EXPERT REBUTTAL REPORT
U.S. v. BP Exploration & Production, Inc., et al.

Human Health Impact of the *Deepwater Horizon* Explosion, Oil Spill, and Response
Submitted on Behalf of the United States

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I have read the Round 2 Expert Report of Dr. Robert Cox and those portions of the Round 2 Expert Reports of Dr. George Bonanno and Capt. Frank Paskewich that pertained to my opinions in this matter.[1] None of the comments and criticisms expressed by these three individuals in their reports have changed the opinions I offered in my Round 1 and Round 2 Expert Reports. In addition to the deaths and injuries caused by the DWH explosion, many short-term adverse health effects have been observed in DWH response and clean-up workers and in on-shore Gulf Coast communities, and additional adverse impacts may become evident in on-going studies of the affected population.

I. Dr. Cox's Assertions about the Need for a Risk Assessment and Full Analysis of Exposure Data Are Unfounded

Dr. Cox asserts that I did not do a toxicological risk assessment in my work. (Round 2 Expert Report of Robert Cox ("Cox Round 2"), p. 2, 3.) I did not conduct a risk assessment. It was not necessary for me to conduct a risk assessment to reach the conclusions I did in either my Round 1 or Round 2 Expert Reports. The primary focus of my reports in this matter has been the publications in the peer-reviewed literature about the impact of oil spills on human health and the various reports about injuries and illnesses in DWH responders, clean-up workers and affected communities. A risk assessment is not necessary in order for me to form an opinion that these publications and reports document many short-term adverse health impacts and the potential for long-term impacts from the DWH oil spill.

[1] I incorporate by reference my resume and the information required by the Federal Rules of Civil Procedure that I submitted with my "Round 1" Expert Report entitled, "Human Health Impact of the Deepwater Horizon Explosion, Oil Spill, and Response, Submitted on Behalf of the United States," submitted on August 15, 2014.

Moreover, while I am not a toxicologist, I do read toxicological literature, and rely upon it when it is applicable to my work. However, I am also familiar with limitations of toxicological risk assessments, including those expressed in "Science and Decisions: Advancing Risk Assessment," which I cited in my Round 2 Report. This publication by the National Academies Press contained text pertinent to and critical of the methods and assumptions used by Dr. Cox in his toxicological risk assessment. For example, this 2009 update of the 1983 "Red Book" cited by Dr. Cox warns against use of "bright line" benchmark doses or reference doses of toxic substances in health risk calculations. The update raises the question of whether "probabilistic expressions of risk and uncertainties" (NAS, 2009, p. 22) better serve the public health than pre-assigned defaults.

Dr. Cox also claims that without risk assessment, I cannot "draw scientifically-defensible conclusions about the causes of any reported health symptoms...." (Cox Round 2, p. 3.) In fact, I have not made any causal conclusions about the observed symptoms; I have said that certain symptoms are consistent with those reported in other studies of oil spills, or that there was a statistically significantly increased prevalence of symptoms in an exposed group compared to an unexposed group. However, my report recognizes the possibility that observed symptoms were caused by heat, stress, fatigue, exposure to fumes from boat engines, etc., and acknowledges that there can be health effects from the spill that are not caused by exposure to oil. Dr. Cox's criticism suffers from the misconception that the symptoms reported during the spill and response must be unequivocally linked to exposure to oil and/or dispersants in order to be considered health effects of the spill. This causal link is simply not necessary to conclude that

short-term health effects occurred as a result of the spill and the response, and that there is the potential for additional effects to become evident in the future.

For instance, Dr. Cox mischaracterizes my discussion of NIOSH's HHE 6, claiming that I "attempt[ed] to link … symptoms [reported in HHE 6] to exposures to oil or dispersants." (Cox Round 2, p. 5.) As mentioned above, I made no causal conclusions in my report. In citing to HHE 6, I simply noted that *NIOSH* found, in at least one instance, a greater prevalence of reported symptoms in groups that had been exposed to oil and dispersants than in groups that had not been so exposed. (NIOSH HHE 6, 2010, p. 6A-2.) Furthermore, Dr. Cox suggests other possible explanations of the respiratory symptoms reported in HHE 6, such as road and gravel dust exposure or crowded work and living conditions for Coast Guard DWH response workers. (Cox Round 2, p. 6.) While these are not oil exposures, these workers were working and living in such conditions *because* they were responding to the oil spill. Such exposures would therefore be a result of the DWH oil spill and would not have occurred if not for the need to respond to the spill.

Dr. Cox is not correct in his assertion that I did not review exposure data from the DWH spill. (Cox Round 2, pp. 2, 3.) As my report did not include a risk assessment, I did not cite to exposure data, however, I reviewed numerous sources of exposure data, as referenced in my list of considered materials. (*See, e.g.*, Ex. 12023, Ex. 12252, Ex. 12258, BP-HZN-2179MDL09231990, US_PP_RC002795.)

II. Drs. Cox and Bonanno Inappropriately Disregard the Literature Regarding Prior Spills

Drs. Cox and Bonanno assert or imply that information about adverse impacts of past oil spills is not comparable to the DWH spill impacts because the nature of the spills was different. (Cox Round 2, pp. 4, 7; Expert Report of George A. Bonanno ("Bonanno Round 2"), pp. 4, 13.) Dr. Cox in particular argues that my report "fails to recognize the differences between these other spills and the DWH oil spill with respect to the potential for human exposures and the weathering of the oil. He also does not consider that these spills involved vastly different types of oils...." (Cox Round 2, p. 4.) Their opinions overstate the dissimilarities between weathered off-shore oil and surface oil from near-shore spills. Clearly, both prior spills and the DWH spill involve hydrocarbons, including polycyclic aromatic hydrocarbons in varying concentrations and human exposures by inhalation, ingestion and skin absorption. The skimming and containment activities and wildlife cleaning are similar in past spills to those employed in the DWH spill. Moreover, as noted in my Round 2 Report, the Response Report of Drs. Boesch and Rice in Section 5.4 addresses this issue of the relative toxicity of weathered oil:

> However, the 3- to 5- ringed PAHs are 1 to 4 orders of magnitude more toxic, persist for longer periods of time, and are the PAH compounds primarily responsible for the many specific toxicity mechanisms, even at lower concentrations of exposure. Substantial contemporary oil spill research (e.g. Exxon Valdez and Cosco Busan oil spills) indicates weathered oil is more toxic per unit volume because it contains relatively more persistent, hence higher-toxicity compounds.

(Responses to BP Expert Reports by Donald F. Boesch and Stanley D. Rice, § 5.4.) The similarities between past oil spills described in peer-reviewed literature and the DWH spill outweigh the differences, notwithstanding the deep-water origin of the oil in the DWH spill.

Dr. Cox further maintains that I have not relied upon original publications but simply a summary of studies of previous oil spills by participants in the Institute of Medicine (IOM) workshop "Assessing the Effects of the Gulf of Mexico Oil Spill on Human Health: A Summary of the June 2010 Workshop." (Cox Round 2, pp. 3, 4.) Dr. Cox overlooks the fact that the IOM workshop – the purpose of which was "'to join together to share our best thinking, our experience, our ideas, our expertise, our concerns, and our strategies' to develop a clearer, more comprehensive, and more focused sense of how to assist and monitor the health of people from" regions affected by the DWH spill (IOM, 2010, p. 18) – brought together dozens of experts, including Drs. Blanca Laffon and Lawrence Palinkas, who gave presentations on their own previous publications about the health effects of oil spills. I am familiar with a number of the scientists who presented at the workshop, and I respect their competence and judgment. I have personally participated in IOM committees and find that they are generally comprised of individuals respected in the scientific community.

Moreover, subsequent to submitting my August 15, 2014 report, in response to Dr. Cox's assertion that workshop summaries are not credible scientific evidence, I have read the original articles by Palinkas, et al. (1993), Lyons, et al. (1999), Morita, et al. (1999), Suarez, et al. (2005), and Carrasco, et al. (2006), IOM summaries of which I cited to in my Round 1 Report, to verify that the summaries accurately captured the full articles. The original articles were accurately described in the IOM workshop summary and they document a variety of injuries and physical and psychological symptoms resulting from previous oil spills that were also seen in DWH response, clean-up and community residents. Nothing in the original articles changed my

opinion regarding either the IOM workshop summary or my assessment of the health effects seen in those affected by the DWH spill.

Finally, while Drs. Cox and Bonanno may argue that the articles regarding these historical spills are not relevant to the DWH spill (*see* Cox Round 2, p. 4; Bonanno Round 2, pp. 4, 13), these same historical spill articles were outlined point by point in a peer-reviewed article about the potential health effects of the DWH oil spill, published in the New England Journal of Medicine (Goldstein, et al. 2011), which I cited in my Round 2 Report. I have also excerpted and attached as Appendix A to this Report portions of two tables from that article that correspond to the historical spill articles that I reviewed.

III. Drs. Cox and Bonanno's Own Citations to Mental Health Articles Document Harm to Mental Health

Dr. Bonanno attacks my analysis of the mental health impacts of the Deepwater Horizon spill by asserting that I mischaracterize the Palinkas study and that I overgeneralize from that study. Dr. Bonanno is correct that my Round 1 Report focuses with respect to mental health on historical literature about the mental health impacts of the *Exxon Valdez* spill. I have reviewed and discuss, in my Round 2 Report, however, evidence specifically related to the DWH spill and response. (Clapp Round 2, § I.F.) Dr. Bonanno himself notes the significance of the one such study I cited in my Round 2 Report, a CDC/SAMHSA study on mental health impacts of the DWH spill, acknowledging that the study shows increases after the DWH incident on some mental health indicators. (Bonanno Round 2, p. 14.) Thus, Dr. Bonanno acknowledges that there is a study directly on point that indicates the impact of the spill on mental health.

Moreover, Dr. Bonanno's criticism of my discussion of Palinkas et al. is misplaced. In my report, I simply note that Palinkas and colleagues had reported higher prevalence of "generalized anxiety disorder, post-traumatic stress disorder and depressive symptoms" in those with high exposure and gave the citation and page number on which the quotation appeared. I did not mischaracterize the study or overgeneralize in my discussion of it.

In his Round 2 Report, Dr. Cox also takes issue with my Round 1 Report's focus on historical literature about the mental health impacts of a previous oil spill, and references the studies he referred to in sections 9.2 and 11 of his Round 1 Report. (Cox Round 2, p. 7.) Section 9.2 of Dr. Cox's Round 1 Report includes references to studies by Buttke, et al. (2011 and 2012). In their 2011 CASPER report, these authors note:

> [R]eports of mental health symptoms in the 2011 CASPER were lower than in the 2010 CASPER. While these data suggest that mental health concerns may be decreased compared to 2010, the proportion of individuals with mental health symptoms is still higher than the 2009 Alabama and nation-wide BRFSS estimates. In addition, CASPER teams completed 6 confidential referral forms for residents to mental health services in Baldwin County, and one mental health referral in Mobile County. Together, this suggests that mental health services are still needed in the area.

(Buttke, et al., 2011, pp. 20-21.) These authors are therefore saying that the symptoms they were observing in survey respondents in coastal communities in Alabama were lower in 2011 than in 2010, but still higher than the surveyed areas in the two years prior to the DWH oil spill.

Later, in section 11 of his Round 1 Report, Dr. Cox indicates that a CDC/SAMHSA report "found that the resources that were mobilized to reduce the economic and behavioral

health impacts of the oil spill on Gulf Coast Residents may have resulted in a reduction in mental health problems relative to what would have occurred if those resources had not been mobilized." This is the same report that found, as Dr. Bonanno acknowledged (Bonanno Round 2, p. 14), increases after the DWH incident on some mental health indicators. And although not quoted by Dr. Cox, this report also cautioned, "it is important to understand the effects of the oil spill on smaller subpopulations in the affected regions may not be evident from survey findings for the population as a whole. In particular, the oil spill may have had and may continue to have major impacts on the behavioral health of subgroups or specific individuals who were directly affected by the spill." (SAMHSA, 2013, p.53.)

Dr. Cox's claim that I ignored the financial assistance that BP provided to mental health facilities (Cox Round 2, p. 7) is also not germane. As I stated in my Round 2 Report, the fact that such financial assistance was provided implies that there were mental health problems that needed to be reduced as a result of the DWH explosion and spill.[2]

IV. Other Challenges Raised by Drs. Cox and Bonanno Are Unfounded and Do Not Change My Opinions

In section 3.4.2 of his Round 2 Report, titled "Dr. Clapp fails to mention the result of a NIOSH investigation into worker hospitalizations," Dr. Cox says: "NIOSH noted, 'their medical records did not include information to identify specific chemicals, indicate how they came into contact with those chemicals or how long they were exposed.'" (Cox Round 2, p. 6.) However,

[2] Capt. Paskewich similarly claimed that I ignored the "steps that BP and others … took to protect response workers." (Rebuttal Expert Report of Frank M. Paskewich, p. 19.) This criticism misses the mark. The focus of my report was on the multitude of symptoms reported during the response, which occurred irrespective of any steps taken to protect workers.

it is not surprising that medical records would be missing information on specific chemical exposures, or even how the patient came into contact with such chemicals, since those details would not typically be available to the person taking the medical history and recording it in the hospital record. Additionally, as I quoted in my Round 1 Report, the same NIOSH HHE noted that: "The fourth worker was given a diagnosis of probable respiratory toxicity, which was based on his reported exposure to chemicals." (Clapp Round 1, p. 8-9, citing NIOSH HHE 6, 2010, p. 6B-2.)

Dr. Cox claims in section 3.5 of his Round 2 Report, without providing specific examples, that the Diaz article I cited in my Round 1 Report has "numerous factual errors concerning air and seafood surveillance levels and FDA Levels of Concern." (Cox Round 2, p. 6-7.) He further opines that the Diaz article "does not add any useful information to the evaluation of actual health effects or risks." (*Id.* at p. 7.) To the contrary, Dr. Diaz points out that "Subpopulations of cleanup workers and the general population with specific conditions or genetic polymorphisms in enzyme systems that detoxify polycyclic aromatic hydrocarbons in petrochemicals and glycols in dispersant will require long-term surveillance…." (Diaz, 2011, p. 5.) This surveillance is currently underway in the NIEHS-sponsored cohort study, and may shed additional light on the adverse health effects in the DWH-exposed population.

In response to Dr. Cox's criticisms in section 3.6.1 of his Round 2 Report of the rat study I cited, I would merely note that rat studies almost always involve doses of toxic chemicals much higher than humans would experience. In part, this is because rats only live two years, and high doses are necessary to observe effects, especially chronic effects.

Finally, Dr. Cox also claims in section 3.6.4 of his Round 2 Report that "scientific organizations and agencies, including the EPA, have studied the potential consequences of exposures to benzene at low doses and have not concluded that low doses cause or are associated with cancer." In his footnote to support his claim, (Cox Round 2, p. 8, fn. 22), he cites an EPA website. However, the 1998 EPA document on the website cited by Dr. Cox says: "Thus, there is not sufficient evidence currently to reject a linear dose-response curve for benzene in the low dose region, nor is there sufficient evidence to demonstrate that benzene is, in fact, nonlinear in its effects." (EPA, 1998, p. xi.) This means that there is no "threshold," or safe level of benzene exposure. This same position was stated more recently in a review article by Dr. Martyn Smith, who wrote: "There is probably no safe level of exposure to benzene, and all exposures constitute some risk in a linear, if not supralinear, and additive fashion." (Smith, 2010, p. 133.)

In the same footnote, Dr. Cox cites an article by Paustenbach and colleagues in which they summarize their re-analysis of data collected by NIOSH in a study of benzene-exposed rubber workers. The original NIOSH authors responded to Paustenbach's re-analysis (Utterback and Rinsky, 1995) and noted that Paustenbach's revised estimates of exposure were implausibly high and distorted the dose-response slope to imply a threshold. In spite of the efforts by Paustenbach and colleagues, the original NIOSH study has continued to be used as evidence of the carcinogenicity of benzene at low dose. Others have pointed out that Paustenbach was paid by the American Petroleum Institute to cast doubt on the NIOSH study and undermine its use as a basis for setting regulatory standards. (*See, e.g.*, Michaels, 2008, pp. 74-5.)

V. Conclusion

The comments and criticisms expressed Drs. Cox and Bonanno and Captain Paskewich in their Round 2 reports have not changed the opinions I offered in my Round 1 and Round 2 Expert Reports: In addition to the deaths and injuries caused by the DWH explosion, many short-term adverse health effects have been observed in DWH response and clean-up workers and in on-shore Gulf Coast communities, and additional adverse impacts may become evident in on-going studies of the affected population.

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Lyons, R., J. Temple, D. Evans, D. L. Fone, and S. R. Palmer.1999. Acute health effects of the Sea Empress oil spill. Journal of Epidemiology and Community Health 53:306–310 (Lyons, et al., 1999).

IOM (Institute of Medicine). 2010. *Assessing the health effects of the Gulf of Mexico oil spill on human health: A summary of the June 2010 workshop*. Washington, DC: The National Academies Press (IOM, 2010) (US_PP_RC005407-613).

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Appendix A: Excerpts of Tables 1 and 2 from New England Journal of Medicine Article Entitled, *The Gulf Oil Spill* (Goldstein, et al., 2011)[1]

[1] Goldstein BD, Osofsky HJ, and MY Lichtveld. The Gulf Oil Spill. N Engl J Med 364:1334-48. 2011. (Goldstein, et al., 2011) (Ex. 12259).

Table 1. **Studies of Effects of Oil Spills on the Health and Safety of Workers and Communities.***

Reference	Study Characteristics	Methods	Results
***Sea Empress* oil spill†**			
Lyons et al.[1]	Survey of 539 exposed residents and 550 controls in communities in Wales 7 weeks after spill	Residents asked about symptoms during the first 4 weeks after the spill Adjustment for reporting biases	Total of 23% of exposed residents believed oil spill to have affected their health, vs. 2% of controls Significantly increased rates of headache, sore eyes, and sore throat among exposed residents were attributed to toxicologic effects of the exposure and increased anxiety and depression scores were attributed to mental health effects of the spill
***Prestige* oil spill‡**			
Suárez et al.[2]	Cross-sectional study of relation between worker activities and symptoms	Structured telephone interview of stratified sample of 265 paid workers, 266 volunteers, 133 seamen, and 135 bird cleaners, with response rate of 62.5% Univariate and multivariate analyses	Injury rate was highest among bird cleaners (19%); rates of headache and throat and respiratory tract disorders were highest among sea- men (15.8% and 30.4%, respectively) On multivariate analysis, >20 days' work in highly polluted areas, vs. fewer days' work, was associated with headache (odds ratio, 2.62; 95% CI, 1.23–5.60); nausea, vomiting, and dizziness (odds ratio, 2.50; 95% CI, 1.09–5.74); and throat and respiratory problems (odds ratio, 3.74; 95% CI, 1.89–7.40) A larger number of symptoms (vs. a smaller number) was associated with a reported perception of unpleasant odors and with eating while working with oil

Carrasco et al.[3]	Cross-sectional study examining effects of providing safety and health information to response workers	Same interview and population as used by Suarez et al.[2] Odds ratios based on logistic regression	Informed workers had a higher level of PPE use than uninformed workers Lack of health information before engaging in cleanup was associated with respiratory problems (odds ratio vs. receipt of health information, 2.43; 95% CI, 1.02–5.79) and headaches (odds ratio, 3.86; 95% CI, 1.74–8.54) As compared with informed workers, uninformed workers had more nausea, vomiting, or dizziness (odds ratio, 2.25; 95% CI, 1.17–4.32), throat and respiratory problems (odds ratio, 2.30; 95% CI, 1.15–4.61), and itchy eyes (odds ratio, 2.89; 95% CI, 1.21–6.90)
***Nakhodka* oil spill¶**			
Morita et al.[4]	Acute health problems studied in 282 cleanup workers who were residents of heavily exposed island	Home interview by public health nurses Total of 97 urine samples obtained Four workers used personal air monitors during cleanup	Lower back pain, leg pain, headaches, and eye and throat irritation were related to duration of cleanup activities At least one symptom found in 78.7% of women and 56.7% of men Highest benzene level was 1.85 ppb (for comparison, allowable 8-hr average in U.S. workplace is 1000 ppb) No increase was found in urinary indicator of benzene exposure among workers Three workers had slightly increased levels of urinary indicator of toluene exposure

* CI denotes confidence interval

† The *Sea Empress* oil spill occurred off Pembrokeshire, Wales, in February 1996. The vessel hit mid-channel rocks and rapidly spilled 73,000 tons of crude oil near a highly populated area, with strong odors detectable in the area.

‡ The *Prestige* oil spill occurred off northwestern Spain in November 2002. Approximately 63,000 tons of oil were released, rapidly at first and more slowly over a period of months. More than 100,000 people were involved in the response.

¶ The *Nakhodka* oil spill occurred in January 1997 off the west coast of Honshu, Japan, with 6000 tons of oil spilled.

Table 2. **Studies of Effects of Oil Spills on Mental Health of Workers and Communities.***

Reference	Study Characteristics	Methods	Results
***Exxon Valdez* oil spill**†			
Palinkas et al.[5]	Cross-sectional study, conducted 1 year after spill, of community patterns of psychiatric disorders in 437 exposed workers and 162 controls	Survey of 599 households in 13 com- munities CES-D score NIMH Diagnostic Interview Schedule	Most-exposed group was more likely than controls to have generalized anxiety disorder (odds ratio, 3.73; 95% CI, 1.99–6.97), PTSD (odds ratio, 2.63; 95% CI, 1.22–5.66), and depression (defined as CES-D score ≥18; odds ratio, 2.13; 95% CI, 1.01–4.50) Women were significantly more vulnerable than men regarding all three measures Native Americans and younger men had more evidence of depression than other subgroups
Palinkas et al.[6]	Cross-sectional study of levels of depression among 188 Alaskan Natives and 371 Americans of European descent	Same as for Palinkas et al.[7]	Exposure significantly associated with CES-D scores in both Alaskan Natives ($P<0.05$) and Euro-Americans ($P<0.01$) Effect on Alaskan Natives associated with loss of subsistence lifestyle
Palinkas et al.[8]	Cross-sectional study 1 year after spill of PTSD symptoms in 188 indigenous people and 371 Euro-American	Factor analysis of Diagnostic Interview Schedule scores	Prevalence of PTSD was similar in the two groups Social disruption was associated with PTSD in both groups but symptoms were dissimilar Low degree of family support, participation in cleanup activities, and decline in subsistence activities were significantly associated with PTSD in indigenous people only

***Sea Empress* oil spill‡**			
Lyons et al.[9]	Cross-sectional study of 4-wk period after spill, involving 539 residents of exposed community and 550 residents of control community	Postal questionnaire Score on Hospital Anxiety and Depression Scale SF-36 mental health score	Residence in exposed community was associated with higher anxiety scores (P = 0.04) and depression scores (P = 0.049) and lower SF-36 mental health scores (P = 0.002) Exposed residents were more likely than controls to consult a general practitioner (odds ratio, 2.34; 95% CI, 1.47–3.72) Residents with higher anxiety scores had more physical symptoms
***Prestige* oil spill§**			
Carrasco et al.[10]	Cross-sectional study of 16-month period after spill, focused on health-related quality of life and mental health among 1350 coastal residents vs. 1350 controls residing inland	Scores on social support and mental health questionnaires: SF-36, General Health Questionnaire, Hospital Anxiety and Depression Scale, and Goldberg Anxiety and Depression Scale	Overall mental health scores did not differ significantly between coastal residents and controls Coastal residents had a higher frequency of suboptimal mental health scores than controls (odds ratio, 1.28; 95% CI, 1.02–1.58) SF-36 physical-functioning score increased with level of exposure (P<0.001)

* CES-D denotes Center for Epidemiological Studies Depression Scale, NIMH National Institute of Mental Health, PTSD post-traumatic stress disorder, SCL-36 Symptom Checklist-36.

† The *Exxon Valdez* oil spill occurred in Prince William Sound, Alaska, in March 1989, spilling 40,000 to 120,000 tons of crude oil.

‡ The *Sea Empress* oil spill occurred off Pembrokeshire, Wales, in February 1996. The vessel hit mid-channel rocks and rapidly spilled 73,000 tons of crude oil near a highly populated area, with strong odors detectable in the area.

§ The *Prestige* oil spill occurred off northwestern Spain in November 2002. Approximately 63,000 tons of oil were released, rapidly at first and more slowly over a period of months. More than 100,000 people were involved in the response.

ENDNOTES FOR TABLES 1 and 2

[1] Lyons RA, Temple JM, Evans D, Fone DL, Palmer SR. Acute health effects of the Sea Empress oil spill. J Epidemiol Community Health 1999;53:306-10.
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[6] Palinkas LA, Russell J, Downs MA, Petterson JS. Ethnic differences in stress, coping, and depressive symptoms after the Exxon Valdez oil spill. J Nerv Ment Dis 1992;180:287-95.
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Expert Report of Dr. Richard Clapp: Appendix B
Consideration Materials
(In addition to documents I cited in my Round 1, Round 2, and Round 3 reports, as well as the consideration materials identified in conjunction with my Round 1 and Round 2 reports)

Bates, Exhibit, TREX, or Other Description
BP-HZN-2179MDL01904354-BP-HZN-2179MDL01904362
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BP-HZN-2179MDL09235742-BP-HZN-2179MDL09235942
BP-HZN-2179MDL09237264-BP-HZN-2179MDL09237266
BP-HZN-2179MDL09237331-BP-HZN-2179MDL09237536
BP-HZN-2179MDL09237892-BP-HZN-2179MDL09237960
BP-HZN-2179MDL09245612-BP-HZN-2179MDL09245647
BP-HZN-2179MDL09293089-BP-HZN-2179MDL09293095
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BP-HZN-2179MDL09293827-BP-HZN-2179MDL09293838
BP-HZN-2179MDL09304999-BP-HZN-2179MDL09305005
BP-HZN-2179MDL09305006-BP-HZN-2179MDL09305013
BP-HZN-2179MDL09305014-BP-HZN-2179MDL09305015
BP-HZN-2179MDL09305016-BP-HZN-2179MDL09305032
BP-HZN-2179MDL09308263-BP-HZN-2179MDL09308269
DEFEXP001877-DEFEXP001878
Deposition Exhibit 12254
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US_PP_EXP000097-US_PP_EXP000230
US_PP_EXP001688-US_PP_EXP001721
US_PP_RC000024-US_PP_RC000427
US_PP_RC005373-US_PP_RC005390
US_PP_RC007598-US_PP_RC007613
US_PP_RC007614-US_PP_RC007663
US_PP_RC007664-US_PP_RC007673
US_PP_RC007674-US_PP_RC007728
US_PP_RC007729-US_PP_RC007750