Bureau of Safety and Environmental Enforcement Comment Response Document
Comparison of Physical and Chemical Characteristics of In-Situ Burn Residue
and Other Environmental Oil Samples Collected During the Deepwater Horizon Spill Response

This is the Bureau of Safety and Environmental Enforcement's (BSEE) Comment Response Document for BSEE's project with the National Oceanic and Atmospheric Administration (NOAA) Project #1010. This document addresses the questions and concerns expressed by the External Peer Review Committee. The Peer Review Committee was tasked with evaluating the scientific merit of the research report, the appropriateness of the assumptions made, and the quality and relevance of the data. Merv Fingas, Ph.D., Spill Science; Christopher M. Reddy, Ph.D., Woods Hole Oceanographic Institution; and Alan M. Shiller, Ph.D., University of Southern Mississippi provided their expertise in the review of this report.

The Comment Response Document addresses the following:

- BSEE's agreement or disagreement with views expressed in the Peer Review Report
- Reasons those actions satisfy key concerns stated in the Peer Review Report (if applicable)

Particular attention was given to significant comments that were not accepted for incorporation into the research product.

Comment	Peer Reviewer	Page	¶	Review Comment	Response
1	MF	12	3	Two methods are given to measure asphaltene content – which one was used or were the results averaged?	Agree, clarify the two stage process
2	MF	18	1-2	The conclusion is that the doubling of asphaltenes after burning was not significant, however in the next paragraph a few percent of FFPI increase is said to be significant – neither result is credible.	Agree. The results were inconclusive. Review the statistics and also the literature, and add discussion
3	MF	32	Table 4	The density of other MC252 tarballs at 0.73 is unrealistically low – some problem with this number – did this tarball contain vegetative material?	Agree. Recheck the table and provide an explanation
4	MF	32	2,3,4	Resins were not measured, nor were viscosity – both of these are important to judging burn extent.	Disagree. Sample quantities were limited and did not allow for further measurement. Furthermore, difficult to measure viscosity with what limited samples there where. However include language into report providing this explanation.
5	MF	EnD 21	I. 2	Estimate the extent of burning by comparing to the Wang Pyrogenic Index	Agree. Need to distinguish between pyrogenic and petrogenic. Add a table to include this information.

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6	MF	EnD 21	II.2.a	Measure asphalt, resin, density, and viscosity	Disagree. Sample quantities were limited and did not allow for further measurement. Furthermore, difficult to measure viscosity with what limited samples there where. However include language into report providing this explanation.
7	CMR	Title		Since the response extended past the capping of the well, would it be informative to list the time period that the burns were conducted in the title?	Disagree. However, PI will add information as part of the Background section
8	CMR	Abstract	1	Be more specific on the dates, distances, water depths—more information	Agree; a table will be added with what limited information is currently available as it might be of use to future research
9	CMR	3		A significant fraction of the oil evaporated quickly. How did that affect the burns?	The weathering of oil was beyond the scope of this study; however, a brief discussion relating to this topic would be useful.
10	CMR	All Pics & elsewhere		Please add as much metadata as possible. Dates? Where? Time of the day? At what point during a burn, etc.?	Disagree. Photos were included in the report to provide imagery. Photos were obtained from operational files and metadata is not readily available.
11	CMR	All pics w/ smoke		Does the smoke tell us anything about the burns?	Disagree. Discussion of smoke seen in the photos is beyond the scope of this study.
12	CMR	Figure 7		What are the temperatures of these burns? This relates to the formation of PAHs (see Max Blumer's classic papers and literature reviews on PAH formation).	Disagree. Temperatures of the DWH controlled burns were not recorded.
13	CMR	16		Use other published results to compare results from this study on characterizing the Macondo well oil. Check the literature.	Agree. Will complete this as part of Wang Pyrogenic Index. Verbiage should be added about the physical and chemical characteristics of the source oil as well as how results compare with aromatics/alkanes.
14	CMR	EnD 27	II.2.2	Evaluation of asphaltenes and weathering processes to be presented in study	Agree. Add text to discuss relationship between weathering and the formation of asphaltenes.
15	CMR	EnD 27	II.2.3	Discuss precision and accuracy of precipitation and gravimetric analysis of asphaltenes at low levels	Agree. A discussion of the ASTM method will be added.

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16	CMR	EnD27	II.2.5	Normalize changes in samples to hopane	Agree; however, further investigation is required. A check of the literature regarding ISB analysis will be conducted. If normalizing with hopane is the standard, the costs of normalizing the samples will be investigated. If normalizing is not the standard, a brief discussion might be included. Again, this topic requires further investigation and discussion.
17	CMR	EnD28	II.a	Consider other methods of future since only 5% of mass studied	Agree. Other methods will be mentioned in an additional paragraph.
18	CMR	EnD28	II.3.b	Reexamine and expand on PAH using the GC-MS data, once normalized to hopane, examine with more than FFPI.	Once item 16 is decided, changes/additions to this section might be considered.
19	CMR	EnD28	II.3.c	Discuss How and WHY results of experiment are important	Agree
20	CMR	EnD29	II.5	Additional synthesis and distillation of data	Agree to add data to an appendix; however, additional analysis/synthesis is beyond the scope of this project.
21	CMR	EnD27		Concern about definition and usage of asphaltene content. Must define operational measurement process.	Agree. Authors will refer back to ASTM method.
22	CMR	EnD28	II.a.4	Add discussion of literature (additionally, MF provided specific literature to review)	Agree
23	CMR	EnD29	Q6	Consider other DWH literature regarding formation of PAHs from incomplete combustion of organic matter	More clarification of "organic matter" is required before this can be considered
24	AMS	14	2	Discuss heat dissipation by water	Disagree. Heat dissipation by water does not add anything to the discussion/results.
25	AMS	15	1	Discuss match criteria	Agree
26	AMS	Appendix	T2	Give characteristic ratios	Disagree. The tables were included to provide the ratios. However, they will be reviewed to see if further clarification is warranted.
27	AMS	EnD32	I	Include ALL data in an appendix	Agree
28	AMS	EnD32	II.2.a	Criterion for "Match" vs "Probable Match" and add description of "simulated distillation of MC252 oil" in Methods section	Agree.

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29	AMS	EnD33	II.2.a	Add discussion of how reproducible the results were	Further review will be initiated to better determine concerns. A section to discuss this might be added.
30	AMS	EndD33	II.3.b	Use literature about pyrogenic/petrogenic diagnostic PAH ratios	Agree. This will be added if investigation of Wang Pyrogenic Index is included.