

EXHIBIT 5

From: Daniel Shark <DShark@indecon.com>
Subject: RE: DWH Lessons Learned - chemistry - notes
To: 'Greg Baker - NOAA Federal'; Ann Jones
Sent: November 29, 2016 11:08 AM (UTC-05:00)
Attached: ChemLL Notes from Bill and Nancy.docx

Hi Greg,

I've consolidated my notes with Ann's and included them in this document. For the time-being, I like the format, but I think a good next step would be to break out feedback from various groups into themes and start a bulleted list that way.

I had considered making a large master table, but because we're talking to a lot of different people and asking different questions of them, I think that format would become unmanageable pretty quickly.

Dan

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From: Greg Baker - NOAA Federal [mailto:greg.baker@noaa.gov]
Sent: Monday, November 28, 2016 1:48 PM
To: Daniel Shark; Ann Jones
Subject: DWH Lessons Learned - chemistry - notes

Hi Dan,

Hope you had a good Thanksgiving.

If you have notes ready to share from the two interviews we did with Nancy and Bill could you pass along?

I've set up some times for talking to NOAA people, and am setting up some additional times for lab people and other PIs. As in Ann's message, I'll do some of the interviews solo, but ask you all to be on some of them too.

I'm talking to Bob Taylor (NOAA lawyer) at 3pm ET today, don't need your notes prior to that, but would be good to start looking at how to synthesize responses soon.

thanks

Greg Baker
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	Bill	Nancy
Biggest success?	30K water samples from field to lab, lost less than 2% to exceeding hold time. Calista, lab folks, dmt, amazing.	Help direct workplans through communications with twg leads, suggest alternatives. Get the analyses done across multiple labs
	Collectively, as chem brain, able to troubleshoot issues as they arose.	
Most challenging?	<p>Technical sampling issues to settle on the fly. From 1st week in Houma, Jim and Deb writing a plan. Sample acquisition and collection out of control – turned into a function, legally intact system. Bumping heads with DM early on about the FSDB. Control of field information. Trying to control the logistic flow, needed more access. Led to development of the TWG Tracker. Fed in field information.</p> <p>Todd was an obstruction early on.</p>	<p>TWGs not knowing what they wanted and not having clear workplans. No framework for what they intended to do. Difficult to know how to help them. Some cruises had a very clear target/purpose, but some were much more disjointed. Also didn't really have thoughts on QA/QC. Too Wild West. E.g., first vers of CWV – too complicated, but all four samples from a quadrat ended up with same name. Not enough focus on data quality. (Note that in contrast, water column and deepwater benthic were quite organized).</p> <p>Could have been improved by developing tables of expected samples, completeness, etc.</p> <p>Everybody so rigid – couldn't just export from LIMS, had to be in NOAA format, but that wasn't flexible enough. As if the data system was wagging the dog. Many of the orphans were because a plan predicted samples that weren't collected, but were still on COC. Cross-referenced IDs were crazy.</p> <p>Wasn't able to answer question like "how many turtle blood samples" because that wasn't an acceptable matrix.</p>
What would you have done differently?	<p>Started off with better designed workplans with clearly defined sampling goals.</p> <p>Access to data early on? Access to COCs early on were restricted. (to keep labs blind). Could have been resolved at lab if there were electronic versions of COCs – or maybe field information? Also would have avoided transcription errors.</p>	<p>Priority setting was very difficult.</p> <p>A lot of garbage in (sample ids) – and then they couldn't be changed.</p> <p>CWV – on the fly review of electronic COCs, which were sent on to the laboratory. Much more effective because it avoided transcription errors.</p>

	<p>FSDB – what was actually done in the field. Greg - More focus on matching, resolving discrepancies. Bill – only able to track data until it left EcoChem. Matching samples was crazy – had validated data that we could not match to field info. Greg – Alpha wanted email of the COC – would have been better as a digital file, not a scan.</p>	<p>Whoever manages the workplan should take ownership of their samples -- confirm that all IDs make sense.</p>
<p>What was the most critical gap that still exists in the science?</p>	<p>Newly advancing field of looking at polar compounds will be key. Oxygenated and polar compounds might be driving the toxicity. Understand what happens to oil as it weathers and becomes more polar/oxygenated.</p>	<p>Project specific SOP. E.g. shaker table vs soxhlet. Comparability poor because of things like reporting limits, below MDLs, could have been cleaned up – more specifications in the AQAP. Response Factors. Use alkylated compound for a response factor (using parent tends to cause a low bias perhaps?)</p>
	<p>Orby Traps, instead of FTIR.</p>	
<p>Useful products from this LL process?</p>	<p>FBOBs – resolve this. Need to modify sampling methods and develop protocols for addressing this issue.</p>	
	<p>More transparency in the data flow – all the metadata flow. Where their job is product going to lab and data coming out. TWGs need chemistry people to make sure they are using it properly. Field rinse blanks are problematic.</p>	<p>Definitely not consistent in approach to field QC. Anecdote- 75% of error comes from the field, not the lab. (**Make copies of field sampler protocols that might get handed out**)</p>
<p>Phase 2</p>		
<p>How to institutionalize?</p>	<p>ASJ: Sample data versus observation data Greg: QAPP for field data? Discussion with Ann B. They thought it should be in every workplan. Some do and some don't. USEPA QAPP “unified field protocol for quality assurance project plans” – now being implemented in various regions – this will be cross-region.</p>	<p>Toolbox for NOAA. Need guidance on expectations for ALD – deliverables, SOPs, process. How to we make them available and ensure they are used? E.g., how to validate the field data – thought they had simple rules, then people made it really complicated, then came back to initial process. TWG leads did not take responsibility for reviewing it in real time. Internal: For Lessons Learned – we should review what</p>

	Greg – Field Ops plan (focused on how to get through data and sample intake, etc.) while Workplan based more on site conceptual model.	is currently available. Unified QAPP process – 37 worksheets. But maybe we could identify one or two that should be filled out. Chem and/or QA should have signed off on each workplan.
	How to get people to think simply but thoughtfully about QA?	Success group: SAV, Natalie Cosentino-Manning. She knew everything about every single sample. Kept on top of the whole program.
		Problem: it seemed too hard, so people never completed the solid work. Issues with mammal-prey plan. Issues with oysters plans, too.
		Review COCs and lab logins in real-time
		Review field notes within real time
	Separate issue: goals too vague, difficult to pull a plan together and get it approved.	Review/recommend a process for data entry and for review/verification. Process for entry into DIVER from the forms. Determine which fields really need entry.
	**Discuss how the FAST programs and training works – do they ever design their own plans on the fly?*	Field notes transfer for oysters? People doing the transfers accidentally concatenated lats and longs.
PIANO vs BTEX	“There must be a reason, since they did so much of it” TPH Screening	Utility? Depends on the spill. Surface spill and cold water, might want to do PIANO. But deep and warm water, probably not necessary. Or rules about how long you do it based on the results you are seeing. **Are there field screenings?*
	Metals – does it give you any ability to discriminate between oils?	TPH screening – was it useful? Yes. Nancy working on more Metals – V and Ni? Maybe Cr? (Note, dropped off in the middle of this for a bit)
		Isotope dilution methodologies? Gowanus Canal. Maybe 30 for PCB congeners. Maybe 16 added for PAHs. Quantify relative to isotope concentration. Internal standards aren’t what you use for recovery correction. Has an effect on cost – but you get sample specific detection limits. Don’t have to deal with reporting limits, MDLs, etc.
Surrogate	Bill. Agrees with Nancy. He never uses it.	No. You shouldn’t do it. Difficult to figure out what the

Recovery Correction?		original data are. But yes, do it with Isotope Dilution. Correcting and cutting down to 2 sig figs really homogenizes the data.
Interactions with RPs and how their involvement affects our work products?	<p>Saw lots of instances where they didn't make very informed decisions in their sampling. E.g. their persistence in sampling clean areas. NOAA generally didn't get to have any input on their plans (although BP had first review on NOAA's).</p> <p>Best spill – Cosco Busan. Cooperative. All on the phone, looking at the same data, deciding what they were looking at. Get together early, then keep talking.</p> <p>Like Boehm and wade papers based on “publicly available data set” – just data mining, and if it's garbage in, it's garbage out. Just averaging. Need to know more and have access to the sampling people – science officer on the cruise, etc. – how did you actually perform the sampling.</p> <p>If workplan is lacking in detail, you won't know how or why the samples were collected. Were you sampling the edges of the spill? How do you do your decon? I.e.. we see dispersant in first three samples at each site?</p>	<p>Perhaps just not have them involved. More care on the wording of the agreements – and perhaps a process for revisiting?</p> <p>Or Sargassum – washed it off before analyzing. Oops.</p> <p>**maybe come up with list of things that need to be done to prepare a workplan and prepare a complete data, and and what would define a “data submission” from an RP.</p>
	Field logs should be part of base information – field forms, and the hand written notes – maybe more guidance on how to take proper field notes. Photographs don't say it all.	We had people and said just go take samples – they weren't invested in the process.