

# The Deepwater Horizon Story

# bank on it

## YOU CAN BANK ON IT

When it's all said and done, a study is only as good as the accuracy of its data. Tasked by NOAA to be the central chain-of-custody cryogenic repository for marine mammal samples collected as a result of the *Deepwater Horizon (DWH)* oil spill disaster, biologists at the NIST Marine Environmental Specimen Bank follow the three P's – precision, procedures and protocols. It's what they are known for and do so well.

Rebecca Pugh, NIST Marine Environmental Specimen Bank Program Coordinator and research biologist, said NOAA relied on NIST's knowledge of sample collection, measurement and archival during the onslaught of samples that needed to be stored and processed following the disaster. The bank receives and maintains marine samples under secure conditions following strict chain-of-custody procedures and distributes them to investigators involved in damage assessment studies.

Their sample set includes frozen tissues that are being collected from several sources, including NOAA's Northern Gulf of Mexico Unusual Mortality Event, bottlenose dolphin dart biopsy collections (skin and blubber samples) and some samples collected from bottlenose dolphin health assessments. In 2013, NOAA conducted health assessments in Sarasota, Florida, Barataria Bay, Louisiana, and Mississippi Sound, Mississippi. Samples from these sources are securely stored in -80 °C electric freezers or in liquid nitrogen vapor-phase (-150 °C) freezers and are monitored 24/7.

To ensure samples remain uncontaminated, Pugh and colleagues don Tyvek clean room apparel and work in ISO Class 5 to ISO Class 7 clean air freezer and sample preparation rooms.

"We have very strict protocols that assure no additional contamination, which is important especially if exposure occurs in the lab setting while we are processing the sample for eventual analysis."

As of summer 2013, NIST researchers implemented a bar code labeling system for all samples collected during the health assessments, not just the samples NIST maintains, but also for the thousands of samples collected for other researchers during the health assessments as part of the *DWH* event.

"All samples are bar coded using our specimen tracking database system and strict attention is paid to the unique identifier for each sample. This ensures that every sample is not only unique but can be scanned to determine its location within the bank or if shipped, can track what scientist received the sample and for what research purpose. In addition, a chain of custody document accompanies every sample that is shipped. There were several hundred samples per animal, so thousands of samples per capture were bar-coded and either sent out for analysis or stored here," Pugh said.

Also as part of the *DWH* effort, NIST developed contaminant-sampling protocols and provided support and supplies for sample collection kits and personnel to assist with sample collections. To date, the bank is storing approximately

12,400 frozen marine mammal samples collected from more than 1,200 animals as a part of the *DWH* oil spill and, at the request of NOAA, has shipped more than 3,000 samples to multiple researchers for analysis.

NIST also develops standard reference materials to help researchers verify if the data they produce are accurate.

"We have developed very precise and standardized protocols which are used to collect, process, and store our samples. Having that level of detail can make a difference when trying to understand where that animal may have been exposed to environmental contaminants, from our oceans and waterways, or from how we may have handled the sample during collection, processing and storage."

They aid with "hind casting," enabling investigators to extend their research into the past through retrospective studies of banked samples. "It's exciting to know that we may be archiving a set of tissues that could help identify what may be an emerging contaminant or a disease that wasn't detected 20 years ago in the marine environment – but with NIST's banked samples, scientists can look into the past to hopefully find some answers to today's concerns."

Pugh scans the rows of barrel-shaped liquid nitrogen freezers and smiles. "We have no idea what secrets lie in these freezers. Though not conducting the research myself, I feel like we touch hundreds of studies because the samples and data that are associated with that sample are so important to the research study and the final results.