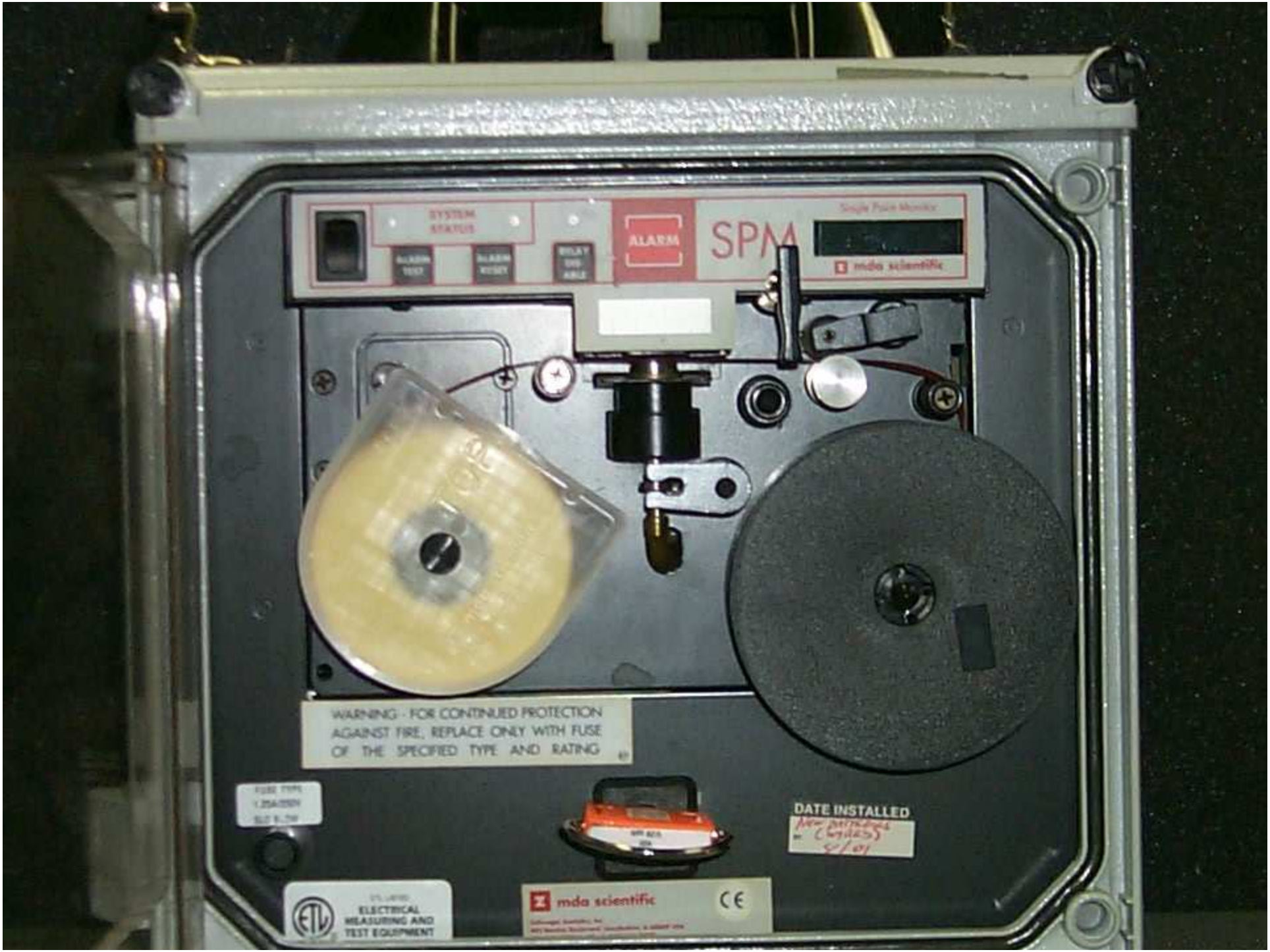
EPA AIR MONITORING EQUIPMENT

PHIIP R CAMPAGNA


SYSTEM STATUS
ALARM
SPM
mda scientific
WARNING - FOR CONTINUED PROTECTION AGAINST FIRE, REPLACE ONLY WITH FUSE OF THE SPECIFIED TYPE AND RATING
DATE INSTALLED
ELECTRICAL MEASURING AND TEST EQUIPMENT
mda scientific
CE

SPM SINGLE POINT MONITOR

- **Chemcassette detection tape & key**
- **Amines**
- **Diisocyanates**
- **Hydrazines**
- **Hydrides**
  - **arsine, phosphine, tert-butyl arsine, tert-butyl phosphine**
- Hydrogen cyanide
- Hydrogen Sulfide
- Minerals acids
- Oxidizers
  - bromine, chlorine, chlorine dioxide
- Phosgene
- Sulfur Dioxide

Technical Specification

Specifications	
Detection Technique	Chemcassette® Detection System
Alarm Point	Dual level alarms typically set at 1/2 TLV and TLV
Response Time	As fast as 10 seconds
Alarm Indication	Local audio/visual alarms; remote capability optional
Signal Outputs	SPDT concentration alarm relays; SPDT fault relay; 4-20 mA; digital display
Relay Rating	120VAC@10amps; 24VAC@5amps
Operating Temperature Range	32° to 104°F; 0° to 40°C (basic unit); heating/cooling optional
Power Requirements	115/230 VAC 50/60 Hz; battery operation optional
Enclosure	NEMA 4X fiberglass (basic unit)
Dimensions	12"(H) x 12"(W) x 7"(D) (30.5 x 30.5 x 17.8 cm) (basic unit)
Weight	14.5 pounds (6.6 kg) (basic unit)

Note: options may vary the specifications

Detectable Gases Range	
Amines	
Ammonia (NH_3)	2.6-75.0 ppm
Ammonia (NH_3)-II	2.6-75.0 ppm
Dimethylamine (DMA)	0.1-6 ppm
n-Butylamine (n-BA)	0.4-12 ppm
Methylene Dianiline (MDA)	3-60 ppb
p-Phenylene Diamine (PPD)	2-60 ppb
Toluene Diamine (TDA)	4-80 ppb
Trimethylamine (TMA)	1.1-30.0 ppm
Diisocyanates	
(CHDI, HDI, HMDI, IEM, IPDI, MDI, NDI, PPDI, TDI, TMDI, TMXDI, XDI)	2-60 ppb
Hydrazines	
MMH*	3-30 ppb
N_2H_4*	20-300 ppb
UDMH*	5-30 ppb
Hydrides	
Arsine (AsH_3)	15-150 ppb
Diborane (B_2H_6)	31-300 ppb
Disilane (Si_2H_6)	1.5-15 ppm
Germane (GeH_4)	141-600 ppb
Hydrogen Selenide (H_2Se)	20-150 ppb
Phosphine (PH_3)	32-900 ppb
Silane (SiH_4)*	0.5-15 ppm
Stibine (SbH_3)	20-300 ppb
tert-Butylarsine (TBA)	15-150 ppb
tert-Butylphosphine (TBP)	60-900 ppb
Hydrogen Cyanide (HCN)	1.1-30.0 ppm
Hydrogen Sulfide (H_2S)*	1.1-30.0 ppm
Mineral Acids	
Hydrogen Bromide (HBr)*	0.3-9.0 ppm
Hydrogen Chloride (HCl)*	0.5-15.0 ppm
Hydrogen Fluoride (HF)	0.6-9.0 ppm
Hydrogen Iodide (HI)	0.3-9.0 ppm
Nitric Acid (HNO_3)	0.2-6.0 ppm
Sulfuric Acid (H_2SO_4)	26-750 ppb
Oxidizers	
Bromine (Br_2)	11-300 ppb
Chlorine (Cl_2)	0.05-1.5 ppm
Chlorine (Cl_2)	-II 0.05-1.5 ppm
Chlorine Dioxide (ClO_2)	11-300 ppb
Hydrogen Peroxide (H_2O_2)*	0.1-3 ppm
Nitrogen Dioxide (NO_2)*	0.3-9.0 ppm
Ozone (O_3)	31-300 ppb
Phosgene ($COCl_2$)*	11-300 ppb
Sulfur Dioxide (SO_2)*	0.2-6.0 ppm

* other ranges available

Amines

Ammonia (NH_3) 2.6-75.0 ppm

Ammonia (NH_3)-II 2.6-75.0 ppm

Dimethylamine (DMA) 0.1-6 ppm

n-Butylamine (n-BA) 0.4-12 ppm

Methylene Dianiline (MDA) 3-60 ppb

p-Phenylene Diamine (PPD) 2-60 ppb

Toluene Diamine (TDA) 4-60 ppb

Trimethylamine (TMA) 1.1-30.0 ppm

Diisocyanates

(CHDI, HDI, HMDI, IEM, IPDI, MDI, NDI, PPDI, TDI, TMDI, TMXDI, XDI) 2-60 ppb

Hydrazines

MMH* 3-30 ppb

N_2H_4* 20-300 ppb

UDMH* 5-30 ppb

Hydrides

Arsine (AsH_3) 15-150 ppb

Diborane (B_2H_6) 31-300 ppb

Disilane (Si_2H_6) 1.5-15 ppm

Germane (GeH_4) 141-600 ppb

Hydrogen Selenide (H_2Se) 20-150 ppb

Phosphine (PH_3) 32-900 ppb

Silane (SiH_4)* 0.5-15 ppm

Stibine (SbH_3) 20-300 ppb

tert-Butylarsine (TBA) 15-150 ppb

tert-Butylphosphine (TBP) 60-900 ppb

Hydrogen Cyanide (HCN) 1.1-30.0 ppm

Hydrogen Sulfide (H_2S)* 1.1-30.0 ppm

Mineral Acids

Hydrogen Bromide (HBr)* 0.3-9.0 ppm

Hydrogen Chloride (HCl)* 0.5-15.0 ppm

Hydrogen Flouride (HF) 0.6-9.0 ppm

Hydrogen Iodide (HI) 0.3-9.0 ppm

Nitric Acid (HNO3) 0.2-6.0 ppm

Sulfuric Acid (H2SO4) 26-750 ppb

Oxidizers

Bromine (Br2) 11-300 ppb

Chlorine (Cl2) 0.05-1.5 ppm

Chlorine (Cl2) -II 0.05-1.5 ppm

Chlorine Dioxide (Cl02) 11-300 ppb

Hydrogen Peroxide (H_2O_2)* 0.1-3 ppm

Nitrogen Dioxide (NO_2)* 0.3-9.0 ppm

Ozone (O_3) 31-300 ppb

Phosgene ($COCl_2$)* 11-300 ppb

Sulfur Dioxide (SO_2)* 0.2-6.0 ppm

* other ranges available

MultiRAE
PLUS
5

MultiRAE

- Combustible gas
- Oxygen monitor
- VOC
  - Volatile organic compounds
  - Photoionization detector (PID)
- TOX1 and TOX2
  - Chemical specific sensors
  - E.g., CO, H2S

Electrochemical Cells

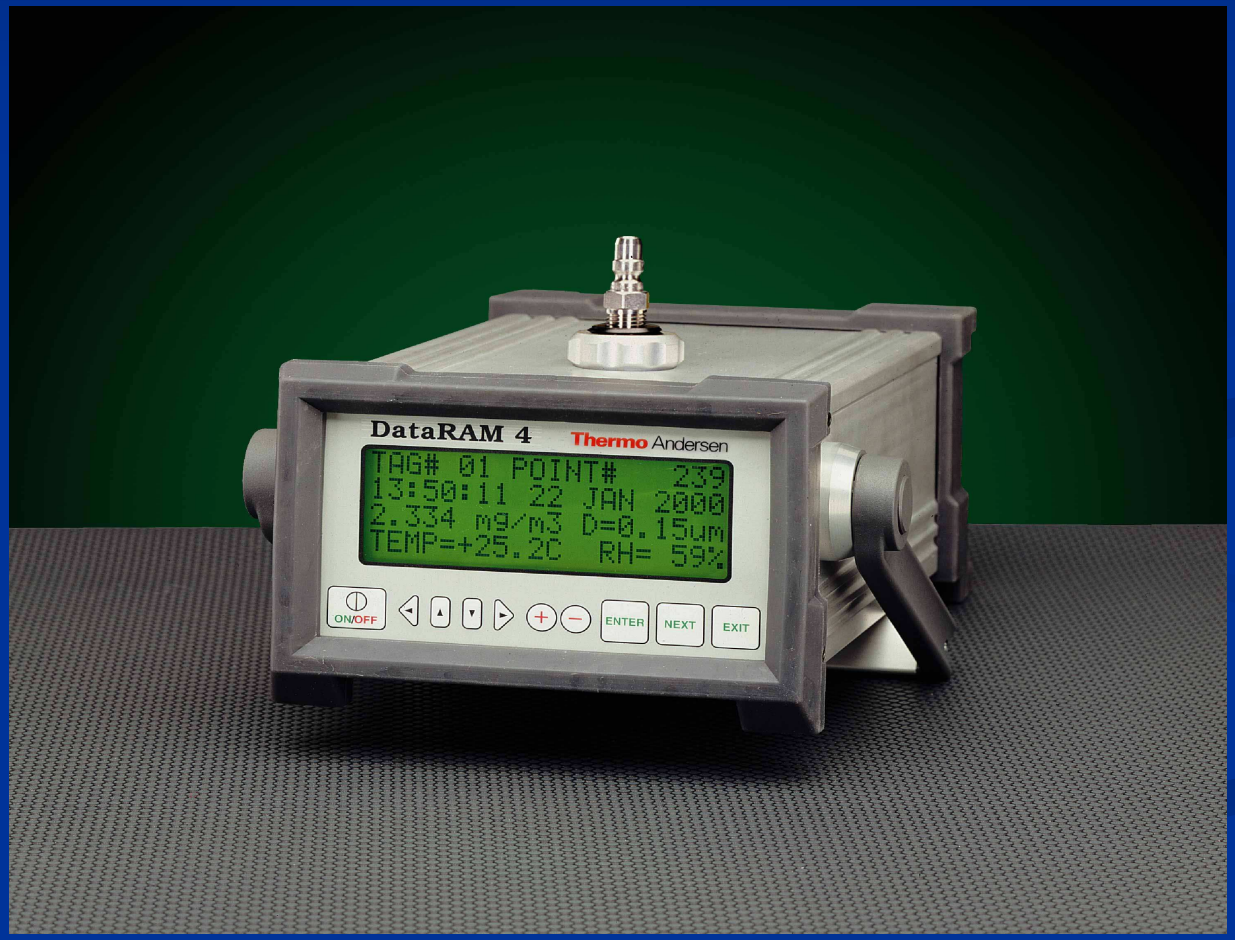
- Flammability
- Combustibility
- Oxygen
- Chlorine
- Hydrogen cyanide
- Sulfur dioxide
- Hydrogen sulfide
- Cyanogen chloride
- Phosgene
- Ammonia
- Nitrogen oxide
- Carbon monoxide

The MultiRae is a portable, hand-held, microprocessor controlled instrument designed for measuring the presence of photoionization chemicals in air at part per million (ppm) levels. In addition, the MultiRAE can detect inorganic compounds, e.g. (CO, H2S, SO2, NO, NO2, Cl2, HCN, NH3, PH3, and O2) with electrochemical sensors, combustible gases with a catalytic bead sensor. The response depends on chemical type and concentration. In the photoionization detector (PID) mode, the MultiRAE does not distinguish one type of chemical from another, but displays a number indicating the total concentration of all photoionizable compounds in the sample.

Century TVA-1000B

DataRAM Model: DR-4000

Portable Real-Time Aerosol Monitor



Dräger CMS V3.01
load chip
Dräger CMS
2
Dräger

Lumex Mercury Analyzer

MIRAN SapphIRe

Thermo Electron

Air Quality Instruments

The Miran Sapphire Ambient Air Analyzer is an intrinsically safe, portable, microprocessor-controlled, single-beam spectrophotometer used to measure concentrations of toxic gases or vapors in the ambient air. With spectra library software containing approximately 400 compounds, the Miran Sapphire can be used to identify unknown gases.

Multi Gas Monitor (AreaRAE)

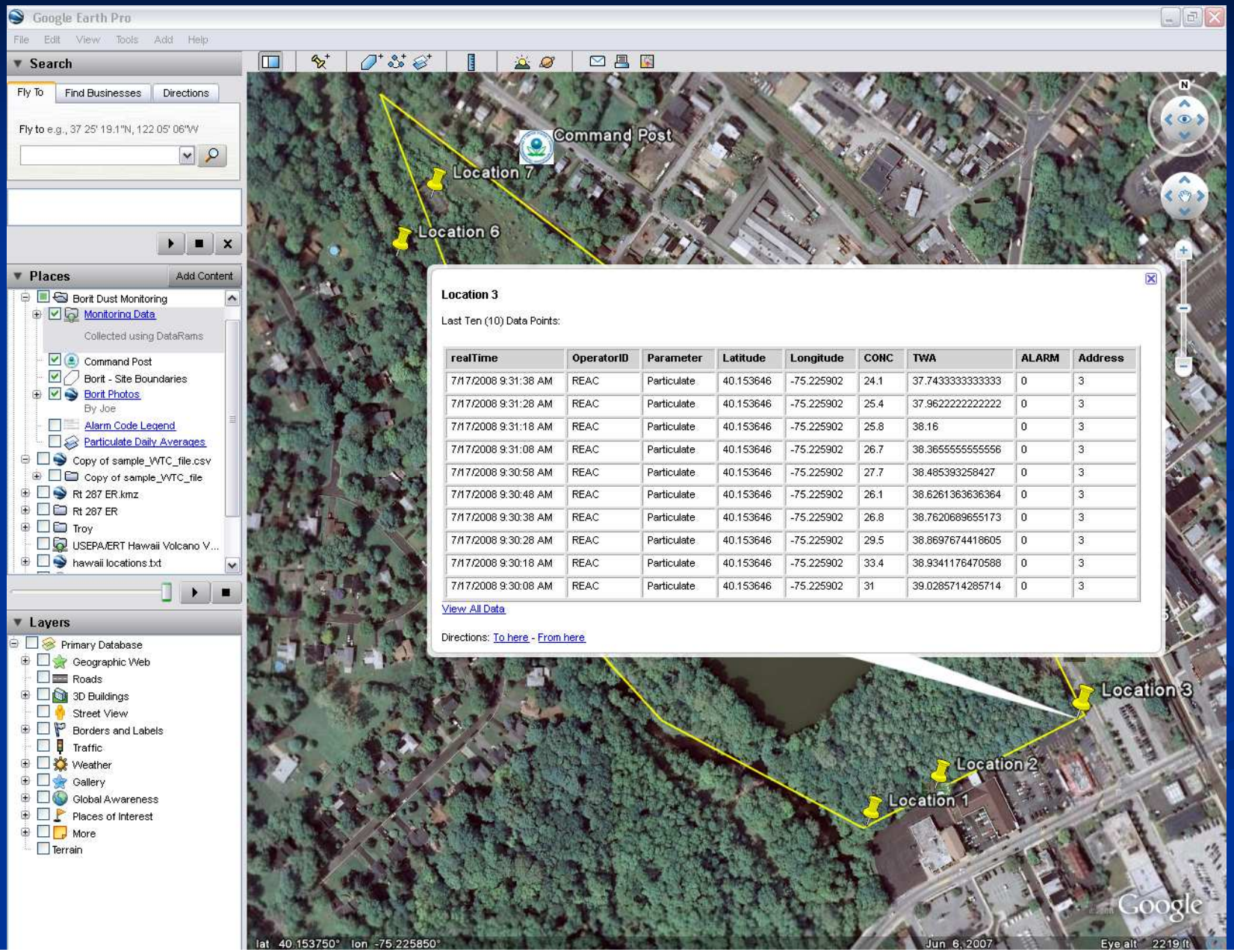
Trace Atmospheric Gas Analyzer (TAGA).

- TAGA instruments consist of triple quadrupole mass spectrometers using atmospheric chemical ionization, either at atmospheric pressure or at reduced pressure, usually in the range of 1-4 Torr. A TAGA mobile laboratory consists of TAGA instruments and Agilent gas chromatograph/mass spectrometer (GC/MS) instruments mounted in a mobile bus, and are used to provide real-time concentrations of toxic substances in ambient air. They have been used also to provide very rapid analyses of gas samples from specific sources. The mobile bus is equipped with satellite communications and internet access for completely independent operation.

ERT Data Acquisition & Display Capabilities

We currently have the ability to poll instruments in real-time, bring that data back wirelessly to one or more locations, push that data to a server and finally display it in real-time in Google Earth

Real-Time Data



Location 3

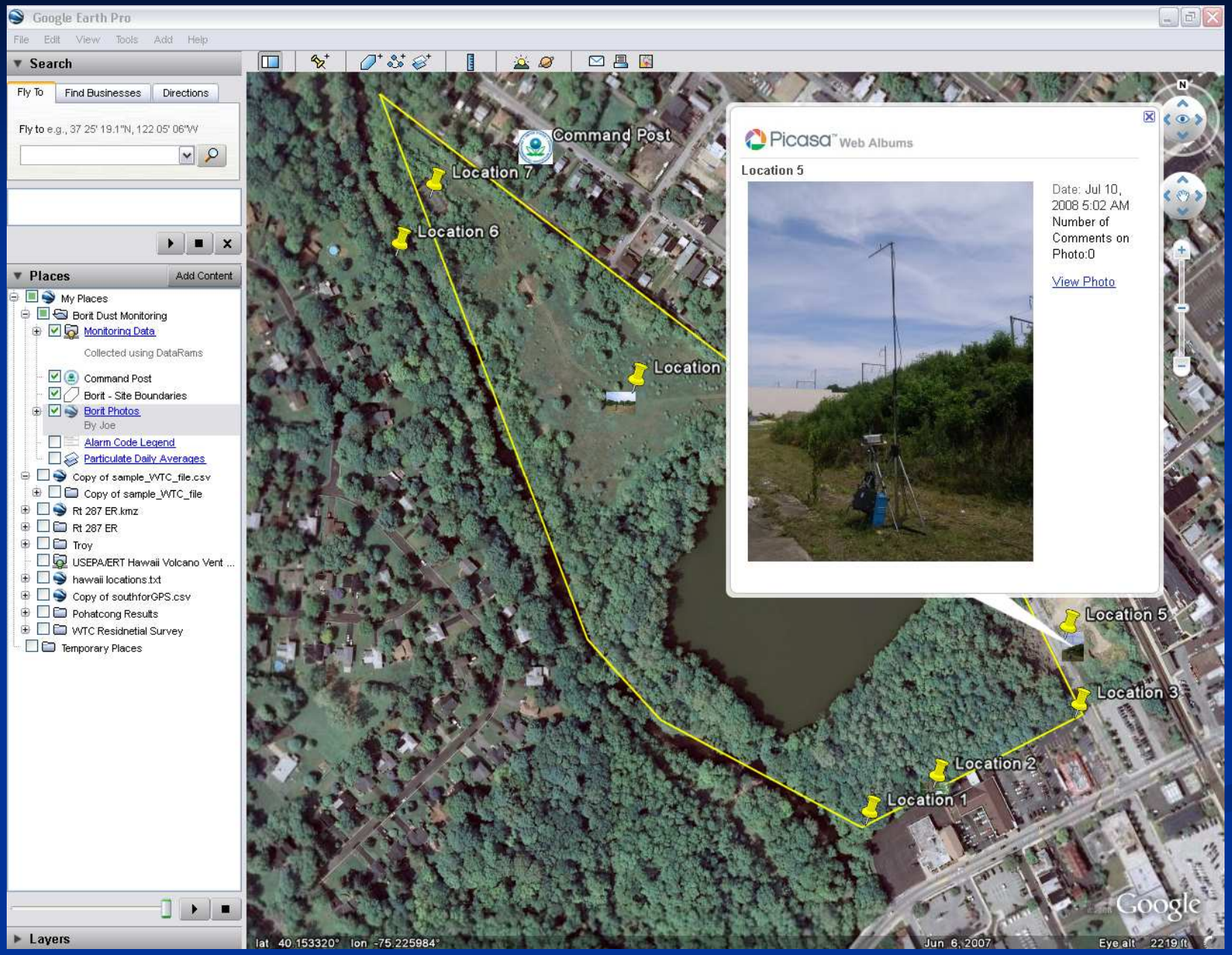
Last Ten (10) Data Points:

realTime	OperatorID	Parameter	Latitude	Longitude	CONC	TWA	ALARM	Address
7/17/2008 9:31:38 AM	REAC	Particulate	40.153646	-75.225902	24.1	37.7433333333333	0	3
7/17/2008 9:31:28 AM	REAC	Particulate	40.153646	-75.225902	25.4	37.9622222222222	0	3
7/17/2008 9:31:18 AM	REAC	Particulate	40.153646	-75.225902	25.8	38.16	0	3
7/17/2008 9:31:08 AM	REAC	Particulate	40.153646	-75.225902	26.7	38.3655555555556	0	3
7/17/2008 9:30:58 AM	REAC	Particulate	40.153646	-75.225902	27.7	38.485393258427	0	3
7/17/2008 9:30:48 AM	REAC	Particulate	40.153646	-75.225902	26.1	38.6261363636364	0	3
7/17/2008 9:30:38 AM	REAC	Particulate	40.153646	-75.225902	26.8	38.7620689655173	0	3
7/17/2008 9:30:28 AM	REAC	Particulate	40.153646	-75.225902	29.5	38.8697674418605	0	3
7/17/2008 9:30:18 AM	REAC	Particulate	40.153646	-75.225902	33.4	38.9341176470588	0	3
7/17/2008 9:30:08 AM	REAC	Particulate	40.153646	-75.225902	31	39.0285714285714	0	3

View All Data

Directions: To here - From here

Geo-Referenced Photos



U.S. EPA EMERGENCY RESPONSE AIR MONITORING GUIDANCE TABLES

August 2008

For Official Use Only

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Table 1
Draft Acid Spill Response
Air Monitoring Guidance

[1]Target Compounds	Instruments	Detection Levels	Intrinsically Safe (Yes/No)	Ionization Potential	Occupational Action Levels		AEGL 1		PPE (PPE will be dependent on concentration of compound) (See NIOSH Pocket Guide-Website)
					Occupational (TWA) ppm	Occupational (IDLH, NIOSH)	4-hour (ppm)	8-hour (ppm)	
Acids									
Hydrochloric Acid	Dräger Tube	1-10 ppm or higher detection tubes	Y	12.74 eV	OSHA PEL = 5 ppm (ceiling)	50 ppm	1.8	1.8	http://www.cdc.gov/niosh/npg/npgd0332.html
	Dräger Chip	1-25 ppm or higher detection chips	N (Y with option)						
	pH Paper	NA	Y						
	Single Point Monitor (SPM)	0.5-15 ppm	N (Y with option)						
Nitric Acid	Dräger Tube	1-50 ppm or higher detection tubes	Y	11.95 eV	OSHA PEL = 2 ppm	25 ppm	0.53	0.53	http://www.cdc.gov/niosh/npg/npgd0447.html
	pH Paper	NA	Y						
	Single Point Monitor (SPM)	0.2-6 ppm	N (Y with option)						
Sulfuric Acid	Dräger Tube	1-5 mg/m3 (mist)	Y	NA	OSHA PEL = 1 mg/m^3	15 mg/m^3	0.2 mg/m^3	0.2 mg/m^3	http://www.cdc.gov/niosh/npg/npgd0577.html
	pH Paper	NA	Y						
	Single Point Monitor (SPM)	26-750 ppb	N (Y with option)						
Hydrocyanic Acid	Dräger Tube	2-30 ppm	Y	13.60 eV	OSHA PEL = 10 ppm	50 ppm	1.3	1	http://www.cdc.gov/niosh/npg/npgd0333.html
	Dräger Chip	2-50 ppm	N (Y with option)						
	pH Paper	NA	Y						
	Single Point Monitor (SPM)	1.1-30 ppm	N (Y with option)						
[2]Radiation									
Gamma Radiation	Ludlum Model 192	0-5,000 micro-R/hr	N	NA	NA	3 x background consult with HP	3 x background consult with HP	NA	NA
Alpha, Beta, Gamma Radiation	Ludlum Model 2241-2 with Pancake Probe	0-9,999 R/hr or 999,000 cpm	N	NA	NA	3 x background consult with HP	3 x background consult with HP	NA	NA

Notes:

[1] Does not include all compounds associated with this type of event, only the most common compounds with the lowest action levels.

[2] Standard EPA Emergency Response Protocol is to screen for radiation with a Micro-R at all Emergency Responses. If readings are three times background, responders consult with Health Physicist. Additional Radiation equipment is available to monitor for Alpha, Beta and Gamma, but is not included in this table.

AEGL - Acute Exposure Guideline Levels
eV - electron volt
cpm - counts per minute
IDLH - Immediately Dangerous to Life and Health
mg/m^3 - milligrams per cubic meter
NA - not available
NIOSH - National Institute for Occupational Safety and Health
OSHA - Occupational Safety and Health Association
PEL - Permissible Exposure Limit
PPE - Personal Protective Equipment
ppm - parts per million
R/hr - roentgen per hour
TWA - Total weighted average
VOCs - Volatile organic compounds

http://www.epa.gov/oppt/aegl/pubs/chemlist.htm U.S. EPA website used to research AELGs using the chemical's name or Chemical Abstracts Service Registry Numbers (CAS).

Table 3
Draft Chemical Plant Fire Response
Air Monitoring Guidance

[1]Target Compounds	Instruments	Detection Levels	Intrinsically Safe (Yes/No)	Ionization Potential	PID Correction Factor	Occupational Action Levels		AEGL 1		PPE (PPE will be dependent on concentration of compound) (See NIOSH Pocket Guide-Website)
						Occupational (TWA) ppm	Occupational (IDLH, NIOSH)	4-hour (ppm)	8-hour (ppm)	
VOCs										
Benzene	UltraRAE-PID	0.1-2000 ppm	Y	9.24 eV	NA	OSHA PEL = 1	500 ppm	18	9	http://www.cdc.gov/niosh/npg/npgd0049.html
	Drager Tube	0.5-10 ppm or higher detection tubes	Y							
	Drager Chip	0.2-10 or higher detection chips	N (Y with option)							
	ppbRAE-PID	1ppb-200ppm	Y							
	MIRAN SapphIRE**	10-200ppm	Y							
	MultiRAE/ AreaRAE-PID	0-2000 ppm	Y		0.53 (10.6 lamp)					
	TVA 1000B	0.5-2,000 ppm (PID) 1-50,000 ppm (FID)	Y							
Carbon monoxide	MultiRAE-CO sensor	0-500 ppm	Y	14.01 eV	NA	NIOSH REL =35	1200 ppm	*33	*27	http://www.cdc.gov/niosh/npg/npgd0105.html
	Drager Tube	3-300 ppm or higher detection tubes	Y							
	Drager Chip	5-150 ppm	N (Y with option)							
	Multiwarn II	0-2000ppm or 0-10,000ppm	Y							
	MIRAN SapphIRE**	4.5-250ppm	Y							
Hydrogen Sulfide	MultiRAE/AreaRAE-H2S sensor	0-100 ppm	Y	10.46 eV	NA	NIOSH REL = 10 (Ceiling)	100 ppm	0.36	0.33	http://www.cdc.gov/niosh/npg/npgd0337.html
	Drager Tube	0.2- 6 ppm or higher detection tubes	Y							
	Drager Chip	0.2- 5 ppm or higher detection chips	N (Y with option)							
	Single Point Monitor (SPM)	1.1-30ppm	N (Y with option)							
	Multiwarn II	0-100ppm or 0-1000ppm	Y							
	MultiRAE/AreaRAE-PID	0-2000 ppm	Y		3.3 (10.6 lamp)					
	TVA 1000B	0.5-2,000 ppm (PID)	Y							
Sulfur dioxide	MultiRAE/AreaRAE-SO2 sensor	0-20 ppm	Y	12.30 eV	NA	NIOSH REL = 2	100 ppm	0.2	0.2	http://www.cdc.gov/niosh/npg/npgd0575.html
	Drager Pac III	0-100 ppm	Y							
	Drager Tube	0.1-3 ppm or higher detection tubes	Y							
	Drager Chip	0.4-10 ppm or higher detection tubes	N (Y with option)							
	MIRAN SapphIRE**	6-30ppm	Y							
	Multiwarn II	0-50ppm	Y							
	Single Point Monitor (SPM)	0.2-8ppm	N (Y with option)							
Mercury	Lumex RA-915	2- 50,000 ng/m^3	N	NA	NA	ACGIH TLV = 25,000	10,000,000 mg/m3	0.67 mg/m^3	0.33 mg/m^3	http://www.cdc.gov/niosh/npg/npgd0383.html
	Jerome 431	1,000- 999,000 ng/m^3	N							
	Jerome J405	500- 999,000 ng/m^3	N							
	Jerome 471	30- 250,000 ng/m^3	N							
Metals										
Lead	Personal Data Ram	0.001-400 mg/m^3	N	NA	NA	OSHA PEL = 0.050 mg/m^3	100 mg/m^3	NA	NA	http://www.cdc.gov/niosh/npg/npgd0353.html
	Data Ram 4	0.001-400 mg/m^3	N							
Particulate										
Particulate	Personal Data Ram	0.001-400 mg/m^3	N	NA	NA	5 mg/m^3	NA	NA	NA	http://www.cdc.gov/niosh/npg/npgd0389.html
	Data Ram 4	0.001-400 mg/m^3	N							
[2]Radiation										
Gamma Radiation	Ludlum Model 192	0-5,000 micro-R/ hr.	N	NA	NA	3 x background consult with HP	3 x background consult with HP	NA	NA	NA
Alpha, Beta, Gamma Radiation	Ludlum Model 2241-2 with Pancake Probe	0-9,999 R/hr or 999,000 cpm	N	NA	NA	3 x background consult with HP	3 x background consult with HP	NA	NA	NA

Notes:

[1] Does not include all compounds associated with Chemical Plant Fires, only the most common compounds with the lowest action levels. Depending on the chemical of concern, certain Drager tubes and chips can be used. In addition, single gas instruments and sensors and/ or a gas chromatography-mass spectrometry instrument may be used.

[2] Standard EPA Emergency Response Protocol is to screen for radiation with a Micro-R at all Emergency Responses. If readings are three times background, responders consult with Health Physicist. Additional Radiation equipment is available to monitor for Alpha, Beta and Gamma, but is not included in this table.

* AEGL 2- There are no AEGLs 1 for this compound.

**MIRAN SapphIRE has problems with complex mixtures (e.g. distinguishing benezene from gasoline vapor)

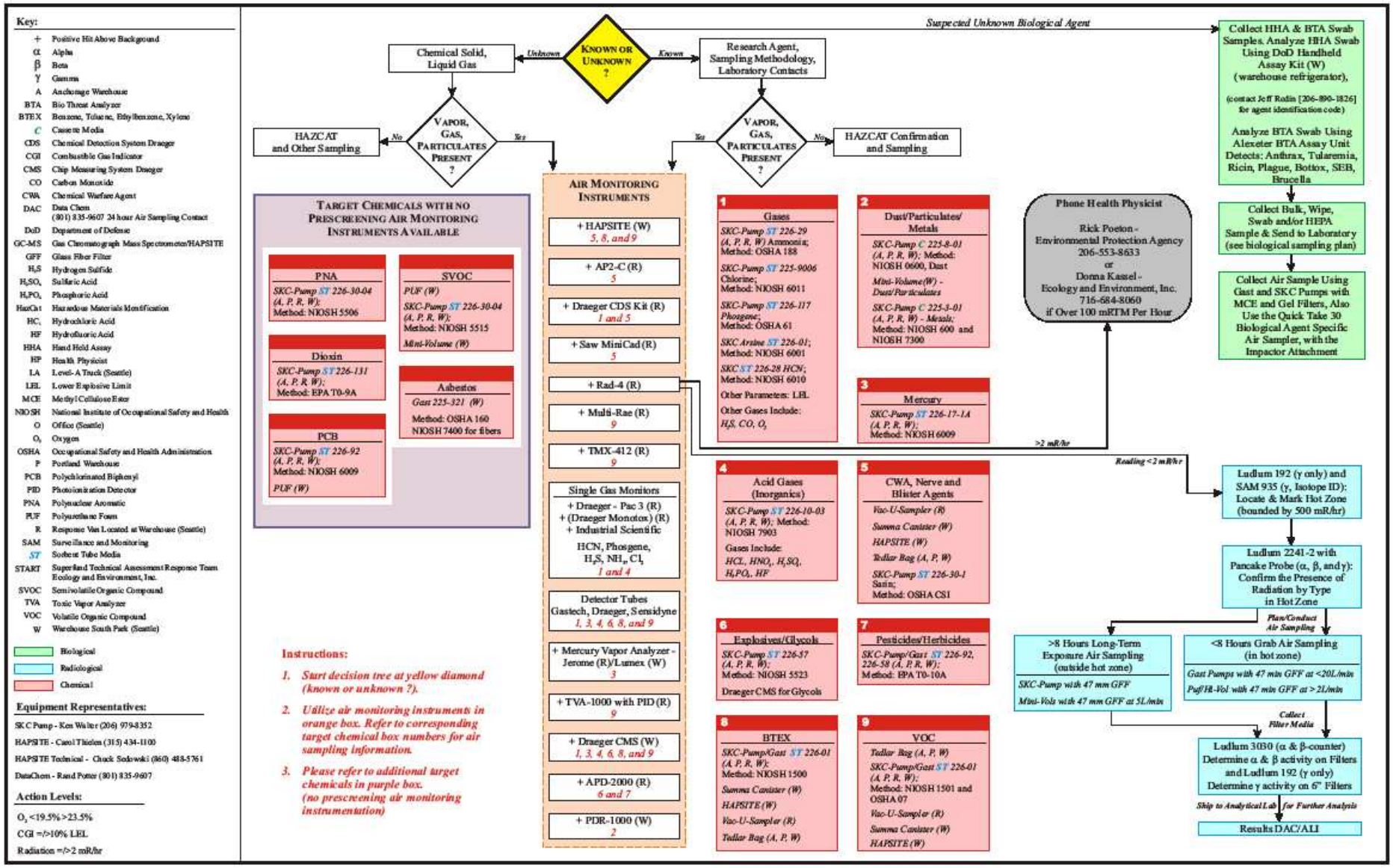
Metal Action Level Formula = [(TLV or other action level in mg/m3)(1E6mg/kg)] / [soil concentration (mg/kg) * 4]

AEGL - Acute Exposure Guideline Levels
cpm - counts per minute
eV - electron volt
IDLH - Immediately Dangerous to Life and Health
mg/m^3 - milligrams per cubic meter
NA - not available

NIOSH - National Institute for Occupational Safety and Health
OSHA - Occupational Safety and Health Association
PEL - Permissible Exposure Limit
PID - Photoionization Detector
PPE - Personal Protective Equipment
ppm - parts per million

R/hr - roentgen per hour
REL - Recommended exposure limit
TWA - Total weighted average
VOCs - Volatile organic compounds

http://www.epa.gov/oppt/aegl/pubs/chemlist.htm

U.S. EPA website used to research AELGs using the chemical's name or Chemical Abstracts Service Registry Numbers (CAS).

AIR SAMPLING DECISION TREE - EPA REGION 10/START