



Date: June 18, 2010

Subject: Oil Spill-Related Environmental Exposures and Testing at NMS Labs

In response to the known exposure of people and animals to crude oil and chemical dispersants being used in the Gulf of Mexico, NMS Labs has developed a panel of agents to help assess exposure. This panel was developed by NMS Labs toxicologists using their knowledge, experience and after discussion with industrial hygienists and scientists from around the country. While no one completely understands each and every component of the leaked crude oil, the following tests cover many of the common agents believed to be present. If at all possible, NMS Labs recommends that baseline testing of individuals takes place before potential exposure. Further, it should be kept in mind that exposure does not necessarily mean physical contact with the crude oil, but also includes being in an environment where vapors from the material permeate the air where individuals are located.

Specific to the oil spill and cleanup effort, the following tests performed in blood and urine may be helpful to monitor exposure levels (see enclosed list for details of these tests):

- Aromatic Solvents Panel, Urine (0457U)
- Aromatic Solvents Exposure Panel, Blood (0785B)
- Benzene, Blood (0541B)
- Benzene Metabolites Panel, Urine (3101U)
- Petroleum Distillates Panel, Blood (2139B)
- 1-Hydroxypyrene, Urine (2358U) (Marker for PAH exposure)
- Thiosulfate, Urine (4472U) (Marker for hydrogen sulfide exposure)
- *2-Butoxyacetic Acid, Urine - coming soon (metabolite of butoxyethanol, a common oil dispersant component)*

This list is a general guide of tests that could be useful for exposures assessment. More compound-specific concerns can be addressed by speaking with a toxicologist at NMS Labs. We recommend calling the laboratory and speaking to one of our toxicologists before sending samples to ensure proper timing of specimen collection, most appropriate specimens, etc.

NMS Labs is proud to perform:

- Testing that can measure aggregate exposure in blood and urine for over 70 metals & elements
- Testing that only a few labs perform (e.g. naphthalene metabolite and glycol metabolites)
- Human exposure testing specific to petroleum toxins
- Customized testing for unique situations and studies

We have experience with testing patients following national catastrophes. As we have in the past, NMS Labs is here to support our nation's disaster recovery efforts. Health officials at the federal, state and local levels as well as healthcare practitioners dealing with the aftermath of major spills and other environmental issues have relied on NMS Labs. It is our privilege and honor to assist in this manner.

Monitoring of individuals can play a significant role in the easing of concerns, medical follow-up, and other post-event issues. As in the past, NMS Labs is poised to assist in determining appropriate testing. Please call an NMS Labs toxicologist to discuss your testing needs. We can be reached at **800-522-6671**.

Sincerely,

Robert A. Middleberg, Ph.D., DABFT, DABCC-TC
Vice President, Quality Assurance
Laboratory Director

Recommended Tests

Test Code	Test Name	Specimen Type	Analytes Measured	Reason for Testing
0457U	Aromatic Solvents Panel	Urine	Specific Gravity, Creatinine, o-Cresol (Toluene), Phenol (common metabolite of such compounds as Benzene and Phenol), Ethylphenol (Ethylbenzene and Phenylglyoxylic Acid), Hippuric Acid (Toluene), Methylhippuric Acid (Xylenes), Mandelic Acid (Ethylbenzene, Styrene), Phenylglyoxylic Acid (Ethylbenzene, Styrene), S-Phenylmercapturic Acid (Benzene), tt-Muconic Acid (Benzene)	Metabolites of Potential Components of Crude Oil as designated in parentheses; Creatinine and Specific Gravity for normalizing purposes
0785B	Aromatic Solvents Exposure Panel	Blood	Benzene, Toluene, o,m,p-Xylenes, Ethyl Benzene, Styrene	Potential Components of Crude Oil
0541B	Benzene	Blood	Benzene	Potential Component of Crude Oil
3101U	Benzene Metabolites Panel	Urine	Creatinine S-Phenylmercapturic Acid (Creatinine corrected) S-Phenylmercapturic Acid t,t-Muconic Acid (Creatinine corrected) t,t-Muconic Acid	Potential Component of Crude Oil
2139B	Petroleum Distillates Panel	Blood	Hydrocarbons C1-7 Hydrocarbons C9-32	Potential Components of Crude Oil
2358U	1-Hydroxypyrene	Urine	1-Hydroxypyrene	Metabolite of Pyrene used as an indicator for Polyaromatic Hydrocarbon (PAH) exposure
4472U	Thiosulfate	Urine	Creatinine Thiosulfate (Creatinine corrected) Thiosulfate	Occupational toxin, biological marker of sulfide exposure
<i>Coming Soon!</i>	2-Butoxyacetic Acid	Urine	Metabolites of ethylene glycol monobutyl ether	Biological marker of ethylene glycol monobutyl ether exposure