



Protean Instrument Corporation

Automating Work Flow
in an Air Monitoring Program
with
TRAC

“Totalized Retentive Air Collection”



Manual Air Sampling

- Conventional programs depend on manual data recording
- Manual data recording is:
 - *Slow*
 - *Error prone**and therefore is...*

Expensive!



Manual Air Sampling Steps

Place air filter and record:

1. Location
2. Filter ID
3. Start time/date
4. Beginning air flow

Collect air filter and verify or record:

5. Location
6. Filter ID
7. Stop time/date
8. Ending air flow

Count air filter and transfer data:

9. Location ID
10. Filter ID
11. Start time/date
12. Stop time/date
13. Beginning air flow
14. Ending air flow



Manual Air Sampling

- **14 points to:**
 - *Introduce data errors*
 - *Use a **lot** of worker time*
- **Estimated time is:**

10-15 minutes per sample for manual data processing*

**K-25 Project, Bechtel-Jacobs & SEC user estimates of time based on existing manual system procedures*



“TRAC” Air Sampling

- **With a TRAC system:**
 - Place air filter
 - Collect air filter
 - Count air filter

Data is collected and transferred automatically





TRAC System

- Totalized Retentive **Air Collection** is:
 - ***TRAC equipped air sampling station***
 - Fixed or Portable (*Wheeled or Desktop*)
 - ***TRAC air filter carrier***
 - Uses your *existing 2"* sample media
 - ***TRAC equipped counting system***
 - Automatic single detector, Manual multi-detector, Manual single detector



TRAC Components

- **Sampling head**
 - Holds TRAC carrier
 - Interfaces with TRAC controller
 - Can mount on flexible extension hose for remote positioning
 - Simple & fast “drop-in” loading of carrier





TRAC Components

- **TRAC Carrier**
 - Uses standard media
 - Stores collection parameters
 - Uses non-volatile memory
 - Rugged, environmentally sealed
 - Hard coded serial number is tamper resistant





TRAC Components

- **TRAC Controller**
 - Updates every few seconds
 - Calibrated mass flow sensor
 - Corrects air flow to STP
 - Can control pump
 - Corrects for filter loading
 - Unique ID per controller
 - Battery backed memory





TRAC Components

- **TRAC Pump (THS)**
 - Has flow controller
 - HEPA filter
 - Pump
 - Head extension
 - Remote head
 - Wheeled cabinet





TRAC Components

- **TRAC Controller**
 - Programmable for
 - Collected volume (L or F³)
 - Time
 - Auto resume on power fail
 - Writes to TRAC carrier
 - Start/Stop time & date
 - Pump ID
 - Totalized air volume
 - Retrofits to existing pumps





TRAC Components

- **TRAC Equipped Counting System**
 - Automatic or manual systems
 - TRAC reader transfers data from button memory
 - Systems have built in reports to use TRAC data





TRAC Components

- **TRAC Calibration**
 - Return to Protean
 - or...
 - Use TRAC Calibrator
 - Contains high precision mass flow sensor
 - Calibrate systems as needed in-house





Benefits of TRAC

- **14 manual data steps are reduced to 0**
 - **No** chance for errors
 - **No** time spent manually transferring data
- **Data is more accurate**
 - Corrected for STP
 - Corrected for filter loading
- **Low cost**
 - Standard 2 inch filter media
 - Special software **not** required
 - Software license **not** required



More Benefits of TRAC

- **Counting system option is rational**
 - Low cost at ~\$600 per system
 - Doesn't interfere with normal system operation
 - Doesn't change counting performance
- **System is Scalable**
 - Can be built from single pump to as many as required
- **Does not require additional hardware**
 - No expensive hand held readers
 - No expensive options on counting system



Is TRAC Worth It?

- **Manual system:**
 - Use these factors
 - L = Labor cost in \$/hour
 - F = Number of filters/year
 - T = Time for manual data transfer
 - *Estimated 10 minutes/filter*

$$\mathbf{Cost = LFT/60 = Total \$/year}$$



Is TRAC Worth It?

- **TRAC system:**
 - Use these factors
 - Manual cost = $F \cdot T \cdot L / 60 = \mathbf{M}$
 - Automatic system is cost of pumps + TRAC sample heads + TRAC controllers = **A**
 - Payoff is **A/M** in years

NOTE: Cost of filter media, counting system(s) is constant for both methods



Is TRAC Worth It?

- **Somewhat hypothetical example:**
 - 10 station system with 5 fixed and 5 mobile sample heads = ~ \$35,000 acquisition cost*
 - Labor is \$25/loaded hour
 - Sampling is 2 filters/day/station = 7300 samples/year
 - Cost is: $7300 * 10 * \$25 / 60 = \$30,417/\text{year}$
 - System is paid for in $35,000/30,417 = 1.15$ years

*Assumes an counting system is already available – double cost & payoff time to add new TRAC compatible automatic ultra-low background system



Long Term Cost Reduction

- **Low cost media**
- **Low cost maintenance**
 - *No software upgrades or licenses*
- **Easy scaling**
 - *Start with 1 TRAC pump*
- **Low maintenance**
 - *Especially counting systems*
- **Reduced labor cost**





In Development

- **TRAC “Lite”**
 - Lower cost multi-head sampling
 - No mass-flow sensor
 - No flow totalization
 - Records start/stop time & date on carrier
 - Single controller can run multiple heads
 - Designed for large in-house pumping systems
 - Uses in-house total flow calibrations



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