

## **Technical Overview of Ongoing Air Monitoring Efforts in Response to the Gulf Oil Spill**

EPA and its state and local agency partners have implemented an air monitoring plan in response to the oil spill in the Gulf of Mexico. The plan is designed to look specifically for impacts of the spill on the coastal areas of Louisiana, Mississippi, Alabama and Florida. This includes the monitoring of particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>) that could come from the controlled burns of the oil and volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) that might exist from off-gassing from the oil as it evaporates off the water. This technical overview provides specific technical information on methods and equipment being used to monitor air quality.

### **Type of sample and compounds**

1. Continuous (hourly) air samples for real time PM<sub>2.5</sub> taken by state and local air quality agencies and reported through EPA AIRNOW program.
  - a. Instrumentation:  
Commercially-manufactured and EPA approved Federal Reference Methods or Federal Equivalent Methods monitoring per EPA guidance and rules.
  - b. Detection Limits  
Specified Federal Reference Methods, generally 1 µg/m<sup>3</sup>
  - c. Data turnaround time (total time < 24 hours)  
Posted to website within 24 hours of collection, and reported as hourly values.
  
2. Continuous (hourly) air sample via screening monitors for PM<sub>10</sub>, total VOCs, H<sub>2</sub>S, and other non-target measurements such as CO, SO<sub>2</sub> taken by EPA Region 4 and Region 6.
  - a. Instrumentation
    - i. For PM<sub>10</sub>: either a DataRam or EBAM;
    - ii. For total VOCs and H<sub>2</sub>S: Area RAEs.
  - b. Detection Limits
    - i. Varies by pollutant: PM - 1 µg/m<sup>3</sup>, VOC 0.1ppm, H<sub>2</sub>S 0.1 ppm for data from May 17 to present; 1 ppm for data collected from April 28 through May 16;
  - c. Data turnaround time (total time 1 ½ - 2 days)
    - i. Includes approximately 24 hours for EPA regions to input data into the SCRIBE database and for the database to collate these data and perform necessary data review (inputting errors or other issues) plus,
    - ii. Up to 24 hours for review by EOC Environmental Unit and Air Desk. Some data, on occasion, will require follow up by Air Desk with regional and field personnel as part of data interpretation. EOC prepares language for posting to website during this time period as well.

3. Daily (24-hour) air samples collected in summa canisters for analysis of individual VOCs and SVOCs; target VOC species are benzene, toluene, xylene, ethylbenzene and naphthalene and SVOC species include poly-aromatic hydrocarbons, taken by EPA Region 4 and Region 6 .
  - a. Instrumentation
    - i. VOCs - Summa canister per EPA-published Method TO15
    - ii. SVOCs – Cartridges analyzed per EPA-published Method TO13
  - b. Detection Limits
    - i. Depends on target VOC compound and analytical laboratory but ranges from .015 micrograms per cubic meter – .03 micrograms per cubic meter (.003 ppb by volume to .008 ppb by volume).
    - ii. Depends on target SVOC compound and analytical laboratory but generally ranges from .02 nanograms per cubic meter – 1.1 nanograms per cubic meter (.0018 ppt by volume - .21 ppt by volume).
  - c. Data turnaround time (total time 7-10 days)
    - i. Includes 24 hours for sample collection in situ,
    - ii. Approximately 24 hours to pick up canister or adsorbent cartridge, ship it to and receive in designated laboratory,
    - iii. 24 hours to conduct laboratory analysis for VOCs,
    - iv. 24-48 hours for laboratory extraction and analysis of adsorbent cartridges for SVOCs.
    - v. 48 hours to complete validation and any subsequent final analysis,
    - vi. Approximately 24 hours to transmit into SCRIBE and conduct data processing, transmit to EOC,
    - vii. Approximately 24 hours to conduct comparison against benchmarks, assess data, develop messages, and post information to website. EOC prepares language for posting to website during this time period as well.
  
4. Real-time, episodic air monitoring using the TAGA laboratory for dispersant and compounds such as benzene, toluene and xylene or 2-butoxyethanol, 1-1(1-methyl-2-butoxy-ethoxy)-2-propanol and propylene glycol using the Sciex 365 triple quadrupole mass spectrometer. Additionally, Tedlar bag sampling and analysis for benzene, toluene, and xylene as well as other volatile organic compounds using the Agilent GC/MS. The TAGA is used by Regions 4 and 6 for a variety of purposes including supporting on-site health and safety assessments, screening real-time detection, odor complaint investigation and dispersant monitoring. The TAGA uses established laboratory methods for sample analysis. To date, TAGA has monitored only episodically and these data are being reported to the EOC.
  - a. Instrumentation
    - i. Sciex 365 triple quadrupole mass spectrometer
    - ii. Agilent 7890 GC and 5975C MSD
  - b. Detection Limits
    - i. Varies but < 1 ppb
  - c. Data turnaround time (total time is ~ 2 days)
    - i. Sciex 365 triple quadrupole mass spectrometer (real time) – 1 hour

- ii. Agilent 7890 GC and 5975C MSD (10-minutes) -30 minutes
  - iii. Approximately 24 hours to transmit into SCRIBE and conduct data processing, transmit to EOC,
  - iv. Approximately 24 hours to conduct comparison against benchmarks, assess data, develop messages, and post information to website. EOC would need to prepare language for posting to website during this time period as well.
5. Mission specified (flying during oil burning periods) open path air sample via ASPECT air craft measurements for off shore measurements taken by EPA ERT Staff and contractor. ASPECT routinely analyses 24 chemical compounds through Fourier transform infrared spectroscopy (interferograms.) Specific compounds include acetone, acrolein, acrylonitril, ammonia, 1,3 butadiene, chloromethane, ethanol, ethylene, Freon 134a, isobutylene, isopropanol, MAPP, methanol, methyl ethyl ketone, methylene chloride, methyl tert butyl ether, n-butyl acetate, phosgene, propylene, sulfur dioxide.
- a. Instrumentation
    - RS800 Line Scanner, Fourier-transform infrared detector, RSX-4 spectrometer, aerial camera, satellite data system
  - b. Detection Limits
    - Varies by compound but approximately 1 ppm\*m (parts per million x meter) with the beam sampling a typical 100 meter path length.
  - c. Data turnaround time (total time )
    - ASPECT data are submitted within 24 hours after landing each day of deployment.

### **Data collection and reporting information**

Results are posted to the EPA spill response website after data quality checks and review. See <http://www.epa.gov/bpspill/air.html> and <http://gulfcoast.airnowtech.org/> for results. Any unusual values are identified for verification or invalidation if a measurement, laboratory analysis or other data quality issue is discovered. Time between collection of a sample or monitored data and reporting to the web depends on the contaminant and the analytical process required to measure that substance. The typical time between collection and posting on the web ranges from less than one day to a week.