

EXECUTIVE SUMMARY

On April 20, 2010, an explosion and fire occurred on the semi-submersible offshore drilling rig, Transocean Deepwater Horizon drill rig at British Petroleum Site Mississippi Canyon 252 in the Gulf of Mexico, approximately 50 miles offshore of Venice, Louisiana. On April 24, 2010, it was found that the wellhead was damaged and leaking crude oil into the Gulf of Mexico. The Secretary of Homeland Security declared the discharge of the oil a Spill of National Significance (SONS), herein known as the British Petroleum Spill (BP Spill). The BP Spill poses a serious threat to the quality of the environment and a potential threat to human health along the Gulf of Mexico. The mission of the U.S. Environmental Protection Agency (EPA) is to protect human health and the environment. In order to fulfill that mission, EPA is supporting the U.S. Coast Guard's response to the BP Spill by monitoring air quality and establishing a baseline of water and sediment quality along the Gulf coast based on data from the National Coastal Condition Assessment (NCCA) (2000- 2006), post-Katrina sampling, and 2010 pre-impact sampling.

EPA took a number of samples along the coastal areas of Louisiana, Mississippi, Alabama, and Florida to develop baseline information. Concurrently, EPA conducted sampling and monitoring along the coastal areas to assess the impacts of the *in situ* burns as well as possible volatilization of chemicals from the oil at the surface of the water. As the spill moves to and within the shoreline, and near-shore areas, EPA is concerned that the crude oil, the large quantity application of the dispersants, and response technologies may have negative short- and/or long-term impacts on human health and the environment. In order to examine the effects of the BP Spill on air, water and sediment quality, EPA plans to conduct further water, sediment, and air sampling, monitoring, and analysis along the U.S. Gulf Coast, including off the coasts of Louisiana, Mississippi, Alabama, Florida, and possibly Texas. The Agency also recognizes the potential for the oil to move with the Loop current around the tip of Florida and up the East Coast, and the need for flexibility to amend the samplings plans, as necessary. In order to monitor the impacts of the spill on the Gulf Coast region, EPA has a detailed sampling plan for the 2010 NCCA which includes sampling in the Gulf of Mexico estuaries. In addition, EPA Regions 4 and Region 6 have developed Quality Assurance Sampling Plans (QASP) to collect further data on the chemical contamination in air, water, and sediments. EPA will remain flexible

in its response to the spill and sampling areas may shift if oil begins to impact other areas of shoreline.

METHODOLOGY OVERVIEW

EPA selected three potential areas of impact and will conduct sampling and monitoring in these three areas. The areas, relative to the Gulf shoreline, are far off-shore (3 – 50 miles from shoreline), nearshore (1 - 3 miles of shoreline), and shoreline (due to variances along the Gulf Coast this includes beaches, bays, estuaries, and nearby populated areas, up to 1 mile of shoreline). To evaluate the large quantities of dispersants used, this sampling plan is designed to provide EPA with information on the effects of both crude oil and chemical dispersants on air, water and sediment quality.

Locations:

- **Far Off-Shore**

- Air monitoring is conducted by Airborne Spectral Photometric Environmental Collection Technology (ASPECT) aircraft to assess the air quality impacts from *in situ* burns.
- Locations for the deep water tracking of the oil plume is coordinated with the National Oceanic and Atmospheric Administration (NOAA).
- Locations for assessing the effectiveness of the dispersants for dispersing the oil along the water column and impacts on aquatic life is coordinated with NOAA.

- **Nearshore**

- Water sampling locations will be determined by targeting areas of ecological importance. The samples may be analyzed for the presence of oil and dispersants' constituents as well as aquatic life toxicity.
- Sediment sampling locations will be determined by targeting areas of ecological importance. The samples will be analyzed for the presence of some oil-related

indicators, aquatic toxicity and benthic infauna. Additional oil and dispersants' constituents may be added as resources allow.

- Fish samples will be analyzed for a variety of contaminants as part of the NCCA, and polycyclic aromatic hydrocarbons (PAHs) can be added as resources allow.

- **Shoreline/Bays and Estuaries**

- The ongoing NCCA includes sample locations in the bays and estuaries of affected states. Samples are collected for water, sediment and fish contaminant analysis. Additional sampling frequency and oil and dispersants' constituents may be added as resources allow.
- Air quality sampling and monitoring are analyzed for the presence of key constituents of oil and dispersants.
- Water samples are analyzed for the presence of oil and dispersants' constituents as well as aquatic toxicity.
- Sediment samples are analyzed for the presence of oil and dispersants constituents as well as aquatic toxicity.

Sampling and Analytical Approach

- For assessing the deep sea tracking of the oil plume and effectiveness of the dispersants, EPA is engaged with NOAA's efforts. Fluorescence monitoring provides data on the presence of oil plumes in the water column. Initial visual monitoring is followed by real-time water column analysis utilizing a submersible fluorometer towed by boat at specified depths in the near-shore environment.
- Water and sediment sampling and analyses in the nearshore and shoreline/bays and estuaries will include parent and alkyl PAHs (if resources allow), volatiles including benzene, toluene, ethylbenzene, and xylene (BTEX), total metals, semi-volatiles, total petroleum hydrocarbons (Diesel and Gasoline range organics), and dispersants. Sample analyses of water will also include chemical oxygen demand (COD), biological oxygen

demand (BOD), and dissolved oxygen (DO). Ecotoxicity analyses will include acute and chronic testing of standard toxicity test species indicative of the Gulf. Analysis of fish tissue will occur as part of the NCCA.

- The presence of free oil globules and/or surface oil at near shore surface water locations has been sampled to characterize the oil and dispersant mixture that is reaching the shoreline. Sampling along beaches, marshes, tidal flats, or other shoreline types may continue in order to collect samples of fresh oil, mousse, tar, tarballs, or tar patties that have accumulated as part of the oil release.
- The air sampling program includes continuous, real time monitoring of particulate matter (PM) 2.5 collected by State and local air quality agencies and reported through the EPA AIRNOW program. In addition, continuous air quality screening is conducted by EPA using monitors for PM10 and PM 2.5, total volatile organic compounds (VOCs), and hydrogen sulfide (H₂S). Daily (24 hour) air samples that are collected in SUMMA® canisters and sorbent cartridges are analyzed for individual VOCs, and semivolatile organic compounds (SVOCs) ; target analytes include: benzene, toluene, xylene, ethylbenzene, naphthalene, benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k) fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene.

Continuous, mobile air monitoring is being performed by the Trace Atmospheric Gas Analyzer (TAGA) laboratory as directed by EPA's Environmental Response Team (ERT). Pollutants measured include benzene, toluene and xylene or 2-butoxyethanol and a propylene glycol ether using the Sciex 365 triple quadrupole mass spectrometer (MS). Additionally, Tedlar bag sampling and analysis for benzene, toluene, and xylene as well as other VOCs are measured using the Agilent gas chromatograph/mass spectrometer (GC/MS). The TAGA is intended to be used to support on-site health and safety assessments and as such uses screening real-time detection techniques and established laboratory methods.

Mission specified (flying during oil burning periods) open path air sampling via ASPECT air craft measurements for off shore measurements are taken by EPA's National

Decontamination Team and contractor staff. ASPECT routinely analyzes 24 chemical compounds through Fourier transform infrared spectroscopy (interferograms). Specific compounds measured 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, and sulfur dioxide.