

**From:** Howard, John (CDC/NIOSH/OD)  
**To:** Schnorr, Teresa M. (CDC/NIOSH/DSHEFS); Tepper, Allison L. (CDC/NIOSH/DSHEFS); Lotz, William G. (Greg) (CDC/NIOSH/DART); DeBord, Gayle (CDC/NIOSH/DART); Snawder, John E. (CDC/NIOSH/DART)  
**CC:** Kitt, Margaret (CDC/NIOSH/OD); Spahr, James S. (CDC/NIOSH/OD); Hearl, Frank J. (CDC/NIOSH/OD); Kiefer, Max (CDC/NIOSH/OD)  
**Sent:** 6/25/2010 10:23:42 AM  
**Subject:** Biomonitoring Recommendation for DWH response workers  
**Attachments:** Need for Biomonitoring of Clean.docx

Folks:

As a result of IOM and other conversations and reading, I am concerned that we may not have a comprehensive approach to exposure monitoring for Gulf workers. DART has prepared their thoughts on the issue (see below) and I think HETAB needs to think about including Biomonitoring in the HHEs (or in a special focused HHE) so that we are not criticized for missing exposure through the dermal route.

I will raise it on the 1 pm call, but think that DART and HETAB/DSHEFS needs to get their heads together on this issue.

JH

---

**From:** Lotz, William G. (Greg) (CDC/NIOSH/DART)  
**Sent:** Thursday, June 24, 2010 8:59 AM  
**To:** Howard, John (CDC/NIOSH/OD)  
**Cc:** Kitt, Margaret (CDC/NIOSH/OD); DeBord, Gayle (CDC/NIOSH/DART); Snawder, John E. (CDC/NIOSH/DART)  
**Subject:** Biomonitoring Recommendation for DWH response workers

Good morning, John,

After listening to your exchange about exposure measurements and worker health with John Mulhausen at the NORA Liaison Committee last week, I spent more time thinking about the potential for biomonitoring of DWH response workers. I asked John Snawder and Gayle DeBord to summarize available information from other research and what's known so far about the DWH situation. I realize you already had a conference call on biomonitoring, but with the expansion of the HHE, and other developments, we think it's worth another look. ( I know that some will think this is just an attempt by DART to get a piece of the action. That's not our motivation.) Like you, we don't need extra work at this point. But we do think a modest biomonitoring exploration has great value in the overall exposure assessment that no amount of air monitoring can provide. I've clipped in John and Gayle's one-page summary below, as well as attached it as a separate file. Just let us know if you'd like to discuss this further.

Greg

### **Need for Biomonitoring of Clean-up Workers of Deep Well Horizon Well Oil Spill**

#### **The Problem:**

Workers are reporting symptoms such as conjunctival irritation, nose and throat discomfort, headache, allergic skin reaction, and nausea. These can be signs of volatile organic compound (VOC) exposure. Polycyclic aromatic hydrocarbons (PAHs) can cause irritation to eyes and skin, which is also being reported by workers.

#### **Extenuating Circumstances:**

To date air monitoring has not been showing high levels of VOCs or PAHs in the air. However, NIOSH research has shown that winds can affect the accuracy of air monitoring of aerosols, such that exposure is underestimated. If high episodic exposures to VOCs and PAHs are occurring, air monitoring might be missing those as the exposure gets diluted out. Air monitoring also does not provide any information on dermal exposures. Glove breakthrough could be a problem so that clean-up workers are exposed to the oil from dermal exposure.

**Benefits of Biomonitoring:**

- A limited biomonitoring study could be beneficial for the following reasons:
- A limited study could provide information as to whether worker exposures to VOCs and PAHs are truly occurring
- Rapid detection methods for these two classes of compounds are already developed such that results could be reported within a few days.
- Biomonitoring could determine the efficacy of personal protective equipment (PPE) being used by the clean-up workers.
- Since heat stress is the number one worker issue, the use of biomonitoring could determine whether more or less PPE is warranted. It may be possible to get the workers out of the Tyvek suits to lessen their heat body burden.

**Potential Problems:**

Currently, there are two groups of clean-up workers, on-shore cleaning beaches and off-shore containment workers. The off-shore workers present more challenges as they are harder to track. These workers are also exposed to the dispersants that are being used complicating their exposures.

**Basics of a Limited Study:**

- Follow 50 workers to get pre- and post-shift urines for 3 days in the on-shore clean-up workers.
- Determine the level of metabolites for PAHs and VOCs in urine.
- Repeat study for off-shore containment workers. The off-shore workers are likely to have higher exposures, and maybe some airborne exposures. However, rather than getting pre- and post-shift urines spot samples would be taken along with a questionnaire on recent work activities. Their results would be compared to a control population. The difference is that many off-shore workers stay out and do not come in at night. Their exposures are continuous and they never get back to baseline. They just have a higher and higher body burden even if the air sampling says they are in compliance.

**Closing Thoughts:**

Our recommendation for a limited biomonitoring study is not based on our desire to get DART laboratories involved. As subject matter experts, we are recommending a biomonitoring study to determine if workers are exposed to PAHs and VOCs. We have the tools to either confirm or rule out worker exposures to these two classes of chemicals. We also believe that biomonitoring would be beneficial to determine the effectiveness of current PPE practices. We would be happy to discuss this with you in more detail.

Gayle DeBord, Ph.D.  
Manager, Exposure Assessment Program

John Snawder, Ph.D.; DABT  
Co-program Leader, Biomonitoring Program, DART

## **Need for Biomonitoring of Clean-up Workers of Deep Well Horizon Well Oil Spill**

### **The Problem:**

Workers are reporting symptoms such as conjunctival irritation, nose and throat discomfort, headache, allergic skin reaction, and nausea. These can be signs of volatile organic compound (VOC) exposure. Polycyclic aromatic hydrocarbons (PAHs) can cause irritation to eyes and skin, which is also being reported by workers.

### **Extenuating Circumstances:**

To date air monitoring has not been showing high levels of VOCs or PAHs in the air. However, NIOSH research has shown that winds can affect the accuracy of air monitoring of aerosols, such that exposure is underestimated. If high episodic exposures to VOCs and PAHs are occurring, air monitoring might be missing those as the exposure gets diluted out. Air monitoring also does not provide any information on dermal exposures. Glove breakthrough could be a problem so that clean-up workers are exposed to the oil from dermal exposure.

### **Benefits of Biomonitoring:**

- A limited biomonitoring study could be beneficial for the following reasons:
- A limited study could provide information as to whether worker exposures to VOCs and PAHs are truly occurring
- Rapid detection methods for these two classes of compounds are already developed such that results could be reported within a few days.
- Biomonitoring could determine the efficacy of personal protective equipment (PPE) being used by the clean-up workers.
- Since heat stress is the number one worker issue, the use of biomonitoring could determine whether more or less PPE is warranted. It may be possible to get the workers out of the Tyvek suits to lessen their heat body burden.

### **Potential Problems:**

Currently, there are two groups of clean-up workers, on-shore cleaning beaches and off-shore containment workers. The off-shore workers present more challenges as they are harder to track. These workers are also exposed to the dispersants that are being used complicating their exposures.

### **Basics of a Limited Study:**

- Follow 50 workers to get pre- and post-shift urines for 3 days in the on-shore clean-up workers.
- Determine the level of metabolites for PAHs and VOCs in urine.
- Repeat study for off-shore containment workers. The off-shore workers are likely to have higher exposures, and maybe some airborne exposures. However, rather than getting pre- and post-shift urines spot samples would be taken along with a questionnaire on recent work activities. Their results would be compared to a control population. The difference is that many off-shore workers stay out and do not come in at night. Their exposures are continuous and they never get back to baseline. They just have a higher and higher body burden even if the air sampling says they are in compliance.

### **Closing Thoughts:**

Our recommendation for a limited biomonitoring study is not based on our desire to get DART laboratories involved. As subject matter experts, we are recommending a biomonitoring study to

determine if workers are exposed to PAHs and VOCs. We have the tools to either confirm or rule out worker exposures to these two classes of chemicals. We also believe that biomonitoring would be beneficial to determine the effectiveness of current PPE practices. We would be happy to discuss this with you in more detail.

Gayle DeBord, Ph.D.  
Manager, Exposure Assessment Program

John Snawder, Ph.D.; DABT  
Co-program Leader, Biomonitoring Program, DART