

**United States Environmental Protection Agency  
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## Ambient Air Monitoring and Quality Assurance in the Region 4 Hurricane Katrina Relief Effort



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**Background**

**On August 29<sup>th</sup>, 2006 Hurricane Katrina made landfall near the Mississippi/Louisiana border as a strong category 3 storm with winds of approximately 130 MPH.**

**The storm made landfall at high tide, producing a storm surge of 35 feet on the western coast of Mississippi.**

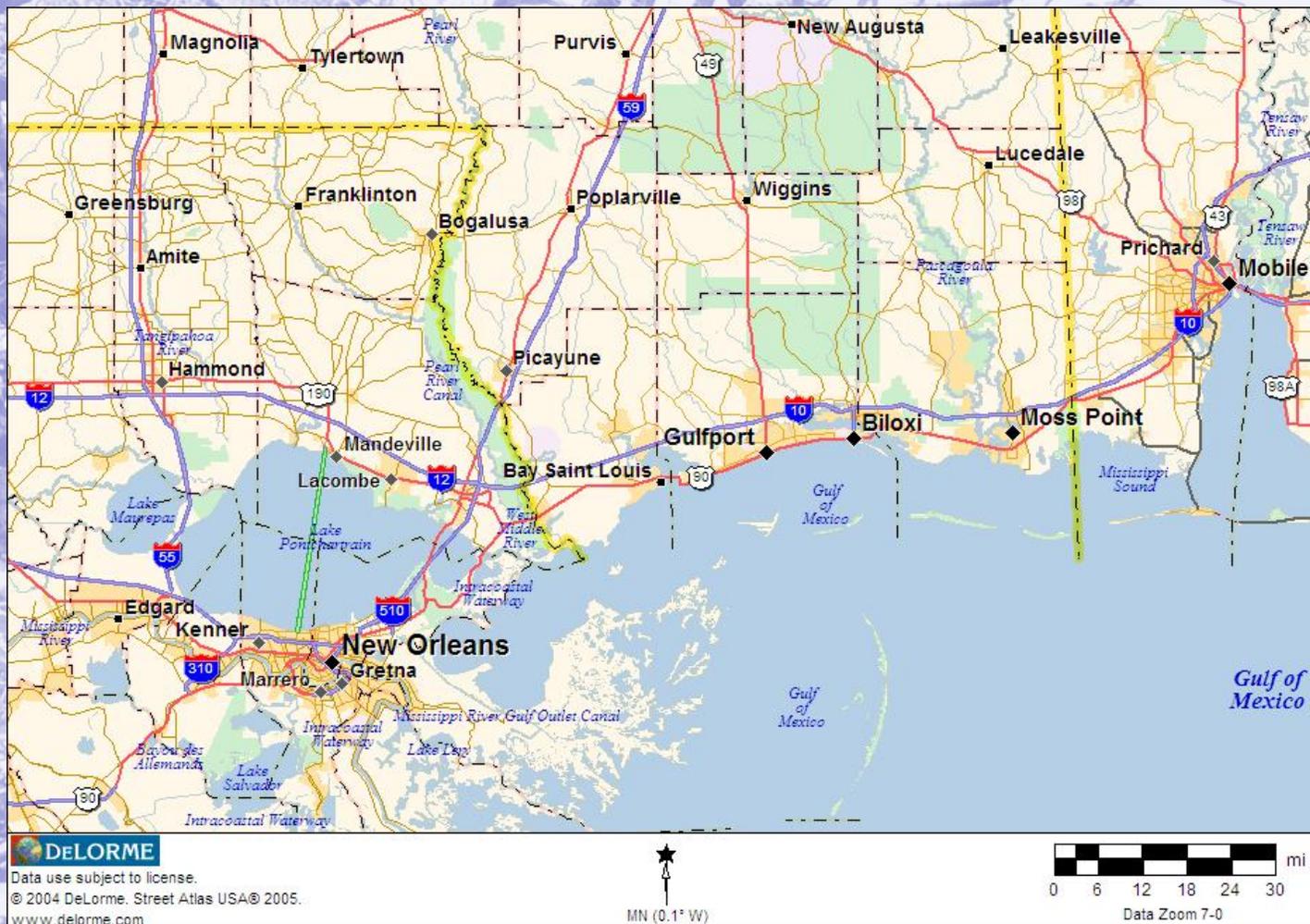
**The storm affected an area ranging from Mobile, Alabama to the Texas border, and from the coast northward to Interstate 20.**

**The storm produced loss of life, destruction of property, and environmental impact on a scale never before seen in the history of the United States.**

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Background – Areas of Greatest Devastation



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## **Background – Region 4 Ambient Air Issues**

**The devastation left in the wake of Katrina produced a monumental debris cleanup task for Louisiana, Mississippi, and Alabama.**

**Huge amounts of vegetative debris (trees, limbs), building debris, and personal property were strewn across miles of coastline and pushed northward.**

**Affected states took different courses of action. In Mississippi, the Mississippi Department of Environmental Quality decided to separate and burn the vegetative debris and clean wood (construction material consisting of primarily bare wood with no finishing materials). The rest of the debris would be taken to a number of Construction and Demolition landfills.**

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## **Changes in Emissions on the Mississippi Gulf Coast**

**Emissions changed substantially in southern Mississippi.**

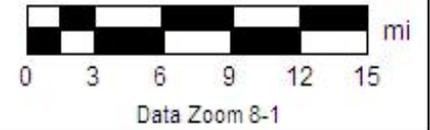
- **Open burning operations**
- **Increase in diesel powered relief equipment**
- **Changes in traffic patterns due to bridge damage**
- **Changing emissions from shutting down and re-firing power plants/manufacturing facilities**
- **Decrease in residential traffic, but increase in relief traffic**

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**Klondyke Rd. Burn Site**



**Bayou LaBatre Sawgrass Fire**

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## **New Diesel Sources in Mississippi**



**Relief Vehicles Arrive by the Dozen**



**Track Hoes Moving Debris**

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## **More Diesel Sources in Mississippi**



**Hundreds of Military Vehicles**

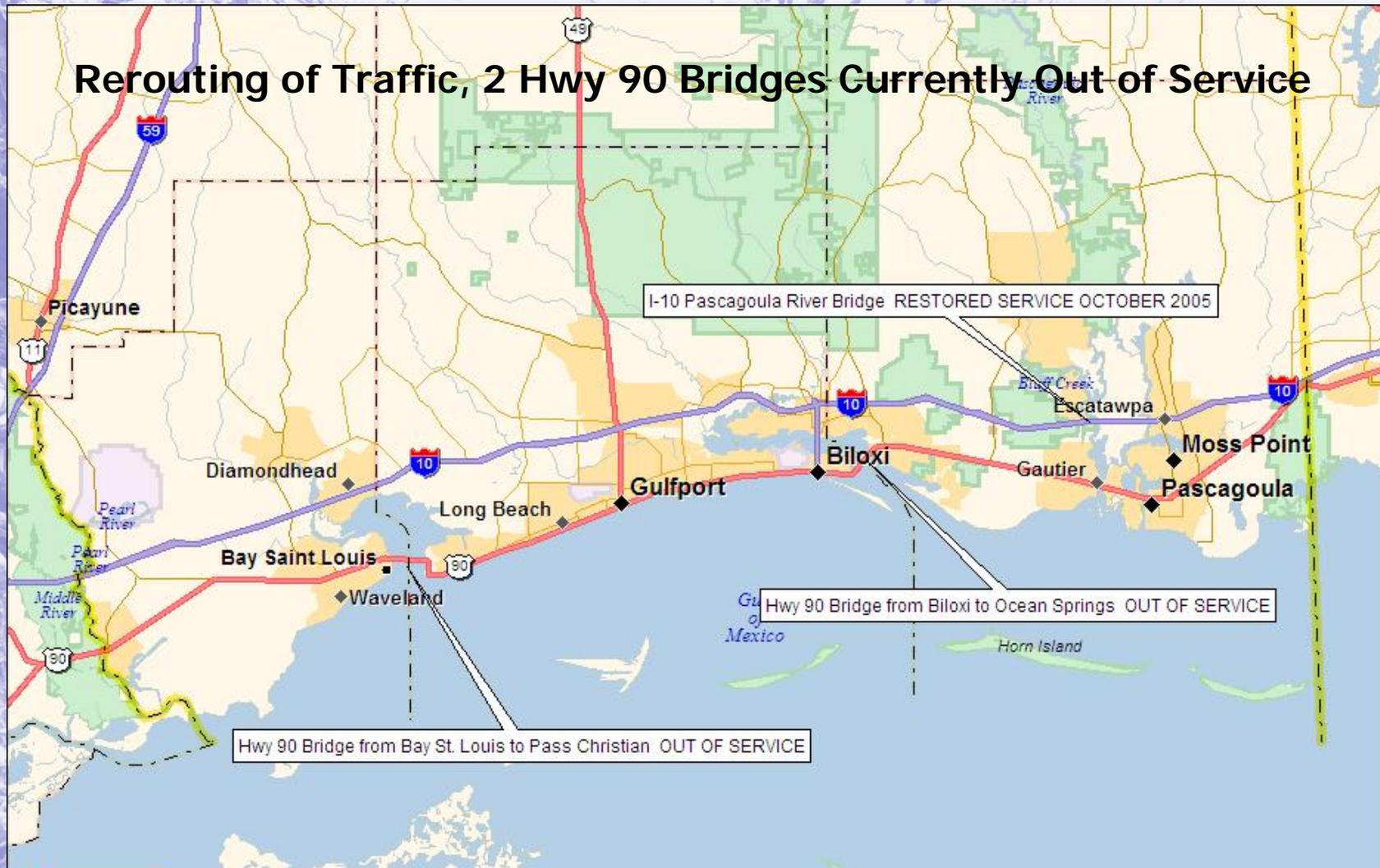


**Anyone with a Hitch, Trailer,  
Or Big Truck**

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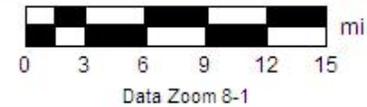


Rerouting of Traffic, 2 Hwy 90 Bridges Currently Out of Service



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## **The EPA Ambient Air Monitoring Response**

**EPA assembled a team of experts to help Louisiana and Mississippi assess their ambient air monitoring needs. This team was named the Katrina Ambient Air Monitoring Response Team. In the Region 4, the team included experts from:**

**Science and Ecosystem Support Division (SESD), EPA, Athens, GA**

**Air Pesticides and Toxics Management Division (APTMD), EPA, Atlanta, GA**

**Office of Solid Waste and Emergency Response, Environmental Response Team (OSWER), EPA, Las Vegas, Nevada**

**Office of Air Quality Planning and Standards (OAQPS), EPA, Research Triangle Park, NC**

**Office Research and Development (ORD), EPA, Research Triangle Park, NC**

**Mississippi Department of Environmental Quality (MDEQ), EPA, Jackson, MS**

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## **Ambient Air Monitoring Objectives**

- To provide information for managing risks, in other words, to give people in the area – government officials, contractors, and private parties –information to guide their actions in ways that will reduce air concentrations and/or exposures whenever feasible to avoid unreasonable risks.**
- To inform the public of the ambient air quality**
- To provide data that may be useful in retrospective studies of the health and ecosystem effects of the storm and recovery activities**
- To provide air quality data that may be useful in developing plans for responding to future disasters**
- Not for regulatory purposes**

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## **Region 4 Ambient Air Monitoring Strategy for Mississippi**

### **Network Summary**

**Setup 8 Monitoring Site Network Across the Entire Mississippi Coast**

**3 sites will be at MDEQ sites, 5 will be placed near burn areas.**

**Burn monitoring sites will be placed between population and burn locations to estimate general population exposure. Most burn locations were north of the coastal areas.**

**Monitor for PM<sub>2.5</sub>, PM<sub>10</sub>, Metals, VOCs, SVOCs, Carbonyls, Hexavalent Chromium, (Full Toxics Suite) Asbestos**

**Monitoring sites will meet 40CFR Part 58 Appendix E Regulations if possible**

**Some sites may be relocated into demolition areas to better assess demolition activities.**

**Contract laboratories conducted routine analyses**

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## **Region 4 Ambient Air Monitoring Strategy for Mississippi**

### **Ambient Monitoring Frequency**

**In accordance with National Sampling Schedule**

**DAILY from September 19, 2005 (sampling beginning) to January 31, 2005 to assess conditions, reducing according to data analysis**

**1 in 3 from January 1, 2006 to March 31, 2006 then reduce according to data analysis**

**1 in 6 from April 1 to present. Data will be reviewed for schedule adjustment. Asbestos will continue at 1 in 3.**

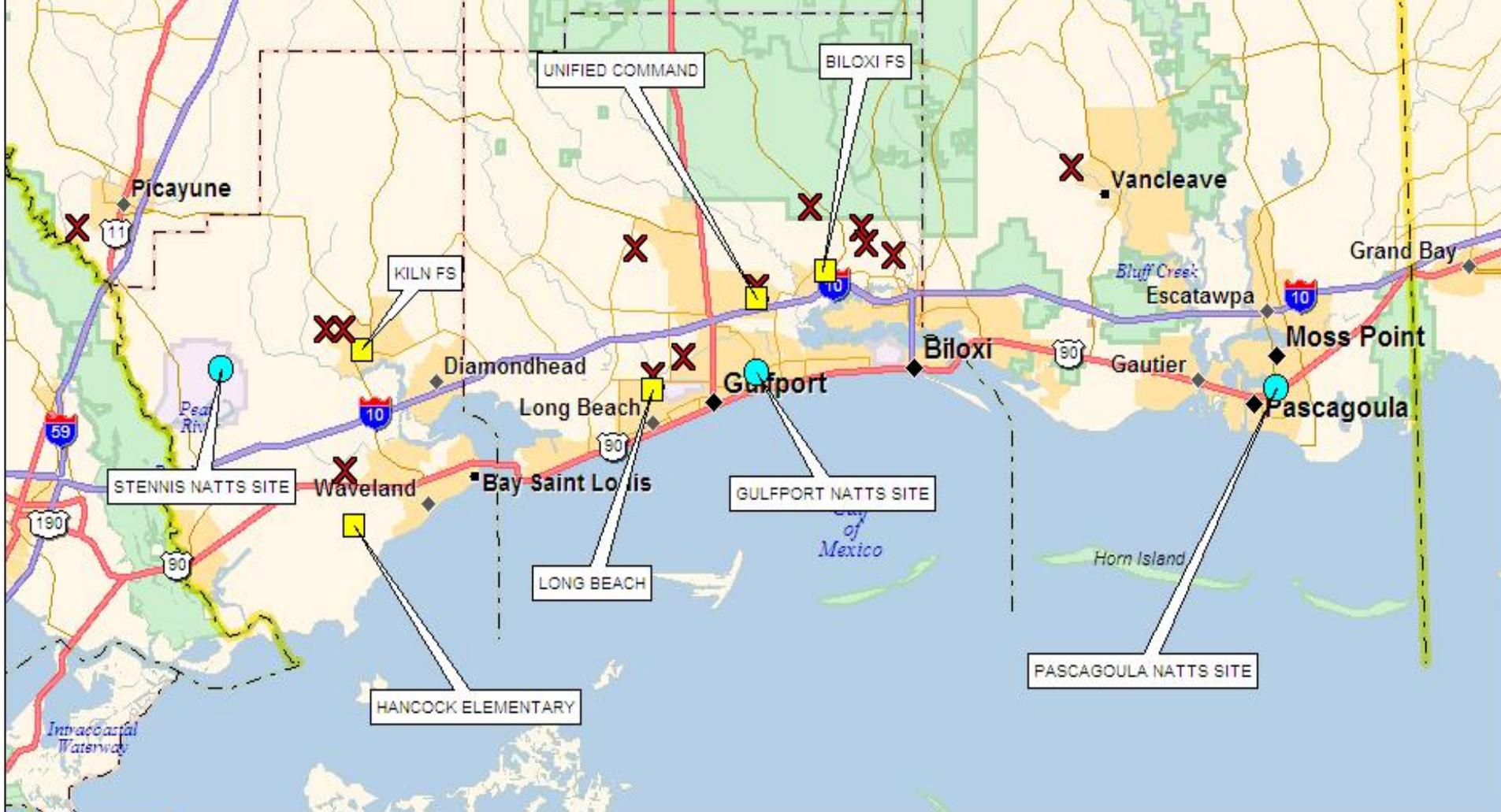
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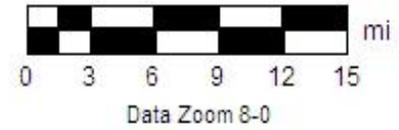
**Ambient Air Monitoring Site Details**

<b>Site Name</b>	<b>Status</b>	<b>Parameters Monitored By EPA</b>
<b>Stennis Space Center</b>	<b>Active</b>	<b>PM2.5, PM10, Asbestos, NATTS</b>
<b>Gulfport (MDEQ)</b>	<b>Active</b>	<b>PM2.5, PM10, Asbestos, NATTS</b>
<b>Pascagoula (MDEQ)</b>	<b>Active</b>	<b>PM2.5, PM10, Asbestos, NATTS</b>
<b>Long Beach Fire Station 1 (Burn Site)</b>	<b>Active</b>	<b>PM2.5, PM10, Asbestos</b>
<b>Unified Command Center (Burn Site)</b>	<b>Inactive</b>	<b>PM2.5, PM10, Asbestos</b>
<b>Biloxi Fire Department (Burn Site)</b>	<b>Inactive</b>	<b>PM2.5, PM10, Asbestos</b>
<b>Hancock Elementary School (Burn Site)</b>	<b>Inactive</b>	<b>PM2.5, PM10, Asbestos</b>
<b>Kiln Fire Station (Burn Site)</b>	<b>Active</b>	<b>PM2.5, PM10, Asbestos</b>
<b>Waveland City Hall</b>	<b>Active 4/4/06</b>	<b>PM2.5, PM10, Asbestos</b>
<b>Pass Christian Fire Department</b>	<b>Active 4/4/06</b>	<b>PM2.5, PM10, Asbestos</b>
<b>Biloxi Yankee Stadium</b>	<b>Active 4/4/06</b>	<b>PM2.5, PM10, Asbestos</b>

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**Particulate Samplers**



**BGI frmOMNI - PM10**



**BGI PQ200A - PM2.5 or PM10**

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**National Air Toxics Trend Sites Samplers**



**Hexavalent Chrome Sampler**



**Combination VOC and Carbonyl  
Sampler**

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**Asbestos Samplers**



**BGI PQ100 Portable Sampler**



**DuPont Alpha-1 Air Sampler**

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## **Katrina Ambient Air Monitoring Quality Assurance Protocols**

**It was very important to start collecting data during the onset of the Hurricane Katrina Emergency Response. Time was of the essence**

**Quality assurance protocols were developed at EPA during the implementation of the network.**

**During this time the field personnel produced quality data by using EPA protocols already in place to guide them in collecting quality data.**

**EPA ambient air monitoring experts with extensive experience in the field from SESD, APTMD and ESAT contractors from the national PM2.5 Performance Evaluation Program were used to implement the network. Many members of this team work directly in programs which involve monitoring or sampling of the Katrina pollutants and have many years of experience in the field.**

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## **Quality Assurance Protocols**

**While QAPPs, Monitoring Plans and Risk Levels were being created and assembled...**

**Experts from EPA in FIELD ambient air monitoring were employed to implement the network**

**Existing QAPPs were used to guide the monitoring effort**

**PM2.5 and PM10 – PM2.5 Performance Evaluation Program**

**NATTS – National Model QAPP**

**Asbestos – Modified AHERA OSWER**

**All were adapted to the unique conditions in the field and to be as flexible as possible to provide accurate and precise data.**

**COMMUNICATION! As plans develop and conditions change, communication to a central command is paramount!**

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## **A Few Quality Assurance Protocol Particulars**

**Weekly flow, barometric pressure, and temperature checks**

**Weekly field blanks for all PM and asbestos samplers**

**One collocated site for all PM<sub>2.5</sub>, PM<sub>10</sub>, and asbestos**

**Each sampler type was collocated (BGI frmOMNI, asbestos pumps)**

**Duplicates were run every 10 days for VOCs, carbonyls, and hexavalent chromium**

**Field blanks were run every 10 days for SVOCs, carbonyls, and hexavalent chromium**

**All sites retained log books updated daily**

**Sample chain of custodies completed and returned to SESD**

**Electronic data archived on external hard drive and copied to SESD**

**Laboratory Data validated by APTMD and ESAT Contractors**

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## **Improvise, Adapt, Overcome!**

**Finding Sites – GPS, few road signs left, fire departments, police stations, city complexes, 24- hour security**

**No equipment on hand – Borrow from other programs in house, adapt monitors in house to do things we had not done before**

**No power available – Acquire power cables for samplers to run on external deep cycle marine batteries that had the option and make battery power cables for those without the option**

**Limited personnel – Use the experts to implement the network and set up the routine, then train a rotation of staff. Overlap rotating staff to refresh them on the operation and the QA timelines. ALWAYS KEEP ONE EXPERT IN THE FIELD WITH NEW STAFF! TRAIN, TRAIN, TRAIN!!!!**

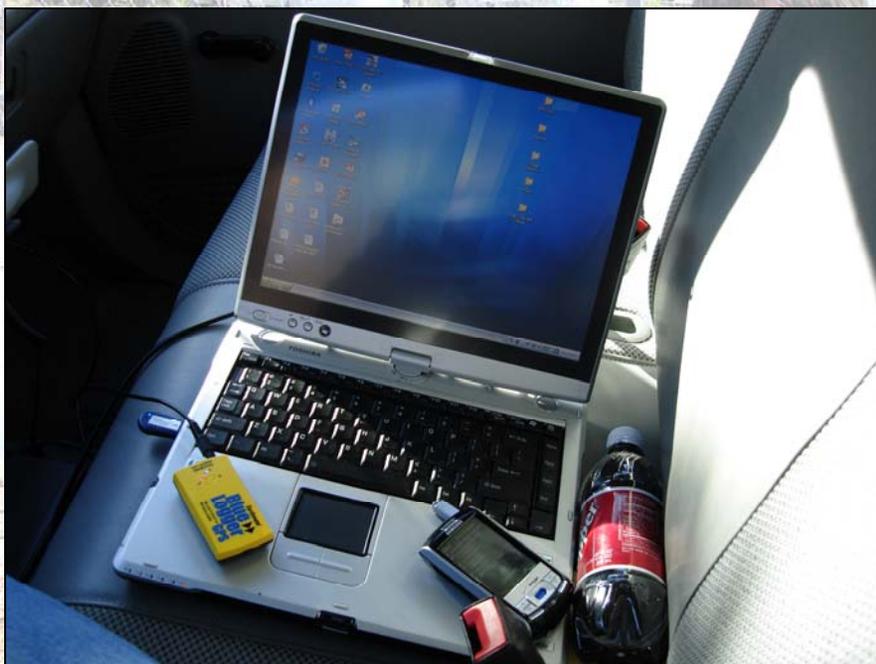
**Many sites, samplers, and responsibilities – Distribute work evenly into manageable tasks. Help out wherever possible.**

**Fatigue – Frequent rotations of no more than 3 weeks in the field**

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## **Basic Katrina Field Necessities**



**Laptop Computer with GPS  
Navigation, Phone with Internet  
Access, and Source of Caffeine**



**Anything You Can Find to Eat**

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**Battery Power is Essential!**

**A rotation was implemented in the field depending on power drain per site. A log was created to track usage.**



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**Routine Quality Assurance**



**Safety! For Personnel Working  
and the Samplers Themselves**



**Communication and  
Recordkeeping**

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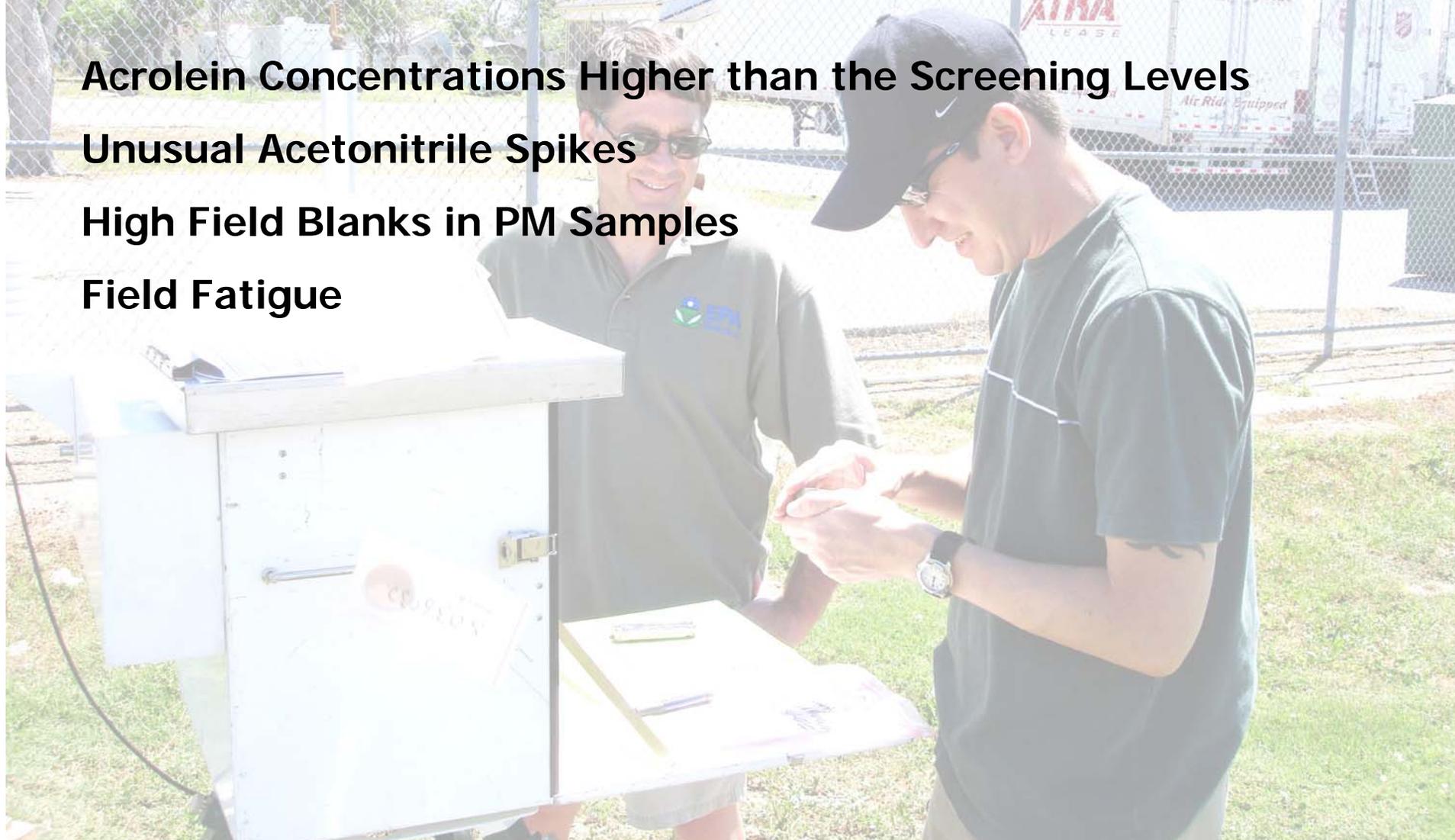
## **Quality Assurance Discoveries**

**Acrolein Concentrations Higher than the Screening Levels**

**Unusual Acetonitrile Spikes**

**High Field Blanks in PM Samples**

**Field Fatigue**



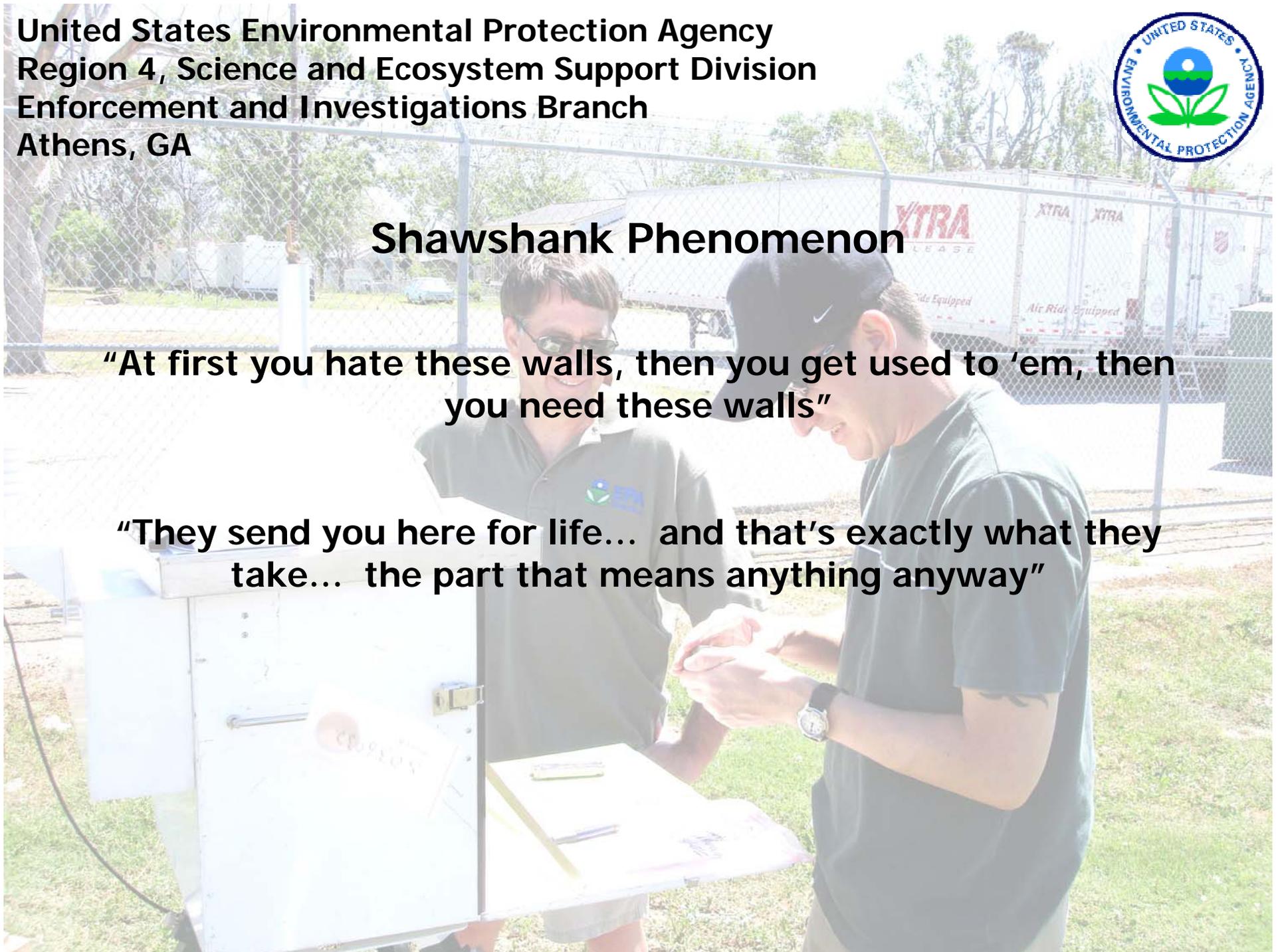
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## **Shawshank Phenomenon**

**"At first you hate these walls, then you get used to 'em, then you need these walls"**

**"They send you here for life... and that's exactly what they take... the part that means anything anyway"**



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