filter Lot: 99357 Sampler Serial No.: 0217 Model:

PE Cassette ID: 3543 Sampler Model: BGI PQ200A Serial No.:

PE Run Time	
PE Start Date:	2/24/00 12:00:05 AM
Elapsed Time (days):	0.999
PE Stop Date:	2/24/00 11:59:05 PM
Filter Removed Date:	2/25/00 10:54:20 AM

PM2.5 Concentration	
Measured by PE Sampler (µg/m³):	8.537
Measured by Site (µg/m³):	
Percent Difference:	

Field Flag:

Comment:

Sample Flow/Volume	
Flow Avg (L/min).:	16.69
Flow CV:	0.23
Sample Vol. (m³):	24.013

Ambient Sample Temperature (°C)	
Average:	21.3
Minimum:	17.9
Maximum:	26.5

Barometric Pressure (mm Hg)	
Average:	765
Minimum:	764
Maximum:	768

Out of Spec.	
Time:	☐
Temperature:	☐
Flow:	☐

Field Verifications	
BP:	☑
Temperature:	☑
Flow:	☑

Field Blank	
Cassette ID:	4604
Filter ID:	T127631
Pre- Wt. (mg):	139.130
Post- Wt. (mg):	139.141
Wt. Change (mg):	0.011

Trip Blank	
Cassette ID:	
Filter ID:	
Pre- Wt. (mg):	
Post- Wt. (mg):	
Wt. Change (mg):	

Lab Blank	
Cassette ID:	N/A
Filter ID:	T127625
Pre- Wt. (mg):	135.880
Post- Wt. (mg):	135.875
Wt. Change (mg):	-0.005

Collocated Samplers	
Collocated:	☐
Count.:	
Std. Dev.:	
Mean:	
Max CV (%):	

Weigh Sessions	Pre-sample (Unexposed)	Post-sample (Exposed)	Pre/Post Change
Equilibration Tray:	TR13 1/27/00 1:14:48 PM	TR02 3/3/00 3:47:36 PM	
Equilibration Time (days):	20	4	

Holding Time (days):	8		12		(Sample Mass)
Filter Weight (mg):	139.286	2/16/00 9:38:02 AM	139.491	3/7/00 2:40:13 PM	0.205
Weighing Room Conditions					
Avg. Temperature (°C):	21.8		21.8		
Temp. Std. Dev. (°C):	0.132		0.15		(RH Difference)
Avg. Relative Humidity (%):	37.3		35.2		-2.100
RH Std. Dev. (%):	0.303		0.294		
Batch Duplicates					
Filter ID:	T127630		T127630		
Primary Weight (mg):	139.286	2/16/00 9:38:02 AM	139.491	3/7/00 2:40:13 PM	
Duplicate Weight (mg):	139.285	2/16/00 9:49:11 AM	139.500	3/7/00 2:55:51 PM	
Weight Change (mg):	-0.001		0.009		
Low Mass Balance Checks					
Verified Weight (mg):					
Minimum Weight (mg):	99.999	2/16/00 9:49:54 AM	99.998	3/7/00 2:30:50 PM	(Max. Overall
Maximum Weight (mg)	100.001	2/16/00 9:35:05 AM	99.998	3/7/00 2:30:50 PM	Wt. Change)
Min/Max Wt. Change (mg)	0.002		0.000		0.003
High Mass Balance Checks					
Verified Weight (mg):					
Minimum Weight (mg):	199.998	2/16/00 9:35:50 AM	199.998	3/7/00 2:31:33 PM	(Max. Overall
Maximum Weight (mg):	199.998	2/16/00 9:35:50 AM	199.998	3/7/00 2:31:33 PM	Wt. Change)
Min/Max Wt. Change (mg):	0.000		0.000		0
Batch Stability Tests (Lot Exposure Blanks)					
Filter Count:	3		3		
Average Wt. Diff (mg):	0.0033		0.003		
Maximum Wt. Diff. (mg):	0.005		0.004		

Lab Approval
Valid Data: ☑
PE Rejected: ☐
Complete: ☑

QA Manager Approval
Approval: ☐
Initials:
Date:

Transfer to AIRS
Approval: ☐
Initials:
Date:

$PM_{2.5}$ Performance Evaluations

Record Last Changed: 5/15/00

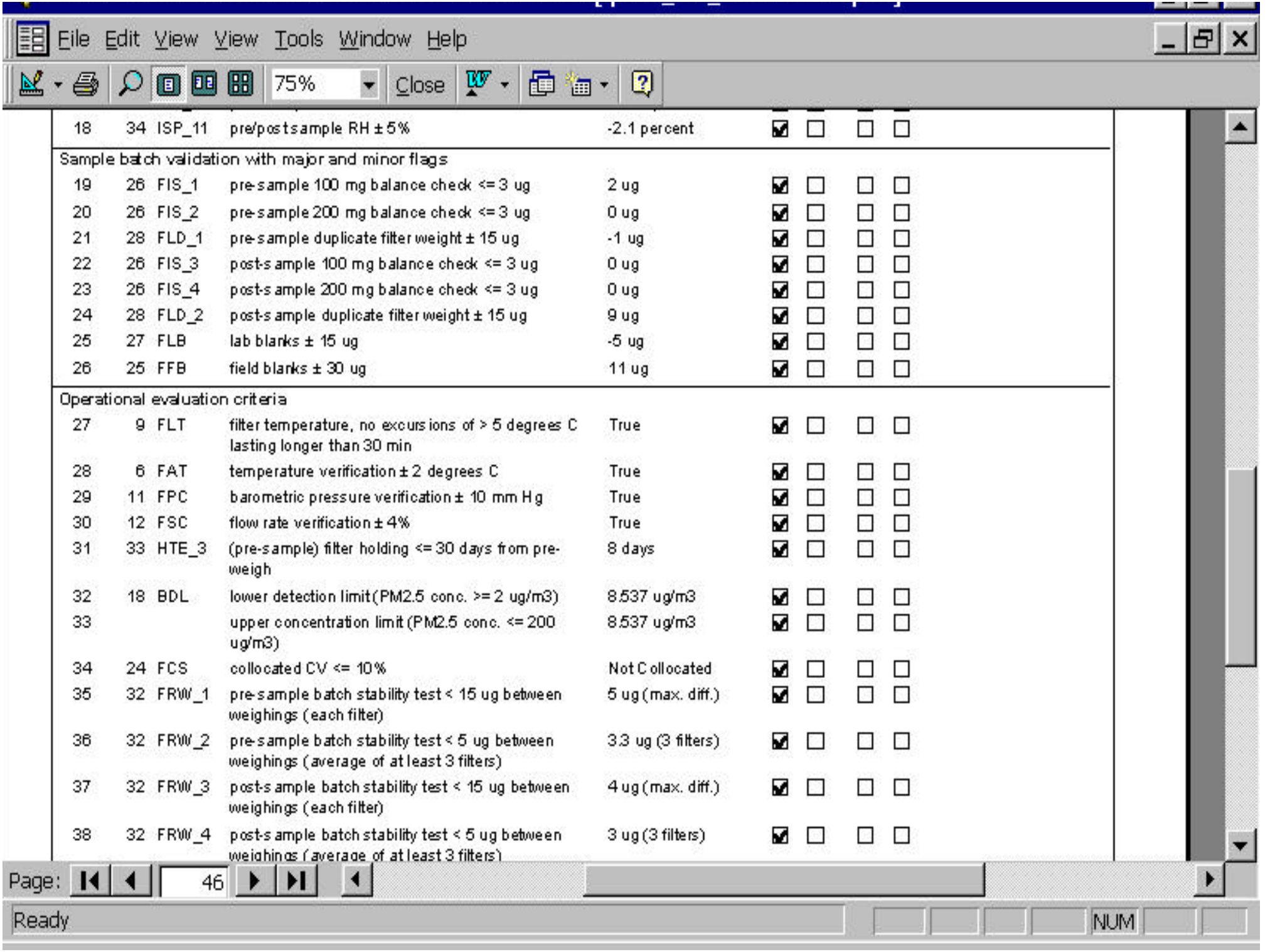
PE Filter ID: T127630 **Sampler ID: BGI0217** **AIRS Site Code: 220550005** POC: 1

Quality Control Checks

Check Date: 5/15/00 4:10:06 PM

Check ID	Flag ID	Check Code	Description	Check Value	Auto QC Pass	Auto QC Fail	Override Pass	Override Fail	Comment
Critical criteria									
1	2	DAM	no filter damage (visual defect)	True	☑	☐	☐	☐	
2	3	EST	sample period 1380-1500 min	1439 min	☑	☐	☐	☐	
3	8	FLR_1	flow rate <= ± 5% of 16.67 L/min	16.69 L/min	☑	☐	☐	☐	
4	8	FLR_2	flow rate <= 2% CV	0.23	☑	☐	☐	☐	
5	13	FVL	no flow rate excursions > ± 5% for > 5 min	True	☑	☐	☐	☐	
6	33	HTE_1	sample recovery <= 96 hours from sample end date	11 hours	☑	☐	☐	☐	
7	33	HTE_2	post-sample weighing <= 10 days at 25 deg C or <= 30 days at 4 deg C	12 days, 0 deg C (cold pack: Frozen)	☑	☐	☐	☐	
8	34	ISP_1	pre-sample minimum 24 hour equilibration	476 hours	☑	☐	☐	☐	
9	34	ISP_2	pre-sample mean temperature 20-23 degrees C	21.8 degrees C	☑	☐	☐	☐	
10	34	ISP_3	pre-sample temperature control ± 2 degrees C over 24 hours	0.132 degrees C	☑	☐	☐	☐	
11	34	ISP_4	pre-sample mean RH 30-40%	37.3 percent	☑	☐	☐	☐	
12	34	ISP_5	pre-sample RH SD control ± 5%	0.303 percent	☑	☐	☐	☐	
13	34	ISP_6	post-sample minimum 24 hour equilibration	95 hours	☑	☐	☐	☐	
14	34	ISP_7	post-sample mean temperature 20-23 degrees C	21.8 degrees C	☑	☐	☐	☐	
15	34	ISP_8	post-sample temperature control ± 2 degrees C over 24 hours	0.15 degrees C	☑	☐	☐	☐	
16	34	ISP_9	post-sample mean RH 30-40%	35.2 percent	☑	☐	☐	☐	
17	34	ISP_10	post-sample RH SD control ± 5%	0.294 percent	☑	☐	☐	☐	
18	34	ISP_11	pre/post sample RH ± 5%	-2.1 percent	☑	☐	☐	☐	

Sample batch validation with major and minor flags



18	34	ISP_11	pre/post sample RH ± 5%	-2.1 percent	☑	☐	☐	☐
Sample batch validation with major and minor flags								
19	26	FIS_1	pre-sample 100 mg balance check <= 3 ug	2 ug	☑	☐	☐	☐
20	26	FIS_2	pre-sample 200 mg balance check <= 3 ug	0 ug	☑	☐	☐	☐
21	28	FLD_1	pre-sample duplicate filter weight ± 15 ug	-1 ug	☑	☐	☐	☐
22	26	FIS_3	post-sample 100 mg balance check <= 3 ug	0 ug	☑	☐	☐	☐
23	26	FIS_4	post-sample 200 mg balance check <= 3 ug	0 ug	☑	☐	☐	☐
24	28	FLD_2	post-sample duplicate filter weight ± 15 ug	9 ug	☑	☐	☐	☐
25	27	FLB	lab blanks ± 15 ug	-5 ug	☑	☐	☐	☐
26	25	FFB	field blanks ± 30 ug	11 ug	☑	☐	☐	☐
Operational evaluation criteria								
27	9	FLT	filter temperature, no excursions of > 5 degrees C lasting longer than 30 min	True	☑	☐	☐	☐
28	6	FAT	temperature verification ± 2 degrees C	True	☑	☐	☐	☐
29	11	FPC	barometric pressure verification ± 10 mm Hg	True	☑	☐	☐	☐
30	12	FSC	flow rate verification ± 4%	True	☑	☐	☐	☐
31	33	HTE_3	(pre-sample) filter holding <= 30 days from pre-weigh	8 days	☑	☐	☐	☐
32	18	BDL	lower detection limit (PM2.5 conc. >= 2 ug/m3)	8.537 ug/m3	☑	☐	☐	☐
33			upper concentration limit (PM2.5 conc. <= 200 ug/m3)	8.537 ug/m3	☑	☐	☐	☐
34	24	FCS	collocated CV <= 10%	Not Collocated	☑	☐	☐	☐
35	32	FRW_1	pre-sample batch stability test < 15 ug between weighings (each filter)	5 ug (max. diff.)	☑	☐	☐	☐
36	32	FRW_2	pre-sample batch stability test < 5 ug between weighings (average of at least 3 filters)	3.3 ug (3 filters)	☑	☐	☐	☐
37	32	FRW_3	post-sample batch stability test < 15 ug between weighings (each filter)	4 ug (max. diff.)	☑	☐	☐	☐
38	32	FRW_4	post-sample batch stability test < 5 ug between weighings (average of at least 3 filters)	3 ug (3 filters)	☑	☐	☐	☐

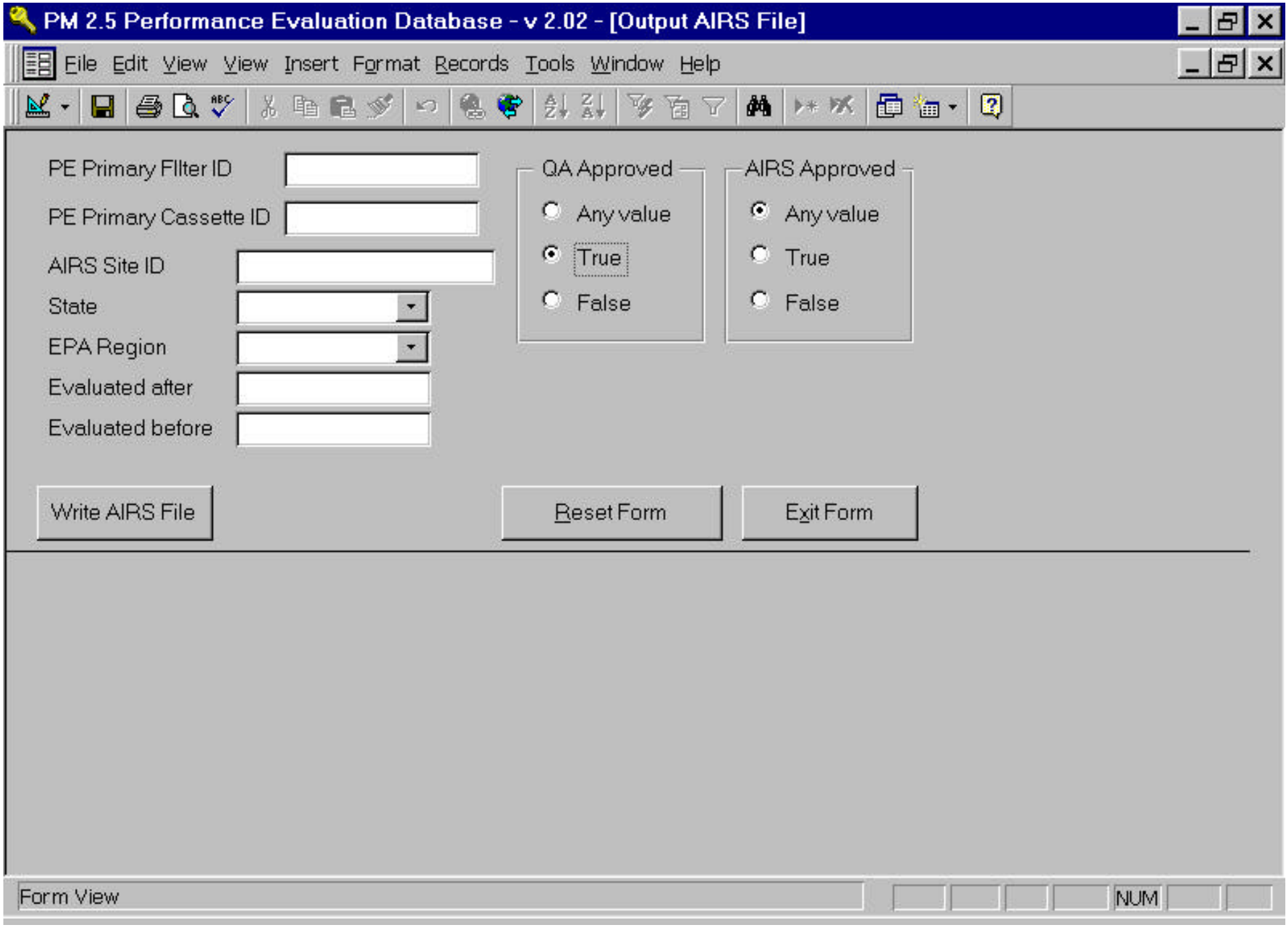
QA Manager Approval

- Once Laboratory Analyst has PE's identified as either:
  - "Valid Data" and "Complete" or
  - "PE Rejected" and "Complete"
- PE's are submitted to the QA Manager for approval:
  - Can have "Approval" or
  - Returned to lab for further investigation

AIRS Data Submittal

- Once data are approved by the QA manager AIRS transactions of those PE's can be generated.
- Example transactions from database output to text file:

```
9421330008881011710599061111 118                    I
9420430401881011710599061111 123                    I
9421290008881011710599061171 125                    I
9421010136881011710599062311 181                    I
9420950025881011710599060811 266                    I
9421010136881011710599060211 223                    I
9420030290881011710599060211 220                    I
```


PM 2.5 Performance Evaluation Database - v 2.02 - [Output AIRS File]
File Edit View View Insert Format Records Tools Window Help
PE Primary FIlter ID
PE Primary Cassette ID
AIRS Site ID
State
EPA Region
Evaluated after
Evaluated before
QA Approved
Any value
True
False
AIRS Approved
Any value
True
False
Write AIRS File
Reset Form
Exit Form
Form View
NUM

Next Steps

- Full validation of '99 dataset in each lab
- Approval by each QA manager
- Decision on submittal to AIRS?
  - Current system does not provide the required statistics identified in part 58
  - Current system requires submittal of audit and State primary data in the same transaction; therefore need to have "Official" State value before submittal of PE values
  - Re-engineered system allows submission of audit data independent of State primary value