May 20, 2010

Rear Admiral Mary Landry
Commander, Eighth Coast Guard District
Hale Boggs Federal Building
500 Poydras Street
New Orleans, LA 70130

Samuel Coleman, P.E.
Director, Superfund Division
U.S. EPA Region 6
Dallas, TX 75202

Re: May 19, 2010 Addendum 2 to Dispersant Monitoring and Assessment Directive ("Addendum 2")

Dear Admiral Landry and Mr. Coleman:

This letter is the response to the directive in Addendum 2 for BP Exploration & Production Inc. ("BP") to identify within 24 hours of issuance of Addendum 2 one or more approved dispersant products from the National Contingency Plan Product Schedule that are "available in sufficient quantities, are as effective at dispersing the oil plume, and have a toxicity value less than or equal to 23.00 ppm LC50 toxicity value for Menidia or 18.00 ppm LC50 for Mysidopis, as indicated on the NCP Product Schedule".

BP's response below considers the criteria set forth in the directive in the following order (1) dispersants with a toxicity value greater than or equal to 32.00 ppm LC50 toxicity value for Menidia or 18.00 ppm LC50 for Mysidopis, as indicated on the NCP Product Schedule, (2) the availability based on existing stockpiles, the estimated time to begin aerial and subsurface application, and time for manufacturing, shipping and warehousing, and (3) as effective as Corexit EC9500A at dispersing the oil plume. As discussed below, given the above criteria, BP continues to believe that Corexit EC9500A is the best alternative.

(1) Toxicity Value.

Only five products on the NCP Product Schedule meet the criteria in the May 19th directive. These are: Sea Brat #4, Nokomis 3-F4 and Nokomis 3-AA, Mare Clean 200, and Neos AB3000.

EPA has used acute toxicity criteria to evaluate dispersants that will be applied to oil floating on the water surface. When evaluating the same materials for subsea use, additional criteria may be relevant. We have attached a summary of the criteria that BP is using to evaluate dispersant options, and comparison tables that evaluate each dispersant by such criteria, based on information currently available to us.

One relevant criterion, given the amount of dispersant that is required at this site and the proposed application near the ocean floor, is the potential long term effect and persistence of the chemicals in each dispersant.

In this regard, Sea Brat #4 contains a small amount of a chemical that may degrade to a nonylphenol (NP). The class of NP chemicals have been identified by various government agencies as potential endocrine disruptors, and as chemicals that may persist in the environment for a period of years. The manufacturer has not had the opportunity to evaluate this product for those potential effects, and BP has not had the opportunity to conduct independent tests to evaluate this issue either. BP learned of this issue after it applied for permission to use Sea Brat #4 at the incident site.

With this additional information in hand, we believe it would be prudent to evaluate the potential NP issue more carefully before EPA or the FOSC require Sea Brat to be used at the incident site, and in particular, before it is applied underwater near the ocean floor.

It would also be prudent to obtain the chemical formulas for the other dispersants that meet the acute toxicity criteria in the May 19th directive, and evaluate them for their potential to degrade to NP, or any other chemical that has been identified as a potential endocrine disruptor. BP has not been able to obtain this information in the 24 hour time frame provided in the directive.

COREXIT does not contain chemicals that degrade to NP. The manufacturer indicates that COREXIT reaches its maximum biodegradability within 28 days of application, and that it does not persist in the environment. These qualities make COREXIT a better choice for subsea application, based on the information currently available. COREXIT appears to have fewer long term effects than the other dispersants evaluated.

(2) Availability.

BP has an inventory of 246,380 gallons of COREXIT that are available for immediate use, and the manufacturer is able to produce an additional 68,000 gallons/day, which is sufficient to meet all anticipated dispersant needs at this site.

BP also has an inventory of 100,000 gallons of Sea Brat #4 available for immediate use. The manufacturer is able to produce an additional [ ] gallons/day, which would be sufficient to meet all anticipated surface application needs, but may not be sufficient to meet both surface and subsurface application needs combined.

BP does not have a stockpile of the other dispersants that meet the criteria in the May 19th Directive, and the manufacturers tell us that they cannot produce the requested volume for 10 to 14 days or more.

Attached to this letter is a table that describes the availability and production capability for each dispersant option (See "Dispersant Supply Profile.')

(3) Effectiveness.

COREXIT was 55% to 63% effective in dispersing samples of South Louisiana Crude Oil. Sea Brat #4 was 61% effective in dispersing samples of the same material. The products are expected to have similar levels of effectiveness in the field.

Attached to this letter is a table that shows the expected effectiveness ratings for the four other dispersants that meet the acute toxicity criteria in Addendum 2. The Nokomis products are slightly more effective (64-65%), while Mare Clean and Neos AB3000 are reported to be substantially more effective at dispersing oil (84% and 90%).

(4) Conclusion.

In the midst of an oil spill response, one of the most important criteria is whether the dispersant in question can be obtained in sufficient volumes to meet immediate needs. Dispersants must be applied to the spill shortly after release to be effective. As oil weathers in the environment, it becomes increasingly difficult to disperse with any of the listed products.

COREXIT was the only dispersant that was available immediately, in sufficiently large quantities, to be useful at the time of the spill. Subsequent efforts have identified Sea Brat #4 as a possible alternative that is equally effective at dispersing oil, but has fewer acute toxicity effects. In the short

time provided to us, BP and the manufacturer of Sea Brat #4 have not had the opportunity to evaluate other potentially significant criteria, including the risk that a small fraction of Sea Brat #4 may degrade to NP, and/or may persist in the environment.

None of the other dispersants that meet the acute toxicity and effectiveness criteria in Addendum 2 are available in sufficient quantities at this time. In addition, before supporting a decision to switch to those dispersants, it would be important to review the formula for each alternative, and evaluate it for additional risks, such as persistence in the environment. BP has not been able to do this in the time provided.

Based on the information that is available today, BP continues to believe that COREXIT was the best and most appropriate choice at the time when the incident occurred, and that COREXIT remains the best option for subsea application.

Before the Coast Guard and EPA issue further directives requiring a change in dispersant products or monitoring, we would appreciate the opportunity to meet with you to discuss the options and their efficacy and potential impacts, in view of the circumstances at the spill site, and the proposed methods of usage.

After you have the opportunity to review the attached information, please let me know the earliest time when you might be available to meet with our team to discuss these issues.

Sincerely,

Douglas J. Suttles

I. INTRODUCTION

This attachment contains detailed technical information in response to the directive addendum from the U.S. Coast Guard (USCG) and the Environmental Protection Agency (EPA), directing BP to identify "one or more approved dispersant products from the National Contingency Plan Schedule that are available in sufficient quantities, are as effective at dispersing the oil plume, and have a toxicity value [greater][1] than or equal to 23.00 ppm LC50 toxicity value for Menidia or 18.00 ppm LC50 for Mysidopsis." *See* Dispersant Monitoring and Assessment Directive - Addendum, dated May 19, 2010 ("May 19th Directive").

To respond to the short deadline contained in the May 19th Directive, the information that we can provide is necessarily limited to the information that was in hand or could be obtained on 24 hours notice.

II. BACKGROUND

By way of background, and to provide some context, we begin by briefly describing why COREXIT was selected and approved for use by the EPA and the USCG. COREXIT is on the list of dispersants that are pre-approved for surface application to oil. It is one of the most commonly used dispersants, and has been used before in the Gulf of Mexico. Most important is that it was possible to quickly obtain a large enough supply of COREXIT to meet the anticipated needs at this site, by purchasing it from the manufacturer and by borrowing it from other companies. No other dispersant was available in the required amounts at the time of the oil spill.

III. POTENTIAL ALTERNATIVE DISPERSANTS

BP has identified the following dispersant products as potential alternatives to the COREXIT products approved for use:

1. Dispersit SPC 1000;
2. JD 2000;
3. Mare Clean 200;
4. Neos AB3000; and
5. Nokomis 3-AA;
6. Nokomis 3-F4
7. SAF-RON Gold;

---

[1] The directive says "less than or equal to," but BP presumes that the intended expression was "greater than or equal to," since lower toxicity values indicate higher toxicity.

8. Sea Brat #4;

The Mare Clean 200, Neos AB3000, Nokomis 3-AA, Nokomis 3-F4 and Sea Brat #4 all have LC50 values greater than or equal to either the *Menidia* or *Mysidopsis* criteria, as required by the May 19th Directive.

IV. EVALUATION CRITERIA

In the table in section __ below, BP provides nine categories of information to assist the USCG and EPA in choosing alternative dispersants for use in the Spill Response. These categories are the following:

A. NCP Product Schedule Listing

Pursuant to Subpart J of the National Oil and Hazardous Substances Pollution Contingency Plan, no dispersant may be used in the United States if it is not listed on the National Contingency Plan Product Schedule. Accordingly, the only dispersant products being considered for possible use in the spill response are among those currently listed on the NCP National Product Schedule.

B. Effectiveness in Laboratory Trials

Each dispersant must be tested for effectiveness before it is listed in the Product Schedule. In addition, pursuant to EPA and U.S. Coast Guard approval, samples of Dispersit SPC 1000, JD-2000, Nokomis 3-AA, SAF-RON Gold, and Sea Brat #4 were tested in the laboratory for their effectiveness in dispersing oil using both the swirling task method (EPA-approved method) and a modified EXDET (Exxon Dispersant Effectiveness Test).[2] The test oil used was a surrogate from the nearby Thunder Hawk rig since fresh crude oil from the MC 252 was unavailable at the time.

C. Effectiveness in Field Trials

Actual field trials can provide a more accurate assessment of the potential performance of dispersants than laboratory trials. Field trials on MC 252 oil in various stages of weathering have been completed for Nalco EC 9500A.

D. Acute Toxicity

Each dispersant must be tested for acute toxicity before it is listed in the Product Schedule. In addition, we have reviewed and will continue to review information available from

---

[2] The EXDET test measures relative dispersant effectiveness, allows comparisons among small-scale laboratory tests, and assists with comparisons to field trials (Becker, K.W., L.G. Coker, and M.A. Walsh. 1991. "A method for evaluating oil spill dispersants, Exxon Dispersant Effectiveness Test (EXDET)" in Oceans '91 Proceedings, Oceanic Engineering Society of IEEE, New York, NY. pp. 1486-1490).

material data safety sheets (MSDS), toxicity information available from the National Product Schedule, information provided by manufacturers and information available in scientific literature.

E. Persistence, Bioaccumulation and Chronic Effects and Endocrine Disruption

BP is reviewing available information about the persistence, bioaccumulation, chronic effects, endocrine disruption and other impacts of each dispersant to determine which dispersants will have the fewest impacts overall, and not just the best performance on the tests for the Product Schedule. There may be only limited data on long-term impacts for many of the dispersants as formulated, however. In addition, there may be only limited information on the constituents of the dispersants, since the dispersants typically contain proprietary substances whose identities are not publicly available. For those dispersants where constituents and/or data are publicly available, BP will identify and catalogue long-term impacts. For those where constituents are not publicly available, BP will endeavor to obtain confidential information about the constituents so that we may identify long-term impacts and review them with the EPA in a confidential manner.

*** CONFIDENTIAL INFORMATION BELOW***

[

]

NP is a potential endrocrine disrupter that has been mentioned by the U.S. EPA's Endocrine Disruption Screening Program, and the EPA has developed final marine acute and chronic water quality criteria developed for NP. NP also has been reviewed under the U.S. EPA's Great Lakes Binational Strategy, is on the OSPAR list of hazardous contituents for discharge into the sea, and is a priority hazardous pollutant under EU Water Directive.

This regulatory attention notwithstanding, NP is still widely used in consumer and agricultural products, and is regularly detected in wastewater treatment plant effluent. For example, Kolpin et al (2002) reported on a 1999-2000 survey of 85 sample sites across the U.S. (freshwater) that NP concentrations averaged 0.8 ug/L.

If a dispersant with NPE levels comparable to those of [ ] is used on the spill, the acute criteria may be temporarily exceeded shortly after application, depending on the thickness of the oil slick and the amount of dispersant applied. Exceedances of the chronic criteria appear unlikely, but could occur if [ ] is applied in the same area over a period of several days. Whether or not the acute criterion will be exceeded largely depends on the interval between applications.

For NP at or near the surface, photochemical transformation can be a significant route of abiotic degradation, according to a literature review conducted by Melcer et. al. (2007). Under simulated summer sunlight conditions in the surface layer of natural waters, NP's half-life has been estimated as less than a day.

For NP in dark, anoxic environments such as deep water sediments, however, available information suggests much slower degradation.

*** CONFIDENTIAL INFORMATION ABOVE***

F. Whether Potential Alternatives Have Been Prohibited Outside the United States

As part of our evaluation of the COREXIT products approved for use, BP has reviewed available information concerning their use outside the United States.[3] BP has conducted similar research for the 8 potential alternatives products. To date, we are not aware that any have been prohibited by any foreign regulators.

G. Behavior in the Environment

The behavior of dispersants in the environment may affect both its effectiveness and its long term impacts. One factor determining the behavior of dispersants after application is the tendency of a dispersant to rise or sink in the water column which, in turn, depends on whether the dispersants contain significant quantities of petroleum-based solvents that are less dense than water. Two other factors are the biodegradation of the dispersant and its tendency to bioaccumulate and bioconcentrate.

H. Quantities Currently Available and Reliability of Supply

An important consideration in identifying and selecting possible alternative dispersants is the commercial availability of those products in quantities sufficient to meet current and anticipated needs. Approximately 75,000 gallons of dispersant is used each day for surface

---

[3] We have learned that COREXIT 9527 and COREXIT 9500 were removed from the list of approved dispersants in the UK. Our understanding is that these two products were removed due to a new test added by the UK regulators. The test, known as the "rocky shores test," is designed to evaluate the toxicity of the dispersants when sprayed in the tidal zone, and the mortality of limpets exposed to the dispersant. The test was added because of concerns that dispersants may cause more significant ecological impacts on rocky shores than they do on sandy or pebble beaches (primarily seaweed overgrowth due to increased mortality in the harvester species). The UK regulators continue to allow the use of existing stockpiles of these COREXIT products away from rocky shorelines, with approval. We have not been informed by the On Scene Coordinator that the "rocky shores test" is applicable to the conditions in the Gulf, as most tidal areas near the release are not rocky, and again US EPA and Coast Guard have approved both products for use in this response.

and subsea application. Going forward, an estimated 50,000 gallons per day will be needed for continued aerial spraying. It is also important to consider the extent to which a manufacturer can reliably produce and deliver sufficient quantities of quality-grade product to the field. Therefore, we have and will continue to evaluate any potential supply chain problems (e.g., interruptions in the manufacturer's ability to obtain raw materials needed to make the product), quality control issues (e.g., production of significant volumes off-specification product that is ineffective in dispersing oil and could not be used) and delivery problems (e.g., inability to arrange timely transport of the product to the field).

V. Available Data on the Potential Alternatives

In the following table, BP has compiled the available information relevant to the dispersants and criteria described above.

Evaluation Criteria for Selected Dispersants								
Evaluation Criteria	**Comment**	**Corexit® EC9500A**	**Corexit® EC9527A**	**JD-2000**	**Dispersit SPC 1000™**	**Nokomis 3-F4**	**Sea Brat #4**	**Saf-Ron Gold**
A. NCP Product Schedule		Yes	Yes	Yes	Yes	Yes	Yes	Yes
B. Effectiveness (EPA Swirl Test)	% Effective (Prudhoe Bay crude)	45.3	37.4	60.4	40	63.20	53.6	84.80
	% Effective (South Lousiana crude)	54.7	63.4	77.8	100	65.70	60.7	53.80
	% Effective (Average)	50.0	50.4	69.1	73	64.50	57.1	69.30
C. Effectiveness (Gulf Field Test)	Based on field test protocols developed by the Dispersant Operation Group				Not yet tested	Not yet tested	May 8 field test indicated oil dispersed with formation of droplets with a likely median diameter <50 microns	Not yet tested
D.1 Acute Toxicity Data (NCP Schedule)	*Mysidopsis bahia* (shrimp) *48hr LC50 (mg/L)*	32.23	24.14	90.50	16.6	20.16	14.0	63.00
	Menidia berylilina (inland silverside fish) *96hr LC50 (mg/L)*	25.20	14.57	407.00	3.5	34.2	30.0	29.43
D.2 Additional Acute Toxicity Data (from MSDS)	*Acartia tonsa* marine copepod) 48hr LC50 (mg/L)	34	--	--	--	--	--	--
	Artemia (shrimp) 48hr LC50 (mg/L)	20.7	--	--	--	--	--	--
	Psetta maxima (Turbot flatfish) 96hr LC50 (mg/l)	--	50	--	--	--	--	--

Evaluation Criteria for Selected Dispersants								
Evaluation Criteria	**Comment**	**Corexit® EC9500A**	**Corexit® EC9527A**	**JD-2000**	**Dispersit SPC 1000™**	**Nokomis 3-F4**	**Sea Brat #4**	**Saf-Ron Gold**
E. Persistence, Bioaccumulation and Chronic Effects and Endocrine Disruption: Constituents	Based on Information Provided by Manufacturer	Proprietary Mixture	Proprietary Mixture	Proprietary Mixture	Proprietary Mixture	Formulations may contain nonylphenol polyethylene ethoxylates (NPE), which biodegrade to nonylphenol, a potential endrocrine disruptor. NPE use restricted in EU, under review in US.	Proprietary Mixture	Proprietary Mixture
G.1. Behavior in the Environment: Solvent	Based on Information Provided by Manufacturer	Petroleum based solvent with proplyene glycol	2-butoxyethanol and propylene glycol	Proprietary mixture, insufficient information	Water based containing emulsifiers, dispersants, and water dilutable coupling solvent	Water and propylene glycol	Water and propylene glycol	Proprietary mixture, insufficient information

Evaluation Criteria for Selected Dispersants								
Evaluation Criteria	**Comment**	**Corexit® EC9500A**	**Corexit® EC9527A**	**JD-2000**	**Dispersit SPC 1000™**	**Nokomis 3-F4**	**Sea Brat #4**	**Saf-Ron Gold**
G.2. Behavior in the Environment: Biodegradation	Based on Information Provided by Manufacturer	Manufacturer describes as biodegradable, majority of components expected to readily biodegrade	Manufacturer describes as biodegradable, majority of components expected to readily biodegrade	Proprietary mixture, insufficient information	Manufacturer describes as "completely biodegradable surfactants" - Proprietary Mixture Currently Insufficient Composition Information to Assess	Nonylphenol, degradation product of NPE, potentially resistant to biodegradation during subsurface application - Proprietary Mixture Currently Insufficient Composition Information to Assess	MSDS describes product as highly biodegradable	Proprietary mixture, insufficient information
G.3. Behavior in the Environment: Potential for Bioaccumulation	Based on Information Provided by Manufacturer	Manufacturer reports component substances have a potential to bioaccumulate	Manufacturer reports component substances have a low potential to bioconcentrate	Proprietary mixture, insufficient information	Proprietary mixture, insufficient information	Proprietary mixture, insufficient information	Proprietary mixture, insufficient information	Proprietary mixture, insufficient information
H. Quantities Currently Available and Reliability of Supply		BP to provide	BP to provide	BP to provide	Anticipates increasing to 20,000 gallons per day, and possibly later to 60,000 gallons per day.	BP to provide	BP to provide	BP to provide

VI. Conclusions

As discussed above, there are many considerations that are relevant to selecting dispersants for use.

*** CONFIDENTIAL INFORMATION BELOW***

In addition, there may be significant concerns with certain of the constituents of the dispersants that we cannot yet evaluate because we lack the proprietary information to do so. We currently have such information only for Sea Brat #4, Corexit EC 9500A, Corexit EC 9527A, and SAF-RON Gold. Of these four, the two Corexits appear to have no constituents that raise issues over and above any that might be evident from the acute toxicity tests. [

]

The MSDS and patent information that are available for Disperit suggest that it does not contain NP or a chemical that would degrade to NP. However, this needs to be confirmed by a review of the current formula, which the manufacturer has not supplied to us.

*** CONFIDENTIAL INFORMATION ABOVE***