From: Bunce, Jeff <jeff.bunce@exxonmobil.com>
Sent: Friday, November 01, 2013 4:59 PM
To: rchastain@agfc.state.ar.us
Cc: Hynum, Tammie; Tyrone, Karen S
Subject: Response to Comments

Mr. Chastain,
Please find the response to comments below.

Comment #1:
The evaluation of the polynuclear aromatic hydrocarbons (PAHs) in soils and sediments is not acceptable
in that it analyzes only a subset of PAHs, thereby possibly substantially understating the potential for
impacts asserted in ExxonMobil's report.
In the analysis of the PAH chemical results, we disagree with ExxonMobil's statement on page 5-4, which
states:
While environmental assessments often initially focus on the 16 priority pollutant PAHs
designated by USEPA, AGFC requested that a longer list of 43 non-alkylated and alkylated PAHs
be evaluated during the development of the DARSP; therefore, separate summations using a
longer list of PAH analytes are also included. Greater weight is placed on the sediment screen
using the priority pollutant PAHs in the summations because the sums are compared to ESVs
that are based on a subset of the priority pollutants or on a single PAH.
In fact, oil spill assessments should always include chemical analysis and evaluation of the alkylated
PAHs because they are present in oils at much higher concentrations than the parent PAHs in the EPA
Priority Pollutant PAHs (which were developed primarily for waste sites, not oil spill sites). The "long list"
of 38 PAHs that they chose to use for their ecological screening values (ESVs) includes only about half of
the PAHs in the source oil. The oil spill assessment literature is clear on this -- all PAHs have the same
mechanism of toxicity and should be included in risk assessments. Therefore, we have calculated toxic
units (TUs) for all the sediment samples for which total organic carbon (TOC) was measured (only the
surface sediment samples). In our analysis, the following surface sediments in Dawson Cove have TU
values greater than1, indicating that they pose some risks to benthic organisms: SED-DA-015, TU = 1.58;
SED-DA-039, TU = 1.68; SED-DA-045, TU = 2.2; and SED-DA-046, TU = 1.01. In contrast, the ExxonMobil
TU calculations are such that all sediment and soil samples have a TU less than 1. Therefore, we disagree
with the statement on page 7-6 where they state:
Therefore, no further evaluation of PAHs in Dawson Cove sediment is necessary.

Also, the 0.5-1.0 foot samples at SED-DA-017, with a total PAH concentration of 26,580 µg/kg, might also have a TU > 1; however, TOC was not measured so the TU cannot be accurately calculated. Assuming that the TOC is the same as the surface sample, it would have a TU = 1.93.
Therefore, we request that ExxonMobil re-analyze the data on PAHs in soils and sediments using the full list of PAHs in the source oil and revise their report and recommendations accordingly.

Response to Comment #1:
The PAH screening approach employed in the Downstream Areas Data Assessment Report (report) is consistent with the most recent USEPA guidance for assessing PAHs in sediment (USEPA 2003), and was outlined in the ADEQ-approved DARSP (ARCADIS 2013). The USEPA 2003 guidance specifically defines the TU calculation for 34 PAHs.
As described in the DARSP (ARCADIS 2013) and in the report, when a TU calculated based on the conservative one-carbon model is greater than 1, a two-carbon model can be employed based on USEPA guidance (USEPA 2012). The one-carbon partitioning model incorporates the partitioning of PAHs to naturally occurring organic carbon (OC such as vegetative debris, humic and fulvic acids) to estimate the dissolved concentration of each PAH in porewater. However, various types of carbon have differing capacity for binding PAHs (USEPA 2012). For example, black carbon (BC) such as coke, charcoal, and soot, is known to have extremely high sorption capacities (USEPA 2012). The presence of BC in sediment makes the one-carbon approach overly conservative as it overestimates dissolved concentrations, therefore the one-carbon model in these cases overestimates bioavailability. The two-carbon model accounts for both natural OC and BC (when BC is present) to more accurately estimate dissolved concentrations. The TUs calculated in the report based on the one-carbon model using 34 PAHs were below 1. One sample SED-DA-045, had a TU of 1 and the two-carbon model was employed for this sample and the resulting TU was 0.4 (as presented in Table I-2 in Appendix I of the report).
Based on comments from the AGFC we reviewed the TUs for samples the four surface samples where the AGFC indicated they derived a TU value greater than 1. The specific samples noted are (SED-DA-015, 039, 045, 046, and 017. (TU for 017 is estimated since organic carbons was analyzed) We further evaluated these samples using the two-carbon TU approach and a longer list of 43 PAHs.

* The TU calculated for SED-DA-045 and SED-DA-046 were 0.7 and 0.3, respectively, indicating
that these sediments are not toxic to benthic invertebrates.
* The TU could not be recalculated for SED-DA-015(0-0.5), SED-DA-039(0-0.5), and SED-DA-
017(0.5-1.0)
Overall the TU calculation results indicate no unacceptable risk associated with 84 of 87 samples for
which a TU was calculated. We believe the report conclusions were appropriate. Nevertheless,
ExxonMobil is willing to discuss sample locations SED-DA-015 and SED-DA-039, and SED-DA-017, to
determine if any additional action is warranted.

Comment #2:
There is no fingerprinting assessment of the sources of the PAHs in the samples; that is, ExxonMobil
makes no effort to document that the PAHs are from the spilled oil, even if the concentrations are below
those thought to have ecological effects. We request that ExxonMobil conduct fingerprinting analyses to
determine which soil and sediment samples are contaminated with the source oil.
Response to Comment #2:
ExxonMobil conducted the data analysis in accordance with the approved Downstream Areas Remedial
Sampling Plan that was reviewed by the ADEQ, USEPA, and AGFC. Section 4 of sampling plan describes
the data assessment and reporting process, and does not include provisions or methodology for
performing a fingerprinting assessment. ExxonMobil requests further clarification on the remedial data
quality objectives and remedial data use objectives for the requested fingerprinting analyses.

Comment #3:
The Sediment Profiling Imagery (SPI) method was not used for the Lake Conway Depositional
Assessment. The Downstream Areas Remedial Sampling Plan says (p. 15) that:
The SPI can be used to measure and qualitatively evaluate a variety of physical, chemical, and biological
parameters including: grain size, surface boundary roughness, depth of apparent redox potential
discontinuity, erosional or depositional features, subsurface methane gas pockets, and observation of
benthic organisms. The images will provide additional information to assist in evaluating both the
presence and extent of recent sediment deposition that may be associated with spill response activities.
The cores taken, instead, are of poor visual quality and it is difficult to compare the differences in the

sediment layers between the sites near Dawson Cove and upstream areas. Further, no information was obtained regarding many of the parameters listed above, and in particular, bioturbation degree and depth. Therefore, it is recommended that ExxonMobil repeat the Sediment Deposition Evaluation using the SPI method.

Response to Comment #3:

The Downstream Areas Remedial Sampling Plan (DARSP) also states (p. 15), "The visual observation of sediment depositional layers will use either a Sediment Profiling Imagery (SPI) approach, a box corer, or other sampling device capable of collecting a sediment sample suitable for visual inspection."

Furthermore, "SPI activities will be conducted according to the SPI SOP in Attachment A, subject to availability of SPI camera equipment and scheduling requirements."

The SPI camera services are provided by a very limited number of qualified contractors and their equipment was not available within the time period that ADEQ required the sampling be completed.

Thus, alternative sampling methods were used, consistent with the DARSP. It is important to clarify that the objective of using these techniques was to determine if the Mayflower Pipeline Incident Response activities within Dawson Cove resulted in the deposition of new surficial sediment within Lake Conway. Observations were made related to grain size, surface boundary roughness, depth of apparent redox potential discontinuity, erosional or depositional features, subsurface methane gas pockets, and observation of benthic organisms. Some of these items were not explicitly discussed in the Downstream Areas Data Assessment Report. In response to this comment, the text in Section 7.9 was revised to document in greater detail the information obtained. A brief summary of this information is listed below.

* Grain size and erosional and depositional features. Grain size variations within and among the cores were used to identify relative differences in sediment layer characteristics and relative differences in sediment texture among locations. This information was reviewed with respect to the water depth, flow regime and wind-fetch/wave environment affecting the various core locations to help interpret erosional and depositional differences among locations and whether these were consistent with the sediment core observations. Additional information concerning grain size observations has been added to the report.
* Apparent redox potential discontinuity and observations of benthic organisms. Information related to depth of apparent redox potential discontinuity based on color differences typical of

transition to anoxia was noted along with presence of any benthic organisms in the
samples. Benthic invertebrates were reported in two of the core samples obtained.
Documentation of these observations have been added to the report.
* Surface boundary roughness and subsurface gas pockets. Observations related to surface
boundary roughness and subsurface gas pockets are generally obtainable using the Lexan core
tubes, however, because there were no data use objectives, these observations were not
recorded. Subsurface gas pockets visible as voids in the cores are associated with decomposition
of organic matter in the sediment, however, the presence/absence of such voids is of limited
significance with respect to evaluation of potential presence of newly formed depositional
layers.
Evaluating bioturbation depth and degree was not the objective of the depositional assessment. The
DARSP did not list bioturbation depth and degree as one of the parameters that would be measured in
the depositional assessment. Observations of benthic organisms were recorded during the depositional
assessment. Section 7.9 of the text has been revised to clarify where observation of benthic organisms
is discussed in the report.

Please let me know if you have any questions or require additional information. Thanks
Regards,
Jeff Bunce