UNITED STATES GOVERNMENT September 21, 2011
MEMORANDUM

To: Public Information (MS 5030)

From: Plan Coordinator, FO, Plans Section (MS 5231)

Subject: Public Information copy of plan

Control # - S-07451

Type - Supplemental Exploration Plan

Lease(s) - OCS-G19555 Block - 336 Keathley Canyon Area
OCS-G25792 Block - 292 Keathley Canyon Area

Operator - BP Exploration & Production Inc.

Description - Wells B, C, F, and G

Rig Type - DP SEMISUBMERSIBLE

Attached is a copy of the subject plan.

It has been deemed submitted as of this date and is under review for approval.

Michael Tolbert
Plan Coordinator

Site Type/Name	**Botm Lse/Area/Blk**	**Surface Location**	**Surf Lse/Area/Blk**
WELL/B	G25792/KC/292	2210 FSL, 5940 FWL	G25792/KC/292
WELL/C	G25792/KC/292	2210 FSL, 5690 FWL	G25792/KC/292
WELL/F	G19555/KC/336	2760 FSL, 3955 FWL	G25792/KC/292
WELL/G	G19555/KC/336	2760 FSL, 4205 FWL	G25792/KC/292

Gulf of Mexico Exploration & Production

Kaskida

Supplemental Exploration Plan
Keathley Canyon Area Blocks 292 and 336

OCS-G-25792 & 19555

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5	9/19/2011	Approved – Reissued for Use	Anne-Renee Laplante	James Grant
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AMENDMENT RECORD

Amendment Date	Revision Number	Amender Initials	Amendment
01/24/2011	1	ARL	Document amended in response to BOEMRE questions
05/26/2011	2	ARL	Updated Appendix B, C, and E with new TD depth. Updated Appendix F, Appendix G, Section 2.7.4, 6.1, 6.2, 8.1.4, and Section 15.
8/22/2011	3	ARL	Updated Sections 1.1, 2.7.5, 2.7.7, 2.7.8,3.6, 8.1.4, 9.1, 16.2, and Appendices A, D, G, & H
9/07/2011	4	ARL	Appendix G
9/19/2011	5	ARL	Document footers, Section 12.1, Appendix A

Supplemental Exploration Plan KC 292/KC 336
Plan Control #-S7451
Amended Sections
September 2011

Section #	Section Heading	Summary of Change	Old Page #	New Page #
All	Document footers	Changed Authority from James Dupree to James Grant		
Section 12.1	General	Added aircraft tanks to Table	25	25
Appendix A	OCS Plan Information Form	Corrected typo in number of days to drill the well	1	1

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1 Plan Contents

1.1 Description of Activities

BP Exploration & Production Inc. (BP) received approval of an Initial Exploration Plan (N-8245) in June 2008 and received approval of a Supplemental Exploration Plan (S-7364) in December 2009. In those plans, BP proposed to drill Wells A, B, C, D, and E in Keathley Canyon Area Block 292, OCS-G 25792, Gulf of Mexico (GoM). BP also received approval of an Initial Exploration Plan (N-8338) in March 2005. In that plan, BP proposed to drill Wells A, B, and C in Keathley Canyon Area Block 336, OCS-G 19555, GoM. These wells will be temporarily abandoned and a well cap will be installed on the wellhead.

In this current Exploration Plan, BP proposes to revise the Initial Exploration Plan (N-8245) to move location B and its mirror location C, and Supplement this Plan by adding location F and its mirror location G. These wells will be drilled utilizing Seadrill's dynamically-positioned West Sirius semi-submersible drilling rig. BP anticipates that it will take approximately 205-days to drill and temporarily abandon each well.

BP Exploration & Production Inc (BP) still plans to conduct the previously approved but not yet conducted activities, depending on the results of the currently planned appraisal operations. When the timeline of those activities not yet conducted becomes more evident, previously approved plans will be revised to comply with the requirements of NTL2010-06 and 2010-10, as well as to incorporate a revised schedule of activities.

Plan information forms (Form MMS-137) are included as Appendix A.

1.2 Location

A map at a scale of 1-in = 2,000-ft on an 8.5-in X 11-in sheet of paper that depicts the surface locations and water depths of the proposed wells is included in Appendix B.

1.3 Safety and Pollution Prevention Features

Safety and pollution prevention features utilized during drilling operations will include the use of appropriately designed casing and cement programs; appropriate blowout preventers, diverters, and other associated well equipment; appropriate mud monitoring equipment and sufficient mud volumes for well control; and properly trained personnel as described in 30 CFR § 250, Subparts C, D, E, G, and O, and as further clarified by BOEMRE Notices to Lessees. Appropriate fire drills and abandon ship drills will be conducted, and navigational aids, lifesaving equipment, and all other shipboard safety equipment will be installed and maintained as mandated by the U.S. Coast Guard regulations contained in 33 CFR § 144.

1.4 Storage Tanks and Production Vessels

1.4.1 Storage Tanks West Sirius

Type of Storage Tank	Type of Facility	Tank Capacity (bbls)	No. of Tanks	Total Capacity (bbls)	Fluid Gravity (API)
Fuel Oil	Semisubmersible	5,260	4	21,040	0.87
Lube oil	Semisubmersible	41.5	2	83	0.85
Lube oil	Semisubmersible	28	8	224	0.85
Lube oil	Semisubmersible	126	1	126	0.85
Active Mud Pits	Semisubmersible	1,063 avg.	6	6,380	
Reserve Mud Pits	Semisubmersible	1547 avg.	6	12,377	
Mud Processing Pits	Semisubmersible	52 avg.	6	312	
Slugging Pit	Semisubmersible	210	2	420	
Base oil	Semisubmersible	4,718	2	9,436	0.93
Brine Tank	Semisubmersible	2,462 avg.	2	4,924	
Crude Oil	Semisubmersible	N/A	N/A		

1.4.2 Storage Tanks Support Vessels

Type of Storage Tank	Type of Facility	Tank Capacity (bbls)	No. of Tanks	Total Capacity (bbls)	Fluid Gravity (API)
Fuel Oil	Supply Boat (Typical 280 ft)	450	16	7,200 dependent on other cargo carried	0.87
Mud tanks	Supply Boat (Typical 280-ft)	1,750	8	14,000 dependent on fluid weight	

1.5 Additional Measures

In addition to the safety, pollution prevention, and early spill detection measures proposed in 30 CFR § 250, BP will rely on its Operating Management System (OMS) designed to help deliver safe, reliable, and compliant operations across BP. OMS is a system of interdependent activities that drive how BP will actually perform work and comply with internal and external standards and regulations. As part of OMS, BP has implemented an Environmental Management System (EMS) which provides a systematic way to identify risks, potential impacts, and compliance requirements that need to be managed. BP has also presented to the BOEMRE a report entitled ***Deepwater Horizon Containment and Response: Harnessing Capabilities and Lessons Learned***. This document helps assess the capabilities that are now available to respond to oil spills in the GoM.

2 General Information

2.1 Applications and Permits

Application/Permit	Issuing Agency	Status
Application for a Permit to Drill (APD)	BOEMRE	Submitted
Suspension of Operations	BOEMRE	Approved
Emergency Evacuation Plan	USCG	Pending submittal

2.2 Drilling Fluids

A table providing information on the types (including chemical constituents) and amounts of the drilling fluids that are planned to be used to drill the proposed wells is included below:

Table 1: Drilling Fluids per Well (205-days)

Type of Drilling Fluid	Estimated Volume of Drilling Fluid to be Used Per Well
Water-base (seawater, freshwater, barite)	158,000-bbls
Oil-based (diesel, mineral oil)	NA
Synthetic-based (internal olefin, ester)	12,552-bbls

2.3 New or Unusual Technologies

Exploration activities in Keathley Canyon Area Blocks 292 and 336 are not expected to utilize any new or unusual technology within the meaning of 30 CFR § 250.200.

2.4 Bonding Information

The bonding requirements for the activities proposed in this Supplemental Exploration Plan are satisfied by an area-wide bond, furnished and maintained according to 30 CFR § 256, Subpart I, Notice to Lessees (NTL) No. 2000-G16, "Guidelines for General Lease Surety Bonds"; and additional security under 30 CFR 256.53(d) and National NTL No.2008-N07, "Supplemental Bond Procedures".

2.5 Oil Spill Financial Responsibility

BP (BOEMRE Operator No. 02481) has demonstrated oil spill financial responsibility for the facilities proposed in this Supplemental Exploration Plan according to 30 CFR § 253, and NTL No. 2008-N05, "Guidelines for Oil Spill Financial Responsibility for Covered Facilities."

2.6 Deepwater Well Control Statement

BP (BOEMRE Operator No. 02481) has the financial capability to drill a relief well and conduct other emergency well control operations.

2.7 Blowout Scenario

2.7.1 Blowout Scenario

The blowout scenario assumes that the pipe has been tripped out of the hole when a problem with the wellhead connector develops, resulting in the removal of the BOP stack. Due to the loss of riser margin, the well flows unrestricted. Day 1 worst case discharge is 27,459-bopd, with the calculation support package for this rate attached as Appendix E. The maximum duration of the blowout is estimated at 184-days (see relief well timing below). The rate profile associated with the well blowout over this 184-day period (also included in Appendix E) results in a potential worst case spill volume estimated at 4.875-mmbo.

2.7.2 The potential for the well to bridge over

While bridging is possible due to generally low formation strengths in the Gulf of Mexico, no bridging was assumed in the 'worst case scenario'. The open hole intervals experienced on each well have multiple formations open simultaneously. The modeling of the failure point of the weakest interval includes many variables, and using no bridging, would yield a maximum flow potential.

2.7.3 The likelihood for surface intervention to stop the blowout

The likelihood for above mudline intervention to stop a blowout is dependent on the failure mechanism. Depending on the circumstances, BP may address a failure of the BOP stack by repairing the control system via ROVs, replacing the BOPs, or adding a BOP on top of the current BOP stack. Failure of the wellhead or casing would be more difficult and require clear access to the well below the failure point in order to run drillpipe and/or tools in the well.

2.7.4 The availability and timing of a rig to drill a relief well

The table below lists the Offshore Mobile Drilling Units that are capable of drilling a relief well. The estimated time to spud is 3 to 10-days, pending requirements to safely secure the current operations of the MODU, required material logistics, mobilization to location, and regulatory approvals. The possibility of drilling a relief well from a neighboring platform or land is not applicable to operations proposed in this Exploration Plan: there is no existing infrastructure in the vicinity of Keathley Canyon Area Block 292 and Keathley Canyon Area Block 336.

BP has obtained written confirmation from the Operators of the rigs, stating that the Operators intend to join the new GoM Mutual Assistance Agreement.

Rig Name	Current Location	Current Operator	Contract Expire Date	Rated WD (ft)	Rated TD (ft)	Rated BOPs (psi)	Moor Type	Relevant Drill Package Limitations
Transocean Discoverer Americas	GOM	Statoil	2014	12K	40K	15K	DP	None identified at this time
Maersk Developer	GOM	Statoil / Woodside	2013	10K	40K	15K	DP	2.0-MM lbs rated Top Drive

The estimated time to drill a relief well is: 10-days to mob, 139-days from spud to casing shoe above WCD zone, plus 35-days for ranging, intersection, and kill operation--for a total of 184 days.

2.7.5 Measures that would enhance our ability to prevent a blowout

Measures employed to prevent a blowout include compliance with all regulations (30 CFR 250), current NTLs, and in particular, the Interim Final Rule focused on BOP certification and reliability. Additional measures:

1. Volume measurements relative to the well will be monitored at all times during all operations;
2. Flow checks before leaving bottom, after pulling into shoe, and before BHA enters stack.

3. BP representative shall observe well conditions prior to each trip and after well kills or testing;
4. BP representative shall be the only person authorized to initiate opening the well as part or conclusion of well control measures;
5. On rig JSA/contingency plan before running any non-shearable tools or pipe through the BOP stack; and
6. BP has adopted additional voluntary performance standards:
    a. BP will use, and will require its contractors involved in drilling operations to use, subsea blowout preventers (BOPs) equipped with no fewer than two blind shear rams and a casing shear ram on all drilling rigs under contract to BP for deepwater service operating in dynamic position mode. With respect to moored drilling rigs under contract to BP for deepwater drilling service using subsea BOPs, the subsea BOP will be equipped with two shear rams, which will include at least one blind shear ram and either an additional blind shear ram or a casing shear ram.
    b. Each time a subsea BOP from a moored or dynamically positioned drilling rig is brought to the surface and testing and maintenance on the BOP are conducted, BP will require that a third party verify that the testing and maintenance of the BOP were performed in accordance with manufacturer recommendations and API RP 53.
    c. BP will require that lab testing of cement slurries for primary cementing of casing and exposed hydrocarbon bearing zones relating to drilling operations of deepwater wells be conducted or witnessed by a BP engineer competent to evaluate such lab testing, or a competent third party independent of the cement provider. BP will provide lab results to the applicable BOEMRE field office within a reasonable period of time.

2.7.6 Measures that would reduce the likelihood of a blowout

Measures to reduce the likelihood of a blowout include compliance with all regulations (30 CFR § 250) and current NTLs. Additional measures:

1. Minimize any influx events to the wellbore by using the best pore pressure / frac gradient predictions available, using downhole tools when appropriate, such as PWDs, to monitor the wellbore and update pore pressure / frac gradient predictions;
2. Management of change process will be followed for all procedure changes; and
3. A Well Control Response Guide will be in place.

2.7.7 Measures that would enhance our ability to conduct early intervention

Measures to enhance our ability to conduct early intervention, in addition to the regulation and NTL requirements, include:

1. Relief well site(s) identified, surveyed, and assessed prior to spud of original well;
2. Wellhead equipment and sufficient casing available for a relief well;
3. A rig(s) is identified and available for a relief well;
4. A Well Control Response Guide is in place; and
5. Incident Management System (IMS) is in place.

- The BP IMS is comprised of government approved plans that cover various scenarios; Incident Management Teams that are trained annually in the Incident Command System, that is a part of the National Incident Management System; access to response capability through various contractors and technical specialists; and predetermined facilities, where our teams can provide adequate oversight to the response.

2.7.8 Other Measures

The BP Oil Spill Response Plan (OSRP) submitted to the BOEMRE on October 15, 2010 describes a number of source control options and a list of potential equipment to be deployed. A revised GoM Regional OSRP is planned to be filed with the BOEMRE in August, 2011.

3 Geological and Geophysical Information

3.1 Geological Description

A discussion of the geological objectives, including a brief description of the hydrocarbon trapping elements, is included in Appendix C in the "Proprietary Information" copies of this Supplemental Exploration Plan.

3.2 Structure Contour Maps

Current structure contour maps are included in Appendix C in the "Proprietary Information" copies of this Supplemental Exploration Plan.

3.3 Interpreted 2-D and/or 3-D Seismic Lines

Migrated and annotated (shot points, time lines, well paths) 3-D seismic lines with depth scale within 152-meters (500-feet) of the proposed surface locations are enclosed with the Site Clearance Narratives included in Appendix C in the "Proprietary Information" copies of this Supplemental Exploration Plan.

3.4 Geological Structure Cross-section Maps

Interpreted geological structure cross-section maps are included in Appendix C in the "Proprietary Information" copies of this Supplemental Exploration Plan.

3.5 Shallow Hazards Report

An AUV Hazard Survey Report of Blocks 246-248, 290-292, and 335-336, Keathley Canyon Area, was submitted with the previously filed Supplemental Exploration Plan (S-7364).

3.6 Shallow Hazards Assessment

A shallow hazards assessment that evaluates the seafloor and subsurface geologic and manmade features and conditions, prepared in accordance with NTL 2008-G05, for the proposed surface locations KC 292 B, C, F, and G is included in Appendix C of this Exploration Plan.

3.7 High-resolution Seismic Lines

As discussed in the Site Clearance Letters (Appendix C), the Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE), has previously approved the use of 3-D survey information for these blocks in lieu of high-resolution survey lines.

3.8 Stratigraphic Column

A generalized biostratigraphic/lithostratigraphic column is included in Appendix C in the "Proprietary Information" copies of this Supplemental Exploration Plan.

3.9 Time vs. Depth Table

Existing well control data for the target areas proposed in this Supplemental Exploration Plan are from the following wells: KC 244 #1 (31,462-ft MD), KC 291 #1 (32,250-ft MD) and KC 292 #1 (32,499-ft MD). These data address the time vs. depth requirements of 30 CFR 250.214(i) and NTL No. 2008-G04.

4 Hydrogen Sulfide (H_2S) Information

4.1 Concentration

Based on previous wells drilled in this area, the concentration would be 0-PPM H_2S. It is not expected that H_2S will be encountered during the operations proposed in this Supplemental Exploration Plan.

4.2 Classification

Based on previous drilling, no H_2S is known to occur in the project area. BP has requested in earlier submissions that Keathley Canyon Area Blocks 292 and 336 be classified as a "Zone where the absence of H_2S has been confirmed". BP requests that BOEMRE re-confirm the "H_2S absent" classification.

4.3 H_2S Contingency Plan

Based on previous drilling, no H_2S is known to occur in the project area. Based on earlier drilling and previous BOEMRE "H_2S absent" classification, it is not anticipated that a contingency plan will be required.

4.4 Modeling Report

Based on previous drilling, no H_2S is known to occur in the project area. Therefore, no modeling report is required.

5 Biological and Physical Information

5.1 Benthic Communities Report

Features or areas that could support high-density benthic communities are not located within 2,000-feet of each proposed muds and cuttings discharge location. The proposed wells will be drilled utilizing a dynamically positioned semi-submersible rig; therefore, physical disturbance of the seafloor will not occur due to anchor emplacements.

5.2 Topographic Features Map

The intent of NTL No. 2009-G39 is to protect biologically sensitive features and areas, in this case, Topographic Features or Banks with moderate to high relief, in water depths less than 300-meters (984-feet). The proposed well location(s) in Keathley Canyon Block 292 are in water depths greater than 6,000-ft. The Site Clearance Analysis conducted by BP, and based on data from an Autonomous Underwater Vehicle (AUV) survey, has identified no similar features within a 2,000-ft radius of the proposed well locations (Map 6, Hazard Map, Fugro 2009). All proposed bottom-disturbing activities will therefore occur outside 305-meters (1,000-feet) of the "No Activity Zone" of an identified topographic feature.

5.3 Topographic Features Statement (shunting)

The intent of NTL No. 2009-G39 is to protect biologically sensitive features and areas, in this case, Topographic Features or Banks with moderate to high relief, in water depths less than 300 meters (984-feet). The proposed well location(s) in Keathley Canyon Area Block 292 are in water depths greater than 6,000-ft. The Site Clearance Analysis conducted by BP and based on data from an Autonomous Underwater Vehicle (AUV) survey did not identify any similar features within a 2,000-ft radius of the proposed well location(s) (Map 6, Hazard Map, Fugro 2009). All proposed bottom-disturbing activities will therefore occur outside of the 3-mile Zone of an identified topographic feature.

5.4 Live Bottoms (Pinnacle Trend) Map

The intent of NTL No. 2009-G39 is to protect biologically sensitive features and areas, in this case, the crests and flanks of pinnacles or hard-bottom features, in water depths less than 300-meters (984-feet). The proposed well location(s) in Keathley Canyon Area Block 292 are in water depths greater than 6,000-ft. The Site Clearance Analysis conducted by BP, based on data from an Autonomous Underwater Vehicle (AUV) survey, did not identify any similar features within a 2,000-ft radius of the proposed well location(s) (Map 6, Hazard Map, Fugro 2009). All proposed bottom-disturbing activities will therefore occur outside 61-meters (200-feet) of any hard-bottoms/pinnacles that have vertical relief of 8-feet or more.

5.5 Live Bottoms (Low Relief) Map

The intent of NTL No. 2009-G39 is to protect biologically sensitive features and areas, in this case, naturally occurring hard or rocky formations with rough, broken or smooth topography, in water depths less than 300-meters (984-feet). The proposed well location(s) in Keathley Canyon Area Block 292 are in water depths greater than 6,000-ft. The Site Clearance Analysis conducted by BP, based on data from an Autonomous Underwater Vehicle (AUV) survey, did not identify any similar features within a 2,000-ft radius of the proposed well location(s) (Map 6, Hazard Map, Fugro 2009). All proposed bottom-disturbing activities will therefore occur outside 30-meters (100-feet) of any live bottom area.

5.6 Potentially Sensitive Biological Features

The intent of NTL No. 2009-G39 is to protect biologically sensitive features and areas in water depths less than 300-meters (984-feet). The proposed well location(s) in Keathley Canyon Area Block 292 are in water depths greater than 6,000-ft. The Site Clearance Analysis conducted by BP, based on data from an Autonomous Underwater Vehicle (AUV) survey, did not identify any similar features (see B, C, D, and E above) within a 2,000-ft radius of the proposed well location(s) (Map 6, Hazard Map, Fugro 2009). All proposed bottom-disturbing activities will therefore occur outside 30-meters (100-feet) of any potentially sensitive biological features.

5.7 Remotely Operated Vehicle (ROV) Monitoring Survey Plan

Keathley Canyon Area Blocks 292 and 336 fall within Grid 7. It has been determined by the BOEMRE that sufficient remotely operated vehicle (ROV) information has been gathered in Grid 7; therefore, no ROV monitoring survey is required.

5.8 Threatened or Endangered Species, Critical Habitat, and Marine Mammal Information

Twenty-nine (29) species of marine mammals occur in the GoM. There are twenty-eight (28) species of cetaceans, seven (7) mysticete, twenty-one (21) odontocete species, and one (1) sirenian species, the manatee.

Five (5) baleen whale species, one (1) toothed whale species, and one (1) sirenian species occur in the GoM and are listed as endangered under the Endangered Species Act (ESA) (USDOI, OCS EIS/EA MMS 2007-018):

- The Northern Right Whale *(Eubalaena glacialis);*
- The Blue Whale *(B. musculus)*;
- The Fin Whale *(Balaenoptera physalus);*
- The Sei Whale *(B. borealis);*
- The Humpback Whale *(Megaptera novaeangliae);*
- The Sperm Whale *(Physeter macrocephalus);* and
- The West Indian Manatee *(Trichechus manatus).*

Of the seven (7) or eight (8) extant species of sea turtle, five (5) are known to inhabit the waters of the Gulf of Mexico:

- The leatherback *(Dermochelys coriacea)*;
- The green *(Chelonia mydas)*;
- The hawksbill *(Eretmochelys imbricata)*;
- The Kemp's ridley *(Lepidochelys kempii);* and
- The loggerhead *(Caretta caretta)*.

The Gulf sturgeon (*Ancipenser oxyrincus desotoi*) and smalltooth sawfish (*Pristus pectinata*) are the listed threatened and endangered fish species in the Gulf of Mexico. Keathley Canyon Area Blocks 292 and 336 are not designated as critical habitat for any of these species.

Additional information can be found in the Environmental Impact Analysis, attached as Appendix F.

5.9 Archaeological Report

Keathley Canyon Area Blocks 292 and 336 are not located within the area of high archaeological potential, as described in NTL No. 2005-G07 and supplemental NTL's. Therefore, an Archaeological Report is not required for activities proposed in this Supplemental Exploration Plan.

However, Keathley Canyon Area Blocks are subject to the recent mitigation guidelines released by the BOEMRE in March 2011 entitled, "Pre-Seabed Disturbance Survey Mitigation," which require archaeological assessments prior to undertaking any bottom-disturbing activities, such as spudding a well. **Appendix C** documents the conclusions of the Marine Archaeologist's review of the 2008 AUV sidescan sonar data in response to these guidelines.

6 Waste and Discharge Information

6.1 Waste Generated, Treated, Downhole Disposed, or Discharged into the GoM

Table 2: Waste Generated, Treated, Downhole Disposed, or Discharged into the GoM

Projected generated waste			Projected ocean discharges		Projected Downhole Disposal
Type of Waste	**Composition**	**Projected Amount**	**Discharge rate**	**Discharge Method**	**Answer yes or no**
Will drilling occur ? If yes, you should list muds and cuttings					
EXAMPLE: Cuttings wetted with synthetic based fluid	*Cuttings generated while using synthetic based drilling fluid.*	*X bbl/well*	*X bbl/hr/well*	*discharge overboard*	*No*
Water-based drilling fluid	Spent drilling fluid drilling riserless hole plus pad mud to fill the hole	158000	32.1	Ocean seafloor discharge	No
Cuttings wetted with water-based fluid	Water base interval	6622	1.3	Ocean seafloor discharge	No
Excess Cement Slurry	Water base interval	275	0.056	Ocean seafloor discharge	No
Cuttings wetted with synthetic-based fluid	Drill cuttings, cement cuttings, and Synthetic base mud retained on cuttings	7,329	1.5	Ocean discharge	No
Wash water from cementing equipment	Equipment cleaning	2000	0.407	Ocean discharge	No
Small Volume Drilling Fluid Discharges	Pit cleanout solids, accumulated solids in sand traps, displacement interfaces	75	0.015	Ocean discharge	No
Cement transfer losses	Bulk transfer to boat then to rig	217	0.044	Ocean discharge	No
Barite transfer losses	Synthetic base interval	57	0.012	Ocean discharge	No
Will humans be there? If yes, expect conventional waste					
EXAMPLE: Sanitary waste water	*Sanitary waste from living quarters*	*X bbl/well*	*X bbl/hr/well*	*chlorinate and discharge overboard*	*No*
Domestic waste	Food waste	268	0.054	Ocean discharge	No
Sanitary waste	Sanitary waste from living quarters	9840	2.0	Ocean discharge	No
Gray water	Gray water from living quarters	71750	14.6	Ocean discharge	No
Is there a deck? If yes, there will be Deck Drainage					
Deck Drainage	Deck washdown & Rain water	39932	8.1	Ocean discharge	No
Will you conduct well treatment, completion, or workover?					
Well treatment fluids	NA				
Well completion fluids	NA				
Workover fluids	NA				
Miscellaneous discharges. If yes, only fill in those associated with your activity.					
Desalinization unit discharge	Seawater	5382275	1094	Ocean discharge	No
Blowout prevent fluid	Ethylene glycol methanol - BOP testing and hydrates	167	0.034	Ocean discharge	No
Ballast water	Uncontaminated seawater	46125	9.4	Ocean discharge	No
Bilge water		3487	0.709	Ocean discharge	No
Excess cement at seafloor	See above Drilling Section.				
Fire water	Uncontaminated seawater	2870	0.583	Ocean discharge	No
Cooling water	Uncontaminated seawater	15375000	3125	Ocean discharge	No
			0.000		
Will you produce hydrocarbons? If yes fill in for produced water.					
Produced water	NA	NA			
Treatment Chemicals	Corrosion, inhibitors, biocides	1.3	0.00027	Ocean discharge	No
Will you be covered by an individual or general NPDES permit ?		Yes			
NPDES General Pemit	GMG290110				

NOTE: If you will not have a type of waste, enter NA in the row.

6.2 Wastes Transported and/or Disposed Onshore

Table 3: Wastes Transported and/or Disposed Onshore

	Projected generated waste		Solid and Liquid Wastes transportation	Waste Disposal		
	Type of Waste	**Composition**	**Transport Method**	**Name/Location of Facility**	**Amount**	**Disposal Method**
Will drilling occur ? If yes, fill in the muds and cuttings.						
	EXAMPLE: Synthetic-based drilling fluid or mud	*internal olefin, ester*	*Below deck storage tanks on offshore support vessels*	*Newport Environmental Services Inc., Ingleside, TX*	*X bbl/well*	*Recycled*
	Oil-based drilling fluid or mud					
	Synthetic-based drilling fluid	Synthetic-based drilling fluid	Liquid mud storage on workboat	MI Swaco Fouchon La	10000 bbls/well	For reuse
	Contaminated Synthetic based drilling fluid	Contaminated Synthetic based drilling fluid	Barged in (25 barrel cutting boxes)	Newpark Environmental Services, Fourchon LA	2000 bbls/well	Deepwell injection on land
	Cuttings wetted with Water-based fluid	NA	NA	NA	NA	NA
	Cuttings wetted with Synthetic-based fluid	NA	NA	NA	NA	NA
	Cuttings wetted with oil-based fluids	NA	NA	NA	NA	NA
Will you produce hydrocarbons? If yes fill in for produced sand.						
	Produced sand	NA	NA	NA	NA	NA
Will you have additional wastes that are not permitted for discharge? If yes, fill in the appropriate rows.						
	EXAMPLE: trash and debris (recylables)	*Plastic, paper, aluminum*	*barged in a storage bin*	*ARC, New Iberia, LA*	*X lb/well*	*Recycled*
	Domestic waste	Municipal trash	Barged in (supersacks)	River Birch Landfill, Avondale, LA	835 yd3/well	Disposal
	Drilling mud contaminated absorbents	Absorbent pads contaminated with drilling muds	Barged in (Omega 2 yard boxes)	Omega Waste Management, Patterson, LA	2.6 tons/well	Recycled
	Excess barite	Excess barite from vessel tank cleaning	Transported by vehicle (supersacks)	Francis Drilling Mud or River Birch landfill	29 tons/well	Reuse/Disposal
	Excess cement	Excess cement from vessel tank cleaning	Transported by vehicle (supersacks)	Grand Isle Port Commission or River Birch landfill	9 tons/well	Reuse/Disposal
	Washwater	Washwater from boat tank cleaning	Transported in (15 barrel cuttings boxes)	Newpark Environmental Services, Fourchon LA	17,500 bbls/well	Deepwell injection on land
	Well Related Hazardous Waste	Rig lab titrations containing isopropanol alcohol, silver nitrate etc.	Barged in (5 gallon DOT containers)	Chemical Waste Management, Sulphur, LA	110 gallons/well	Disposal
	Scrap Metal	scrap piping, grating and other metals	Barged in (scrap baskets)	Southern Scrap. LA	17 tons/well	Recycled
	Recyclables	Plastic bottles, cardboard, paper, tin, aluminum	Barged in (supersacks)	Recycle the Gulf ARC, Iberia, LA	30 tons/well	Recycled
	Rig Maintenance Wastes (painting, blasting)	Paint thinner, paint chips, blast media, aerosol cans	Barged in (drums or totes)	L&L Oil and Gas Services, Fourchon, LA	55 gallons/well	Disposal
	Rig Maintenance Wastes (non hazardous)	Oily rags, pads, oil filters etc.	Barged in (drums or totes)	L&L Oil and Gas Services, Fourchon, LA	100 bbls/well	Recycle or Disposal
	Rig Waste oil	Lube oil, hydraulic oil, some glycol	Barged in (totes)	L&L Oil and Gas Services, Fourchon, LA	112 bbls/well	Recycled
	Universal Waste	Batteries	Barged in (DOT drums)	L&L Oil and Gas Services, Fourchon, LA	45 lbs/well	Recycled
	Universal Waste	Fluorescent light bulbs	Barged in (DOT drums)	L&L Oil and Gas Services, Fourchon, LA	620 bulbs/well	Recycled
	NOTE: If you will not have a type of waste, enter NA in the row.					

7 Air Emissions Information

7.1 Screening Questions

Screening Questions for EP's	Yes	No
Is any calculated Complex Total (CT) Emission amount (tons) associated with your proposed exploration activities more than 90% of the amounts calculated using the following formulas: CT = $3400D^{2/3}$ for CO, and CT = 33.3D for the other air pollutants (where D = distance to shore in miles)?		x
Do your emission calculations include any emission reduction measures or modified emission factors?		x
Are your proposed exploration activities located east of 87.5° W longitude?		x
Do you expect to encounter H_2S at concentrations greater than 20 parts per million (ppm)?		x
Do you propose to flare or vent natural gas for more than 48 continuous hours from any proposed well?		x
Do you propose to burn produced hydrocarbon liquids?		x

7.2 Emissions Worksheets

Air emissions associated with activities proposed in this Supplemental Exploration Plan have been calculated, and the appropriate emissions information is included in Appendix D.

8 Oil Spill Information

8.1 Oil Spill Response Planning

8.1.1 Regional Oil Spill Response Plan (OSRP) Information

All the proposed activities and facilities in this Supplemental Exploration Plan will be covered by the OSRP filed by BP (BOEMRE Operator No. 2481) in accordance with 30 CFR § 254 and approved on July 21, 2009. A revised GoM Regional OSRP is planned to be filed with the BOEMRE in August 2011.

BP's revised Oil Spill Response Plan (OSRP) will include information about enhanced measures for responding to a spill in open water, near shore response and shoreline spill response based on lessons learned from the Deepwater Horizon oil spill. In complying with the requirements of 30 CFR § 254 and related Notices to Lessees, BP's revised OSRP will include:

- Provisions to maintain access to a supply of dispersant and fireproof boom for use in the event of an uncontrolled long-term blowout for the length of time required to drill a relief well;
- Contingencies for maintaining an ongoing response for the length of time required to drill a relief well;
- A description of the measures and equipment necessary to maximize the effectiveness and efficiency of the response equipment used to recover the discharge on the water's surface. The discussion must include methods to increase encounter rates, the use of vessel tracking, and the use of remote sensing technologies;
- Information on remote sensing technology and equipment to be used to track oil slicks, including oil spill detection systems and remote thickness detection systems (such as X-band/infrared systems);
- Information pertaining to the use of vessel tracking systems and communication systems between response vessels and spotter personnel;
- A shoreline protection strategy that is consistent with applicable area contingency plans (ACP); and
- For operations using a subsea BOP or a surface BOP on a floating facility, a discussion regarding strategies and plans related to source abatement and control for blowouts from drilling.

8.1.2 Spill Response Sites

Primary Response Equipment Location	Preplanned Staging Location(s)
Houma, LA.; Lake Charles, LA.; Galveston, Texas	Fourchon, LA.

8.1.3 OSRO Information

BP is a member of the Marine Spill Response Corporation (MSRC), Clean Gulf Associates (CGA), and the National Response Corporation and would utilize said Oil Spill Response Organizations' (OSRO) personnel and equipment in the event of an oil spill at Keathley Canyon Area Block 292. CGA is an oil spill cooperative which owns a large inventory of oil spill clean-up equipment which is supported by Marine Spill Response Corporation (MSRC). MSRC is responsible for storing, inspecting, maintaining, and dispatching CGA's equipment. MSRC will also provide personnel to supervise and operate the equipment.

8.1.4 Worst-case Scenario Determination

Category	Regional OSRP (Exploration) (Approved July 2009)	Revised Regional OSPR (Exploration) (Planned for submittal August 2011)	EP
Type of Activity	**Exploration Drilling**	**Exploration Drilling**	**Exploration Drilling**
Facility Location	MC 462	WR 282	KC 292
Facility Designation	MODU	MODU	KC 292 #2 (Loc. "B Rev.")
Distance to Nearest Shoreline	33	262	199
Volume Uncontrolled Blowout (Day 1)	250,000-bbls	270,000-bbls	27,459-bbls
Storage tanks (total)	0	0	0
Flowlines (on facility)	0	0	0
Lease term pipelines	0	0	0
Total Volume (Day1)	250,000-bbls	270,000-bbls	27,459-bbls
Type of Oil(s)	Crude Oil	Crude Oil	Crude Oil
API Gravity	26° (estimated)	30°	25.4°

BP has determined that the worst case scenario from the activities proposed in this Exploration Plan does not supersede the worst cast scenario in BP's Regional July 2009 OSRP or the Revised OSRP planned to be filed with BOEMRE in August 2011. Therefore, pursuant to NTL No. 2008-G04, BP is required to make the following statement:

Since BP has the capability to respond to the worst-case spill scenario included in its regional Oil Spill Response Plan approved on July 21, 2009, and resubmitted, in revised form in October 2010, and further revised and planned to be filed in August 2011, and since the worst-case scenario determined for this Exploration Plan does not replace the worst-case scenario in their regional OSRP, BP certifies that it has the capability to respond, to the maximum extent practicable, to a worst-case discharge, or a substantial threat of such a discharge, resulting from the activities proposed in our Exploration Plan.

Wellbore data, geologic data, reservoir data, and fluid data used in modeling and making the Worst Case Discharge determination for Well B, as well as for the Exploration Well WCD Scenario in the Revised Regional OSRP, which is planned to be submitted to BOEMRE in August 2011, are provided in Appendix E.

8.2 Oil Spill Response Discussion

A detailed discussion of a response to an oil spill at KC 292 is included in Appendix G. This Appendix addresses topics such as resource identification, release modeling, response technologies, and source containment/control.

9 Environmental Monitoring and Mitigation Measures

9.1 Monitoring Systems

Operational personnel have been instructed to check for pollution frequently during their tour of duty and, in the event pollution is spotted, to identify and shut-off the source and make immediate notifications as per instructions provided in Section 2 and 3 of BP's approved OSRP, Volume II.

In accordance with the provisions of Title 30 CFR § 250.417(e) and NTL 2009-G02 *"Deepwater Ocean Current Monitoring on Floating Facilities,"* dated January 27, 2009, the MODU will be equipped with an Acoustic Doppler Current Profile (ADCP) current monitoring system on board to allow continuous monitoring and gathering of ocean current data on a real-time basis in the upper 1,000-meters.

9.2 Incidental Takes

To mitigate against incidental takes, all activities will be conducted in adherence to NTL 2007-G03 "Marine Trash and Debris Awareness Training and Elimination" and NTL 2007-G04 "Vessel Strike Avoidance and Injured/Dead Protected Species Reporting". As required by NTL 2007-G03, BP submits an annual certification letter for its Marine Debris Awareness Training Process. The marine debris awareness training is required annually by the BOEMRE, as identified on BP's Gulf of Mexico (GoM) Environmental Training Matrix and BP's GoM Health, Safety, and Environmental (HSE) Training Needs Assessment, both of which are located on BP's GoM HSE website and accessible to all BP employees. Monitoring activities are conducted by all personnel on rigs and platforms to prevent accidental loss of materials overboard, and to report sightings of injured/dead protected species. Reporting of dead/injured protected species is addressed in BP's Incident Notification and Investigation Procedure—Attachment 1.

9.3 Flower Garden Banks National Marine Sanctuary

All proposed activities will occur outside of the Protective Zones of the Flower Garden Banks and Stetson Bank.

10 Lease Stipulation Information

Lease Stipulation for Protected Species (Sea Turtles, Marine Mammals, Gulf Sturgeon, Brown Pelican, Whooping Cranes, and Other Federally Protected Species).

All activities will be conducted in adherence to NTL 2007-G03 "Marine Trash and Debris Awareness Training and Elimination" and NTL 2007-G04 "Vessel Strike Avoidance and Injured/Dead Protected Species Reporting". Mitigation to prevent takes varies based on the activity underway and it can include worker training on waste management and trash and debris containment procedures to avoid accidental loss overboard and its potential impact on protected species, and training on reporting of dead/injured protected species addressed in BP's Incident Notification and Investigation Procedure—Attachment 1.

11 Related Facilities and Operations Information

11.1 Produced Liquid Hydrocarbons Transportation Vessels

There are no well tests proposed in this Exploration Plan.

12 Support Vessels and Aircraft Information

12.1 General

Type	Maximum Fuel Tank Storage Capacity	Maximum No. in Area at Any Time	Trip Frequency or Duration
Crew Boats	1,000-bbls	1	2/week
Supply Boats	1,000-bbls	1	4/week
Aircraft	760-gallons	1	1/daily

12.2 Diesel Oil Supply Vessels

Size of Fuel Supply Vessel	Capacity of Fuel Supply Vessel	Frequency of Fuel Transfers	Route Fuel Supply Vessel Will Take
240 feet to 280 feet	50,000-gallons (boat fuel) 150K to 250K gallons of transferrable fuel (rig fuel)	Weekly / as needed	From the shorebase in Fourchon, LA, to KC 292

12.3 Vicinity Map

A vicinity map depicting the location of the proposed activities is included in Appendix B.

13 Onshore Support Facilities Information

13.1 General

The following table provides information of the onshore facility that will be used to provide supply and service support for the activities proposed in this Exploration Plan.

Name	Location	Existing/New/Modified
C-port	Fourchon, LA	Existing

The C-Port facility provides a vehicle parking lot, office space, radio communication equipment, outside and warehouse storage space, crane, forklifts, water and fueling facilities, and boat dock space. The base is owned by Chouest and is leased by BP. The base is in operation 24-hours each day.

A small amount of vessel and helicopter traffic may originate from bases other those described above in order to address changes in weather, market, and operational conditions. It is expected that this vessel traffic will originate from bases and locations that are in the near vicinity of the base previously described.

13.2 Support Base Construction or Expansion

BP will utilize existing support bases for these Exploration activities in Keathley Canyon Area Block 292 and therefore will not require the construction or expansion of additional support bases.

14 Coastal Zone Management Act (CZMA) Information

A Coastal Zone Management Act consistency certification according to 15 CFR § 930.76(c) and (d) for the State of Louisiana, was attached to the Initial Plan of Exploration for Keathley Canyon Area Block 292. No additional CZMA information is required for activities proposed in this Supplemental Exploration Plan.

15 Environmental Impact Analysis (EIA)

Attached as Appendix F is an Environmental Impact Analysis (EIA) prepared for the proposed project by C-K Associates, LLC, 17170 Perkins Road, Baton Rouge, Louisiana 70810.

16 Administrative Information

16.1 Exempted Information Description

In accordance with 43 CFR § 2, Appendix E, sections (4) and (9), the following information has been determined by the BOEMRE GOMR exempt from public disclosure:

- Geologic Objectives (BHL, TVD and MD);
- Proprietary New or Unusual Technology;
- Geological and Geophysical Information (except for non-proprietary version of Shallow Hazard Assessment); and
- Hydrogen Sulfide Correlative Well Information.

This information is excluded from the "Public Information" copies of the submitted Exploration Plan.

16.2 Bibliography

Keathley Canyon 292 Initial Exploration Plan (N-8245), approved June 2008.

Keathley Canyon 292 Supplemental Exploration Plan (S-7364), approved December 2009.

Keathley Canyon 336 Initial Exploration Plan (N-8338), approved March 2005.

Deepwater Horizon Containment and Response: Harnessing Capabilities and Lessons Learned.

Appendix A: Plan Information Forms

U.S. Department of the Interior
Minerals Management Service

OMB Control Number: 1010-0151
OMB Approval Expires: 12/31/2011

OCS PLAN INFORMATION FORM

General Information

Type of OCS Plan:	X	Exploration Plan (EP)	Development Operations Coordination Document (DOCD)
Company Name: BP Exploration & Production Inc.		MMS Operator Number: 2481	
Address: 200 Westlake Park Blvd.		Contact Person: Anne-Renee Laplante	
Houston, Texas 77079		Phone Number: 281/366-5155	
		E-Mail Address: anne-renee.laplante@bp.com	

Lease(s): OCS-G-25792 & 19555	Area: Keathley Canyon	Block(s): 292 & 336	Project Name (If Applicable):

Objective(s):	X	Oil		Gas	X	Sulphur		Salt	Onshore Base: Fourchon	Distance to Closest Land (Miles): 188

Description of Proposed Activities (Mark all that apply)

X	Exploration drilling		Development drilling
	Well completion		Installation of production platform
	Well test flaring (for more than 48 hours)		Installation of production facilities
	Installation of caisson or platform as well protection structure		Installation of satellite structure
	Installation of subsea wellheads and/or manifolds		Commence production
	Installation of lease term pipelines		Other (Specify and describe) Wells will be TA and a TA cap will be installed on the wellhead.

Have you submitted or do you plan to submit a Conservation Information Document to accompany this plan?		Yes	X	No
Do you propose to use new or unusual technology to conduct your activities?		Yes	X	No
Do you propose any facility that will serve as a host facility for deepwater subsea development?		Yes	X	No
Do you propose any activities that may disturb an MMS-designated high-probability archaeological area?		Yes	X	No
Have all of the surface locations of your proposed activities been previously reviewed and approved by MMS?		Yes	X	No

Tentative Schedule of Proposed Activities

Proposed Activity	Start Date	End Date	No. of Days
Drill and temporarily abandon Well B	11/1/2011	5/24/2012	205
Drill and temporarily abandon Well C	6/1/2012	12/23/2012	205
Drill and temporarily abandon Well F	1/1/2013	7/25/2013	205
Drill and temporarily abandon Well G	8/1/2013	2/22/2014	205

Description of Drilling Rig

	Jackup		Drillship
	Gorilla Jackup		Platform rig
	Semisubmersible		Submersible
X	DP Semisubmersible		Other (Attach Description)
Drilling Rig Name (If Known):			

Description of Production Platform

	Caisson		Tension leg platform
	Well protector		Compliant tower
	Fixed platform		Guyed tower
	Subsea manifold		Floating production system
	Spar		Other (Attach Description)

Description of Lease Term Pipelines

From (Facility/Area/Block)	To (Facility/Area/Block)	Diameter (Inches)	Length (Feet)

OCS PLAN INFORMATION FORM (CONTINUED)

Include one copy of this page for each proposed well/structure

Proposed Well/Structure Location			
Well or Structure Name/Number (If renaming well or structure, reference previous name): B			Subsea Completion
Anchor Radius (if applicable) in feet: NA			Yes [ ] X No

	Surface Location	Bottom-Hole Location (For Wells)
Lease No.	OCS G25792	OCS
Area Name	Keathley Canyon	
Block No.	292	
Blockline Departures (in feet)	N/S Departure: 2210' FSL F___ L	N/S Departure: F___ L
	E/W Departure: 5940' FWL F___ L	E/W Departure: F___ L
Lambert X-Y coordinates	X: 1,780,020'	X:
	Y: 9,680,450'	Y:
Latitude/ Longitude	Latitude 26* 40' 38.5"	Latitude
	Longitude 92* 34 20.4	Longitude
	TVD (Feet): 32,873'	MD (Feet): / Water Depth (Feet):

Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)

Anchor Name or No.	Area	Block	X Coordinate	Y Coordinate	Length of Anchor Chain on Seafloor
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	

Paperwork Reduction Act of 1995 Statement: The Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35) requires us to inform you that MMS collects this information as part of an applicant's Exploration Plan or Development Operations Coordination Document submitted for MMS approval. We use the information to facilitate our review and data entry for OCS plans. We will protect proprietary data according to the Freedom of Information Act and 30 CFR 250.197. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid Office of Management and Budget Control Number. The use of this form is voluntary. The public reporting burden for this form is included in the burden for preparing Exploration Plans and Development Operations Coordination Documents. We estimate that burden to average 600 hours per response, or 640 with an accompanying EP (1,000 hours in AKOCSR), or 690 (1,700 in AKOCSR) with an accompanying DPP or DOCD, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the forms associated with subpart B. Direct comments regarding the burden estimate or any other aspect of this form to the Information Collection Clearance Officer, Mail Stop 5438, Minerals Management Service, 1849 C Street, NW., Washington, DC 20240.

OCS PLAN INFORMATION FORM (CONTINUED)

Include one copy of this page for each proposed well/structure

Proposed Well/Structure Location			
Well or Structure Name/Number (If renaming well or structure, reference previous name): C			Subsea Completion
Anchor Radius (if applicable) in feet: NA			Yes [ ] X No
	Surface Location	**Bottom-Hole Location (For Wells)**	
Lease No.	OCS G25792	OCS	
Area Name	Keathley Canyon		
Block No.	292		
Blockline Departures (in feet)	N/S Departure: 2210' FSL F___ L	N/S Departure: F___ L	
	E/W Departure: 5690' FWL F___ L	E/W Departure: F___ L	
Lambert X-Y coordinates	X: 1,779,770'	X:	
	Y: 9,680,450'	Y:	
Latitude/ Longitude	Latitude 26* 40' 38.5"	Latitude	
	Longitude 92* 34' 23.2	Longitude	
	TVD (Feet): 32,873'	MD (Feet):	Water Depth (Feet):

Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)

Anchor Name or No.	Area	Block	X Coordinate	Y Coordinate	Length of Anchor Chain on Seafloor
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	

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OCS PLAN INFORMATION FORM (CONTINUED)

Include one copy of this page for each proposed well/structure

Proposed Well/Structure Location			
Well or Structure Name/Number (If renaming well or structure, reference previous name): F			Subsea Completion
Anchor Radius (if applicable) in feet: NA			Yes [ ] X No

	Surface Location	Bottom-Hole Location (For Wells)
Lease No.	OCS G25792	OCS
Area Name	Keathley Canyon	
Block No.	292	
Blockline Departures (in feet)	N/S Departure: 2760' FSL F___ L	N/S Departure: F___ L
	E/W Departure: 3955' FWL F___ L	E/W Departure: F___ L
Lambert X-Y coordinates	X: 1,778,035'	X:
	Y: 9,681,000'	Y:
Latitude/ Longitude	Latitude 26* 40' 44.0"	Latitude
	Longitude 92* 34' 42.3"	Longitude
	TVD (Feet): 33,242'	MD (Feet): / Water Depth (Feet):

Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)

Anchor Name or No.	Area	Block	X Coordinate	Y Coordinate	Length of Anchor Chain on Seafloor
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	

Paperwork Reduction Act of 1995 Statement: The Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35) requires us to inform you that MMS collects this information as part of an applicant's Exploration Plan or Development Operations Coordination Document submitted for MMS approval. We use the information to facilitate our review and data entry for OCS plans. We will protect proprietary data according to the Freedom of Information Act and 30 CFR 250.197. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid Office of Management and Budget Control Number. The use of this form is voluntary. The public reporting burden for this form is included in the burden for preparing Exploration Plans and Development Operations Coordination Documents. We estimate that burden to average 600 hours per response, or 640 with an accompanying EP (1,000 hours in AKOCSR), or 690 (1,700 in AKOCSR) with an accompanying DPP or DOCD, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the forms associated with subpart B. Direct comments regarding the burden estimate or any other aspect of this form to the Information Collection Clearance Officer, Mail Stop 5438, Minerals Management Service, 1849 C Street, NW., Washington, DC 20240.

OCS PLAN INFORMATION FORM (CONTINUED)
Include one copy of this page for each proposed well/structure

Proposed Well/Structure Location			
Well or Structure Name/Number (If renaming well or structure, reference previous name): G		Subsea Completion	
Anchor Radius (if applicable) in feet: NA		Yes	X No

	Surface Location	Bottom-Hole Location (For Wells)
Lease No.	OCS G25792	OCS
Area Name	Keathley Canyon	
Block No.	292	
Blockline Departures (in feet)	N/S Departure: 2760' FSL F___ L	N/S Departure: F___ L
	E/W Departure: 4205' FWL F___ L	E/W Departure: F___ L
Lambert X-Y coordinates	X: 1,778,285'	X:
	Y: 9,681,000'	Y:
Latitude/ Longitude	Latitude 26* 40' 44.0"	Latitude
	Longitude 92* 34' 39.6"	Longitude
	TVD (Feet): 33,242'	MD (Feet): Water Depth (Feet):

Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)

Anchor Name or No.	Area	Block	X Coordinate	Y Coordinate	Length of Anchor Chain on Seafloor
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
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Paperwork Reduction Act of 1995 Statement: The Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35) requires us to inform you that MMS collects this information as part of an applicant's Exploration Plan or Development Operations Coordination Document submitted for MMS approval. We use the information to facilitate our review and data entry for OCS plans. We will protect proprietary data according to the Freedom of Information Act and 30 CFR 250.197. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid Office of Management and Budget Control Number. The use of this form is voluntary. The public reporting burden for this form is included in the burden for preparing Exploration Plans and Development Operations Coordination Documents. We estimate that burden to average 600 hours per response, or 640 with an accompanying EP (1,000 hours in AKOCSR), or 690 (1,700 in AKOCSR) with an accompanying DPP or DOCD, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the forms associated with subpart B. Direct comments regarding the burden estimate or any other aspect of this form to the Information Collection Clearance Officer, Mail Stop 5438, Minerals Management Service, 1849 C Street, NW., Washington, DC 20240.

Appendix B: Vicinity Plat and Location Plat

TEXAS

LOUISIANA

Houma Airport

Fourchon

230.88 statute miles
200.63NM
to Houma

222.14 statute miles
193.04NM
to Port Fourchon

191.22 statute miles
166.17NM
to Near Shoreline point

SABINE PASS

WEST CAMERON

HIGH ISLAND

EAST CAMERON

VERMILION

SOUTH MARSH ISLAND N. ADDN

EUGENE ISLAND

SOUTH MARSH ISLAND

SOUTH PELTO

GRAND ISLE

SOUTH TIMBALIER

SHIP SHOAL

EWING BANK

GALVESTON

WEST CAMERON W. ADDN

HIGH ISLAND E. ADDN

BRAZOS

WEST CAMERON S. ADDN

EAST CAMERON S. ADDN

VERMILION S. ADDN

GALVESTON S. ADDN

HIGH ISLAND S. ADDN

HIGH ISLAND E. ADDN S. EXT

BRAZOS S. ADDN

GREEN CANYON

EAST BREAKS

GARDEN BANKS

CORPUS CHRISTI

KC292

PORT SABEL

ALAMINOS CANYON

KEATHLEY CANYON

WALKER RIDGE

Sigsbee Escarpment

Amery Terrace

Area of Operations

N

Grid North

W

E

S

Projection: UTM Zone 15 North
Datum: NAD27
Distance Units: US Survey Feet

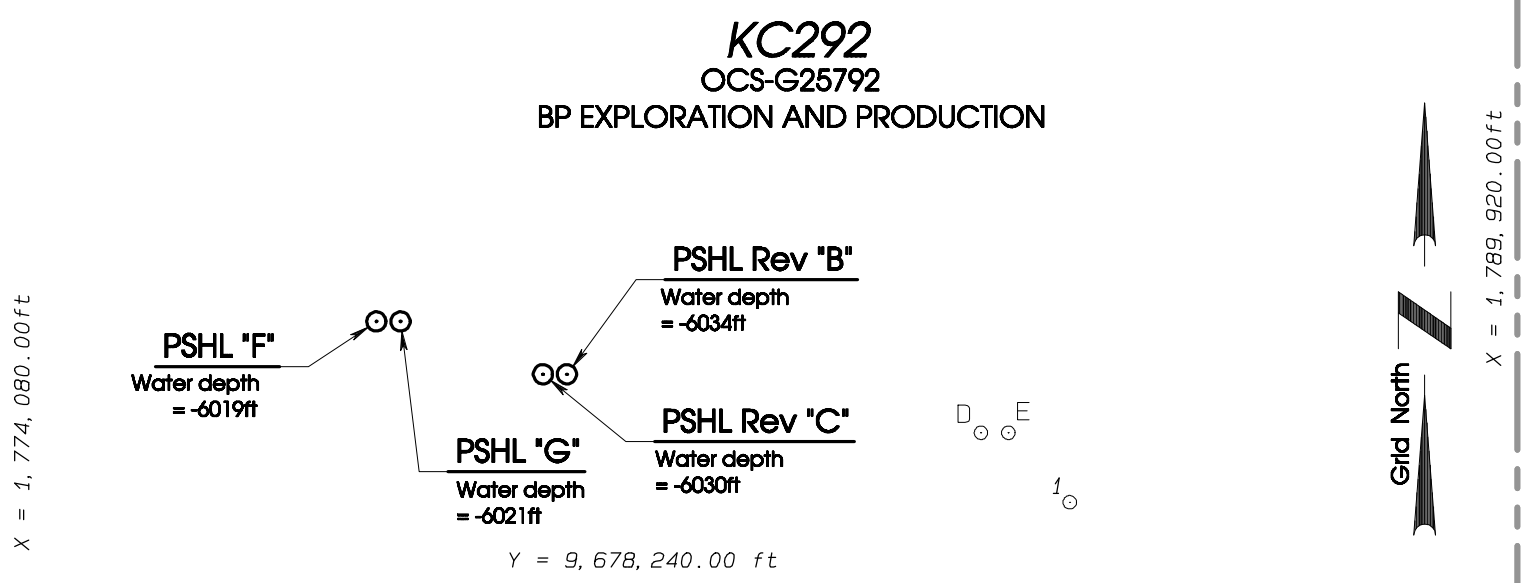
"VICINITY CHART"

bp	BP EXPLORATION AND PRODUCTION	Scale 1" = 50 miles
	EP Locations OCS-G25792 KC 292 Revised "B", Revised "C" ,"F" and "G"	Revised: 8Oct2010
	Keathley Canyon Area (OPD# NG15-05) Blocks 292 and 336 Offshore Federal - Louisiana	Date: 24Aug2010
	Plat prepared by: Brian D. Autio, RPLS BP GoM CDO Subsea Survey	

Geospatial Location Table

Proposed Surface Locations (Note: locations "B" and "C" are revised locations):

SHL EP		KC292 Block Ties (ft)	UTM Zone 15 North NAD27 - US Survey feet		NAD27 Lat/Long		NAD83 Lat/Long	
Block	Name	FSL X FWL	Northing (Y)	Easting (X)	Latitude	Longitude	Latitude	Longitude
KC292	"B"	2210.00 X 5940.00	9,680,450.00	1,780,020.00	26°40'38.523"N	92°34'20.447"W	26°40'39.580"N	92°34'20.754"W
KC292	"C"	2210.00 X 5690.00	9,680,450.00	1,779,770.00	26°40'38.531"N	92°34'23.204"W	26°40'39.588"N	92°34'23.511"W
KC292	"F"	2760.00 X 3955.00	9,681,000.00	1,778,035.00	26°40'44.037"N	92°34'42.317"W	26°40'45.094"N	92°34'42.625"W
KC292	"G"	2760.00 X 4205.00	9,681,000.00	1,778,285.00	26°40'44.029"N	92°34'39.560"W	26°40'45.086"N	92°34'39.868"W



Notes:
1) Location in MMS Lafayette District
2) NOT located in a Military Warning Zone
3) OPD = NG15-05
4) All coordinate data in UTM Zone 15 North, NAD27, US Survey feet, unless otherwise noted
5) All geodetic calculations performed using NADCON 2.0 or better

"Public Information"

bp	BP EXPLORATION AND PRODUCTION	Scale 1" = 2000 ft
	EP Locations OCS-G25792 KC 292 Revised "B", Revised "C" ,"F" and "G"	Revised: 7Oct2010
	Keathley Canyon Area (OPD# NG15-05) Blocks 292 and 336 — Offshore Federal	Date: 24Aug2010
	Plat prepared by: Brian D. Autio, RPLS BP GoM CDO Subsea Survey	Terramodel by: BDA

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Appendix C: Shallow Hazard Assessments (other contents are PROPRIETARY)

SITE CLEARANCE NARRATIVE

PROPOSED KC292 "B Rev." LOCATION
BLOCK 292, OCS-G-25792
KEATHLEY CANYON AREA
GULF OF MEXICO

PROPOSED KC292 "B Rev." Surface Location (Vertical well through salt overburden)	
26° 40' 38.523" N	92° 34' 20.447" W
X = 1,780,020.00 ft E	Y = 9,680,450.00 ft N
2,210 ft FSL	5,940 ft FWL

WATER DEPTH:
6,034 ft MSL

PROPOSED TOTAL DEPTH:
34,149 ft MD 32,367 ft TVD

X and Y Coordinates in UTM Zone 15N (US ft)
Geodetic Datum: NAD 1927
Spheroid: Clarke 1866

SITE CLEARANCE NARRATIVE

PROPOSED KC292 "B Rev." LOCATION
BLOCK 292, OCS-G-25792
KEATHLEY CANYON AREA
GULF OF MEXICO

This document summarizes shallow conditions at the proposed drilling location KC292 "B Rev." in Keathley Canyon Block 292 (OCS-G-25792) in the northwestern Gulf of Mexico (Plates 1 and 2).

The surface locations of the proposed KC292 "B Rev." well, together with a re-spud location (KC292 "C Rev.") sited 250 ft to the west, are defined as:

KC292 "B Rev."	
2,210 ft FSL	**5,940 ft FWL**
X = 1,780,020.00	**Y = 9,680,450.00**
Latitude: 26° 40' 38.523" N	**Longitude: 92° 34' 20.447" W**

KC292 "C Rev."	
2,210 ft FSL	**5,690 ft FWL**
X = 1,779,770.00	**Y = 9,680,450.00**
Latitude: 26° 40' 38.531" N	**Longitude: 92° 34' 23.204" W**

UTM (US Survey Feet)	**Zone 15N**
Datum: NAD 1927	**Spheroid: Clarke 1866**

The alternate re-spud location, "C Rev.", should it be required, maintains recommended clearances from known geohazards and is within the 300 meter (985 ft) clearance zone of the primary "B Rev." location as stipulated by the United States Department of the Interior, Bureau of Ocean Energy Management, Regulation and Enforcement, BOEMRE (known as the MMS prior to June 2010), and the 2,000 ft radius clearance zone as described in this letter..

The proposed surface location of this well, which will be drilled vertically into salt and then deviate to the west-northwest to the proposed target, was selected based on the results of: a regional shallow hazards study (BP, 2004) performed using 3D exploration seismic data acquired by Digicon in 1998; a 2007 ROV (Remotely-Operated Vehicle) survey carried out over proposed

wellsites and potential chemosynthetic habitats in KC291, with interpretation report by Geoscience, Earth & Marine Associates (GEMS, 2007); an AUV (Autonomous Underwater Vehicle) survey conducted by Fugro GeoServices, Inc. (FGSI) in October 2008 for BP, which covered Keathley Canyon (KC) Blocks 246-248, 290-292 and 335-336; results of an HR2D survey acquired by FGSI from October to December 2008 and in early August 2009 (the 24-fold HR2D data was acquired over a subset of the AUV grid along 200 m spaced N-S lines and 900 m spaced E-W lines); preliminary results of a Geological Assessment and Geotechnical Field Program Planning Report primarily based on the 2008 AUV data (GEMS, 2010); an Archaeological Assessment for the Kaskida Prospect based on the 2008 AUV survey data (FGSI, 2011); and well information for the nearby KC292#1 and KC291#1wells. Copies of the 2008 AUV Survey Report were included with the EP submission for the KC292#2 well (Plan Control S7364, approved 9 December, 2009). The 2004 Regional Shallow Hazards Report has already been submitted to the MMS in support of the EP documentation for the KC292#1 well (Plan Control N 8245, approved 2 December, 2004). A map showing the extents of the various surveys is included as Plate 3.

This document contains a site-specific shallow hazards review of the proposed KC292 "B Rev." well location and includes data examples from the geophysical data sets listed above. The depth of investigation is from the seafloor to the top of salt, located about 5,110 ft below the mud line (bml). The depth of the first pressure containment string (22" casing) is planned for ~4,000 ft BML.

The exploration 3D seismic data used for identifying shallow hazards at the KC292#1 well location was approved for use by the MMS on 12/2/2004 (Plan Control N8245). In 2008, in order to address data quality and, specifically, 3D seismic data frequency content in the immediate vicinity of a proposed KC291#1 location, in the adjacent block to the west, as required by MMS NTL 2008-G05, the BP Appraisal Group re-processed the data by applying an rgain filter. A waiver request to use this re-processed data for the KC291#1 well was approved by Dr. William Kou of the MMS in an e-mail communication dated 9 September, 2008.

For the current proposed KC292 "B Rev." well, the 50Hz frequency requirement is mitigated by the availability of HR2D data. The HR2D data was acquired by FGSI during the 4th quarter of 2008 by the r/v Geodetic Surveyor, and during the first week in August 2009 by the r/v Seis Surveyor, using identical set-ups of a SSI 90 cubic inch airgun and a 48-channel, 600 m long streamer, with a group interval and shot point interval of 12.5 m. Data was recorded to 4 seconds at a sample rate of 1 msec. The data was processed by Fugro Seismic Imaging, Inc. (FSI) to give 24-fold migrated AGC and RAP displays.

A power spectra diagram for the HR2D seismic data was constructed using the PostStack/PAL attribute function in Landmark Graphic's SeisWorks software (Plate 4). The

spectra was generated for a 3,000 ft x 3,000 ft square centered on the proposed well location, which included portions of lines 155-159 and 206, using a one-second time-window below the seafloor. The x-axis represents the frequency of the data between 0 and 300 Hertz, and the y-axis represents power attributed to each component frequency as a percentage of the reference value of 100%. A spectrum for the exploration 3D seismic data is also included on Plate 4 for comparison. The results demonstrate that within the first second of Two-Way Travel Time beneath the seafloor over 50% of the HR2D data possesses frequencies in excess of 50 Hz (Plate 4).

The seafloor reflector over the proposed location as exhibited by the HR2D data is shown on Plate 5 and is taken from a SeisWorks/Seismic View display using parameters of 95.74 Inches/Second and 6.71 Traces/Inch. The wiggle display is variable area with a "Varifill" positive and negative infill. The auto-correlation pick for the seafloor, which is shown in red, shows the reflector to be free of gaps and is defined by a wavelet of stable shape and phase.

The proposed KC292 "B Rev." well will be drilled using a dynamically-positioned semi-submersible drilling rig, which will not require anchoring or mooring to the seafloor.

The key findings of the shallow hazards assessment for the proposed "B Rev." location are as follows (subseabed conditions at the proposed "C Rev." location are considered to be similar):

Proposed Primary Well Location KC292 "B Rev.":

Water Depth and Seafloor Gradient:	Water depth at the proposed "B Rev." location is estimated as 6,034 ft below Mean Sea Level using swath bathymetry data from the FGSI 2008 AUV survey calibrated to the recorded water depth at the KC292#1 well (Plate 6). The seafloor at the proposed "B Rev." location has an average gradient of 3.1º (5.4%) down to the north-northeast (Plates 6 and 7). The water depth at the re-spud "C Rev." location is 6,030 ft below Mean Sea Level with a seafloor gradient of 2.8º (4.9%) down to the north-northeast.
Seafloor Morphology and Shallow Sediments:	The proposed well location is sited on the southeastern flank of a minibasin that deepens to the northwest and occupies most of KC292 (Plate 8). A large graben feature in KC248 extends into the northeast of KC292, with a large curvilinear strike-slip fault trending south and west from the graben through the east of KC292 into an area of complex east-west trending, faulted seafloor within KC336 to the south. This large fault passes ~2,500 ft to the southeast of the proposed "B Rev." location (Plate 9) and has a seafloor scarp of about 10 ft. An area of seafloor sediment failure is in the north of KC292 on the south facing slope of the graben uplift ~2.2 miles to the north of the proposed "B Rev." location, and an isolated seafloor mound is in the northeast corner of KC291 ~2.5 miles to the northwest of the proposed "B Rev." location (Plate 10). A 2007 ROV investigation of this mound (conducted by Sonsub and reported by GEMS) revealed upturned slabs of very soft clay with a single anemone, but no evidence for active gas/fluid seepage,

hardgrounds or chemosynthetic fauna/flora.

The backscatter map produced from the AUV multibeam echosounder data (Plates 10 and 11) shows the seafloor sediments at the proposed well location to be of moderate and uniform reflectivity typical of clays. The darker seafloor streaks seen on Plates 10 and 11 represent the splay of drilling mud and cuttings from the KC 292#1 well dispersed by bottom currents. A seabed sampling program was carried out during the 4th quarter of 2008 from the survey vessel used to acquire the HR2D data. One of the piston cores, PC-9, sampled the seafloor ~950 ft to the north of the proposed "B Rev." location (Plates 6 to 9 and 11). This core sampled very soft clays down to the maximum recovery depth of 15 ft (Plate 12), which exhibited a gradual decrease in water content and an increase in shear strength (from 0.03 to 0.12 Kips/sq ft) with depth.

The subbottom profiler data, Plate 13, shows about 6 ft of amorphous clays overlying well-stratified clays, silts and silty clays to depths of at least 150 ft bml. The Geological Assessment conducted by GEMS (2010) has identified buried landslide episodes throughout the Kaskida Minibasin which appear to have affected the Hrz10 to Hrz15 interval. At the proposed "B Rev." location, this interval occurs from 6 ft to 9 ft bml and has suffered sediment removal (depletion or erosion) by landslide events (Plate 14).

Seafloor Obstructions: The existing KC292#1 well is ~1.0 miles to the east-southeast of the proposed "B Rev." location, and the existing KC291#1 well is ~3.9 miles to the northwest (Plate 10). No man-made or natural seafloor obstructions are identified on the AUV data within a radius of 2,000 ft of the proposed location.

Keathley Canyon Block 292 does not fall in an area of high cultural resource probability (BOEMRE NTL 2005-G07 and subsequent revision 2008-G20). However, Keathley Canyon blocks are subject to the recent mitigation guidelines released by the BOEMRE in March 2011 entitled "Pre-Seabed Disturbance Survey Mitigation", which require archaeological assessments prior to undertaking any bottom-disturbing activities such as spudding a well.

A review of the 2008 AUV sidescan sonar data by a Marine Archaeologist (Fugro, 2011) revealed three sonar contacts (nos. 28, 30 and 67) identified as probable debris within KC292 (Plate 15). Contact no. 28 measures 14 x 8 ft and is ~1 mile to the north-northeast of proposed location "B Rev."; contact no. 30 measures 30 x 10 ft and is ~1.7 miles to the northeast; contact no. 67 measures 19 x 5 ft and is ~0.9 miles to the north-northwest. A fourth sonar contact, no. 78, is identified as a drilling mud splay from the KC292#1 well, and an additional target, no. 24, is in KC366 ~4,500 ft to the southwest of the proposed "B Rev." location. This target measures 20 x 8 ft. Contact no. 67 has a measured height of 11 ft, but none of the other targets exhibited relief above the seafloor. The Marine Archaeologist concluded that

"there were no unusual depressions, scours, sediment changes, or unidentified seafloor targets observed within the survey area that could represent unidentified shipwreck remains".

The proposed well will be drilled from a dynamically positioned drilling rig, so positioning of, and any seafloor disturbance due to, anchors is not an issue.

Chemosynthetic Communities:

Keathley Canyon Block 292 lies in water depths greater than 300 meters (984 ft) and is thus subject to NTL 2009-G40 regarding Deepwater Benthic Communities.

A seafloor amplitude map produced from the exploration 3D seismic data shows no anomalous features indicative of areas of "hardground" or authigenic carbonates in the vicinity of the proposed "B Rev." location (Plate 16). Anomalous amplitudes associated with the smooth-surfaced seafloor in the deepest parts of the minibasin in the northwest of KC292 are interpreted as acquisition or processing artifacts.

A backscatter map produced from the AUV multibeam echosounder data shows moderate backscatter intensity associated with the seafloor drilling splays in the vicinity of the proposed "B Rev." location (Plates 10 and 11). The highest backscatter intensity seafloor is associated with the seafloor mounds and adjacent seafloor in a prominent graben feature within the west of KC291 (Plate 10). The 2007 ROV survey (Plate 3) identified hardgrounds with chemosynthetic communities of mussels and tube worms within these areas, and the pre-spud ROV survey for the KC291#1 well (in B-geO, 2008) identified an area of asphalt clumps with tubeworms to the north of the spud location, which correlates with the high backscatter area on Plate 10. No similar high intensity backscatter areas, mounds or gas/fluid expulsion features are identified within a 2,000 ft radius of the proposed "B Rev." location **and the potential for chemosynthetic communities is therefore *Negligible*.**

Nearest Offset Wells:

The KC292#1 well in the southeast of KC292, which was drilled by BP in 2005 and the KC291#1 well in the west of KC291 which was drilled by Devon\BP in 2008\2009 are the nearest offset wells. The only other nearby wells are KC199#1 situated at the northwestern end of the Worzel Basin, ~17.2 miles to the northwest of the "B Rev." location and drilled by Marathon in 2000, and BP's KC244#1 well bordering the south side of the Worzel Basin ~11.4 miles to the west-northwest of the proposed "B Rev." location, which was drilled in 2007 (Plate 2).

Shallow Geology:

Plate 15, the Seafloor and Subsurface Geohazards Map based on an integration of the exploration 3D seismic data and the HR2D data, shows the location of HR2D line 157 and expl. 3D seismic trace 4037, which pass directly over the proposed "B Rev." location. Uninterpreted and interpreted sections of these lines are included as Plates 17, 18 and 19. At the proposed well location, the top of the underlying salt canopy is at a depth of 11,144 ft (TVDSS) and is overlain by approximately 5,110 ft of sediments,

which have been divided into eight general seismic-stratigraphic units (Plate 19 and Plate 20 – Tophole Formation and Geohazards Summary Sheet) based on correlation with the post-drill results from the nearby KC292#1 well:

- Unit A (Seafloor to Horizon 10) is about 457 ft thick and comprises a series of soft clays overlying interbedded clays and thin clay-prone debris flows.
- Unit B (Horizon 10 to Horizon 20) is about 474 ft thick and comprises an upper clay-prone debris flow overlying a lower section of well-bedded clay turbidites. The debris flow has eroded the underlying turbidites, and to the north and northwest of the proposed location, within the deepest parts of the minibasin, Unit B is entirely comprised of debris flows.
- Unit C (Horizon 20 to Horizon 30) is about 567 ft thick and comprises well-bedded turbidites grading downward from clays into silts and clays, with possible sands.
- Unit D (Horizon 30 to Horizon 40) is about 492 ft thick and comprises a massive clay-prone debris flow overlying clay and silt turbidites with possible sands.
- Unit E (Horizon 40 to Horizon 50) is about 577 ft thick and comprises clay and silt turbidites with possible sands above and below a central clay-prone debris flow. Horizon 50 at the base of Unit E appears to be an unconformity.
- Unit F (Horizon 50 to Horizon 60) is about 346 ft thick and comprises clay and silt turbidites with thin interbedded clay-prone debris flows. Unit F appears to pinch-out around the margins of the minibasin to the south and east.
- Unit G (Horizon 60 to Horizon 70) is about 533 ft thick and comprises well-bedded clay and silt turbidites with possible sands in the lower portion.
- Unit H (Horizon 70 to Top Salt reflector) is about 1,664 ft thick and comprises clay and silt turbidites with thin interbedded debris flows. Post-drill results from the KC292#1 offset well indicate occasional sandy horizons (e.g. H75 at 4,245 ft bml) are present within the central and lower portions of the unit.

Shallow Hazards:

Plate 20 is a Top-Hole Formation and Geohazards Summary Sheet for the proposed well showing the interpreted stratigraphy and predicted drilling hazards.

Faults: The proposed well bore will intersect one fault at a depth of ~4,003 ft bml (Plates 17, 19 and 20). The fault plane dips to the south and can be traced to a shallowest depth of ~2,300 ft bml, suggesting it is no longer active. No seafloor faults are identified within 1,500 ft of the proposed well location. The large curvilinear strike-slip fault that passes 2,500 ft to the southeast of the proposed "B Rev." location appears to have a near-vertical dip and intersects the Top Salt reflector ~ 2,000 ft to the southeast of the proposed wellbore.

Shallow Gas: Analysis of both the HR2D and exploration 3D seismic data identified several anomalies with indications of shallow gas within the southwest quadrant of KC292 (Plate 15). The closest anomalies to the proposed wellbore are ~600 ft to the north within the lower sandy portion of Unit E at a depth of ~2,500 ft bml, and associated with a possible sand within the central portion of Unit G ~1,000 ft to the south at a depth of ~3,100 ft bml (Plates 18 and 19). Hence, ***the risk of encountering shallow gas within the overburden section at the proposed "B Rev." location between seabed at 6,034 ft TVDSS and the Top Salt reflector at 11,144 ft TVDSS is considered to be Negligible***. No shallow gas was encountered in the KC292#1 offset well.

Shallow Water Flow (SWF): Two potential sand-prone units, Units E and G, were identified by BP in 2004 prior to the drilling of the KC292#1 well as potential SWF zones (Plate 20). Both of these units could be correlated with sand zones at the offset well, KC 199#1, where the shallowest interval (equivalent to Unit E at the proposed well location) produced a mild SWF occurrence. These two units are present at the proposed "B Rev." location (Unit E is from 1,990 to 2,567 ft bml and Unit G is from 2,913 to 3,446 ft bml) and appear to be thicker and structurally deeper.

Seawater was used to drill the initial tophole section of the KC292#1 well down to the level of the 28-inch casing shoe, which topset Unit E. The remainder of the tophole section down to the mud, and the equivalent mud weight at the bottom of the hole (ECD) increased from 8.6 ppg to 9.8 ppg during the drilling of Units E, F, G and the upper portion of Unit H. The gamma ray logs for this section of the well confirmed sands within units E and G, but there were no instances of SWF.

The risk for encountering shallow water flow at the proposed "B Rev." well is therefore considered Negligible for the tophole section including the sand-prone units E and G.

It is anticipated that the proposed casing program for the "B Rev." well will be similar to that used for the KC292#1 well, with the 28" casing shoe topsetting Unit E and the 22" casing shoe topsetting the shallowest sand (Horizon 75) within Unit H.

Shallow Oil: No oil or tar seeps are evident at the seafloor in the vicinity of the proposed "B Rev." location (sidescan sonar and backscatter data) and no shallow oil was encountered during drilling of the overburden sediments at the KC292#1 well. Therefore, the risk for encountering shallow oil from the seafloor to the Top Salt reflector is considered ***Negligible***.

Hydrates: Bottom Simulating Reflectors (BSRs) are not observed on the either the exploration 3D or HR2D seismic profiles throughout the KC292 area, and no instances of gas hydrates were reported during drilling of the KC292#1 well. The risk of encountering hydrates in the proposed well is therefore considered ***Negligible***.

CONCLUSIONS

This Shallow Hazards Assessment for location "B Rev." in Keathley Canyon Block 292 (OCS-G-25792) supplements the Exploration Plan (EP) to be submitted to the United States Department of the Interior, Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE). This narrative defines the proposed location and documents the anticipated seafloor and tophole drilling conditions, any geohazards, and the likelihood of encountering chemosynthetic community habitats within 2,000 ft of the primary location. This clearance area encompasses proposed alternate location KC292 "C Rev.", 250 ft to the west of the primary "B Rev." location.

Conditions at the proposed drilling location have been evaluated on the basis of: 3D seismic data acquired by Digicon in 1998 and the findings of a regional 3D geohazards assessment for KC 247, 248, 291, and 292, based on this data volume and carried out by BP in 2004; the results of a 2007 ROV survey carried out over proposed wellsites and potential chemosynthetic habitats in KC291; an AUV survey and interpretive report conducted by Fugro GeoServices, Inc. in October 2008 for BP, which covered KC Blocks 246-248, 290-292 and 335-336; results of an HR2D survey acquired by FGSI over a subset of the AUV grid from October to December 2008 and in early August 2009; preliminary results of a Geological Assessment and Geotechnical Field Program Planning Report primarily based on the 2008 AUV data (GEMS, 2010); and well information for the nearby KC292#1 well drilled in 2005 and the KC291#1 well drilled in 2009/2009.

Results of the data review for the proposed "B Rev." location indicate:

- Water depth is 6,034 ft and the uniform, soft clay seafloor sediments slope down to the north-northeast at 3.1°.
- A major seafloor strike-slip fault, which extends down to the Top Salt reflector, and trends approximately northeast-southwest, is 2,500 ft to the southeast of the proposed location. This fault has a 10 ft relief seafloor scarp and a near vertical dip, so will not intersect the proposed borehole.
- There are no seafloor mounds, hardgrounds or evidence for gas/fluid escape features on the seafloor in the vicinity of the proposed well and therefore **the risk for the existence of high-density chemosynthetic communities within 2,000 ft of the proposed well location is considered *Negligible*.**
- The existing KC292#1 well is ~1.0 miles to the east-southeast of the proposed "B Rev." well. A Marine Archaeologist examined the 2008 AUV survey data and concluded that the four sonar contacts within KC292 are not indicative of shipwreck remains.

- The risk of encountering **shallow gas** or **shallow water flow** is ranked as ***Negligible*** throughout the supra-salt section. Sandy intervals which exhibited no overpressures in the nearby KC292#1 well are expected between depths of 1,990 – 2,567 ft bml (Unit E) and 2,913 – 3,446 ft bml (Unit G). The nearest possible shallow gas anomalies occur ~600 ft to the north within Unit E and ~1,000 ft to the south within Unit G.
- The risk of encountering **shallow oil** or **gas hydrates** is ranked as ***Negligible*** between the Seafloor and Top Salt reflector.

We advise caution, but believe that the risk of danger to personnel and damage to the borehole, equipment and environment is ***Low***, provided strict adherence to proper drilling and cementing procedures is followed concerning these hazards until the first pressure containment string is in place at about 4,000 ft below mudline.

Prepared By:

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18 May 2011

Reviewed By:

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BP GoM Exploration SPU, Tiger Team
18 May 2011

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Fugro GeoServices, Inc. (FGSI), 2009. "AUV Hazard Survey Report, Kaskida Development Project, Blocks 246, 247, 248, 290, 291, 292, 335 and 336, Keathley Canyon Area, US Gulf of Mexico". FGSI Report No. 2408-5016, prepared for BP America Inc., June 1, 2009.

Fugro GeoServices, Inc. (FGSI), 2011. "AUV Archaeological Assessment, Kaskida Prospect, Blocks 246-248, 290-292 & 335-336, Keathley Canyon Area, Gulf of Mexico". FGSI Report No. 2411-1025, prepared for BP America Inc., May 12, 2011.

Geoscience Earth & Marine Services, Inc. (GEMS), 2007. "Seafloor Verification Study Using ROV Data, Kaskida Prospect Area, Block 291, Keathley Canyon Area, Gulf of Mexico". GEMS Project No. 0202-1298, prepared for BP America Inc, May 3, 2007.

Geoscience Earth & Marine Services, Inc. (GEMS), 2010. "Phase 1 Report: Geologic Assessment and Geotechnical Field Program Planning, Kaskida Development Project, Blocks 246-248, 290-292, and 335-336, Keathley Canyon Area, Gulf of Mexico". GEMS Project No. 1209-1731, preliminary report prepared for BP America Inc, June 3, 2010.

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Proposed KC 292 “B Rev.” Location Shallow Hazards Assessment Data Examples

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Bernie Care, May 2011

Location Map, Northern Gulf of Mexico

Proposed Keathley Canyon Block 292 “B Rev.” Location

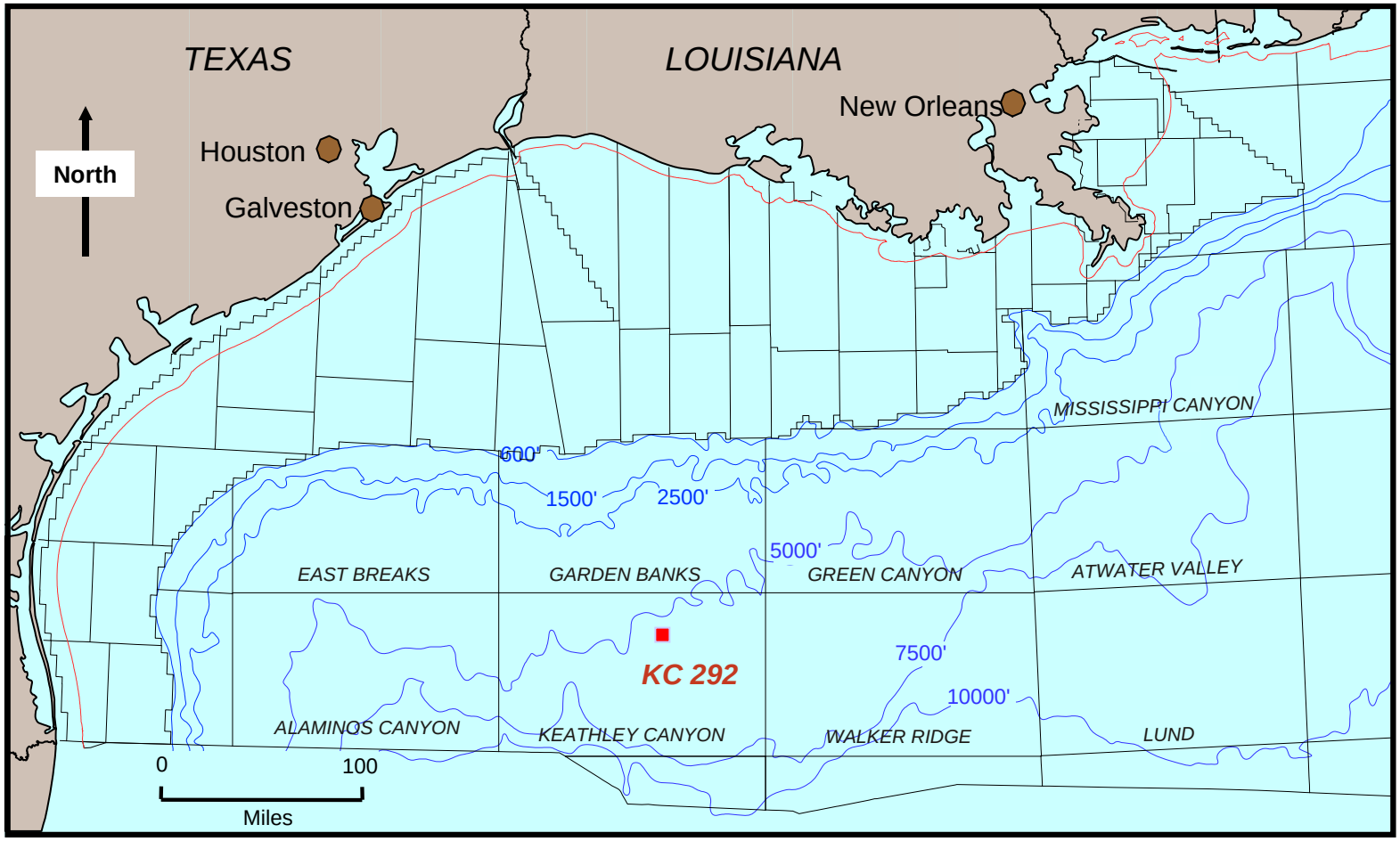
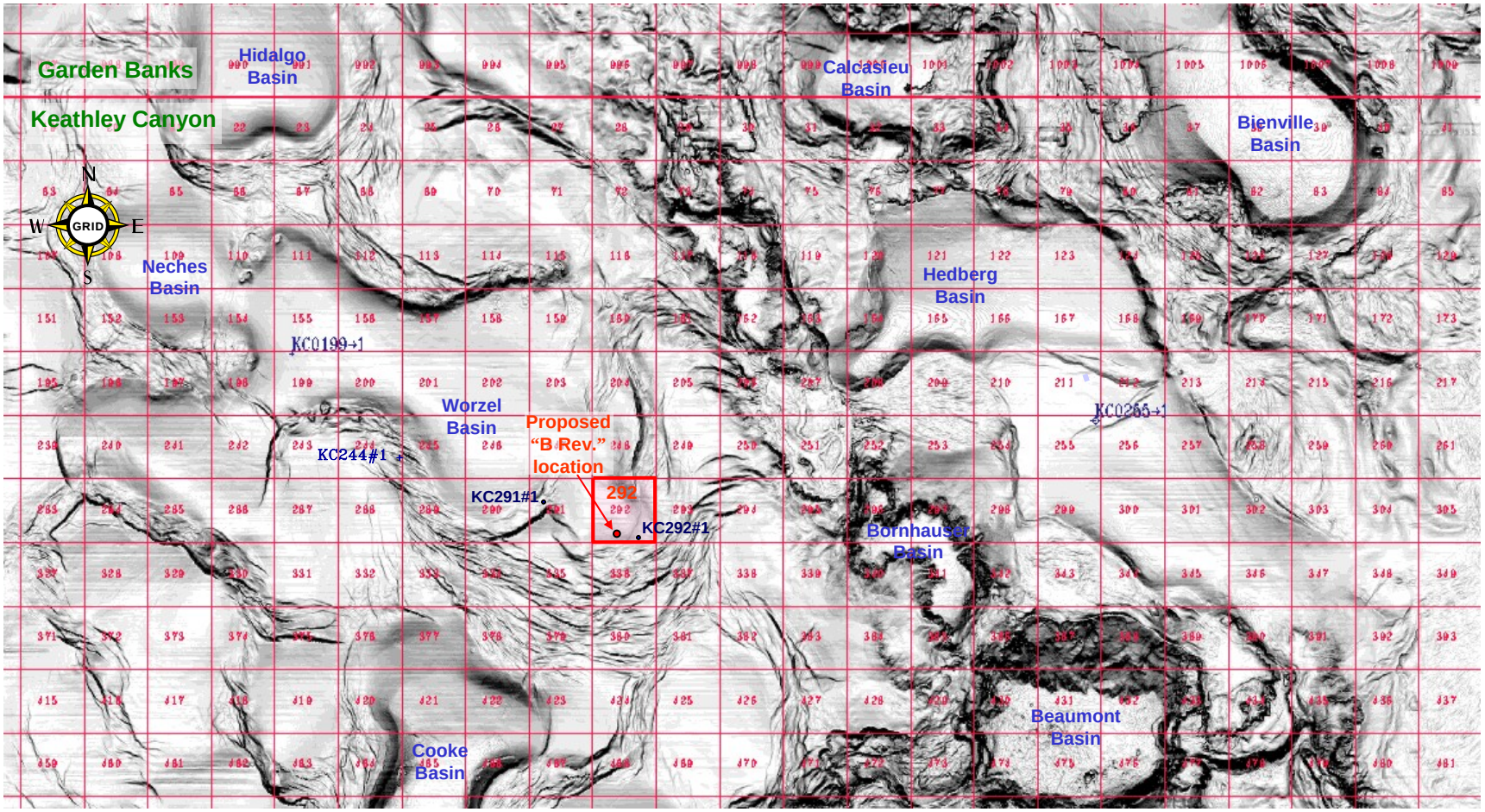


Plate 1

Regional Seafloor Morphology, Northern Keathley Canyon Area

Proposed Keathley Canyon Block 292 “B Rev.” Location



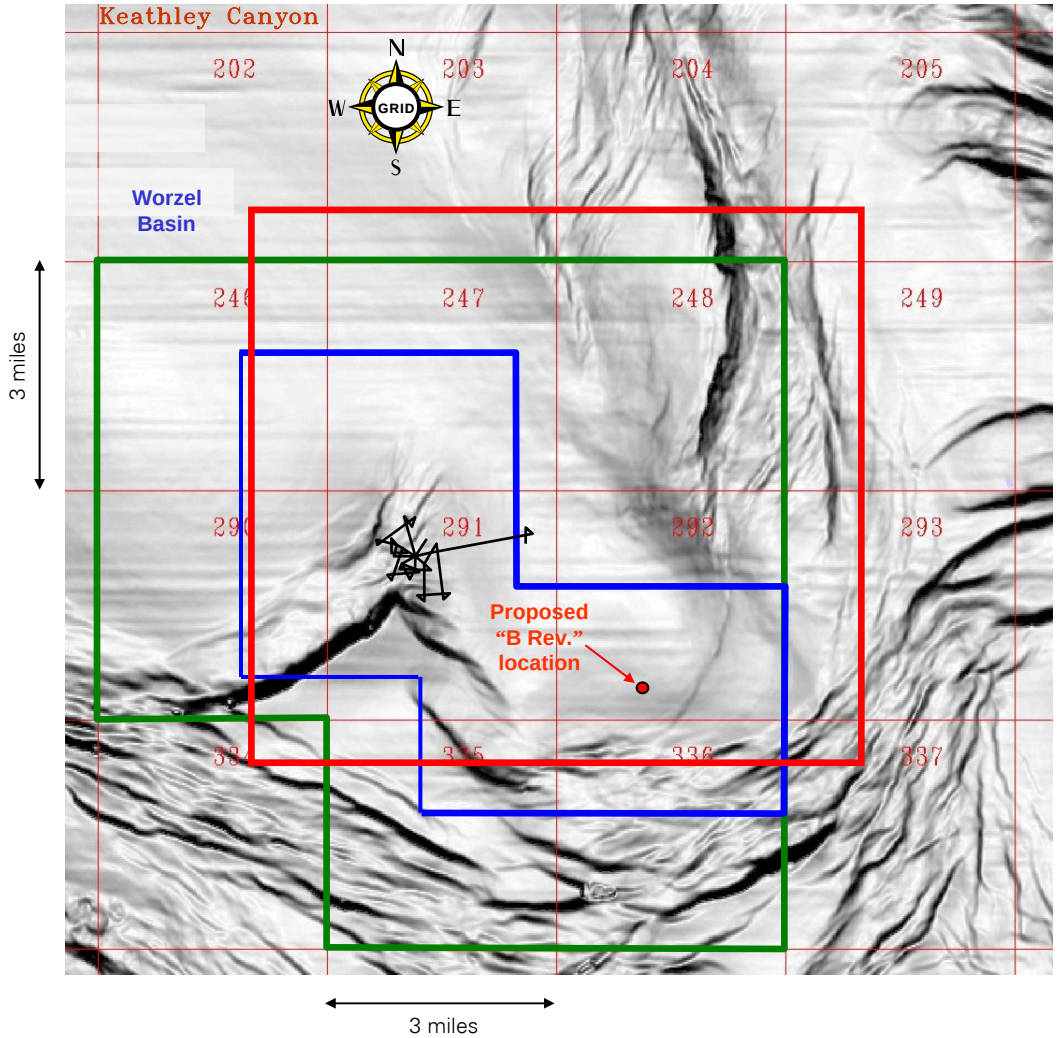
→ 3 miles ←

(Edge map produced from exploration 3D seismic data)

Plate 2

Seafloor Morphology, Kaskida Prospect, Showing Existing Survey Coverage

Proposed Keathley Canyon Block 292 “B Rev.” Location



Shallow Hazards Reports:

BP 2004 (Expl. 3D seismic)

FGSI 2008 (AUV)

FGSI 2008/2009 (HR2D seismic – acquisition only)

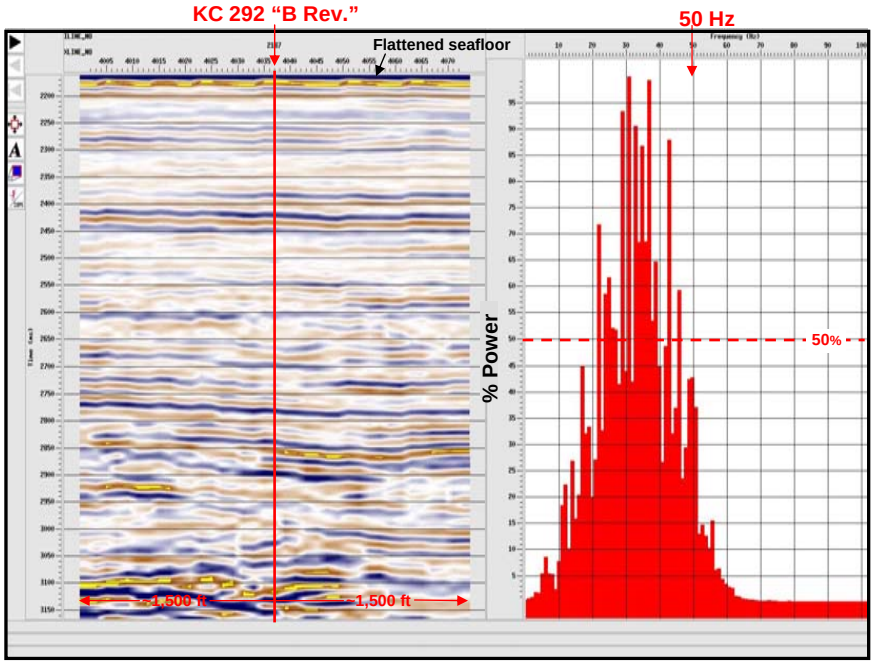
GEMS 2007 (ROV chemo. survey)

(Edge map produced from exploration 3D seismic data)

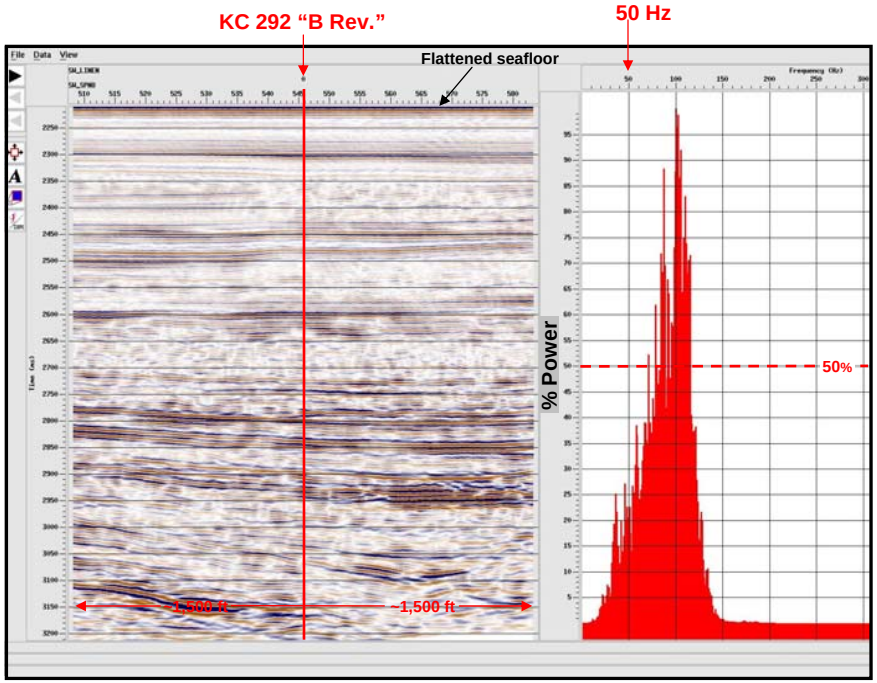
Plate 3

Power Spectra – Exploration 3D and High-Resolution 2D Seismic Data Comparison

Proposed Keathley Canyon Block 292 “B Rev.” Location



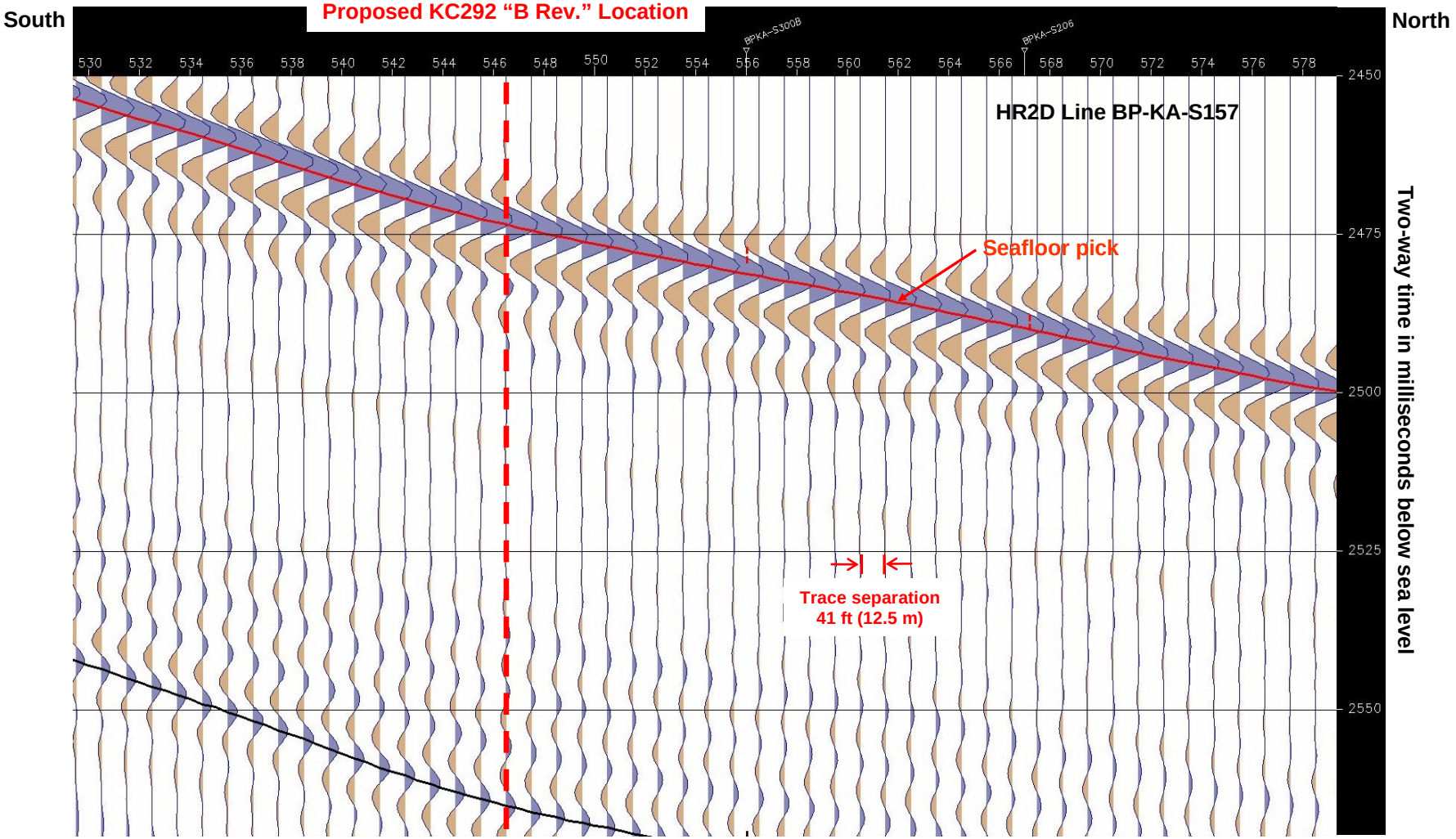
Exploration 3D Seismic Data
“B Rev.” location at Line 2187 and Trace 4037



High-Resolution 2D Seismic Data
“B Rev.” location at SP 546 on Line BP-KA-S157

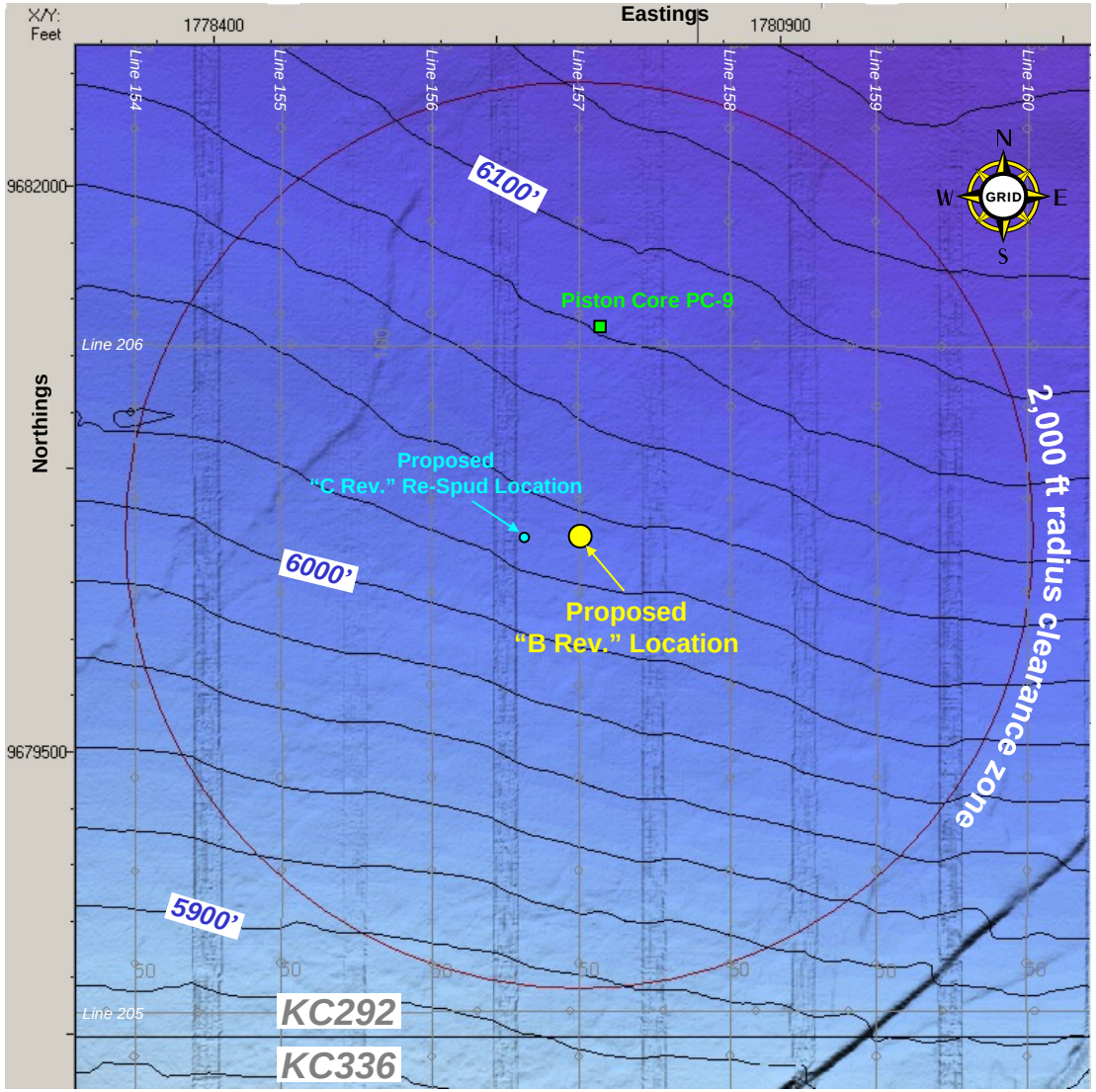
High-Resolution 2D Seismic Data - Seafloor Reflection Wavelet

Proposed Keathley Canyon Block 292 “B Rev.” Location



Bathymetry Map

Proposed Keathley Canyon Block 292 “B Rev.” Location



LEGEND

SHOT POINT & SHOT POINT No.

CONTOUR INTERVAL = 20'

ZERO DATUM = SEA LEVEL

APPLIED ACOUSTIC VELOCITY = HARMONIC MEAN

Water Depths

Deep

Shallow

Vertical Exaggeration x1

Artificial Sun:

Azimuth = 315°

Inclination = 45° from horizontal

Scale 1:10,000

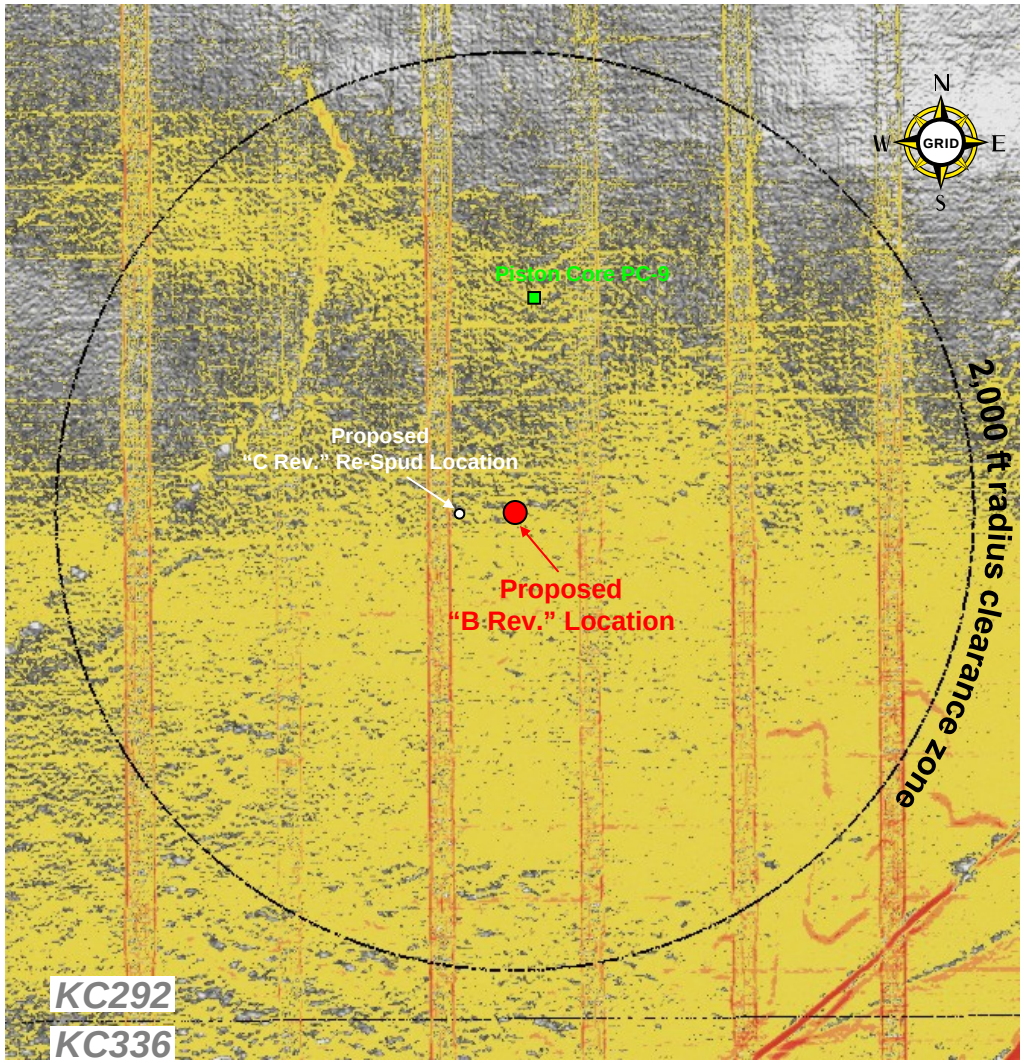
0 1,000

U.S. Survey Feet

SMT display of seafloor rendering with bathymetry contours overlain (derived from Fugro 2008 AUV MBES data)

Seafloor Gradient Map

Proposed Keathley Canyon Block 292 “B Rev.” Location



LEGEND

Seafloor Slope in Degrees

- >9
- 6-9
- 3-6
- 3
- 0

Scale 1:10,000

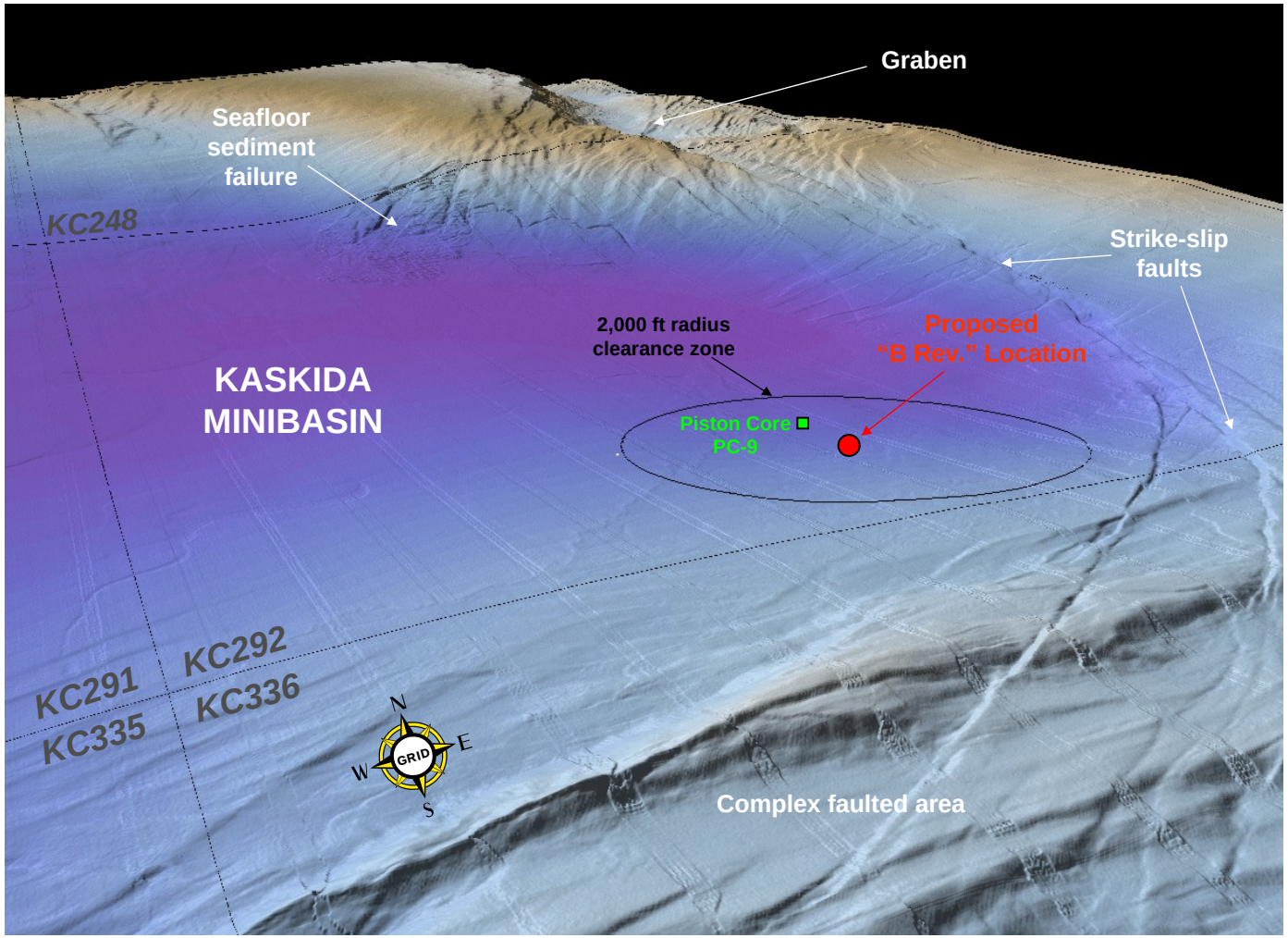
0 1,000

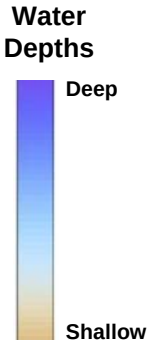
U.S. Survey Feet

Fledermaus display of seafloor gradient (derived from Fugro 2008 AUV MBES data)

3-D Perspective View Looking to North-Northeast Across KC 292 Showing Prominent Seafloor Features

Proposed Keathley Canyon Block 292 “B Rev.” Location



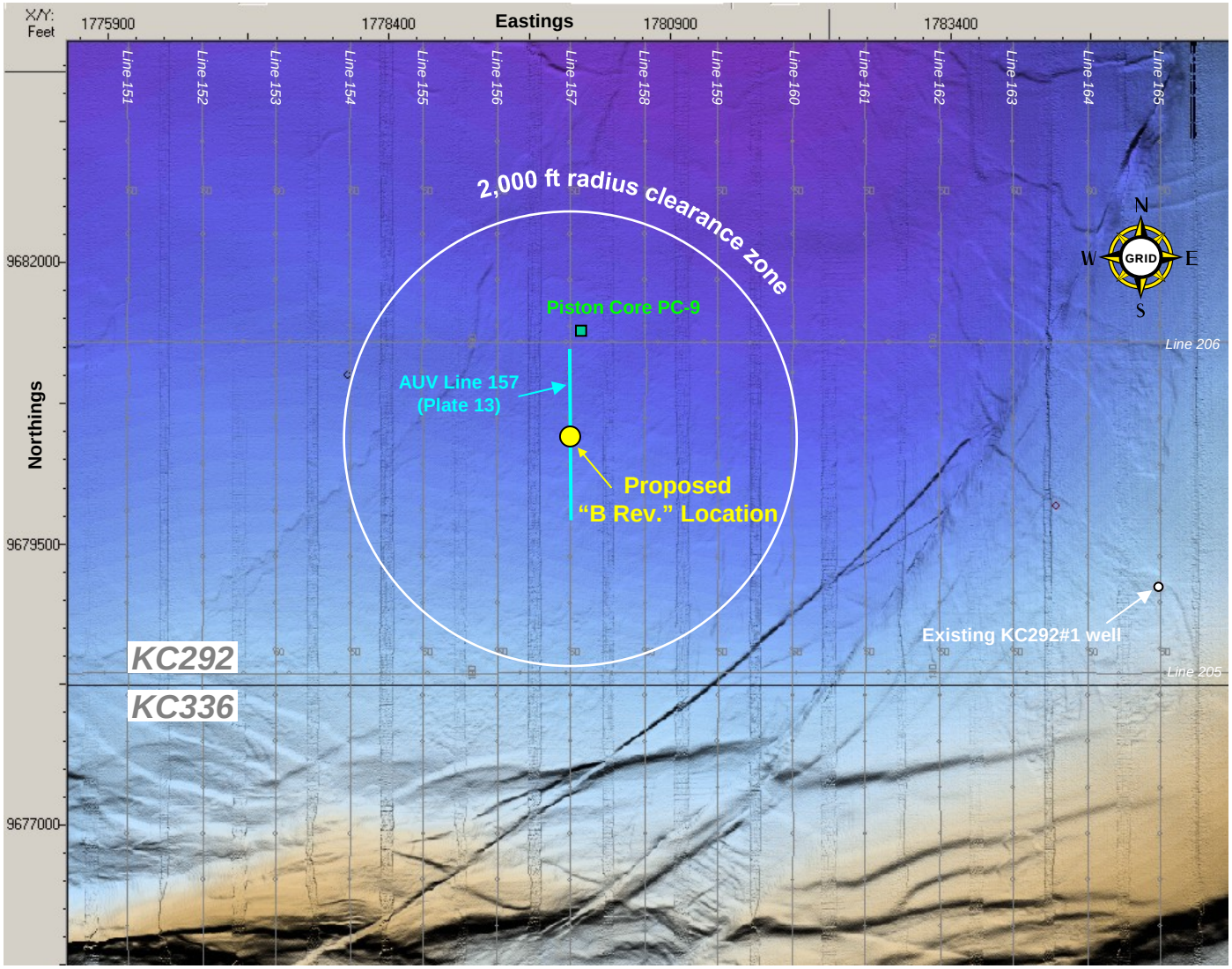


Vertical Exaggeration x2
Artificial Sun:
Azimuth = 315°
Inclination = 20° from horizontal

Seafloor display produced using Fledermaus software and Fugro 2008 AUV MBES data

Seafloor Rendering

Proposed Keathley Canyon Block 292 "B Rev." Location



LEGEND

Water Depths

Deep

Shallow

Vertical Exaggeration x1

Artificial Sun:

Azimuth = 315°

Inclination = 45° from horizontal

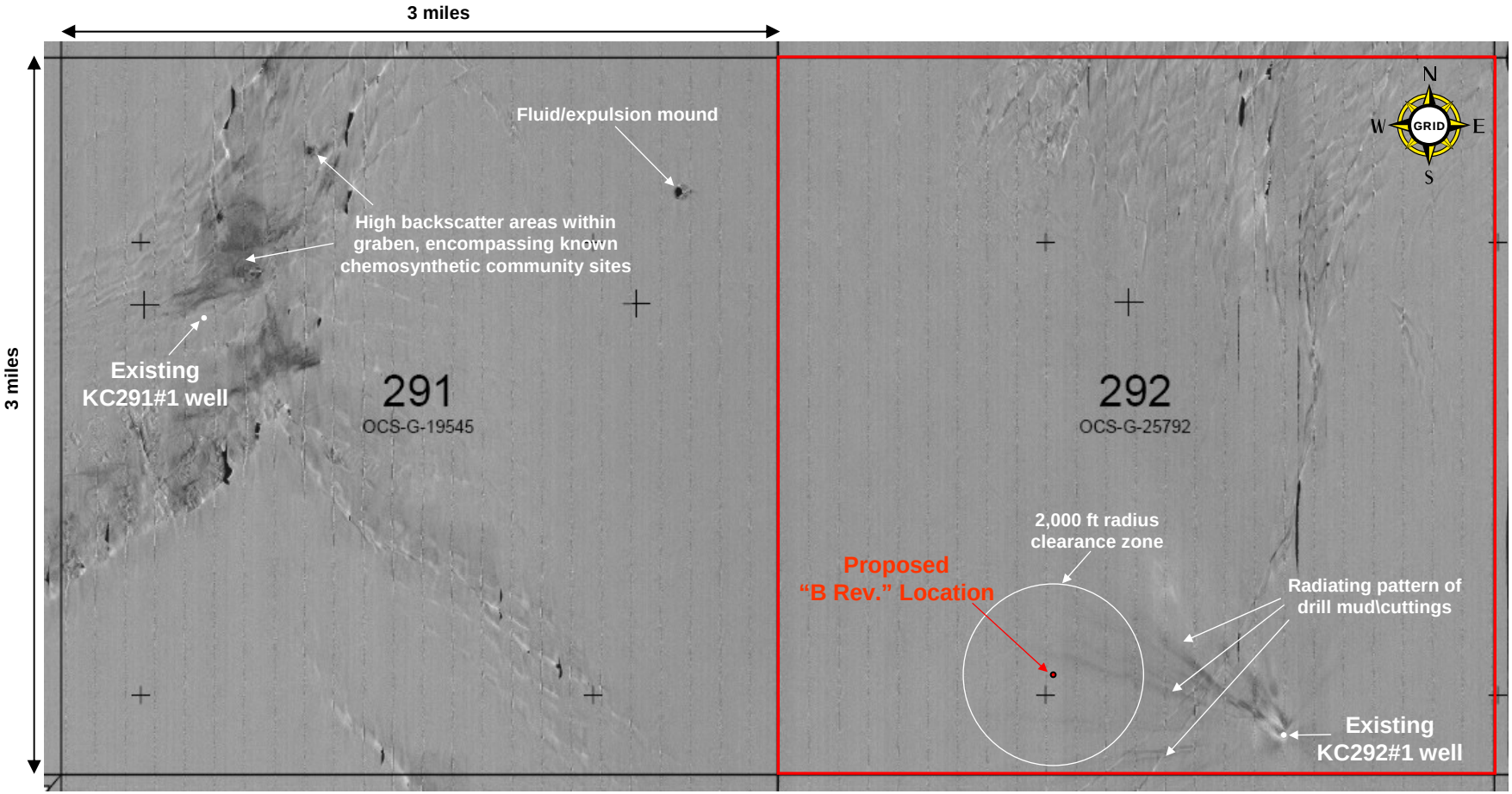
0 2,000

U.S. Survey Feet

SMT display of seafloor rendering (derived from Fugro 2008 AUV MBES data)

Seafloor Backscatter Map – KC291 and KC292

Proposed Keathley Canyon Block 292 “B Rev.” Location



BACKSCATTER INTENSITY

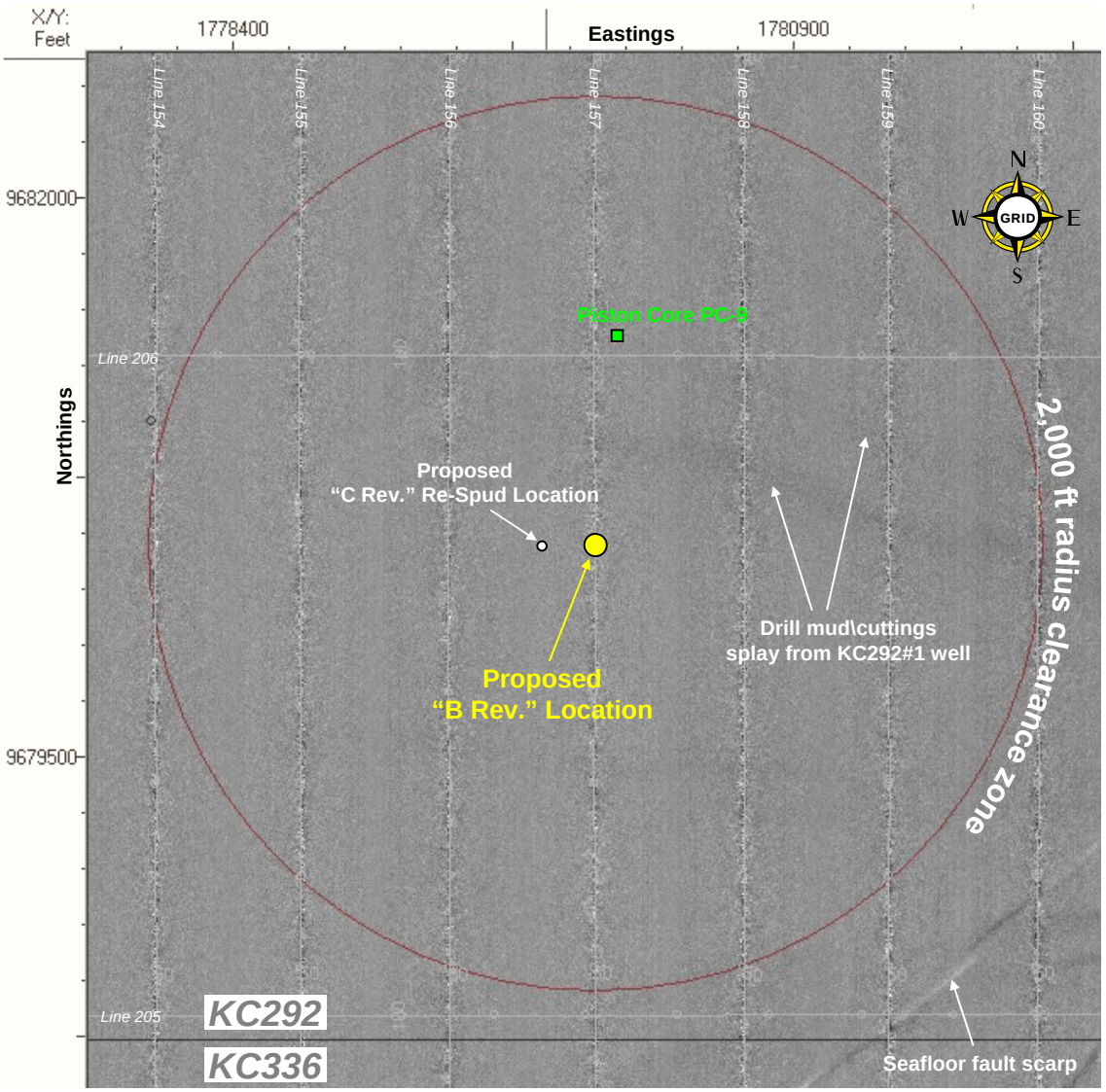
High Low

BIN SIZE = 50cm
FISH ALTITUDE = 42m

Portion of Multibeam Backscatter Map
(from Fugro 2009 AUV Hazard Survey Report)

Seafloor Backscatter Map

Proposed Keathley Canyon Block 292 “B Rev.” Location



LEGEND

BACKSCATTER INTENSITY

Scale 1:10,000

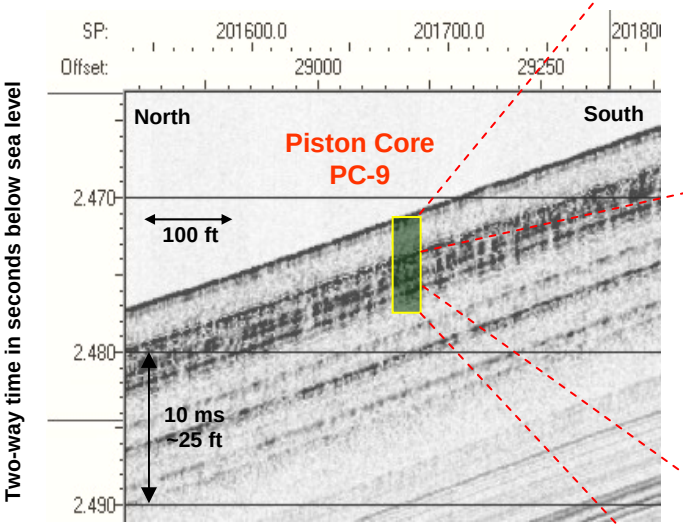
0 1,000

U.S. Survey Feet

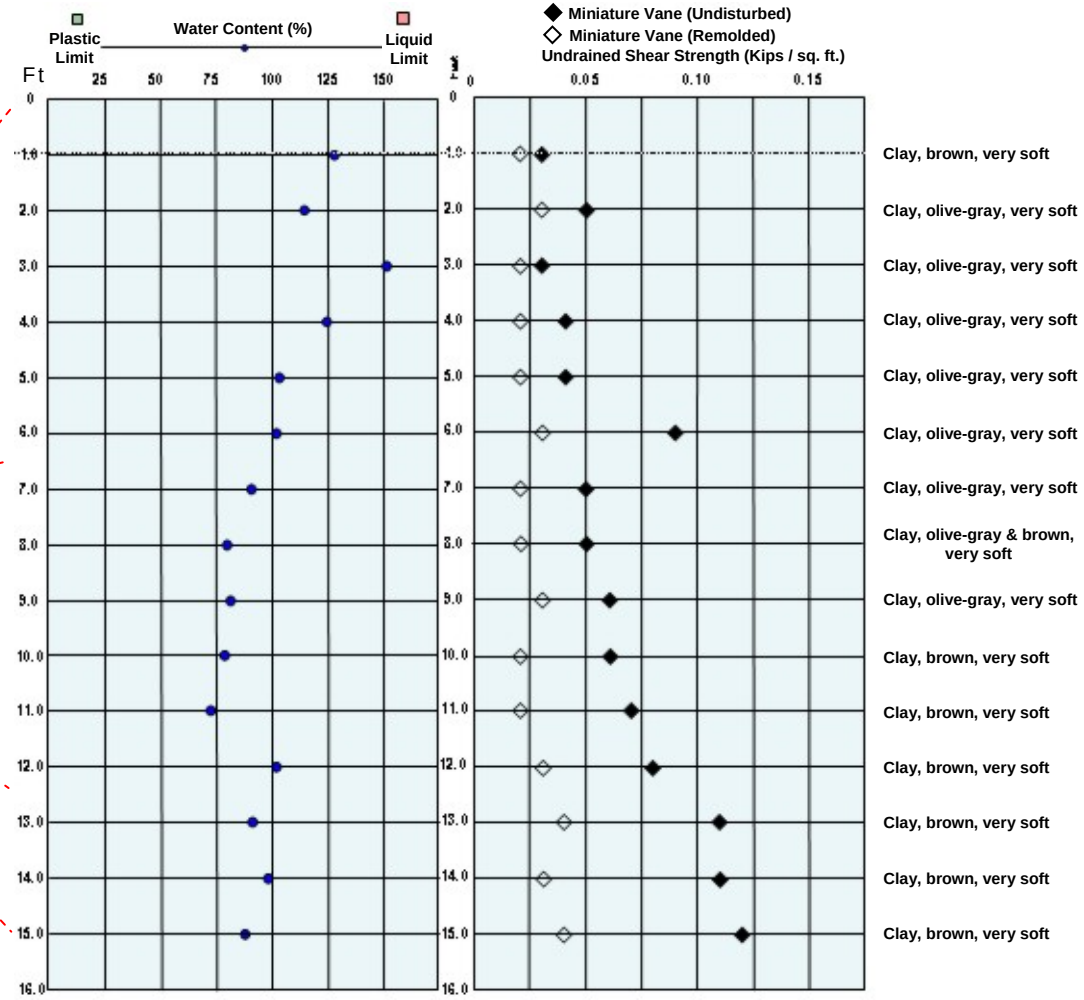
SMT display of seafloor backscatter
(derived from Fugro 2008 AUV MBES data)

Geotechnical Log – Piston Core PC-9

Proposed Keathley Canyon Block 292 “B Rev.” Location



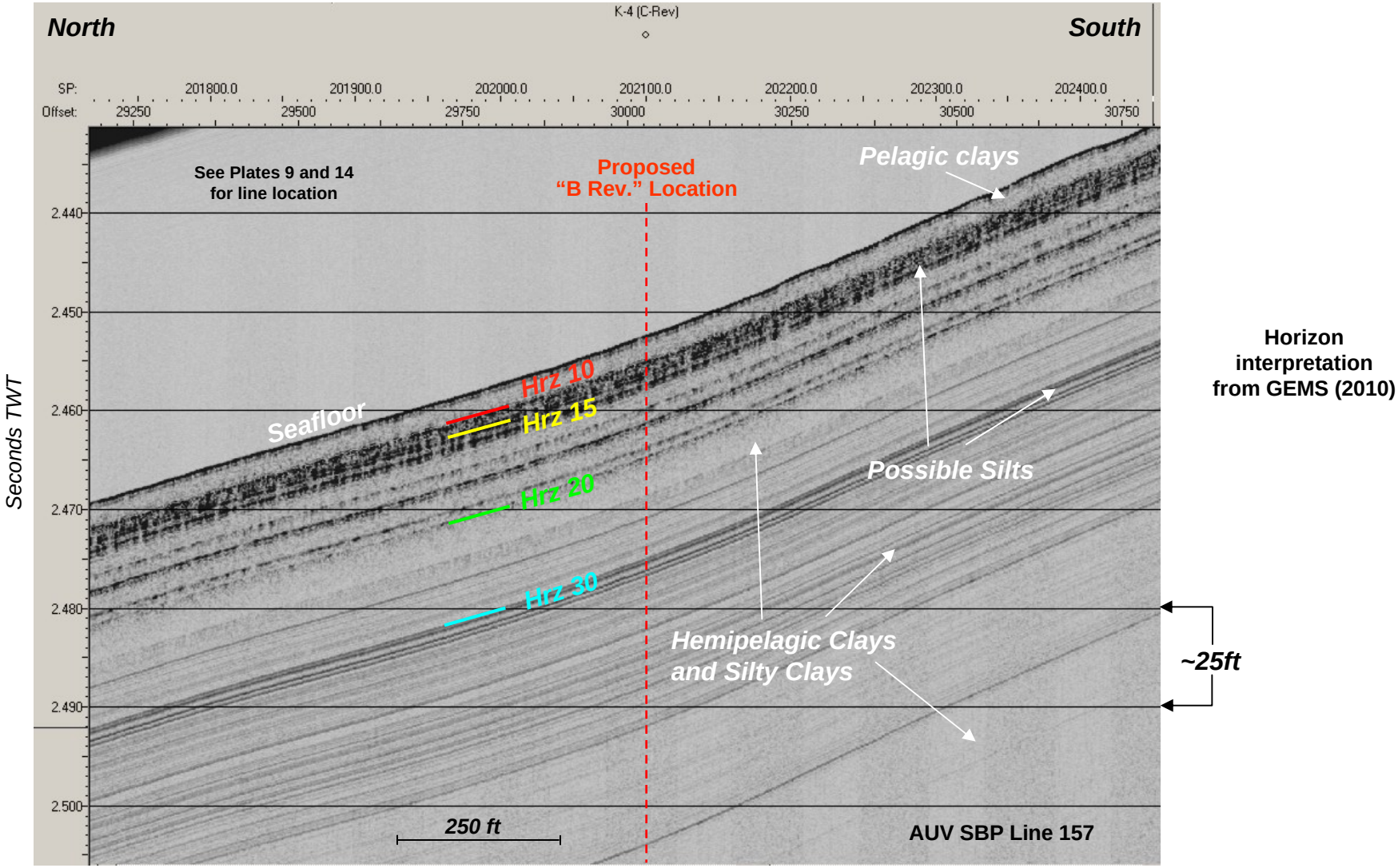
SMT display of portion of AUV SBP Line 157



Soil laboratory test results from Fugro McClelland Marine Geosciences, Inc. (in FGSI 2009 report)
PC-9 location is ~950 ft to N of Proposed “B Rev.” Location (Plates 6 thru 9 and 11)

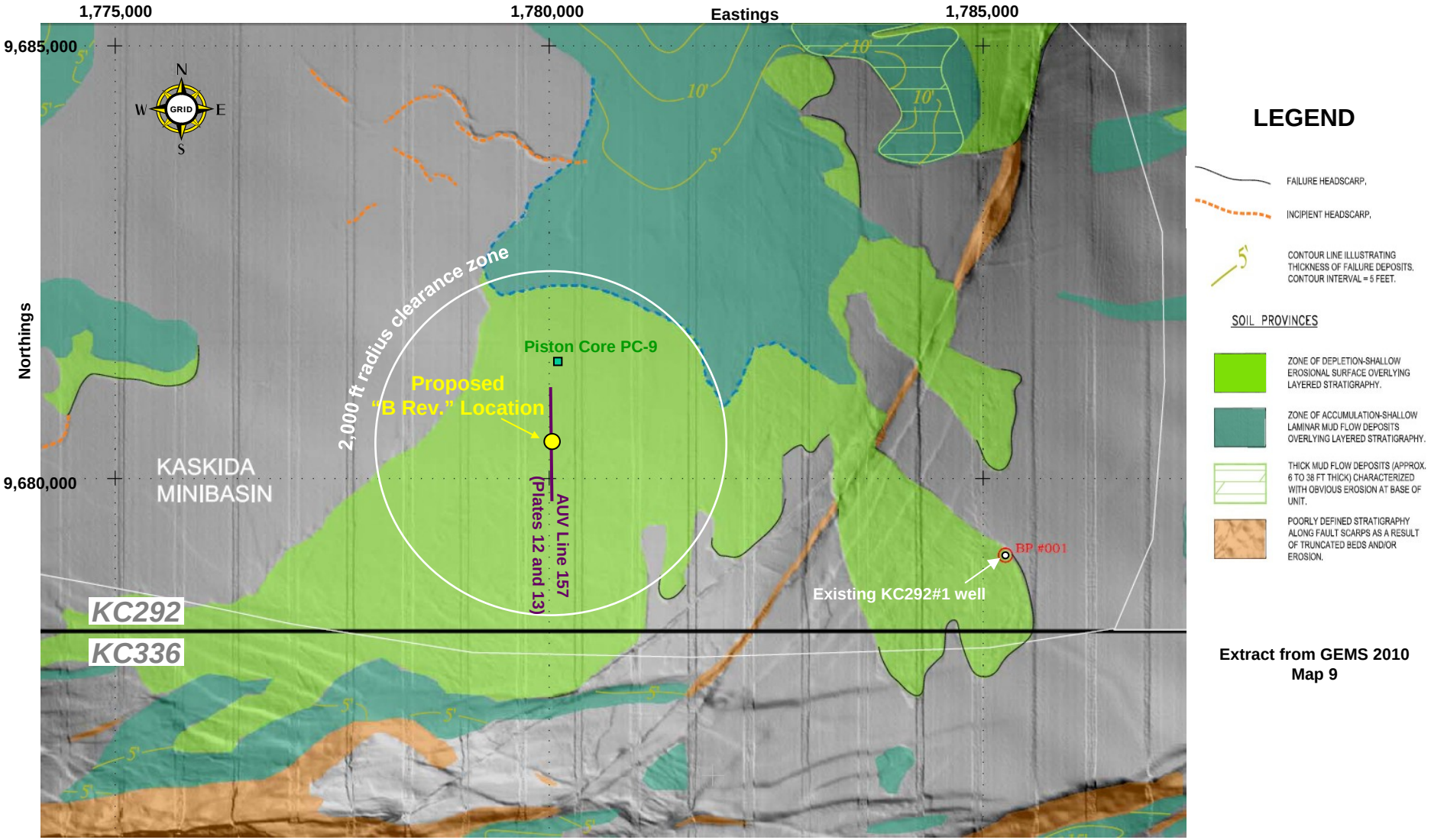
North-South Subbottom Profile Through Proposed Location

Proposed Keathley Canyon Block 292 “B Rev.” Location



Shallow Soils Province Map

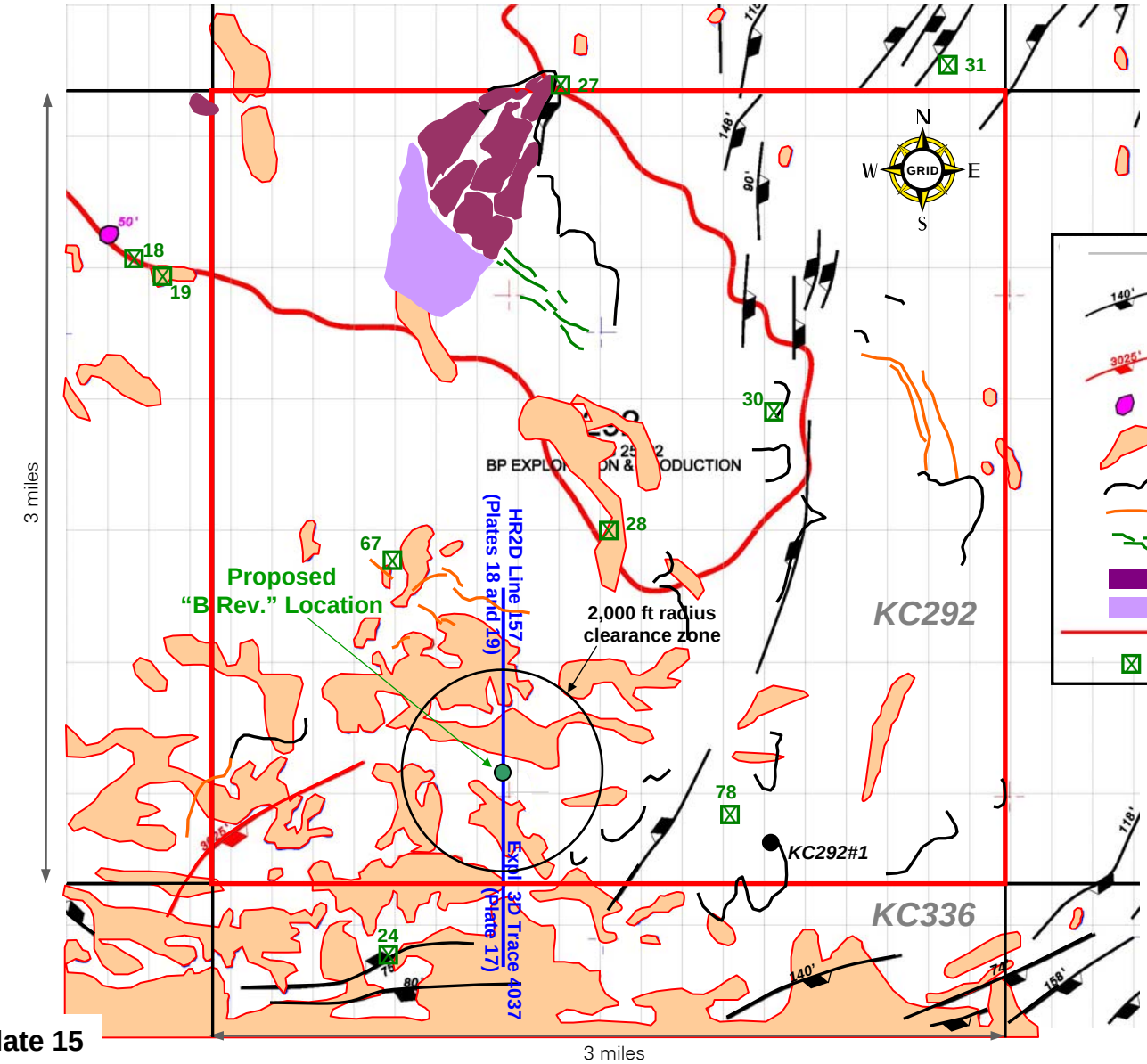
Proposed Keathley Canyon Block 292 “B Rev.” Location



Extract from GEMS 2010
Map 9

Seafloor and Subsurface Geohazards Map

Proposed Keathley Canyon Block 292 “B Rev.” Location



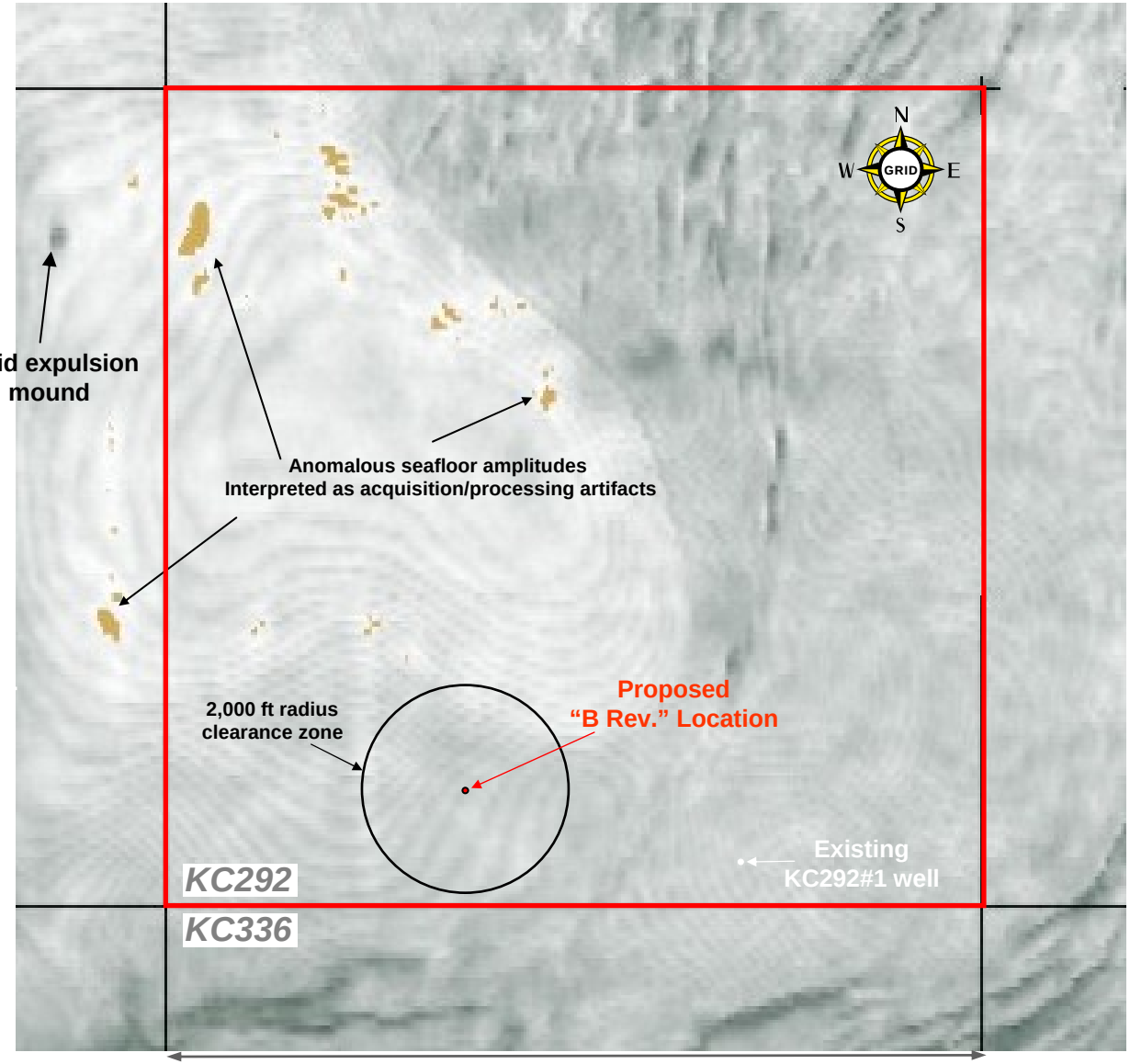
LEGEND

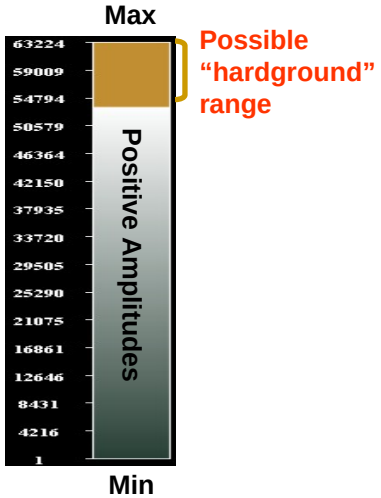
- 3D SEISMIC LINE
- 140' — SEAFLOOR FAULT WITH SCARP RELIEF INDICATED IN FEET. HOUSE SHOWS DIRECTION OF FAULT DIP. UN-ANNOTATED FAULTS HAVE SCARP RELIEFS OF LESS THAN 35 FT.
- 3025' — BURIED FAULT WITH DEPTH OF BURIAL INDICATED IN FEET. HOUSE SHOWS DIRECTION OF FAULT DIP.
- SEAFLOOR GAS/FLUID EXPULSION MOUNDS WITH RELIEF IN FEET.
- AMPLITUDE ANOMALIES REPRESENTING POSSIBLE GAS BETWEEN HORIZON 40 AND HORIZON 70. ANOMALIES ARE DERIVED FROM BOTH EXPLORATION 3D AND HR2D DATA.
- FAILURE HEADSCARP
- INCIPIENT HEADSCARP
- “CREASE” – DOWNSLOPE LIMIT OF SEDIMENT ACCUMULATION FROM A POTENTIAL CREEP FAILURE
- SHALLOW BURIED LANSLIDE – COHESIVE RAFTED SEDIMENT BLOCKS
- SHALLOW BURIED LANDSLIDE – MUD FLOW
- APPROXIMATE EDGE OF SALT CANOPY. SALT IS ABSENT BENEATH AN AREA IN THE NW OF KC 292 AND EXTENDING TO THE NW.
- 28 — SIDESCAN SONAR TARGET

Extract from BP 2004 Regional Shallow Hazards Report, Map 12 modified with addition of potential shallow gas anomalies mapped from HR2D data and landslide features taken from GEMS 2010

Seafloor Amplitude Map

Proposed Keathley Canyon Block 292 “B Rev.” Location

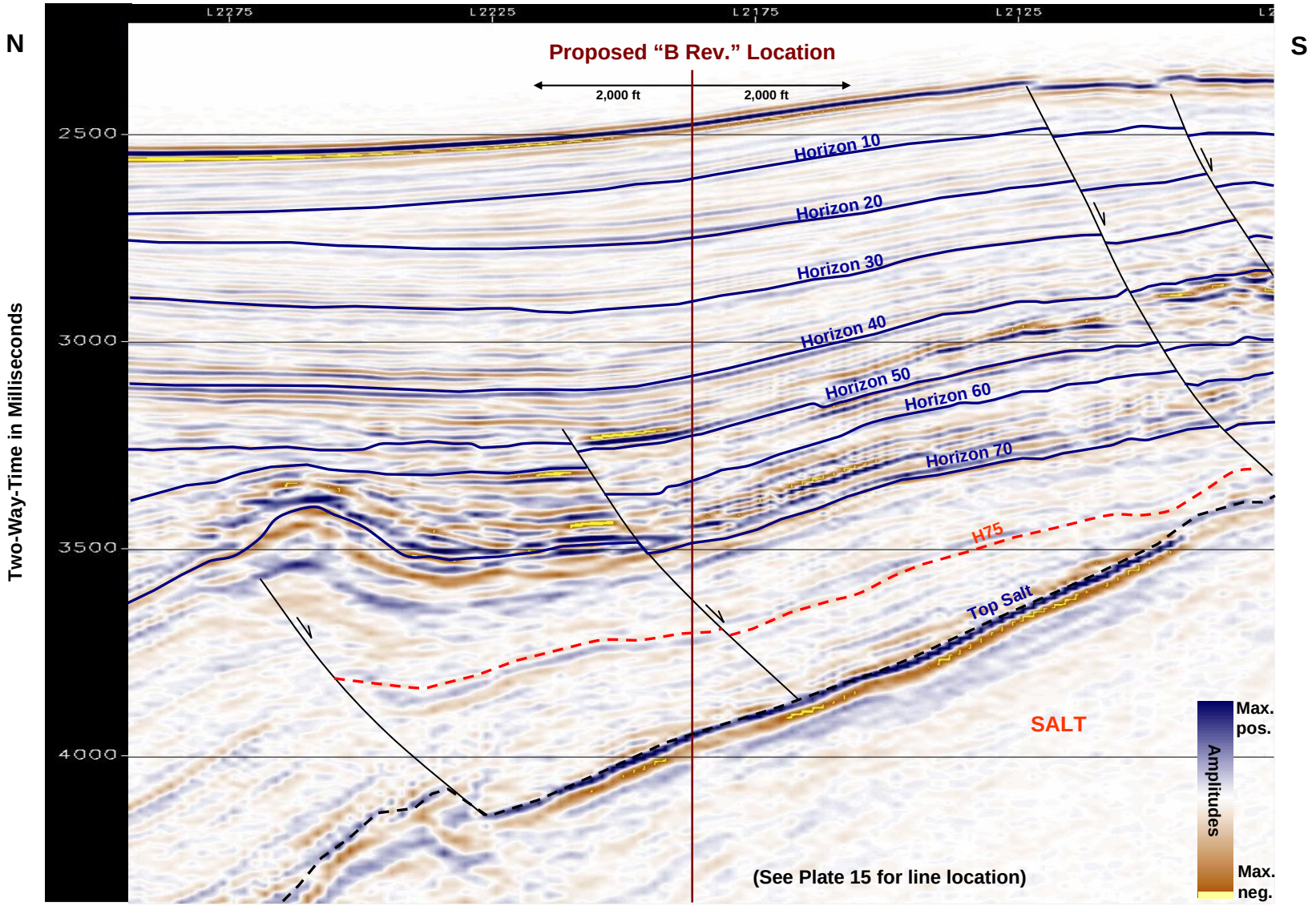




Seafloor amplitudes derived from exploration 3D seismic data

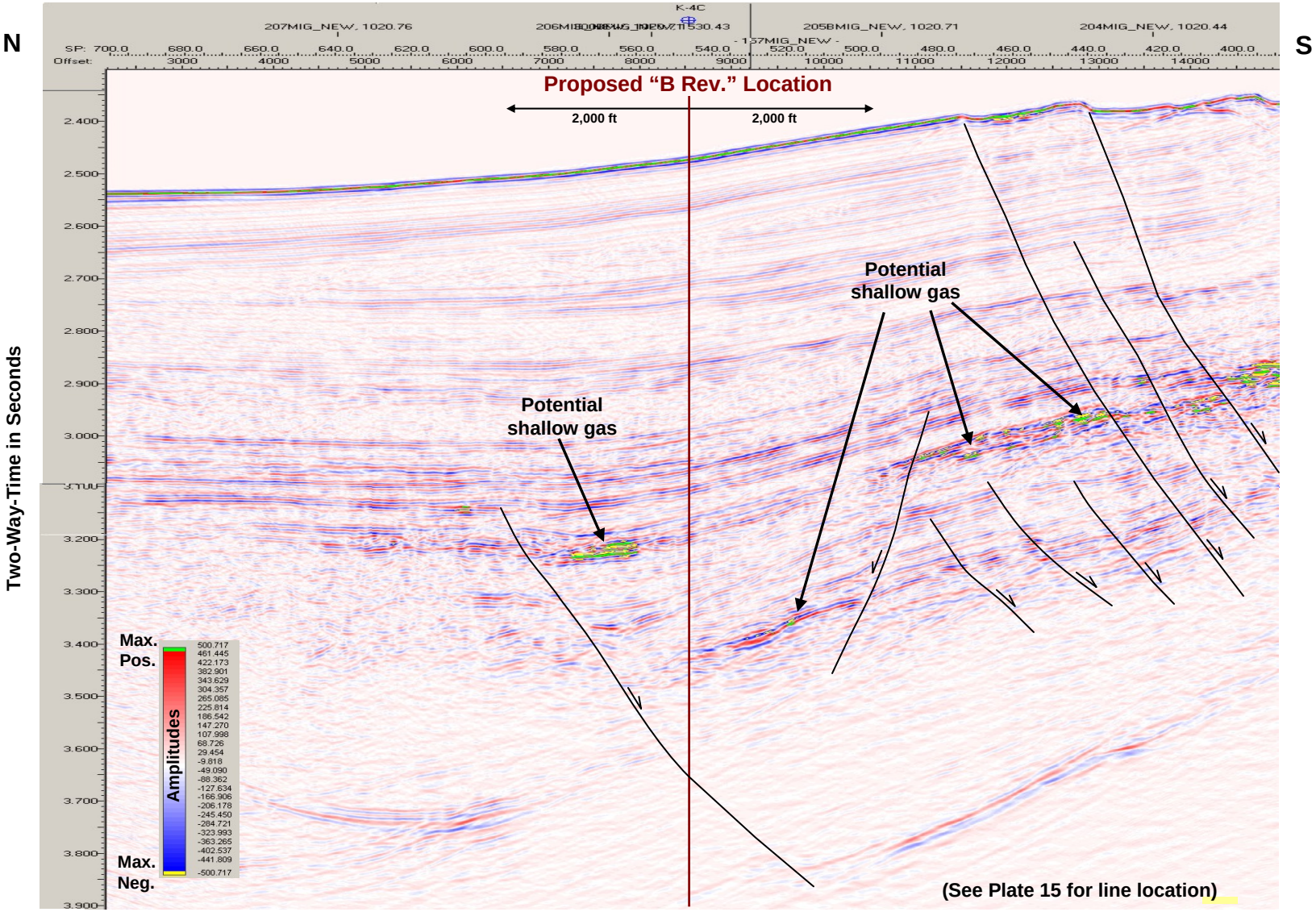
Exploration 3D Seismic Trace 4037 Through Proposed Well Location

Proposed Keathley Canyon Block 292 “B Rev.” Location



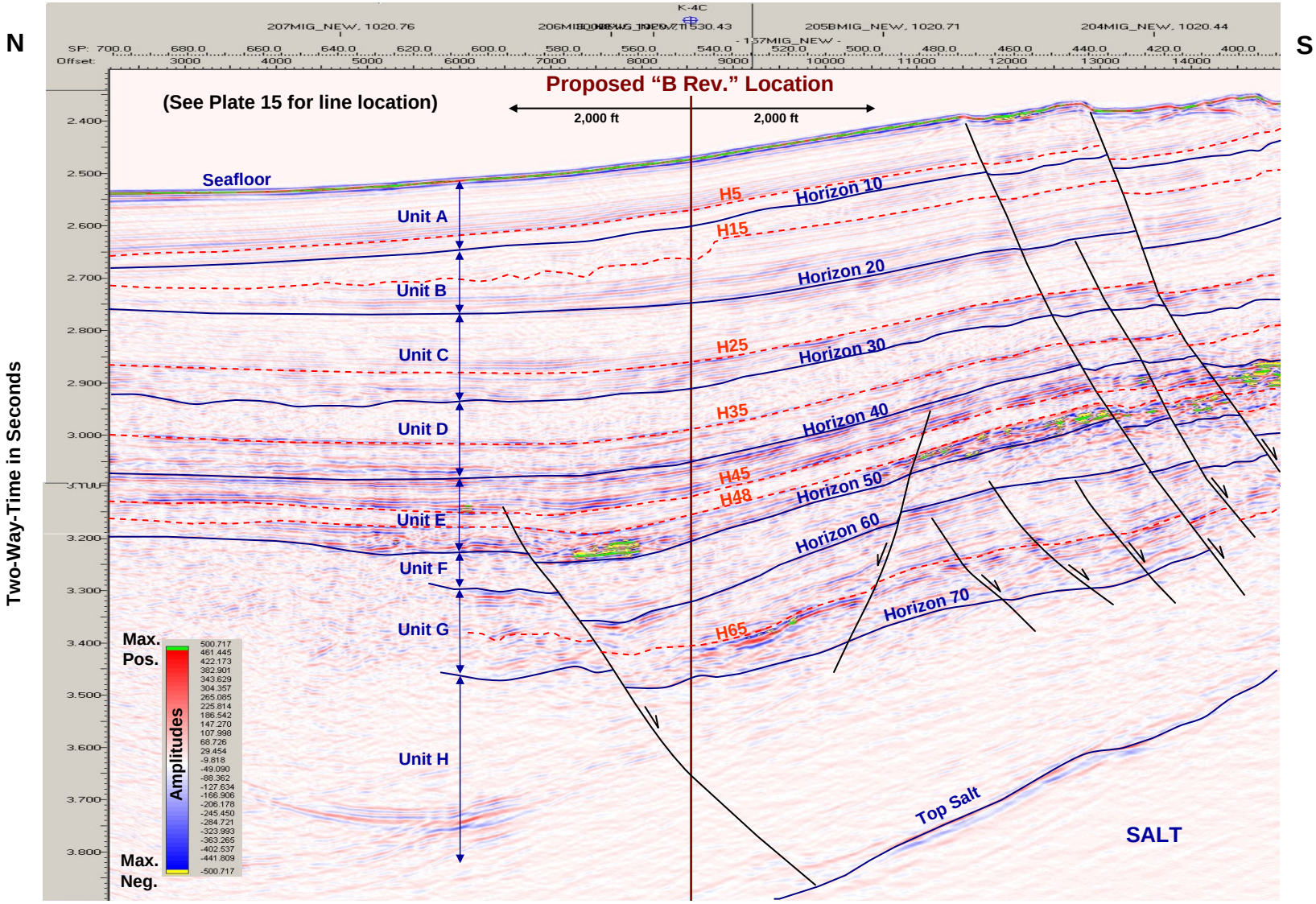
HR2D Seismic Line 157 Through Proposed Well Location

Proposed Keathley Canyon Block 292 “B Rev.” Location



Interpreted HR2D Seismic Line 157 Through Proposed Well Location

Proposed Keathley Canyon Block 292 “B Rev.” Location

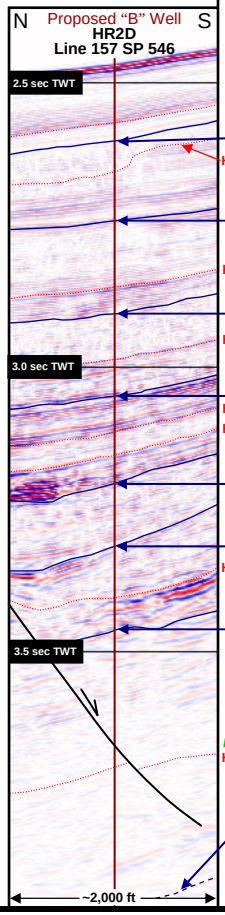


Seafloor and Horizons 10, 20, 30, 40, 50, 60, 70 and Top Salt are main lithological boundaries described in text and Plate 20

H5, H15, H25, H35, H45, H48 and H65 are sub-unit boundaries defining internal facies variations

Tophole Formation and Geohazards Summary Sheet

Proposed Keathley Canyon Block 292 “B Rev.” Location



KC292 “B Rev.” Keathley Canyon 292 (OCS-G-25792)	Interpretation: Stratigraphy	Interpretation: Lithology	Depth BML (ft)	Depth BSL (ft)	TWT BSL (sec)	Interval Thickness (ft)	Comments	Shallow Hazards Risk of Occurrence: Hydrates	Shallow Oil	Shallow Gas	Shallow Water Flow
	Seafloor		0	6,034	2.473		Relatively smooth seafloor, slopes ~3.1° to NNE				
	H5 Unit A	Clays				457	Hemipelagic drape and thin debris flows				
	Horizon 10		457	6,491	2.605						
	H15 Unit B	Clays				474	Debris flow overlying turbidites				
	Horizon 20		931	6,965	2.742						
	H25 Unit C	Clays with silts towards base				567	Well-bedded turbidites				
	Horizon 30		1,498	7,532	2.906						
	H35 Unit D	Clays with silts and possible sands in lower portion				492	Debris flow overlying turbidites				
	Horizon 40		1,990	8,024	3.048						
	H45 H48 Unit E	Clays, with silts and possible sands above and below central debris flow				577	Turbidites with interbedded debris flow				
	Horizon 50		2,567	8,601	3.215						
	Unit F	Clays and silts				346	Turbidites and thin interbedded debris flows				
	Horizon 60		2,913	8,947	3.315						
	H65 Unit G	Clays and silts with possible sands in lower portion				533	Well-bedded turbidites				
	Horizon 70		3,446	9,480	3.469						
	Unit H Fault H75	Clays and silts with possible thin sands in lower section	*4,003*	*10,037*	*3.630*	1,664	Turbidites and thin interbedded debris flows H75 is an inferred thin sand @ 4,245 ft bml mapped from exploration 3D seismic data and correlates to a sand identified from gamma ray logs at the KC292#1 well				
	Top Salt	Depth Limit of Investigation	5,110	11,144	3.950						

Risk level: Negligible | Low | Moderate | High

Shallow hazards risks and lithologies based on results from KC292#1 well

SITE CLEARANCE NARRATIVE

PROPOSED KC292 "F" LOCATION
BLOCK 292, OCS-G-25792
KEATHLEY CANYON AREA
GULF OF MEXICO

PROPOSED KC292 "F" (Vertical well through salt overburden)	
26° 40' 44.037" N	92° 34' 42.317" W
X = 1,778,035.00 ft E	Y = 9,681,000.00 ft N
2,760 ft FSL	3,955 ft FWL

WATER DEPTH:
6,019 ft MSL

PROPOSED TOTAL DEPTH:
33,947 ft MD 33,242 ft TVD

X and Y Coordinates in UTM Zone 15N (US ft)
Geodetic Datum: NAD 1927
Spheroid: Clarke 1866

SITE CLEARANCE NARRATIVE

PROPOSED KC292 "F" LOCATION
BLOCK 292, OCS-G-25792
KEATHLEY CANYON AREA
GULF OF MEXICO

This document summarizes shallow conditions at the proposed drilling location KC292 "F" in Keathley Canyon Block 292 (OCS-G-25792) in the northwestern Gulf of Mexico (Plates 1 and 2).

The surface locations of the proposed KC292 "F" well, together with a re-spud location (KC292 "G") sited 250 ft to the east, are defined as:

KC292 "F"	
2,760 ft FSL	**3,955 ft FWL**
X = 1,778,035.00	**Y = 9,681,000.00**
Latitude: 26° 40' 44.037" N	**Longitude: 92° 34' 42.317" W**

KC292 "G"	
2,760 ft FSL	**4,205 ft FWL**
X = 1,778,285.00	**Y = 9,681,000.00**
Latitude: 26° 40' 44.029" N	**Longitude: 92° 34' 39.560" W**

UTM (US Survey Feet)	**Zone 15N**
Datum: NAD 1927	**Spheroid: Clarke 1866**

The alternate re-spud location, "G", should it be required, maintains recommended clearances from known geohazards and is within the 300 meter (985 ft) clearance zone of the primary "F" location as stipulated by the United States Department of the Interior, Bureau of Ocean Energy Management, Regulation and Enforcement, BOEMRE (known as the MMS prior to June 2010), and the 2,000 ft radius clearance zone as described in this letter.

The proposed surface location of this well, which will be drilled vertically into salt and then deviate to the south-southwest to the proposed target, was selected based on the results of: a regional shallow hazards study (BP, 2004) performed using 3D exploration seismic data acquired by Digicon in 1998; a 2007 ROV (Remotely-Operated Vehicle) survey carried out over proposed wellsites and potential chemosynthetic habitats in KC291, with interpretation report by Geoscience,

Earth & Marine Associates (GEMS, 2007); an AUV (Autonomous Underwater Vehicle) survey conducted by Fugro GeoServices, Inc. (FGSI) in October 2008 for BP, which covered Keathley Canyon (KC) Blocks 246-248, 290-292 and 335-336; results of an HR2D survey acquired by FGSI from October to December 2008 and in early August 2009 (the 24-fold HR2D data was acquired over a subset of the AUV grid along 200 m spaced N-S lines and 900 m spaced E-W lines); preliminary results of a Geological Assessment and Geotechnical Field Program Planning Report primarily based on the 2008 AUV data (GEMS, 2010); and well information for the nearby KC292#1 and KC291#1wells. Copies of the 2008 AUV Survey Report were included with the EP submission for the KC292#2 well (Plan Control S7364, approved 9 December, 2009). The 2004 Regional Shallow Hazards Report has already been submitted to the MMS in support of the EP documentation for the KC292#1 well (Plan Control N 8245, approved 2 December, 2004). A map showing the extents of the various surveys is included as Plate 3.

This document contains a site-specific shallow hazards review of the proposed KC292 "F" well location and includes data examples from the geophysical data sets listed above. The depth of investigation is from the seafloor to the top of salt, located about 4,782 ft below the mud line (bml). The depth of the first pressure containment string (22" casing) is planned for ~4,000 ft BML.

The exploration 3D seismic data used for identifying shallow hazards at the KC292#1 well location was approved for use by the MMS on 12/2/2004 (Plan Control N8245). In 2008, in order to address data quality and, specifically, 3D seismic data frequency content in the immediate vicinity of a proposed KC291#1 location, in the adjacent block to the west, as required by MMS NTL 2008-G05, the BP Appraisal Group re-processed the data by applying an rgain filter. A waiver request to use this re-processed data for the KC291#1 well was approved by Dr. William Kou of the MMS in an e-mail communication dated 9 September, 2008.

For the current proposed KC292 "F" well, the 50Hz frequency requirement is mitigated by the availability of HR2D data. The HR2D data was acquired by FGSI during the 4th quarter of 2008 by the r/v Geodetic Surveyor, and during the first week in August 2009 by the r/v Seis Surveyor, using identical set-ups of a SSI 90 cubic inch airgun and a 48-channel, 600 m long streamer, with a group interval and shot point interval of 12.5 m. Data was recorded to 4 seconds at a sample rate of 1 msec. The data was processed by Fugro Seismic Imaging, Inc. (FSI) to give 24-fold migrated AGC and RAP displays.

A power spectra diagram for the HR2D seismic data was constructed using the PostStack/PAL attribute function in Landmark Graphic's SeisWorks software (Plate 4). The spectra was generated for a 3,000 ft x 3,000 ft square centered on the proposed well location, which included portions of lines 151-157 and 206, using a one-second time-window below the seafloor. The x-axis represents the frequency of the data between 0 and 300 Hertz, and the y-axis

represents power attributed to each component frequency as a percentage of the reference value of 100%. A spectrum for the exploration 3D seismic data is also included on Plate 4 for comparison. The results demonstrate that within the first second of Two-Way Travel Time beneath the seafloor over 50% of the HR2D data possesses frequencies in excess of 50 Hz (Plate 4).

The seafloor reflector over the proposed location as exhibited by the HR2D data is shown on Plate 5 and is taken from a SeisWorks/Seismic View display using parameters of 95.74 Inches/Second and 6.71 Traces/Inch. The wiggle display is variable area with a "Varifill" positive and negative infill. The auto-correlation pick for the seafloor, which is shown in red, shows the reflector to be free of gaps and is defined by a wavelet of stable shape and phase.

The proposed KC292 "F" well will be drilled using a dynamically-positioned semi-submersible drilling rig, which will not require anchoring or mooring to the seafloor.

The key findings of the shallow hazards assessment for the proposed "F" location are as follows (subseabed conditions at the proposed "G" location are considered to be similar):

Proposed Primary Well Location KC292 "F":

Water Depth and Seafloor Gradient:	Water depth at the proposed "F" location is estimated as 6,019 ft below Mean Sea Level using swath bathymetry data from the FGSI 2008 AUV survey calibrated to the recorded water depth at the KC292#1 well (Plate 6). The seafloor at the proposed "F" location has an average gradient of 2.2º (3.8%) down to the north (Plates 6 and 7). The water depth at the re-spud "G" location is 6,021 ft below Mean Sea Level with a seafloor gradient of 2.1º (3.7%) down to the north.
Seafloor Morphology and Shallow Sediments:	The proposed well location is sited on the southeastern flank of a minibasin that deepens to the northwest and occupies most of KC292 (Plate 8). A large graben feature in KC248 extends into the northeast of KC292, with a large curvilinear strike-slip fault trending south and west from the graben through the east of KC292 into an area of complex east-west trending, faulted seafloor within KC336 to the south. This large fault passes ~4,000 ft to the southeast of the proposed "F" location (Plate 9) and has a seafloor scarp of about 10 ft. An area of seafloor sediment failure is in the north of KC292 on the south facing slope of the graben uplift ~2.0 miles to the north of the proposed "F" location, and an isolated seafloor mound is in the northeast corner of KC291 ~2.3 miles to the northwest of the proposed "F" location (Plate 10). A 2007 ROV investigation of this mound (conducted by Sonsub and reported by GEMS) revealed upturned slabs of very soft clay with a single anemone, but no evidence for active gas/fluid seepage, hardgrounds or chemosynthetic fauna/flora. The backscatter map produced from the AUV multibeam echosounder data (Plates 10 and 11) shows the seafloor

sediments at the proposed well location to be of moderate and uniform reflectivity typical of clays. The darker seafloor streaks seen on Plates 10 and 11 represent the splay of drilling mud and cuttings from the KC 292#1 well dispersed by bottom currents. A seabed sampling program was carried out during the 4th quarter of 2008 from the survey vessel used to acquire the HR2D data. One of the piston cores, PC-9, sampled the seafloor ~2,100 ft to the east of the proposed "F" location (Plates 6 to 9 and 11). This core sampled very soft clays down to the maximum recovery depth of 15 ft (Plate 12), which exhibited a gradual decrease in water content and an increase in shear strength (from 0.03 to 0.12 Kips/sq ft) with depth.

The subbottom profiler data, Plate 13, shows about 7 ft of amorphous clays overlying well-stratified clays, silts and silty clays to depths of at least 150 ft bml. The Geological Assessment conducted by GEMS (2010) has identified buried landslide episodes throughout the Kaskida Minibasin which appear to have affected the Hrz10 to Hrz15 interval. At the proposed "F" location, this interval occurs from 7 ft to 12 ft bml and does not exhibit depletion or accumulation, indicating the local area has not been affected by landslide events (Plate 14).

Seafloor Obstructions: The existing KC292#1 well is ~1.4 miles to the east-southeast of the proposed "F" location, and the existing KC291#1 well is ~3.4 miles to the northwest (Plate 10). No man-made or natural seafloor obstructions are identified on the AUV data within a radius of 2,000 ft of the proposed location.

Keathley Canyon Block 292 does not require an Archeological Resource Survey and Report (NTL's 2005-G07 and 2008-G20). A review of the 2008 AUV sidescan sonar data revealed two sonar contacts (nos. 28 and 30) within KC292 (Plate 15). Contact no. 28 measures 14 x 8 ft and is ~1.1 miles to the northeast of proposed location "F", whilst contact no. 30 measures 30 x 10 ft and is ~1.9 miles to the northeast. An additional target, no. 24, is in KC366 ~4,000 ft to the south of the proposed "F" location. This target measures 20 x 8 ft. None of these three targets exhibited relief above the seafloor and all are interpreted as minor debris of no cultural significance.

The proposed well will be drilled from a dynamically positioned drilling rig, so positioning of, and any seafloor disturbance due to, anchors is not an issue.

Chemosynthetic Communities: Keathley Canyon Block 292 lies in water depths greater than 300 meters (984 ft) and is thus subject to NTL 2009-G40 regarding Deepwater Benthic Communities.

A seafloor amplitude map produced from the exploration 3D seismic data shows no anomalous features indicative of areas of "hardground" or authigenic carbonates in the vicinity of the proposed "F" location (Plate 16). Anomalous amplitudes associated with the smooth-surfaced seafloor in the deepest parts of the minibasin in the northwest of KC292 are interpreted as

acquisition or processing artifacts.

A backscatter map produced from the AUV multibeam echosounder data shows moderate backscatter intensity associated with the seafloor drilling splays in the vicinity of the proposed "F" location (Plates 10 and 11). The highest backscatter intensity seafloor is associated with the seafloor mounds and adjacent seafloor in a prominent graben feature within the west of KC291 (Plate 10). The 2007 ROV survey (Plate 3) identified hardgrounds with chemosynthetic communities of mussels and tube worms within these areas, and the pre-spud ROV survey for the KC291#1 well (in B-geO, 2008) identified an area of asphalt clumps with tubeworms to the north of the spud location, which correlates with the high backscatter area on Plate 10. No similar high intensity backscatter areas, mounds or gas/fluid expulsion features are identified within a 2,000 ft radius of the proposed "F" location **and the potential for chemosynthetic communities is therefore *Negligible*.**

Nearest Offset Wells: The KC292#1 well in the southeast of KC292, which was drilled by BP in 2005 and the KC291#1 well in the west of KC291 which was drilled by Devon\BP in 2008\2009 are the nearest offset wells. The only other nearby wells are KC199#1 situated at the northwestern end of the Worzel Basin, ~16.8 miles to the northwest of the "F" location and drilled by Marathon in 2000, and BP's KC244#1 well bordering the south side of the Worzel Basin ~11.0 miles to the west-northwest of the proposed "F" location, which was drilled in 2007 (Plate 2).

Shallow Geology: Plate 15, the Seafloor and Subsurface Geohazards Map based on an integration of the exploration 3D seismic data and the HR2D data, shows the location of HR2D line 154 and expl. 3D seismic trace 3989, which pass directly over the proposed "F" location. Uninterpreted and interpreted sections of these lines are included as Plates 17, 18 and 19. At the proposed well location, the top of the underlying salt canopy is at a depth of 10,801 ft (TVDSS) and is overlain by approximately 4,782 ft of sediments, which have been divided into eight general seismic-stratigraphic units (Plate 19 and Plate 20 – Tophole Formation and Geohazards Summary Sheet) based on correlation with the post-drill results from the nearby KC292#1 well:

- Unit A (Seafloor to Horizon 10) is about 433 ft thick and comprises a series of soft clays overlying interbedded clays and thin clay-prone debris flows.
- Unit B (Horizon 10 to Horizon 20) is about 484 ft thick and comprises an upper clay-prone debris flow overlying a lower section of well-bedded clay turbidites. The debris flow has eroded the underlying turbidites, and to the north and northwest of the proposed location, within the deepest parts of the minibasin, Unit B is entirely comprised of debris flows.
- Unit C (Horizon 20 to Horizon 30) is about 519 ft thick and

comprises well-bedded turbidites grading downward from clays into silts and clays, with possible sands.

- Unit D (Horizon 30 to Horizon 40) is about 533 ft thick and comprises a massive clay-prone debris flow overlying clay and silt turbidites with possible sands.
- Unit E (Horizon 40 to Horizon 50) is about 560 ft thick and comprises clay and silt turbidites with possible sands above and below a central clay-prone debris flow. Horizon 50 at the base of Unit E appears to be an unconformity.
- Unit F (Horizon 50 to Horizon 60) is about 305 ft thick and comprises clay and silt turbidites with thin interbedded clay-prone debris flows. Unit F appears to pinch-out around the margins of the minibasin to the south and east.
- Unit G (Horizon 60 to Horizon 70) is about 623 ft thick and comprises well-bedded clay and silt turbidites with possible sands in the lower portion.
- Unit H (Horizon 70 to Top Salt reflector) is about 1,325 ft thick and comprises clay and silt turbidites with thin interbedded debris flows. Post-drill results from the KC292#1 offset well indicate occasional sandy horizons (e.g. H75 at 4,048 ft bml) are present within the central and lower portions of the unit.

Shallow Hazards: Plate 20 is a Top-Hole Formation and Geohazards Summary Sheet for the proposed well showing the interpreted stratigraphy and predicted drilling hazards.

Faults: The proposed well bore will intersect one fault at a depth of ~3,457 ft bml (Plates 17, 19 and 20). The fault plane dips to the south and can be traced to a shallowest depth of ~1,700 ft bml, suggesting it is no longer active. No seafloor faults are identified within 1,500 ft of the proposed well location. The large curvilinear strike-slip fault that passes 4,000 ft to the southeast of the proposed "F" location appears to have a near-vertical dip and intersects the Top Salt reflector ~ 4,000 ft to the southeast of the proposed wellbore.

Shallow Gas: Analysis of both the HR2D and exploration 3D seismic data identified several anomalies with indications of shallow gas within the southwest quadrant of KC292 (Plate 15). The closest anomalies to the proposed wellbore are ~400 ft to the north within the lower sandy portion of Unit E at a depth of ~2,350 ft bml, and associated with a possible sand within the central portion of Unit G to the south at a depth of ~3,100 ft bml (Plates 17, 18 and 19). The exploration 3D seismic data (Plate 17) shows anomalous amplitudes within the Unit G sand at ~300 ft south of the proposed wellbore, whilst the HR2D data (Plates 18 and 19) shows the closest anomalies to be ~1,300 ft to the south. Hence, ***the risk of encountering shallow gas within the overburden section at the proposed "F" location between seabed at 6,019 ft TVDSS and the Top Salt reflector at 10,801 ft TVDSS is considered to be Negligible***. No shallow gas was

encountered in the KC292#1 offset well.

Shallow Water Flow (SWF): Two potential sand-prone units, Units E and G, were identified by BP in 2004 prior to the drilling of the KC292#1 well as potential SWF zones (Plate 20). Both of these units could be correlated with sand zones at the offset well, KC 199#1, where the shallowest interval (equivalent to Unit E at the proposed well location) produced a mild SWF occurrence. These two units are present at the proposed "F" location (Unit E is from 1,969 to 2,529 ft bml and Unit G is from 2,834 to 3,457 ft bml) and appear to be thicker and structurally deeper.

Seawater was used to drill the initial tophole section of the KC292#1 well down to the level of the 28-inch casing shoe, which topset Unit E. The remainder of the tophole section down to the 22-inch casing shoe was drilled with 10.5 ppg pump and dump mud, and the equivalent mud weight at the bottom of the hole (ECD) increased from 8.6 ppg to 9.8 ppg during the drilling of Units E, F, G and the upper portion of Unit H. The gamma ray logs for this section of the well confirmed sands within units E and G, but there were no instances of SWF.

The risk for encountering shallow water flow at the proposed "F" location is therefore considered Negligible for the tophole section including the inferred sand-prone units E and G.

It is anticipated that the proposed casing program for the "F" well will be similar to that used for the KC292#1 well, with the 28" casing shoe topsetting Unit E and the 22" casing shoe topsetting the shallowest sand (Horizon 75) within Unit H.

Shallow Oil: No oil or tar seeps are evident at the seafloor in the vicinity of the proposed "F" location (sidescan sonar and backscatter data) and no shallow oil was encountered during drilling of the overburden sediments at the KC292#1 well. Therefore, the risk for encountering shallow oil from the seafloor to the Top Salt reflector is considered ***Negligible***.

Hydrates: Bottom Simulating Reflectors (BSRs) are not observed on the either the exploration 3D or HR2D seismic profiles throughout the KC292 area, and no instances of gas hydrates were reported during drilling of the KC292#1 well. The risk of encountering hydrates in the proposed well is therefore considered ***Negligible***.

CONCLUSIONS

This Shallow Hazards Assessment for proposed well "F" with surface location in Keathley Canyon Block 292 (OCS-G-25792) supplements the Exploration Plan (EP) to be submitted to the United States Department of the Interior, Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE). This narrative defines the proposed location and documents the anticipated seafloor and tophole drilling conditions, any geohazards, and the likelihood of encountering chemosynthetic community habitats within 2,000 ft of the primary location. This clearance area encompasses proposed alternate location KC292 "G", 250 ft to the east of the primary "F" location.

Conditions at the proposed drilling location have been evaluated on the basis of: 3D seismic data acquired by Digicon in 1998 and the findings of a regional 3D geohazards assessment for KC 247, 248, 291, and 292, based on this data volume and carried out by BP in 2004; the results of a 2007 ROV survey carried out over proposed wellsites and potential chemosynthetic habitats in KC291; an AUV survey and interpretive report conducted by Fugro GeoServices, Inc. in October 2008 for BP, which covered KC Blocks 246-248, 290-292 and 335-336; results of an HR2D survey acquired by FGSI over a subset of the AUV grid from October to December 2008 and in early August 2009; preliminary results of a Geological Assessment and Geotechnical Field Program Planning Report primarily based on the 2008 AUV data (GEMS, 2010); and well information for the nearby KC292#1 well drilled in 2005 and the KC291#1 well drilled in 2009/2009.

Results of the data review for the proposed "F" location indicate:

- Water depth is 6,019 ft and the uniform, soft clay seafloor sediments slope down to the north at 2.2°.
- A major seafloor strike-slip fault, which extends down to the Top Salt reflector, and trends approximately northeast-southwest, is 4,000 ft to the southeast of the proposed location. This fault has a 10 ft relief seafloor scarp and a near vertical dip, so will not intersect the proposed borehole.
- There are no seafloor mounds, hardgrounds or evidence for gas/fluid escape features on the seafloor in the vicinity of the proposed well and therefore **the risk for the existence of high-density chemosynthetic communities within 2,000 ft of the proposed well location is considered *Negligible*.**
- The existing KC292#1 well is ~1.4 miles to the east-southeast of the proposed "F" well. Apart from a splay of drilling mud and cuttings from the existing well, there is no

evidence of cultural resources or any other man-made features within 1,500 ft of the proposed well.

- The risk of encountering **shallow gas** or **shallow water flow** is ranked as ***Negligible*** throughout the supra-salt section. Sandy intervals which exhibited no overpressures in the nearby KC292#1 well are expected between depths of 1,969 – 2,529 ft bml (Unit E) and 2,834 – 3,457 ft bml (Unit G). The nearest possible shallow gas anomalies occur ~400 ft to the north within Unit E and ~300 ft to the south within Unit G.
- The risk of encountering **shallow oil** or **gas hydrates** is ranked as ***Negligible*** between the Seafloor and Top Salt reflector.

We advise caution, but believe that the risk of danger to personnel and damage to the borehole, equipment and environment is ***Low***, provided strict adherence to proper drilling and cementing procedures is followed concerning these hazards until the first pressure containment string is in place at about 4,000 ft below mudline.

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24 August 2010

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Geoscience Earth & Marine Services, Inc. (GEMS), 2010. "Phase 1 Report: Geologic Assessment and Geotechnical Field Program Planning, Kaskida Development Project, Blocks 246-248, 290-292, and 335-336, Keathley Canyon Area, Gulf of Mexico". GEMS Project No. 1209-1731, preliminary report prepared for BP America Inc, June 3, 2010.

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Proposed KC 292 “F” Location Shallow Hazards Assessment Data Examples

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Bernie Care, August 2010

Location Map, Northern Gulf of Mexico

Proposed Keathley Canyon Block 292 “F” Location

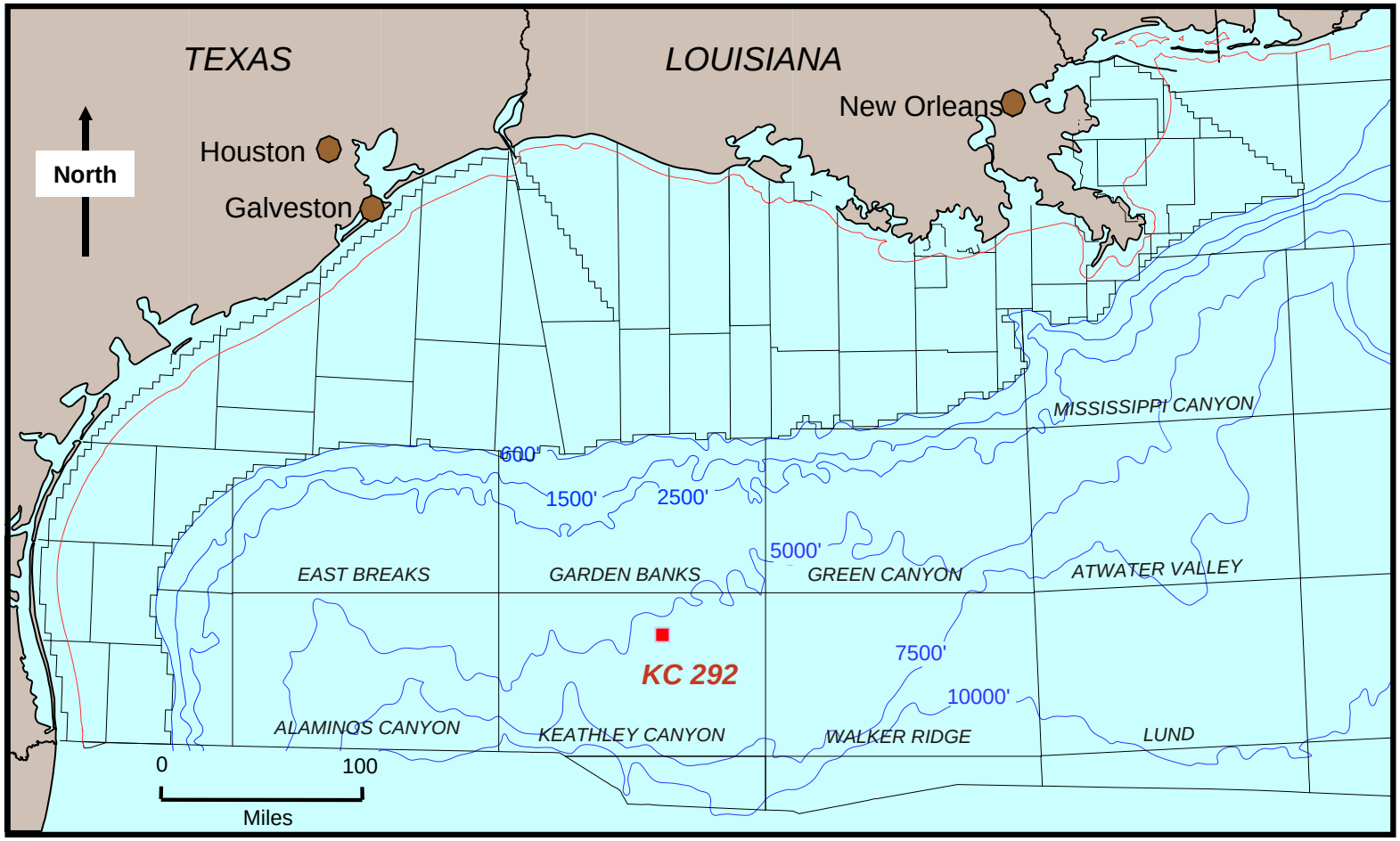
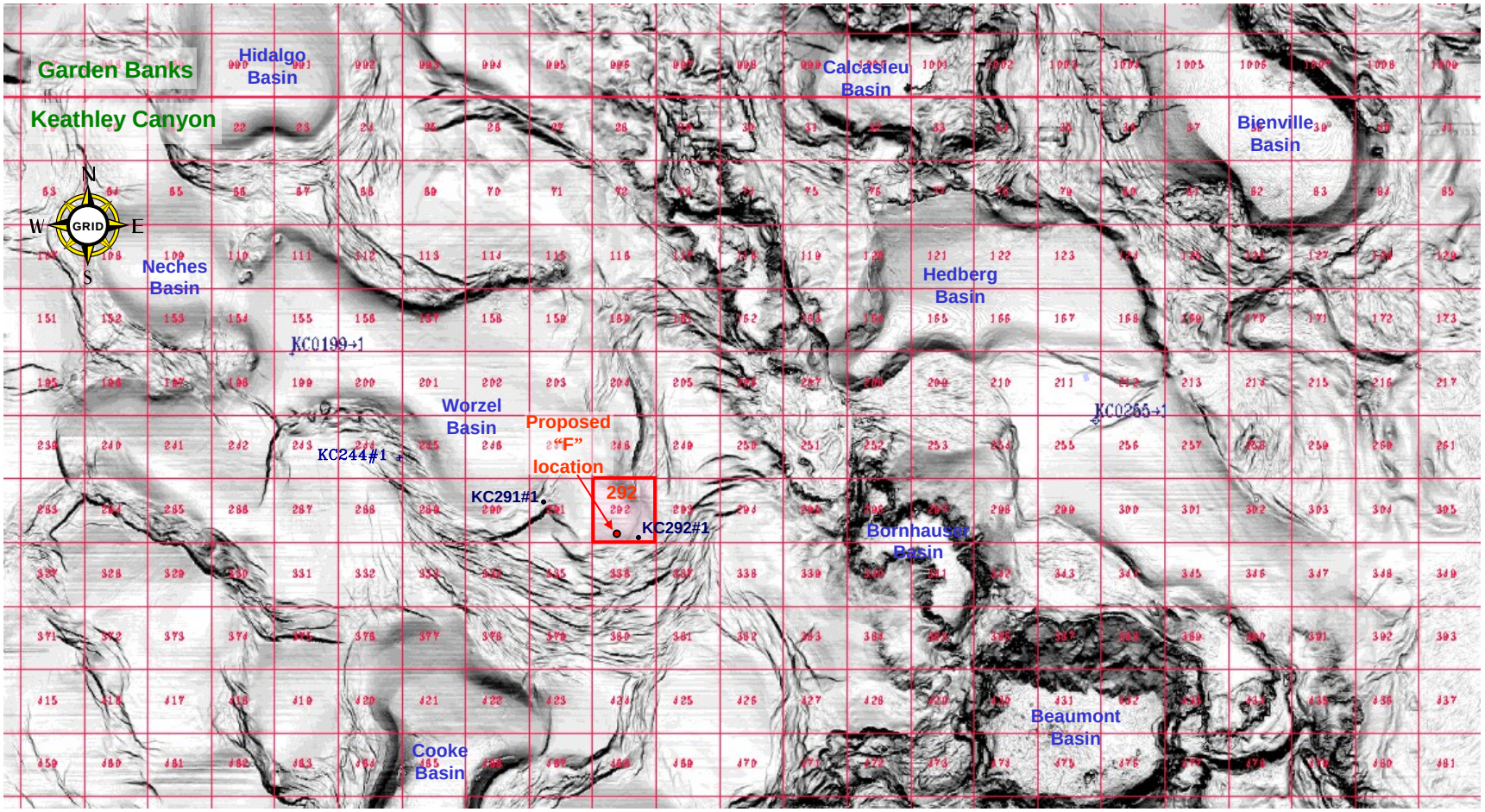


Plate 1

Regional Seafloor Morphology, Northern Keathley Canyon Area

Proposed Keathley Canyon Block 292 “F” Location

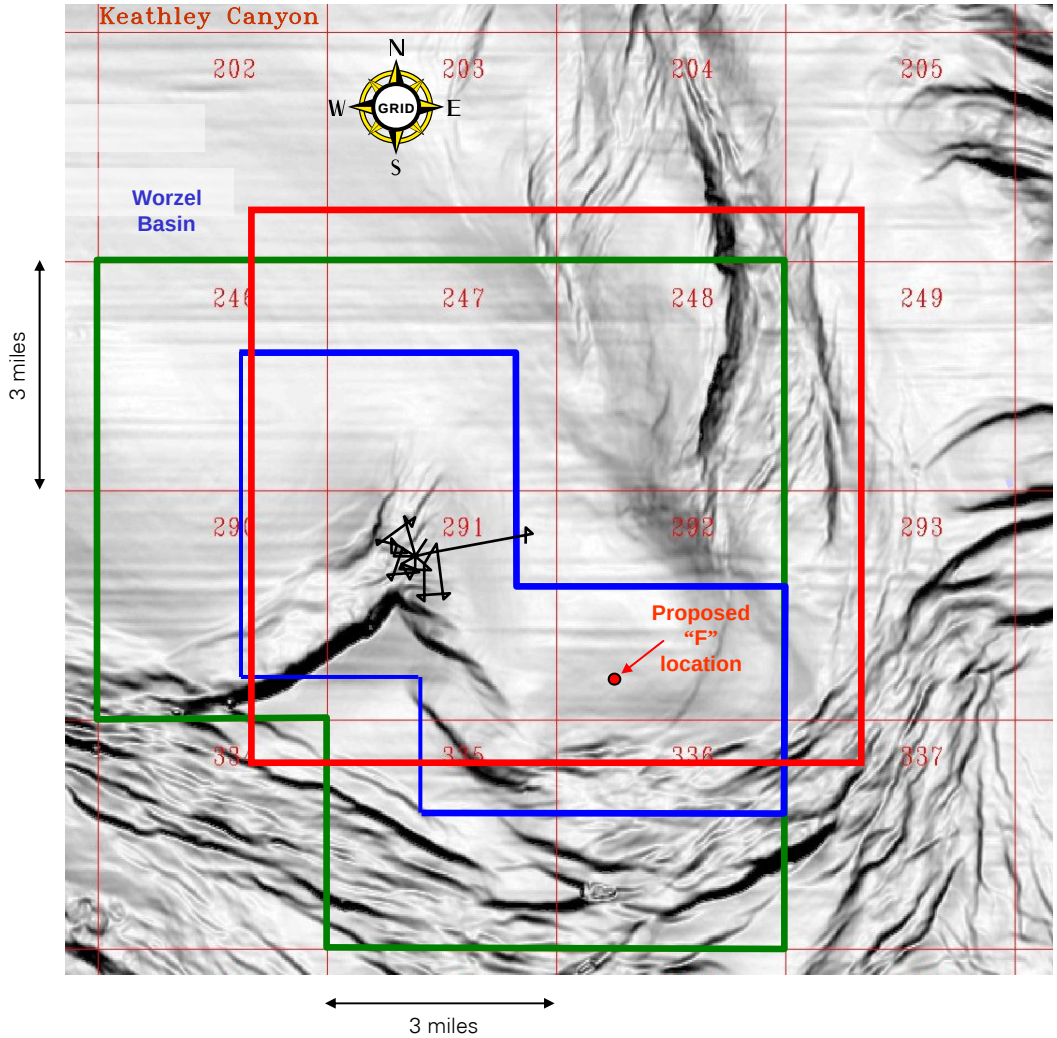


→ 3 miles ←

(Edge map produced from exploration 3D seismic data)

Seafloor Morphology, Kaskida Prospect, Showing Existing Survey Coverage

Proposed Keathley Canyon Block 292 “F” Location



Shallow Hazards Reports:

BP 2004 (Expl. 3D seismic)

FGSI 2008 (AUV)

FGSI 2008/2009 (HR2D seismic – acquisition only)

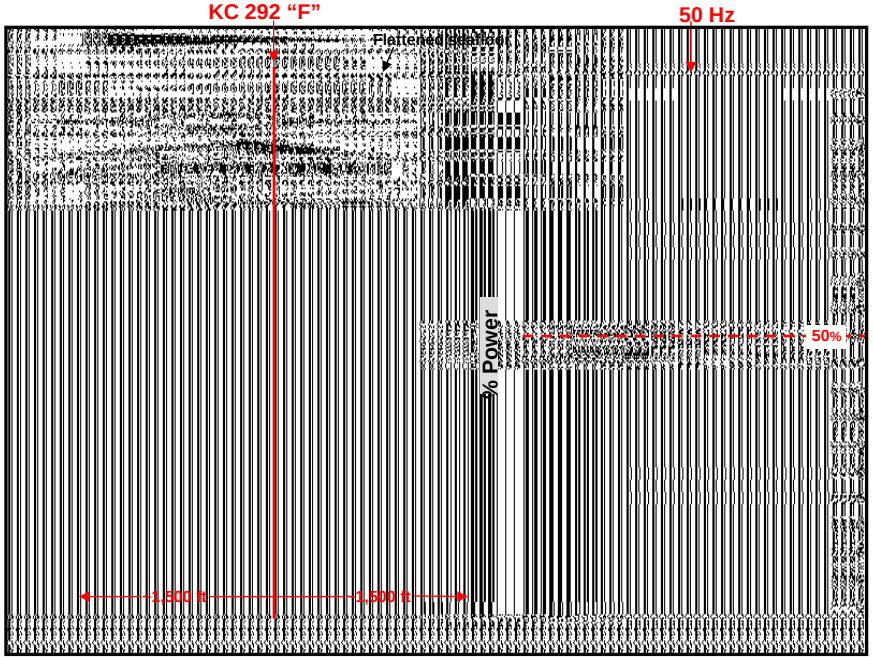
GEMS 2007 (ROV chemo. survey)

(Edge map produced from exploration 3D seismic data)

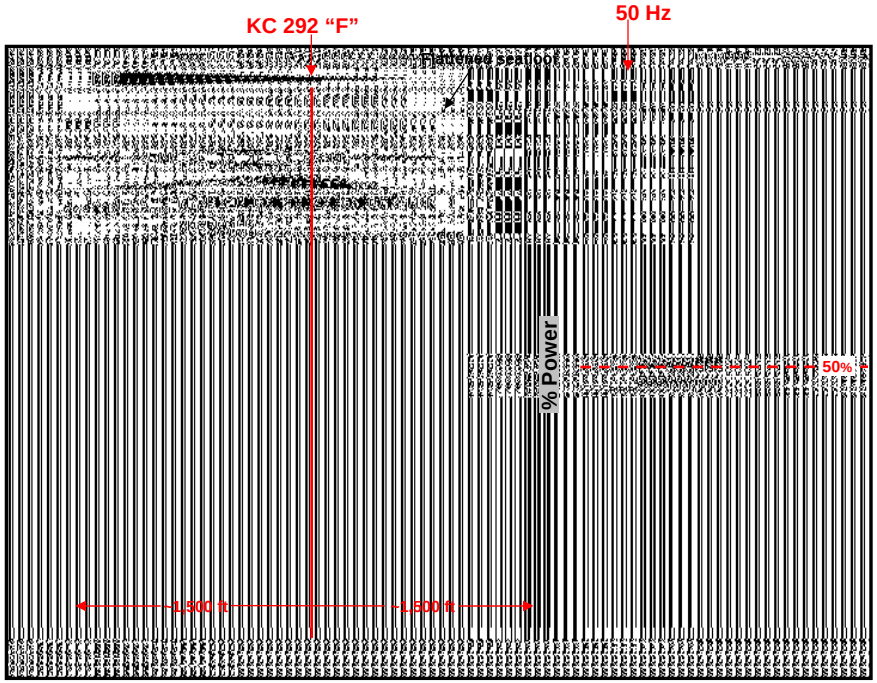
Plate 3

Power Spectra – Exploration 3D and High-Resolution 2D Seismic Data Comparison

Proposed Keathley Canyon Block 292 "F"



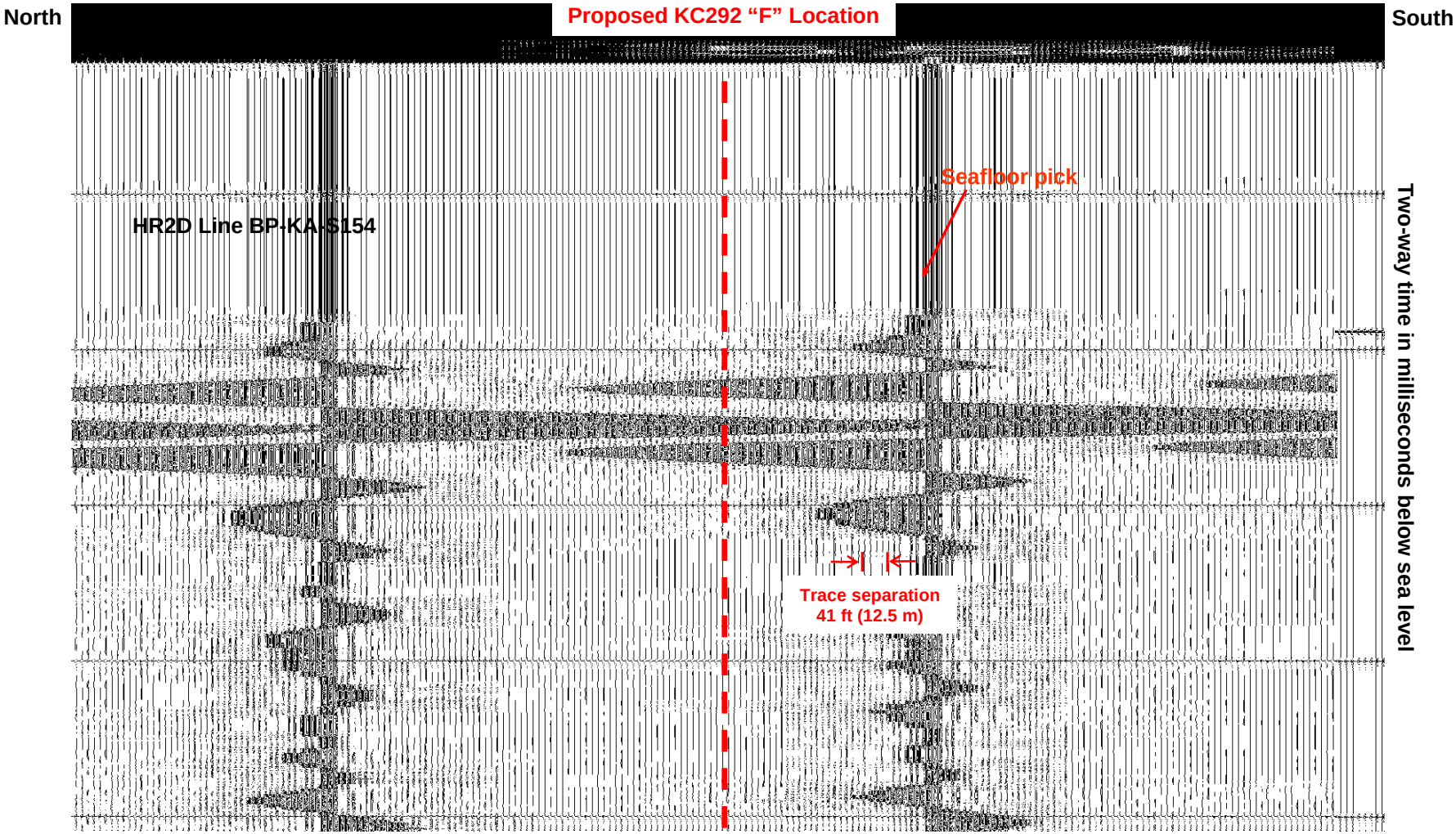
Exploration 3D Seismic Data
"F" location at Line 2195 and Trace 3989



High-Resolution 2D Seismic Data
"F" location at SP 559.5 on Line BP-KA-S154

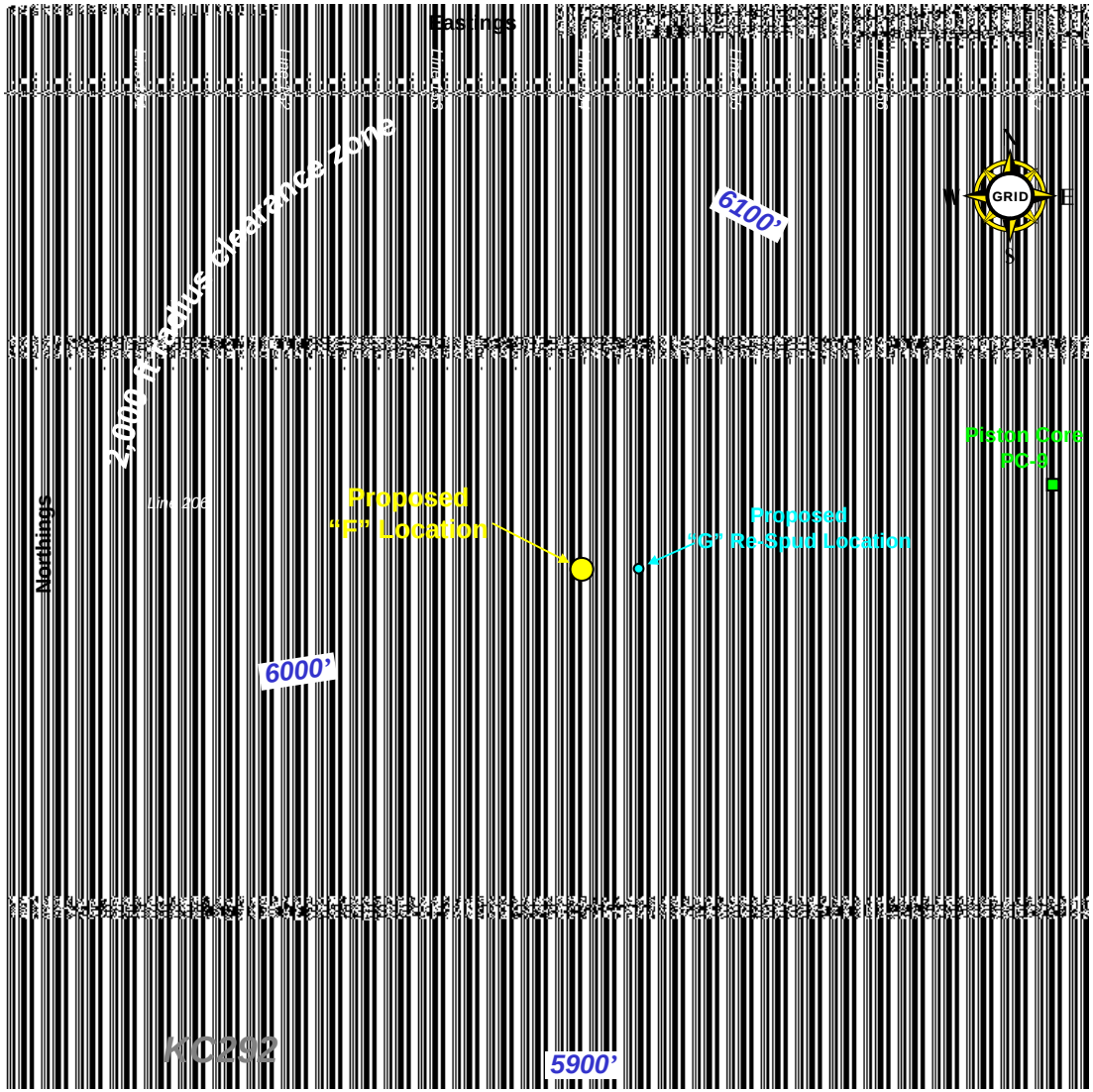
High-Resolution 2D Seismic Data - Seafloor Reflection Wavelet

Proposed Keathley Canyon Block 292 “F” Location



Bathymetry Map

Proposed Keathley Canyon Block 292 “F” Location



LEGEND

SHOT POINT & SHOT POINT No.

CONTOUR INTERVAL = 20’

ZERO DATUM = SEA LEVEL

APPLIED ACOUSTIC VELOCITY = HARMONIC MEAN

Water Depths

Deep

Shallow

Vertical Exaggeration x1

Artificial Sun:

Azimuth = 315°

Inclination = 45° from horizontal

Scale 1:10,000

0 1,000

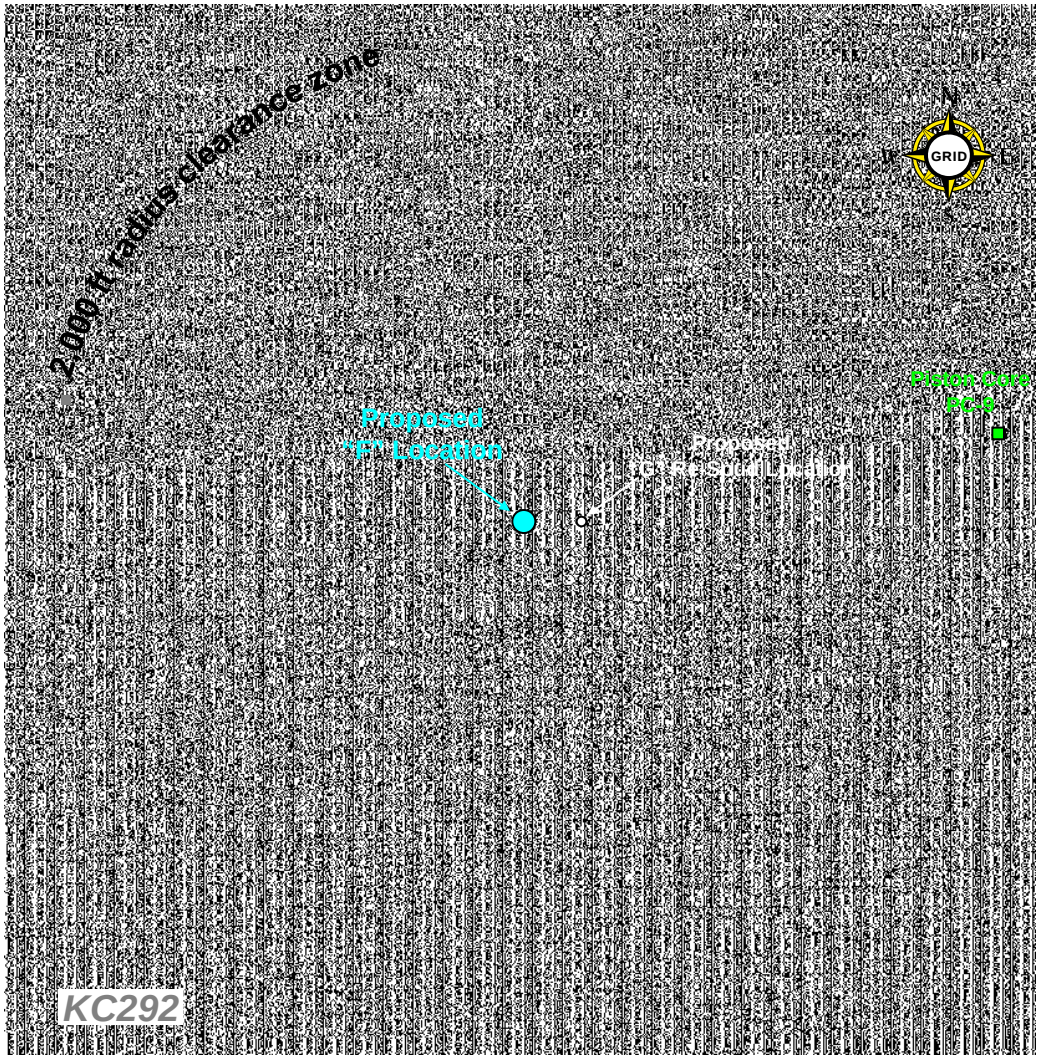
U.S. Survey Feet

SMT display of seafloor rendering with bathymetry contours overlain (derived from Fugro 2008 AUV MBES data)

Plate 6

Seafloor Gradient Map

Proposed Keathley Canyon Block 292 “F” Location



LEGEND

Seafloor Slope in Degrees

- >9
- 6-9
- 3-6
- 3
- 0

Scale 1:10,000

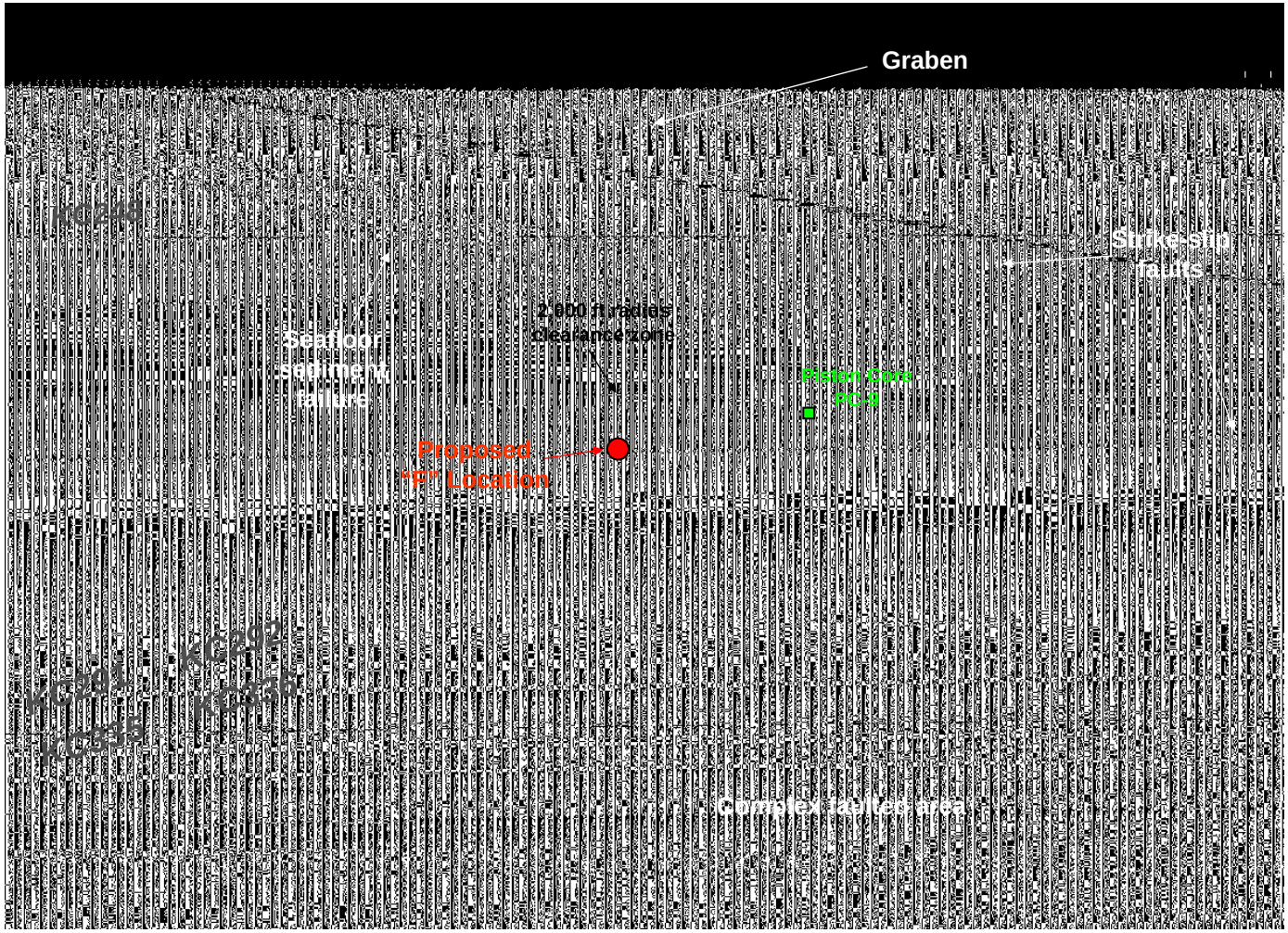
0 — 1,000

U.S. Survey Feet

Fledermaus display of seafloor gradient (derived from Fugro 2008 AUV MBES data)

3-D Perspective View Looking to North-Northeast Across KC 292 Showing Prominent Seafloor Features

Proposed Keathley Canyon Block 292 “F” Location



Water Depths

Deep

Shallow

Vertical Exaggeration x2

Artificial Sun:

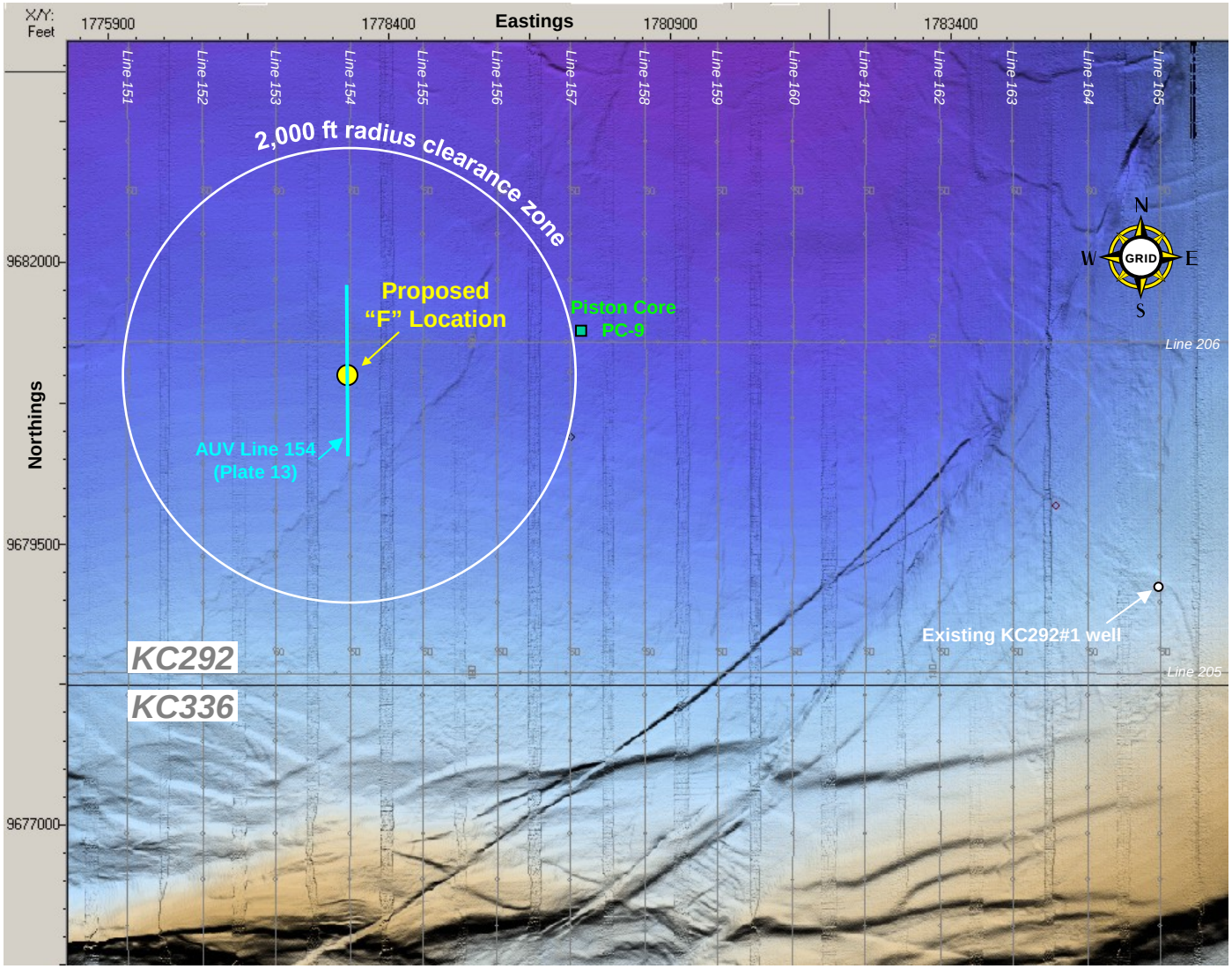
Azimuth = 315°

Inclination = 20° from horizontal

Seafloor display produced using Fledermaus software and Fugro 2008 AUV MBES data

Seafloor Rendering

Proposed Keathley Canyon Block 292 “F” Location



LEGEND

Water Depths

Deep

Shallow

Vertical Exaggeration x1

Artificial Sun:

Azimuth = 315°

Inclination = 45° from horizontal

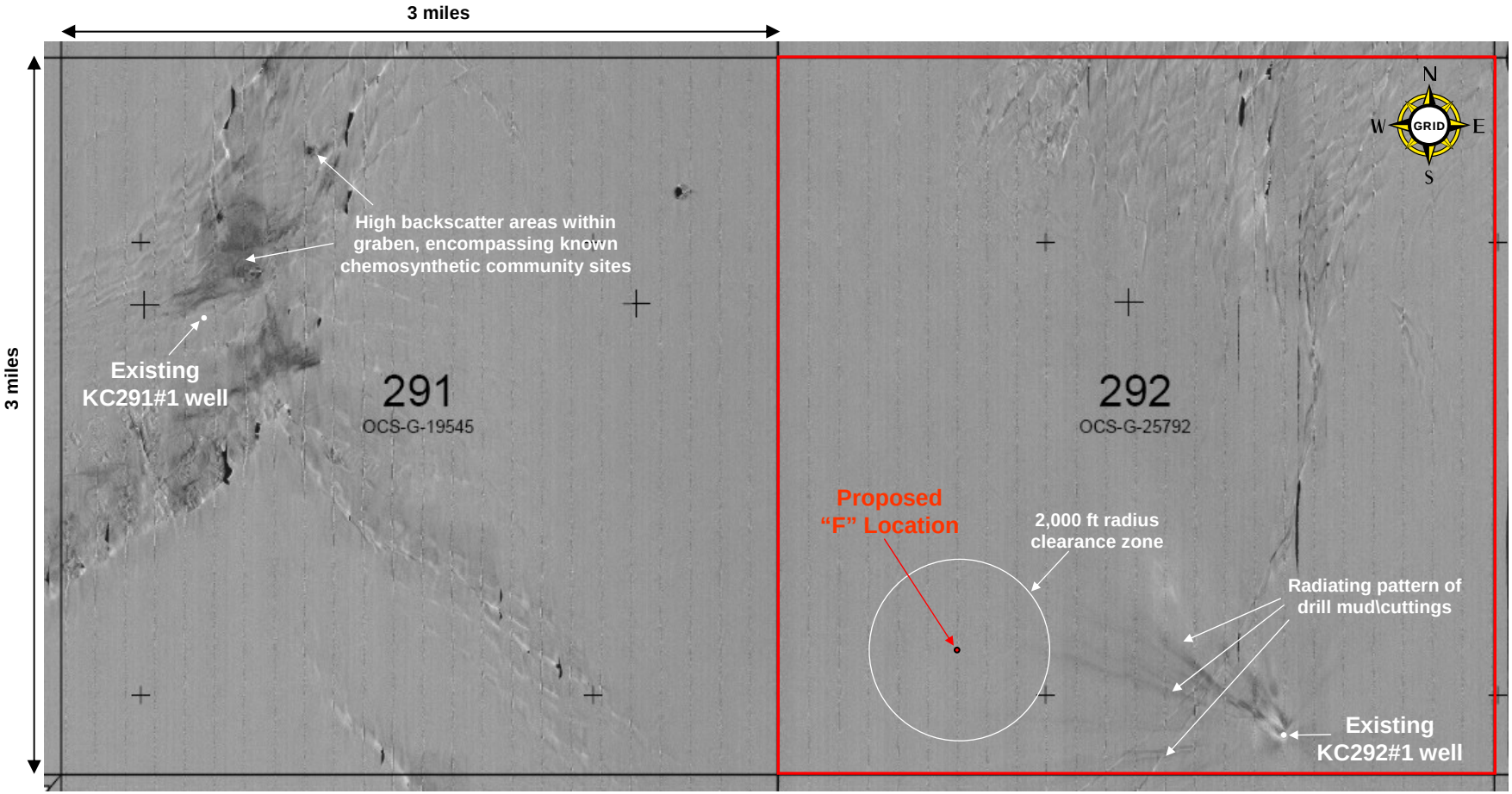
0 2,000

U.S. Survey Feet

SMT display of seafloor rendering (derived from Fugro 2008 AUV MBES data)

Seafloor Backscatter Map – KC291 and KC292

Proposed Keathley Canyon Block 292 “F” Location



BACKSCATTER INTENSITY

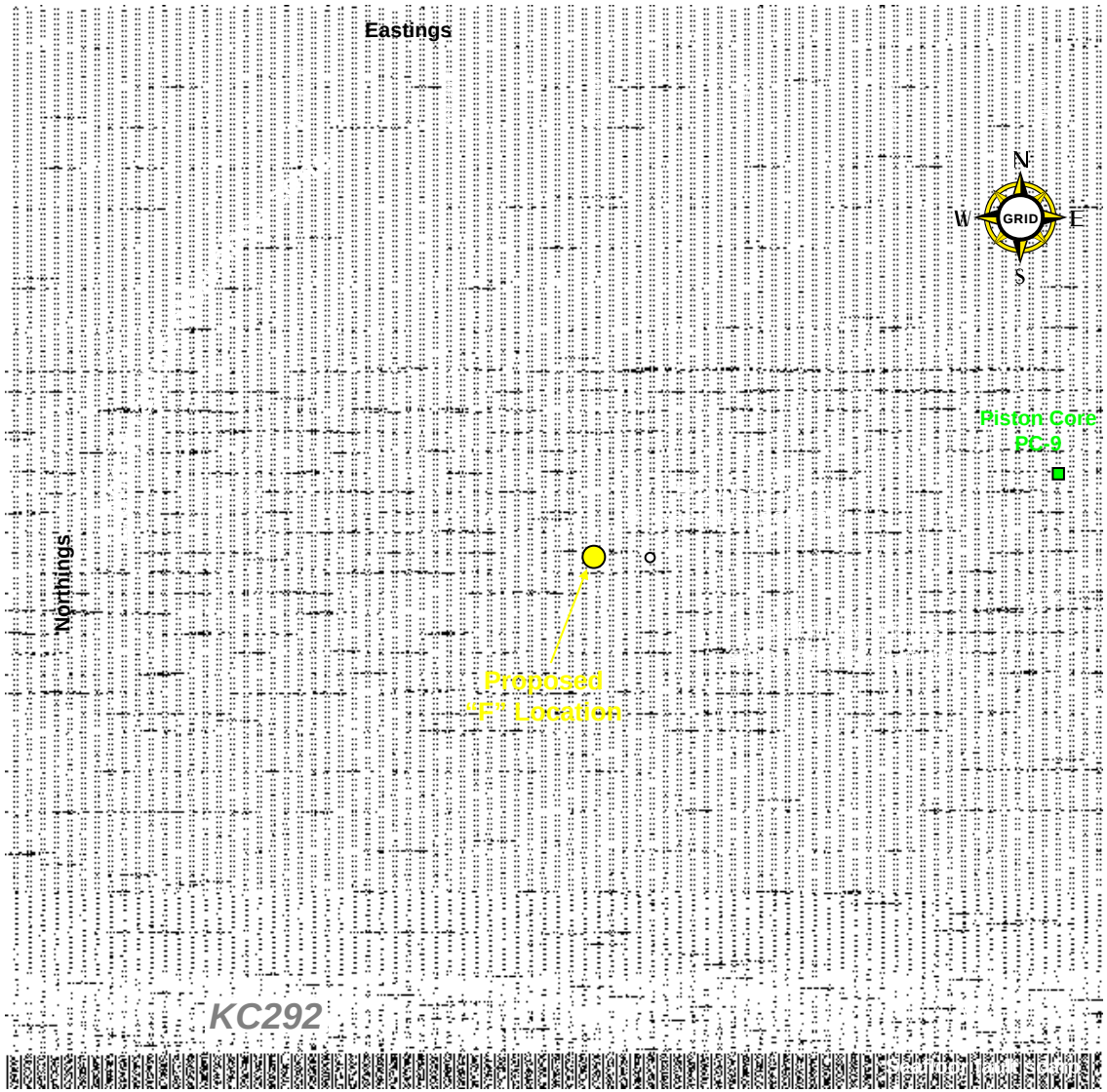
High Low

BIN SIZE = 50cm
FISH ALTITUDE = 42m

Portion of Multibeam Backscatter Map
(from Fugro 2009 AUV Hazard Survey Report)

Seafloor Backscatter Map

Proposed Keathley Canyon Block 292 “F” Location



LEGEND

BACKSCATTER INTENSITY

Scale 1:10,000

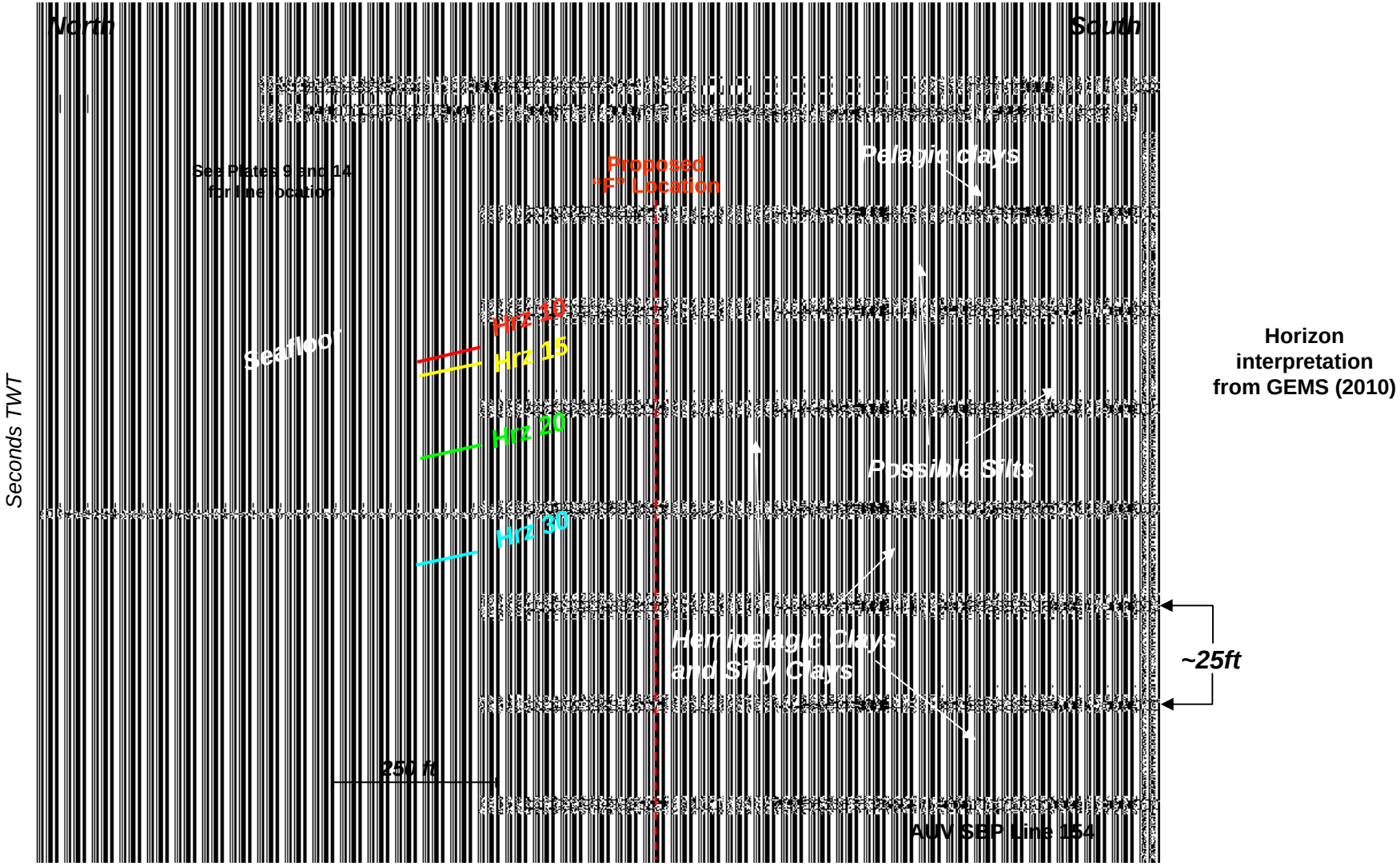
0 1,000

U.S. Survey Feet

SMT display of seafloor backscatter
(derived from Fugro 2008 AUV MBES data)

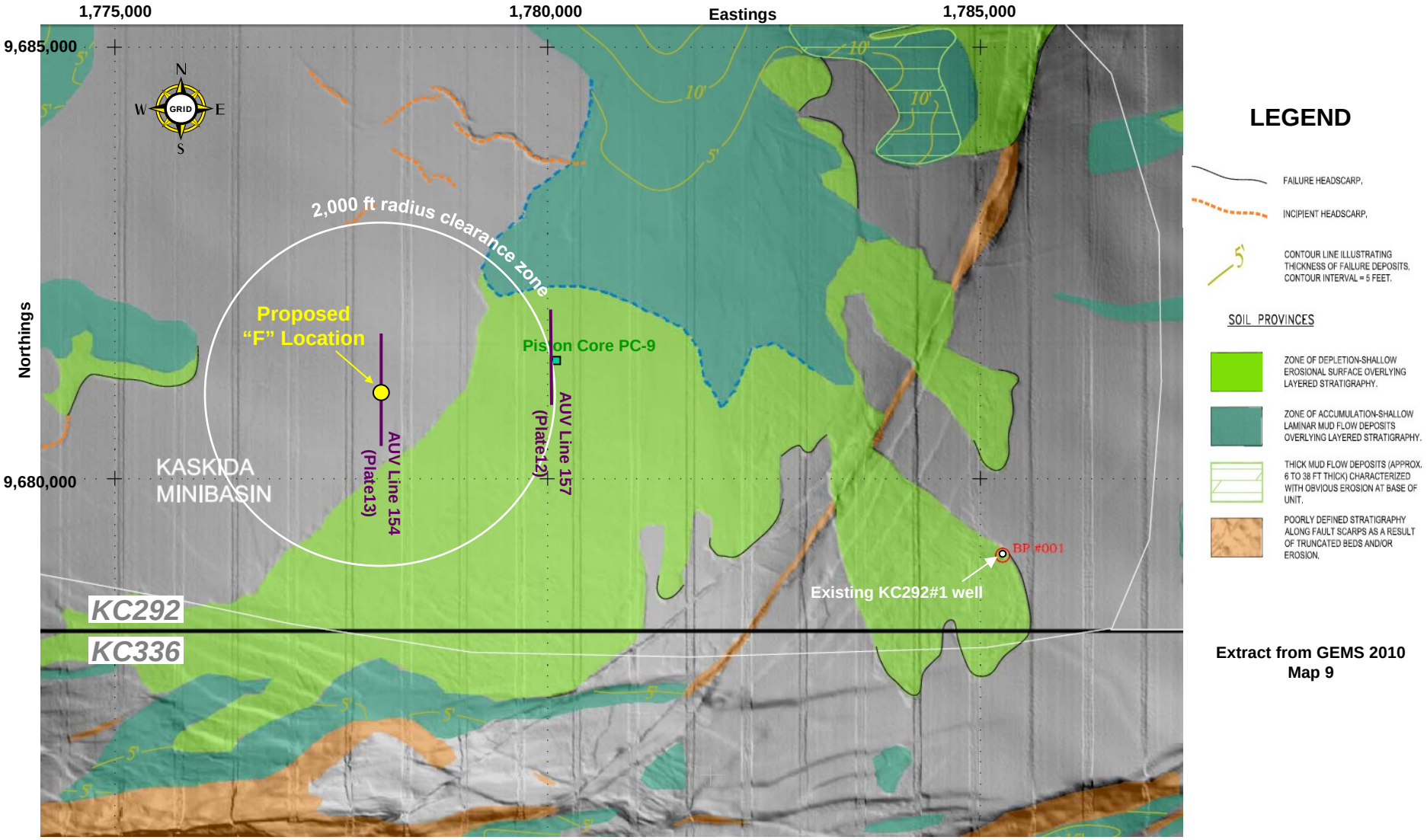
North-South Subbottom Profile Through Proposed Location

Proposed Keathley Canyon Block 292 “F” Location



Shallow Soils Province Map

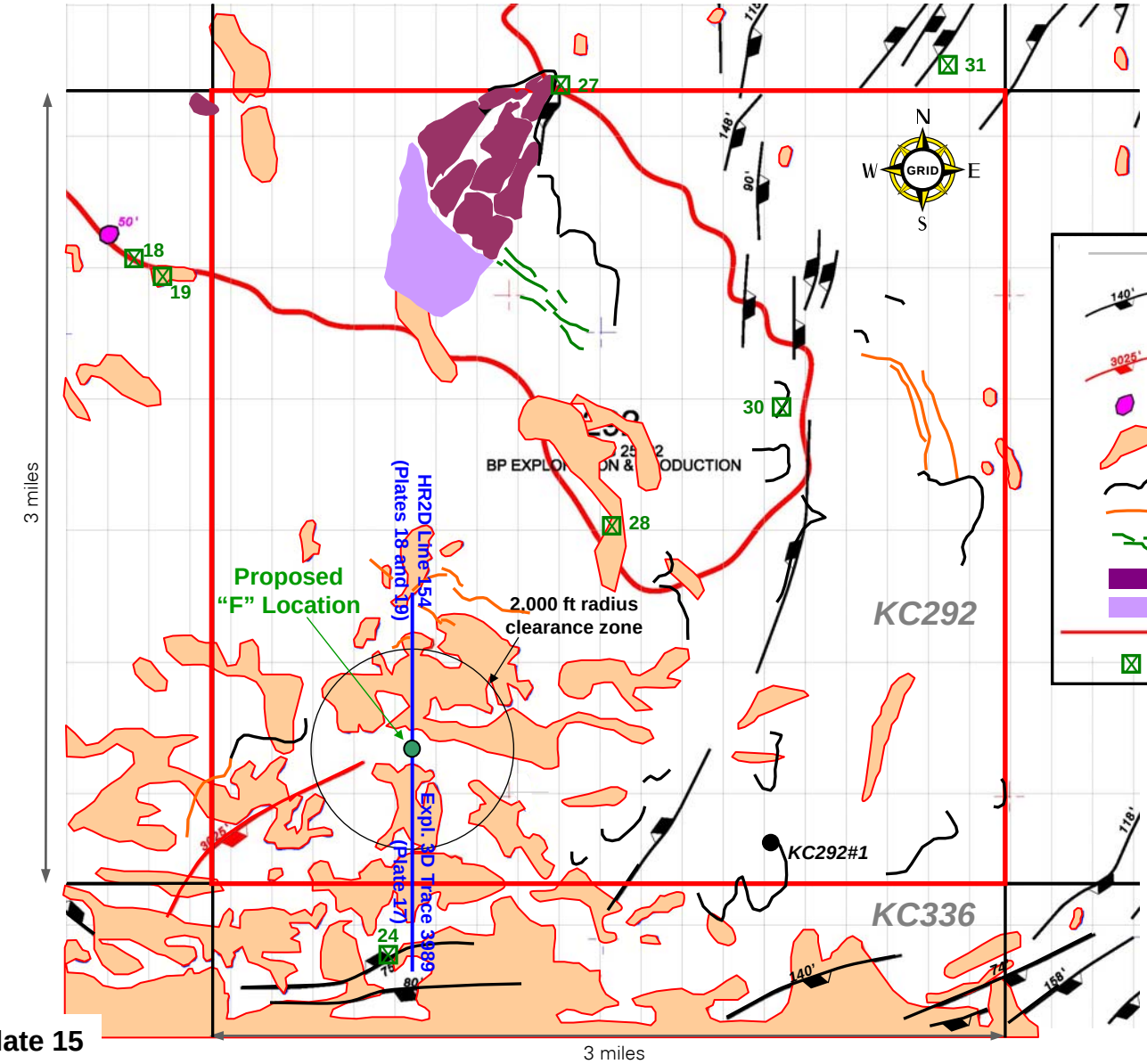
Proposed Keathley Canyon Block 292 “F” Location



Extract from GEMS 2010
Map 9

Seafloor and Subsurface Geohazards Map

Proposed Keathley Canyon Block 292 “F” Location



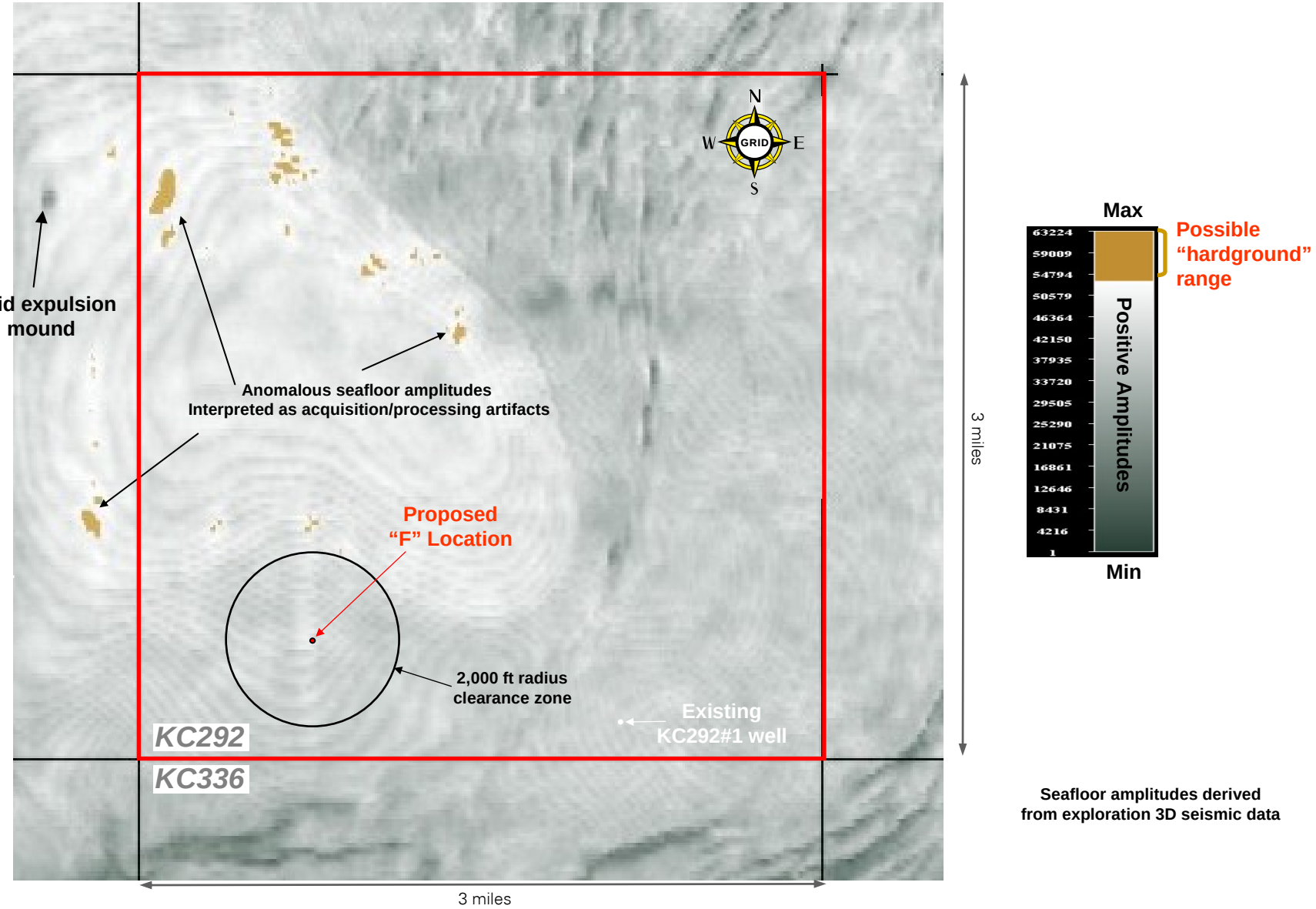
LEGEND

- 3D SEISMIC LINE
- 140' — SEAFLOOR FAULT WITH SCARP RELIEF INDICATED IN FEET. HOUSE SHOWS DIRECTION OF FAULT DIP. UN-ANNOTATED FAULTS HAVE SCARP RELIEFS OF LESS THAN 35 FT.
- 3025' — BURIED FAULT WITH DEPTH OF BURIAL INDICATED IN FEET. HOUSE SHOWS DIRECTION OF FAULT DIP.
- SEAFLOOR GAS/FLUID EXPULSION MOUNDS WITH RELIEF IN FEET.
- AMPLITUDE ANOMALIES REPRESENTING POSSIBLE GAS BETWEEN HORIZON 40 AND TOP-OF-SALT. ANOMALIES ARE DERIVED FROM BOTH EXPLORATION 3D AND HR2D DATA.
- FAILURE HEADSCARP
- INCIPIENT HEADSCARP
- “CREASE” – DOWNSLOPE LIMIT OF SEDIMENT ACCUMULATION FROM A POTENTIAL CREEP FAILURE
- SHALLOW BURIED LANSLIDE – COHESIVE RAFTED SEDIMENT BLOCKS
- SHALLOW BURIED LANDSLIDE – MUD FLOW
- APPROXIMATE EDGE OF SALT CANOPY. SALT IS ABSENT BENEATH AN AREA IN THE NW OF KC 292 AND EXTENDING TO THE NW.
- 28 — SIDESCAN SONAR TARGET

Extract from BP 2004 Regional Shallow Hazards Report, Map 12 modified with addition of potential shallow gas anomalies mapped from HR2D data and landslide features taken from GEMS 2010

Seafloor Amplitude Map

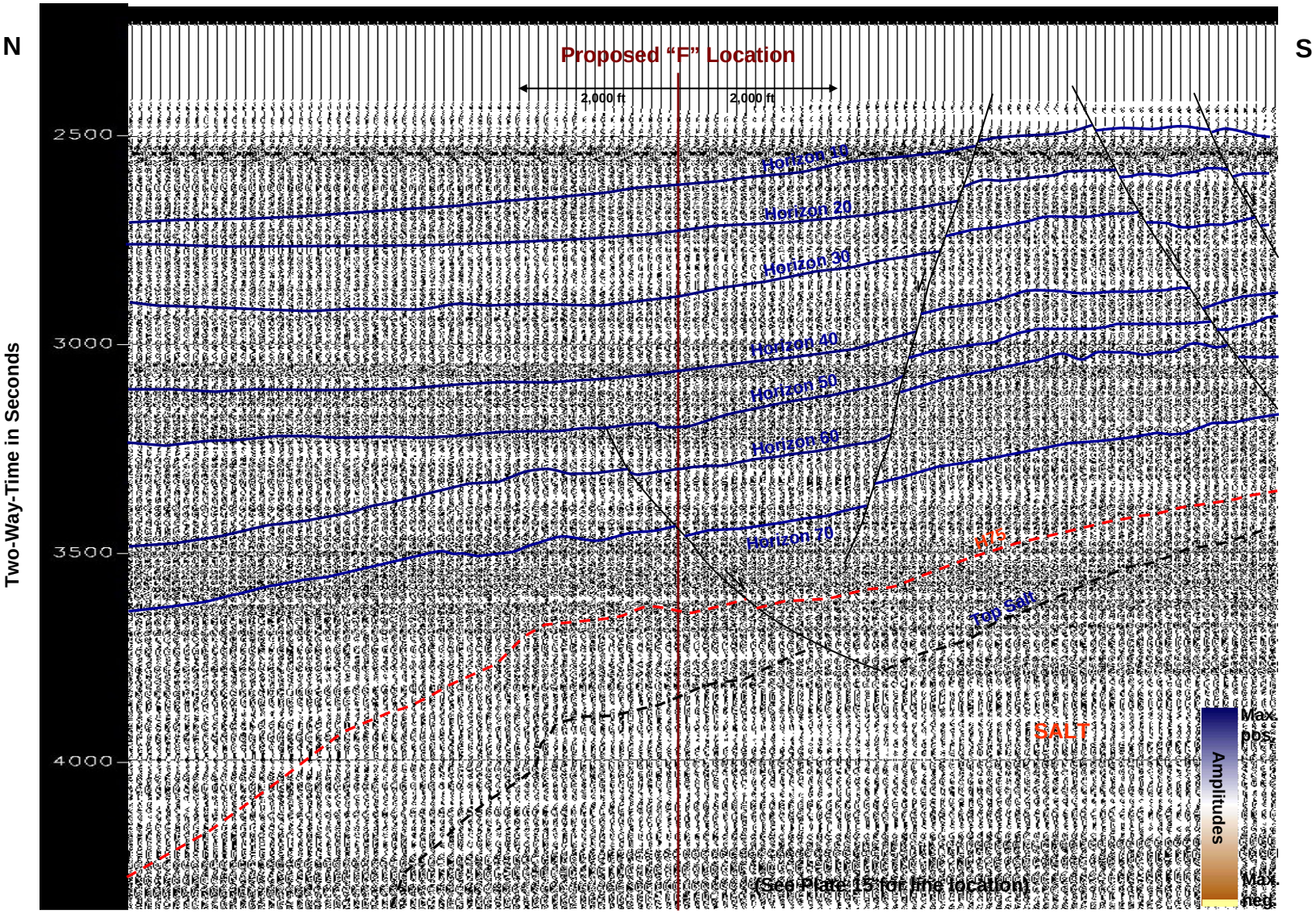
Proposed Keathley Canyon Block 292 “F” Location



Seafloor amplitudes derived from exploration 3D seismic data

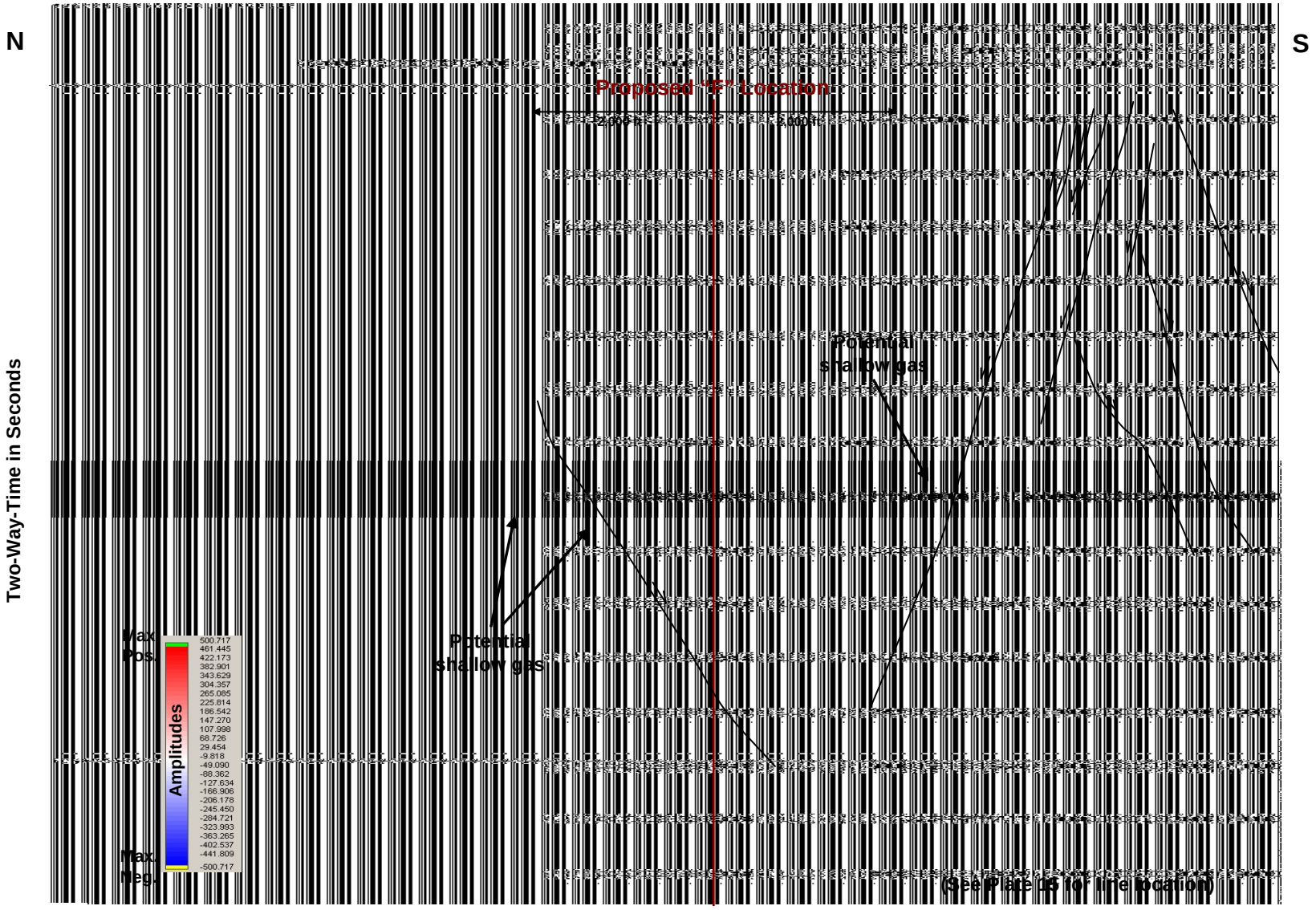
Exploration 3D Seismic Trace 3989 Through Proposed Well Location

Proposed Keathley Canyon Block 292 “F” Location



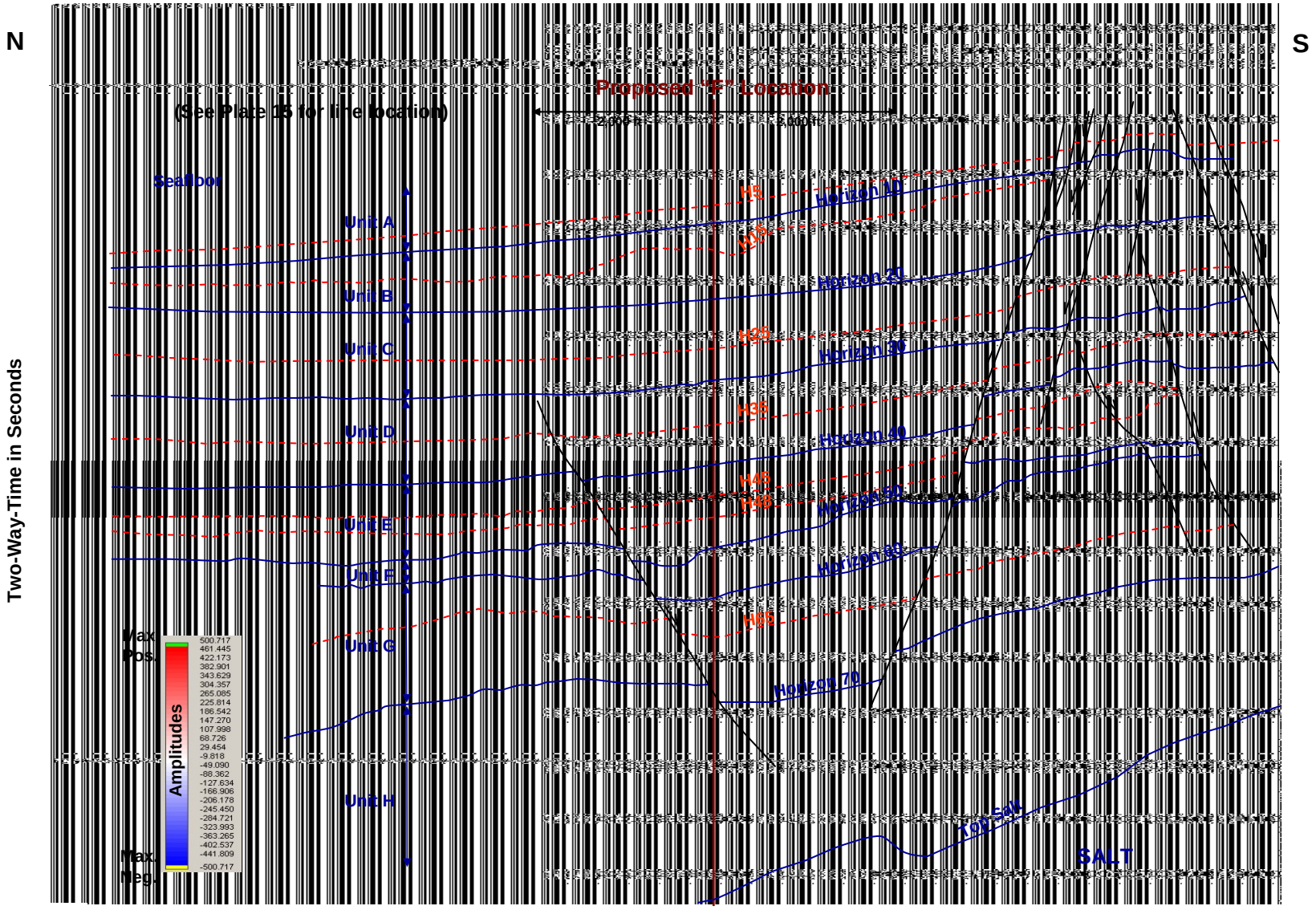
Uninterpreted HR2D Seismic Line 154 Through Proposed Well Location

Proposed Keathley Canyon Block 292 “F” Location



Uninterpreted HR2D Seismic Line 154 Through Proposed Well Location

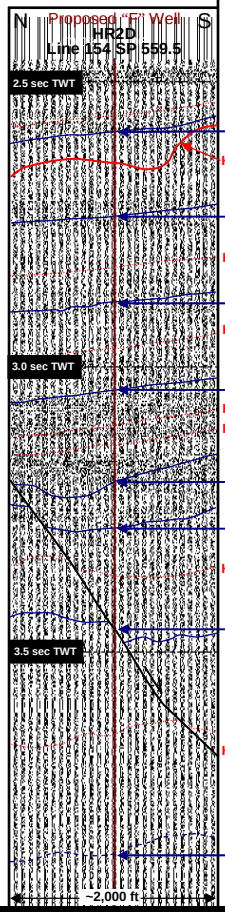
Proposed Keathley Canyon Block 292 “F” Location



Tophole Formation and Geohazards Summary Sheet

Proposed Keathley Canyon Block 292 “F” Location

KC292 “F”
Keathley Canyon 292
(OCS-G-25792)



Interpretation: Stratigraphy	Interpretation: Lithology	Depth BML (ft)	Depth BSL (ft)	TWT BSL (sec)	Interval Thickness (ft)	Comments	Shallow Hazards Risk of Occurrence: Hydrates	Shallow Oil	Shallow Gas	Shallow Water Flow
Seafloor		0	6,019	2.470		Relatively smooth seafloor, slopes ~2.2° to N				
H5 *Unit A*	Clays				433	Hemipelagic drape and thin debris flows				
Horizon 10		433	6,452	2.595						
H15 *Unit B*	Clays				484	Debris flow overlying turbidites				
Horizon 20		917	6,936	2.735						
H25 *Unit C*	Clays with silts towards base				519	Well-bedded turbidites				
Horizon 30		1,436	7,455	2.885						
H35 *Unit D*	Clays with silts and possible sands in lower portion				533	Debris flow overlying turbidites				
Horizon 40		1,969	7,988	3.039						
H45 H48 *Unit E*	Clays, with silts and possible sands above and below central debris flow				560	Turbidites with interbedded debris flow				
Horizon 50		2,529	8,548	3.201						
Unit F	Clays and silts				305	Turbidites and thin interbedded debris flows				
Horizon 60		2,834	8,853	3.289						
H65 *Unit G*	Clays and silts with possible sands in lower portion				623	Well-bedded turbidites				
Horizon 70 *(Fault)*		3,457	9,476	3.469						
Unit H H75	Clays and silts with possible thin sands in lower section				1,325	Turbidites and thin interbedded debris flows H75 is an inferred thin sand @ 4,048 ft bml mapped from exploration 3D seismic data and correlates to a sand identified from gamma ray logs at the KC292#1 well				
Top Salt	Depth Limit of Investigation	4,782	10,801	3.852						

Risk level: Negligible | Low | Moderate | High

Shallow hazards risks and lithologies based on results from KC292#1 well

Appendix D: Air Quality Report

OMB Control No. 1010-0151
OMB Approval Expires: 12/31/2011

EXPLORATION PLAN (EP)
AIR QUALITY SCREENING CHECKLIST

COMPANY	BP Exploration & Production, Inc.
AREA	Keathley Canyon
BLOCK	292
LEASE	OCS-G-25792
PLATFORM	
WELL	Wells F & G
COMPANY CONTACT	Donne Gyles
TELEPHONE NO.	281/366-6152
REMARKS	

EMISSIONS FACTORS

Fuel Usage Conversion Factors	Natural Gas Turbines		Natural Gas Engines		Diesel Recip. Engine		REF.	DATE
	SCF/hp-hr	9.524	SCF/hp-hr	7.143	GAL/hp-hr	0.0483	AP42 3.2-1	4/76 & 8/84

Equipment/Emission Factors	units	PM	SOx	NOx	VOC	CO	REF.	DATE
NG Turbines	gms/hp-hr		0.00247	1.3	0.01	0.83	AP42 3.2-1& 3.1-1	10/96
NG 2-cycle lean	gms/hp-hr		0.00185	10.9	0.43	1.5	AP42 3.2-1	10/96
NG 4-cycle lean	gms/hp-hr		0.00185	11.8	0.72	1.6	AP42 3.2-1	10/96
NG 4-cycle rich	gms/hp-hr		0.00185	10	0.14	8.6	AP42 3.2-1	10/96
Diesel Recip. < 600 hp.	gms/hp-hr	1	1.468	14	1.12	3.03	AP42 3.3-1	10/96
Diesel Recip. > 600 hp.	gms/hp-hr	0.32	1.468	11	0.33	2.4	AP42 3.4-1	10/96
Diesel Boiler	lbs/bbl	0.084	2.42	0.84	0.008	0.21	AP42 1.3-12,14	9/98
NG Heaters/Boilers/Burners	lbs/mmscf	7.6	0.593	100	5.5	84	P42 1.4-1, 14-2, & 14	7/98
NG Flares	lbs/mmscf		0.593	71.4	60.3	388.5	AP42 11.5-1	9/91
Liquid Flaring	lbs/bbl	0.42	6.83	2	0.01	0.21	AP42 1.3-1 & 1.3-3	9/98
Tank Vapors	lbs/bbl				0.03		E&P Forum	1/93
Fugitives	lbs/hr/comp.				0.0005		API Study	12/93
Glycol Dehydrator Vent	lbs/mmscf				6.6		La. DEQ	1991
Gas Venting	lbs/scf				0.0034			

Sulphur Content Source	Value	Units
Fuel Gas	3.33	ppm
Diesel Fuel	0.4	% weight
Produced Gas(Flares)	3.33	ppm
Produced Oil (Liquid Flaring)	1	% weight

EMISSIONS CALCULATIONS 1ST YEAR

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL		CONTACT	PHONE	REMARKS
BP Exploration & Production, Inc.	Keathley Canyon	292	OCS-G-25792	0	Wells F & G		Donne Gyles	281/366-6152	

OPERATIONS	EQUIPMENT	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR					ESTIMATED TONS				
	Diesel Engines	**HP**	**GAL/HR**	**GAL/D**												
	Nat. Gas Engines	**HP**	**SCF/HR**	**SCF/D**												
	Burners	**MMBTU/HR**	**SCF/HR**	**SCF/D**	**HR/D**	**DAYS**	**PM**	**SOx**	**NOx**	**VOC**	**CO**	**PM**	**SOx**	**NOx**	**VOC**	**CO**
DRILLING	"West Sirius" Semi-submersible															
	Total Rig>600hp diesel	50560	2442.048	58609.15	24	266	35.64	163.48	1225.02	36.75	267.28	113.75	521.84	3910.27	117.31	853.15
	VESSELS>600hp diesel(crew)	7200	347.76	8346.24	6	76	5.07	23.28	174.45	5.23	38.06	1.16	5.31	39.77	1.19	8.68
	VESSELS>600hp diesel(supply)	7200	347.76	8346.24	8	152	5.07	23.28	174.45	5.23	38.06	3.09	14.15	106.07	3.18	23.14
FACILITY	DERRICK BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INSTALLATION	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MISC.	**BPD**	**SCF/HR**	**COUNT**												
	TANK-	0			0	0				0.00					0.00	
DRILLING	OIL BURN	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WELL TEST	GAS FLARE		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
2012 YEAR TOTAL							**45.79**	**210.05**	**1573.92**	**47.22**	**343.40**	**118.00**	**541.31**	**4056.11**	**121.68**	**884.97**
EXEMPTION CALCULATION	**DISTANCE FROM LAND IN MILES**											**6260.40**	**6260.40**	**6260.40**	**6260.40**	**111579.43**
	188.0															

EMISSIONS CALCULATIONS 2ND YEAR

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL		CONTACT	PHONE	REMARKS
BP Exploration & Production, Inc.	Keathley Canyon	292	OCS-G-25792	0	Wells F & G		Donne Gyles	281/366-6152	

OPERATIONS	EQUIPMENT	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR					ESTIMATED TONS				
	Diesel Engines	**HP**	**GAL/HR**	**GAL/D**												
	Nat. Gas Engines	**HP**	**SCF/HR**	**SCF/D**												
	Burners	**MMBTU/HR**	**SCF/HR**	**SCF/D**	**HR/D**	**DAYS**	**PM**	**SOx**	**NOx**	**VOC**	**CO**	**PM**	**SOx**	**NOx**	**VOC**	**CO**
DRILLING	"West Sirius" Semi-submersible															
	Total Rig>600hp diesel	50560	2442.048	58609.15	24	144	35.64	163.48	1225.02	36.75	267.28	61.58	282.50	2116.84	63.51	461.86
	VESSELS>600hp diesel(crew)	7200	347.76	8346.24	6	41	5.07	23.28	174.45	5.23	38.06	0.62	2.86	21.46	0.64	4.68
	VESSELS>600hp diesel(supply)	7200	347.76	8346.24	8	82	5.07	23.28	174.45	5.23	38.06	1.66	7.64	57.22	1.72	12.48
FACILITY INSTALLATION	DERRICK BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MISC.	**BPD**	**SCF/HR**	**COUNT**												
	TANK-	0			0	0				0.00					0.00	
DRILLING WELL TEST	OIL BURN	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GAS FLARE		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
2013 YEAR TOTAL							**45.79**	**210.05**	**1573.92**	**47.22**	**343.40**	**63.87**	**293.00**	**2195.51**	**65.87**	**479.02**
EXEMPTION CALCULATION	**DISTANCE FROM LAND IN MILES**											**6260.40**	**6260.40**	**6260.40**	**6260.40**	**111579.43**
	188.0															

SUMMARY

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL
BP Exploration & Production, Inc.	Keathley Canyon	292	OCS-G-25792	0	Wells F & G

Year	Emitted Substance				
	PM	SOx	NOx	VOC	CO
2012	118.00	541.31	4056.11	121.68	884.97
2013	63.87	293.00	2195.51	65.87	479.02
Allowable	6260.40	6260.40	6260.40	6260.40	111579.43

OMB Control No. 1010-0151
OMB Approval Expires: 12/31/2011

EXPLORATION PLAN (EP)
AIR QUALITY SCREENING CHECKLIST

COMPANY	BP Exploration & Production, Inc.
AREA	Keathley Canyon
BLOCK	292
LEASE	OCS-G-25792
PLATFORM	
WELL	Wells B & C
COMPANY CONTACT	Donna Gyles
TELEPHONE NO.	281/366-6152
REMARKS	

EMISSIONS FACTORS

Fuel Usage Conversion Factors	Natural Gas Turbines		Natural Gas Engines		Diesel Recip. Engine		REF.	DATE
	SCF/hp-hr	9.524	SCF/hp-hr	7.143	GAL/hp-hr	0.0483	AP42 3.2-1	4/76 & 8/84

Equipment/Emission Factors	units	PM	SOx	NOx	VOC	CO	REF.	DATE
NG Turbines	gms/hp-hr		0.00247	1.3	0.01	0.83	AP42 3.2-1& 3.1-1	10/96
NG 2-cycle lean	gms/hp-hr		0.00185	10.9	0.43	1.5	AP42 3.2-1	10/96
NG 4-cycle lean	gms/hp-hr		0.00185	11.8	0.72	1.6	AP42 3.2-1	10/96
NG 4-cycle rich	gms/hp-hr		0.00185	10	0.14	8.6	AP42 3.2-1	10/96
Diesel Recip. < 600 hp.	gms/hp-hr	1	1.468	14	1.12	3.03	AP42 3.3-1	10/96
Diesel Recip. > 600 hp.	gms/hp-hr	0.32	1.468	11	0.33	2.4	AP42 3.4-1	10/96
Diesel Boiler	lbs/bbl	0.084	2.42	0.84	0.008	0.21	AP42 1.3-12,14	9/98
NG Heaters/Boilers/Burners	lbs/mmscf	7.6	0.593	100	5.5	84	P42 1.4-1, 14-2, & 14	7/98
NG Flares	lbs/mmscf		0.593	71.4	60.3	388.5	AP42 11.5-1	9/91
Liquid Flaring	lbs/bbl	0.42	6.83	2	0.01	0.21	AP42 1.3-1 & 1.3-3	9/98
Tank Vapors	lbs/bbl				0.03		E&P Forum	1/93
Fugitives	lbs/hr/comp.				0.0005		API Study	12/93
Glycol Dehydrator Vent	lbs/mmscf				6.6		La. DEQ	1991
Gas Venting	lbs/scf				0.0034			

Sulphur Content Source	Value	Units
Fuel Gas	3.33	ppm
Diesel Fuel	0.4	% weight
Produced Gas(Flares)	3.33	ppm
Produced Oil (Liquid Flaring)	1	% weight

EMISSIONS CALCULATIONS 1ST YEAR

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL		CONTACT	PHONE	REMARKS
BP Exploration & Production, Inc.	Keathley Canyon	292	OCS-G-25792	0	Wells B & C		Donna Gyles	281/366-6152	

OPERATIONS	EQUIPMENT	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR					ESTIMATED TONS				
	Diesel Engines	HP	GAL/HR	GAL/D												
	Nat. Gas Engines	HP	SCF/HR	SCF/D												
	Burners	MMBTU/HR	SCF/HR	SCF/D	HR/D	DAYS	PM	SOx	NOx	VOC	CO	PM	SOx	NOx	VOC	CO
DRILLING	"West Sirius" Semi-submersible															
	Total Rig>600hp diesel	50560	2442.048	58609.15	24	327	35.64	163.48	1225.02	36.75	267.28	139.84	641.51	4806.99	144.21	1048.80
	VESSELS>600hp diesel(crew)	7200	347.76	8346.24	6	93	5.07	23.28	174.45	5.23	38.06	1.42	6.50	48.67	1.46	10.62
	VESSELS>600hp diesel(supply)	7200	347.76	8346.24	8	187	5.07	23.28	174.45	5.23	38.06	3.80	17.41	130.49	3.91	28.47
FACILITY	DERRICK BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INSTALLATION	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MISC.	**BPD**	**SCF/HR**	**COUNT**												
	TANK-	0			0	0				0.00					0.00	
DRILLING	OIL BURN	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WELL TEST	GAS FLARE		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
2011 YEAR TOTAL							**45.79**	**210.05**	**1573.92**	**47.22**	**343.40**	**145.05**	**665.42**	**4986.15**	**149.58**	**1087.89**
EXEMPTION CALCULATION	**DISTANCE FROM LAND IN MILES**											**6260.40**	**6260.40**	**6260.40**	**6260.40**	**111579.43**
	188.0															

EMISSIONS CALCULATIONS 2ND YEAR

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL		CONTACT	PHONE	REMARKS
BP Exploration & Production, Inc.	Keathley Canyon	292	OCS-G-25792	0	Wells B & C		Donna Gyles	281/366-6152	

OPERATIONS	EQUIPMENT	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR					ESTIMATED TONS				
	Diesel Engines	**HP**	**GAL/HR**	**GAL/D**												
	Nat. Gas Engines	**HP**	**SCF/HR**	**SCF/D**												
	Burners	**MMBTU/HR**	**SCF/HR**	**SCF/D**	**HR/D**	**DAYS**	**PM**	**SOx**	**NOx**	**VOC**	**CO**	**PM**	**SOx**	**NOx**	**VOC**	**CO**
DRILLING	"West Sirius" Semi-submersible															
	Total Rig>600hp diesel	50560	2442.048	58609.15	24	83	35.64	163.48	1225.02	36.75	267.28	35.49	162.83	1220.12	36.60	266.21
	VESSELS>600hp diesel(crew)	7200	347.76	8346.24	6	24	5.07	23.28	174.45	5.23	38.06	0.37	1.68	12.56	0.38	2.74
	VESSELS>600hp diesel(supply)	7200	347.76	8346.24	8	47	5.07	23.28	174.45	5.23	38.06	0.95	4.38	32.80	0.98	7.16
FACILITY INSTALLATION	DERRICK BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MISC.	**BPD**	**SCF/HR**	**COUNT**												
	TANK-	0			0	0				0.00					0.00	
DRILLING WELL TEST	OIL BURN	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GAS FLARE		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
2012 YEAR TOTAL							**45.79**	**210.05**	**1573.92**	**47.22**	**343.40**	**36.81**	**168.88**	**1265.48**	**37.96**	**276.10**
EXEMPTION CALCULATION	**DISTANCE FROM LAND IN MILES**											**6260.40**	**6260.40**	**6260.40**	**6260.40**	**111579.43**
	188.0															

SUMMARY

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL
BP Exploration & Production, Inc.	Keathley Canyon	292	OCS-G-25792	0	Wells B & C

Year	Emitted Substance				
	PM	SOx	NOx	VOC	CO
2011	145.05	665.42	4986.15	149.58	1087.89
2012	36.81	168.88	1265.48	37.96	276.10
Allowable	6260.40	6260.40	6260.40	6260.40	111579.43

Appendix E: PROPRIETARY - WCD Assumptions for KC 292 and for WR 282 (Exploration Well Scenario in Revised OSRP)

Appendix F: Environmental Impact Analysis (EIA)

BP EXPLORATION & PRODUCTION

ENVIRONMENTAL IMPACT ANALYSIS For

KEATHLEY CANYON BLOCKS 292 AND 336

MAY 2011

Prepared by:

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C-K Associates' Project 6148E

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List of Acronyms

bbl	barrel
BOEMRE	Bureau of Ocean Energy Management, Regulation and Enforcement
BP	BP Exploration and Production, Inc.
C	Celsius
CFR	Code of Federal Regulations
CGA	Clean Gulf Associates
CIAP	Coastal Impact Assistance Program
CO	carbon monoxide
CPA	Central Planning Area
CWIS	Cooling Water Intake Structure
CWPPRA	Coastal Wetlands Protection, Planning & Restoration Act
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIA	Environmental Impact Analysis
EIS	Environmental Impact Statement
EP	Exploration Plan
EPA	Eastern Planning Area
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FGBNMS	Flower Garden Banks National Marine Sanctuary
FMP	Fishery Management Plan
FPSO	floating production, storage and offloading systems
ft	feet
FWS	U.S. Fish and Wildlife Service
GMFMC	Gulf of Mexico Fishery Management Council
GOM	Gulf of Mexico
HAPC	Habitat Area of Particular Concern
IPF	impact-producing factor
KC	Keathley Canyon
km	kilometer
l	liter
LCRP	Louisiana Coastal Resources Program
m	meter
MARPOL	International Convention for the Prevention of Pollution from Ships
mi	mile
µg	micrograms
mm	millimeter
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
MODU	Mobile Offshore Drilling Unit
MPRSA	Marine Protection, Research, and Sanctuaries Act
MSRC	Marine Spill Response Corporation
MWCC	Marine Well Containment Company
NAAQS	National Ambient Air Quality Standards

NEPA	National Environmental Policy Act
NERR	National Estuarine Research Reserve
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRC	National Response Corporation
NTL	Notice to Lessees
NWR	National Wildlife Refuge
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
OSRA	Oil Spill Risk Analysis
OSRO	Oil Spill Response Organization
OSRP	Oil Spill Response Plan
PAH	polycyclic aromatic hydrocarbon
PEA	Programmatic Environmental Assessment
PM	particulate matter
ppe	personal protective equipment
ppm	parts per million
PSD	Prevention of Significant Deterioration
SONS	Spill of National Significance
SOx	sulfur oxides
USCG	U.S. Coast Guard
USDOC	U.S. Department of Commerce
USDOI	U.S. Department of the Interior
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound
WCD	worst case discharge
WPA	Western Planning Area

1.0 INTRODUCTION

Project Background

BP Exploration & Production Inc. (BP) received approval of an Initial Exploration Plan (EP) (N-8245) in June 2008 and received approval of a Supplemental EP (S-7364) in December 2009. In those plans, BP proposed to drill five wells (Wells A, B, C, D and E) in Keathley Canyon Area Block 292. BP also received approval of an Initial Exploration Plan (N-8338) in March 2005. In that plan, BP proposed to drill three wells (Wells A, B and C) in Keathley Canyon Area Block 336.

In this Supplemental EP, BP proposes to drill two wells (Revised Wells B and C) in Keathley Canyon Area Block 292 and two wells (Supplemental F and G) in Keathley Canyon Area Block 336 from surface locations in Keathley Canyon Area Block 292 utilizing Seadrill's dynamically-positioned West Sirius semi-submersible drilling rig. BP anticipates that it will take approximately 205 days to drill and temporarily abandon each well.

Regulatory Background

Under the Federal Outer Continental Shelf Lands Act (OCSLA) the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE; formerly Minerals Management Service [MMS] prior to June 2010) is charged with the responsibility for managing and regulating exploration and development on the Outer Continental Shelf (OCS).

The BOEMRE Notice to Lessees and Operators (NTLs) provide clarification, description, or interpretation of a regulation; special lease stipulation or regional requirement strategies; or administrative information. Several of the NTLs are applicable and contain stipulations which direct lease development to avoid or mitigate impacts.

NTL No. 2005-G07
<u>Archaeological Resource Surveys and Reports</u>

Provides regulatory guidance for archaeological discoveries and clarifies when to report discoveries, responsibility for conducting discovery investigations and assessments, penalties for non-compliance and changes to survey requirements.

NTL No. 2007-G03
<u>Marine Trash and Debris Awareness and Elimination</u>

Provides regulatory guidance for the management of marine trash and debris, including the handling and disposal of small items and packing material. Requires the posting of placards, marine trash and awareness training and certification.

NTL No. 2007-G04
<u>Vessel Strike Avoidance and Injured/Dead Protected Species Reporting</u>

Provides guidance on how to implement monitoring programs to minimize risk of vessel strikes to protected species and to report observations of injured or dead species.

NTL No. 2008-G04
Information requirements for Exploration Plans and Development Operations Coordination Documents

Provides guidance on information requirements for OCS plans including guidance on information requirements for compliance with the Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), and placing high resolution survey lines with 3-D survey data.

NTL No. 2008–G20
Revisions to the List of OCS Lease Blocks Requiring Archaeological Resource Surveys and Reports

Makes additions to and modifies the list of OCS blocks that require archaeological surveys.

NTL No. 2009–G39
Biologically-Sensitive Underwater Features and Areas

Provides guidance to protect biologically-sensitive underwater features. Changes the water depth from 400 meters ((m) 1,812 feet (ft)) to 300 m (984 ft), minor regulatory references, update NTL references, and minor administrative changes.

NTL No. 2009–G40
Deepwater Benthic Communities

Provides guidance to protect high density deepwater benthic communities from damage from OCS oil and gas activities. Covers all high density deepwater features in deepwater greater than 300 m (984 ft) with a separation distance of 610 m (2,000 ft) from drilling muds and cutting locations.

NTL No. 2010–N06
Information Requirements for Exploration Plans, Development and Production Plans, and Development Operations Coordination Documents on the OCS

Rescinds the limitations set forth in NTL 2008-G04 regarding a blowout scenario and provides guidance regarding the content of the information required in the blowout scenario and worst case discharge (WCD) scenario descriptions.

Under the National Environmental Policy Act (NEPA), the BOEMRE prepared an Environmental Impact Statement (EIS) prior to the lease sale in which Keathley Canyon Blocks 292 and 336 are located. Additionally, a Programmatic Environmental Assessment (PEA) for specific activities within Grid 7 in the OCS region was prepared which includes Keathley Canyon Blocks 292 and 336 (USDOI MMS 2003). The PEA updates some of the material covered in the EIS. The EIS and PEA contain a description of the affected resources; potential impacts on the physical, biological, socioeconomic, and human resources; and the cumulative effects of a proposed action.

2.0 IMPACT PRODUCING FACTORS

The NTL 2008-G04 contains the requirements used to conduct a project specific Environmental Impact Analysis (EIA) to assess the potential direct and indirect environmental impacts to offshore and onshore resources. In conducting the EIA several

Impact Producing Factors (IPFs) are considered that are uniquely associated with offshore exploration activities. The following are examples of IPFs that have the potential to impact the environment as specified in NTL 2008-G04 are:

(1) air emissions;
(2) seafloor disturbance from anchoring and structure emplacement;
(3) discharges of drilling muds, cuttings, and produced water;
(4) emissions of light and noise;
(5) water intakes and discharges;
(6) use of service vessels and helicopters;
(7) construction or expansion of onshore support facilities;
(8) onshore waste disposal;
(9) marine trash and debris: and
(10) accidental events including oil spills, chemical spills, blowouts, vessel collisions, hydrogen sulfide releases, or large-volume flaring or venting events (for such accidents, describe in terms of volume, duration, etc.).

Several of the IPFs may be considered to be routine for exploration activities (USDOI BOEMRE 2011a). These routine IPFs include waste and discharges from vessel operations and drilling activities; air emissions from equipment and vessels; noise from vessel and helicopter transportation and drilling activities; and anchoring. The routine activities have been addressed in the multisale EIS for the western and central Gulf of Mexico (GOM) (USDOI MMS 2002, 2007) and the supplemental EIS for the central and western planning area sales (USDOI MMS 2008b). Several IPFs can occur from an accidental event such as a vessel collision with marine mammals and sea turtles; oil spills and blowouts; and, vessel and helicopter collisions with coastal and marine birds (USDOI BOEMRE 2011a). The IPFs are addressed in detail in the impact analysis for each of the affected resources in Section 3.0. Table 2 is the EIA Worksheet developed by BOEMRE. It contains the relevant IPFs and the potentially affected environmental resources for the activities proposed in this EP.

On June 18, 2010, BOEMRE issued NTL 2010-N06 that rescinded the limitations set forth in NTL 2008-G04 regarding a blowout scenario and provides guidance regarding the information required in a blowout scenario and worse case discharge descriptions.

Impact determinations may consider two potential impact scenarios; (1) the release is in the immediate vicinity of the natural resource and contact with the resource is likely, and (2) the release is beyond the immediate vicinity of the natural resource but, based on volume, duration, wind and currents, contact with the resource is possible, even if the probability is low.

Oil Spill Risk Analysis:

The BOEMRE conducted an oil-spill risk analysis (OSRA) that produced oil spill trajectory simulations used to estimate the risk from a spill (Ji et al. 2004). According to BOEMRE studies (Ji et al. 2004) the occurrence of an oil spill (or spills) is a matter of probability and its impact is determined by variables such as the amount of oil released, and winds and ocean currents that transport spills. While the occurrence of a spill cannot be predicted, an estimate can be calculated of the likelihood of an event contacting environmental resources.

The trajectories simulated represent only hypothetical pathways of oil slicks and does not involve any consideration of spill response activities (i.e., clean up), dispersion, or weathering processes that could alter the quantity or properties of oil that may eventually contact the environmental resource locations (Ji et al. 2004).

The OSRA model simulated the likely trajectory of a surface slick, from locations projected onto a gridded area. The trajectory simulates a spill's movement on the surface of water by using modeled ocean current and wind fields. The OSRA model tabulates the number of times that each trajectory moves across or touches (contacts) a location representative of various environmental features or shoreline segments. The OSRA model compiles the number of contacts to each feature that result from the modeled trajectory simulations from all of the launch points for a specific launch area. Each trajectory was allowed to continue for as long as 30 days and contacts within 3, 10 and 30 days were compiled. If the hypothetical spill contacted shoreline sooner than 30 days after the start of the spill, the spill trajectory was terminated, and the contact was recorded (Ji et al. 2004; Smith et al. 1982; LaBelle and Anderson 1985). The location of a launch area(s) where a lease or facility is located can be found at http://www.boemre.gov/itd/pubs/2004/2004-026.pdf.

Keathley Canyon Blocks 292 and 336 are in Launch Area 26. The tables with the conditional probability results for three time frames (within 3, 10, or 30 days) can be found in the OSRA (Ji et al. 2004) and are summarized below for Launch Area 26 (Table 1).

Table 1
Summary Table of Probabilities (expressed as a percent chance) that an oil spill starting at Launch Area W026 (includes Keathley Canyon Blocks 292 and 336) will contact a county within 3/10/30 days

County	Launch Area				
		Winter	Spring	Summer	Autumn
	W026	W026	W026	W026	W026
Cameron, TX	-/-/1	-/-/-		-/-/1	-/-/1
Willacy, TX	-/-/-	-/-/-		-/-/-	-/-/-
Kenedy, TX	-/-/1	-/-/2	-/-/1	-/-/1	-/-/1
Kleberg, TX	-/-/1	-/-/2	-/-/1	-/-/-	-/-/-
Nueces, TX	-/-/-	-/-/1	-/-/-	-/-/-	-/-/-
Aransas, TX	-/-/1	-/-/2	-/-/1	-/-/-	-/-/-
Calhoun, TX	-/-/1	-/-/2	-/-/2	-/-/-	-/-/-
Matagorda, TX	-/-/3	-/-/2	-/-/8	-/-/2	-/-/-
Brazoria, TX	-/-/1	-/-/-	-/-/3	-/-/1	-/-/-
Galveston, TX	-/-/2	-/-/-	-/-/8	-/-/1	
Chambers, TX			-/-/-		
Jefferson, TX	-/-/2		-/-/7	-/-/1	
Cameron, LA	-/-/4		-/-/14	-/-/1	
Vermillion, LA	-/-/2		-/-/5	-/-/1	
Iberia, LA	-/-/1		-/-/2	-/-/-	

Terrebonne, LA	-/-/1		-/-/2	-/-/1	
LaFourche, LA			-/-/-		
Jefferson, LA			-/-/-		
Plaquemines, LA	-/-/-		-/-/1	-/-/-	
St. Bernard, LA					
Hancock, MS					
Harrison, MS					
Jackson, MS					
Mobile, AL					
Baldwin, AL					

Note: "-" = less than 0.5 percent. Blank cells are either less than 0.5 percent for all values or there were no contacts made.

The model predicts either a less than 0.5 percent or no shoreline contacts within 3 or 10 days of a spill. After 30 days, there is a greater than 0.5 percent chance that nine counties or parishes may be contacted, including ten counties in Texas and five parishes in Louisiana.

BOEMRE recently published trajectory modeling for a high volume, long duration offshore oil spill (USDOI BOERME 2011b, Appendix C). This modeling for a high volume, long duration oil spill supplements the previous OSRA spill projections (Ji et al. 2004). This analysis looked at projected shoreline impacts for a hypothetical high volume, long duration oil spill lasting for up to 90 days with a trajectory predicted for 120 days (30 days after the spill is controlled). The three months probabilities provided preliminary impact data based on seasonal oceanographic and meteorological variability. Releases were simulated for three launch points in the Central Planning Area (CPA) and two launch points in the Western Planning Area (WPA). The OSRA model does not address the likelihood of such an event but may assist in identifying potential impacts if the event occurs. A wide range of resources (physical, biological, and socioeconomic) could be impacted by such an event depending on the location of the spill as well as wind and ocean currents. Offshore resources in the vicinity of the drilling rig or platform could be impacted. As time passes there is a higher probability these impacts may extend to near shore and coastal resources. Understandably the model concluded that near shore and coastal resources closer to the spill site have the greatest likelihood of impact. The chance for shoreline impacts increases as time increases due to interactions between the oil and complex ocean and wind currents.

Accidental Release:

An accidental release (i.e. spill) is an unplanned, unforeseeable event and past experiences are relied upon to predict many factors regarding oil-spill risks (USDOI BOERME 2011a). In a recent environmental assessment (EA), BOEMRE published the analysis of a catastrophic event (USDOI BOEMRE 2011a, Appendix B). In this EA, a catastrophic event is defined as "large-scale damage involving destruction of species, ecosystems, infrastructure, or property with long-term effects, and/or major loss of human life (Eccleston 2008)." Several factors were used during the analysis of a catastrophic event such as time of year, location of a release relative to winds, currents, land, and sensitive resources, specifics of the well (i.e., flow rates, hydrocarbon characteristics, and infrastructure damage), and response (i.e., speed and effectiveness).

A catastrophic event for oil and gas activities on the OCS is considered to be a high volume and long duration oil spill, regardless of the cause (USDOI BOEMRE 2011a). Furthermore, a WCD for an offshore facility is the largest foreseeable discharge in adverse weather conditions (Section 311(a)(24) of the Clean Water Act). A Spill of National Significance (SONS) is defined as a spill that because of the severity, size, location, actual or potential impact on the public health and welfare or the environment, or the necessary response effort is so complex that it requires extraordinary coordination of federal, state, local, and responsible party resources to contain and cleanup the discharge (40 C.F.R. Part 300, Appendix E).

An assessment of the probability of a future large spill must consider a number of factors, including historical data regarding the occurrence of such events and the low estimated spill risk of a larger spill event (.002 percent risk of spill ≥ 1,000 barrels (bbl) as reported by BOEMRE). Risk is further reduced by the recent response and containment improvements, BOEMRE's enhanced oversight, and industry's heightened safety awareness (USDOI BOEMRE 2011a). Based on these factors, it is reasonable to conclude that the likelihood such an accidental spill event will occur has been reduced (USDOI BOERME 2011a). Additionally, the regulations require the submittal of an Oil-Spill Response Plan (OSRP) that outlines the availability of spill containment and cleanup equipment as well as trained personnel able to respond, to the maximum extent practicable, to a worst case discharge or a substantial threat of such a discharge.

New safety measures (30 CFR Part 250) reduce the risk of catastrophic and smaller oil spills occurring, whereas the development of new well containment technology, well containment protocols and oil spill response technology, methodologies, and protocols reduce the severity and duration of catastrophic oil spills (USDOI BOERME 2010a).

TABLE 2
ENVIRONMENTAL IMPACT ANALYSIS WORKSHEET

The IPF's included in Table 2 that can cause impacts to the listed environmental resources are identified by an "x". For those cells that are footnoted, a statement is provided that addresses its applicability to this EP.

Environmental Resources	**Impact Producing Factors (IPFs) Categories and examples Refer to a recent GOM OCS Lease Sale EIS for a more complete list of IPFs**						
	Emissions (air, noise, light, etc.)	**Effluents (muds, cuttings, other discharges to the water column or seafloor)**	**Physical disturbances to the seafloor (rig or anchor emplacements, etc.)**	**Wastes sent to shore for treatment or disposal**	**Accidents (e.g., oil spills, chemical spills, H_2S releases, vessel strikes)**	**Marine Trash and Debris**	**Cooling Water Intake**
Site-specific at Offshore Location							
Soft bottom communities		x			x		
Designated topographic features		(1)	(1)		(1)x		
Pinnacle Trend area live bottoms		(2)	(2)		(2)x		
Eastern Gulf live bottoms		(3)	(3)		(3)x		
Chemosynthetic communities			(4)		x		
Water quality		x			x		
Fisheries	x	x			x		x
Marine mammals, sea turtles, sturgeon	(8) x	x			(8)x	x	
Air quality	(9) x				x		
Shipwreck sites (known or potential)			(7)		x		
Prehistoric archaeological sites			(7)		x		
Vicinity of Offshore Location							
Essential fish habitat	x	x			(6)x		
Marine and pelagic birds	x	x			x	x	
Public health and safety					(5)x		
Coastal and Onshore							
Beaches					(6)x	x	
Wetlands/Sea grass					(6)x		
Coastal protected species (shore birds, coastal nesting birds, and beach mice)					(6)x		
Coastal protected areas (wildlife refuges wilderness, estuaries, seashore)					(6)x		
Wilderness areas					x		
Socioeconomics					x		
Groundwater and onshore environments				x	x		

NOTE: The numbers in parentheses refer to the footnotes on page 2 of this form.

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Footnotes for Environmental Impact Analysis Matrix

1. *Activities that may affect a marine sanctuary or topographic feature. Specifically, if the well or platform site or any anchors will be on the seafloor within the:*
   a. *4-mile zone of the Flower Garden Banks, or the 3-mile zone of Stetson Bank;*
   b. *1000-m, 1-mile or 3-mile zone of any topographic feature (submarine bank) protected by the Topographic Features Stipulation attached to an OCS lease;*
   c. *Essential Fish Habitat (EFH) criteria of 500 ft from any no-activity zone; or*
   d. *Proximity of any submarine bank (500 ft buffer zone) with relief greater than 2 meters that is not protected by the Topographic Features Stipulation attached to an OCS lease.*

2. *Activities with any bottom disturbance within an OCS lease block protected through the Live Bottom Activities (Pinnacle Trend) Stipulation attached to an OCS lease.*

3. *Activities within any Eastern Gulf OCS block where seafloor habitats are protected by the Live Bottom (Low Relief) Stipulation attached to an OCS lease.*

4. *Activities on blocks designated by the MMS as being in water depths 400 meters or greater.*

5. *Exploration or production activities where H_2S concentrations greater than 500 ppm might be encountered.*

6. *All activities that could result in an accidental spill of produced liquid hydrocarbons or diesel fuel that you determine would impact these environmental resources. If the proposed action is located a sufficient distance from a resource that no impact would occur, the EIA can note that in a sentence or two.*

7. *All activities that involve seafloor disturbances, including anchor emplacements, in any OCS block designated by the MMS as having high-probability for the occurrence of shipwrecks or prehistoric sites, including such blocks that will be affected that are adjacent to the lease block in which your planned activity will occur. If the proposed activities are located a sufficient distance from a shipwreck or prehistoric site that no impact would occur, the EIA can note that in a sentence or two.*

8. *All activities that you determine might have an adverse effect on endangered or threatened marine mammals or sea turtles or their critical habitats.*

9. *Production activities that involve transportation of produced fluids to shore using shuttle tankers or barges*

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3.0 AFFECTED RESOURCES AND IMPACT ANALYSIS

3.1 Site Specific at Offshore Location

3.1.1 Soft Bottom Benthic Communities

Affected Resource – Much of the GOM consists of a soft, muddy bottom in which burrowing infauna are the most abundant invertebrates. Single-celled bacteria to invertebrates as well as fish inhabit soft-bottom habitat at almost every depth range in the GOM (USDOI MMS 2007). Major groups of animals that live in this habitat include: bacteria and other microbenthos; meiofauna (0.063-0.3 millimeter (mm)); macrofauna (>0.3 mm); and (4) megafauna (larger organisms such as crabs, sea pens, sea cucumbers, crinoids, and bottom-dwelling (demersal) fish). All of these groups are represented throughout the entire GOM from the continental shelf to the deepest abyssal depths (about 3,850 m (12,630 ft)).

Impact Analysis – IPFs potentially affecting soft bottom benthic communities are effluent discharges (drilling mud and cuttings) and accidental releases. The proposed drilling will be done with a dynamically positioned rig, so there are no associated anchors, anchor chain or wire ropes. Discharges of drilling mud and cuttings only move to limited directions depending on prevailing currents. Impacts will also be limited by the drilling of a single well at each location and this would not result in a significant impact on the benthic communities because the duration and areal extent of the proposed activities would be limited and recolonization of benthic communities is facilitated from nearby surrounding areas (USDOI MMS 2007).

Oil from a surface spill can be driven into the water column; measurable amounts have been documented down to a 10 m (32.8 ft) depth and modeling did indicate that oil could reach a depth of 20 m (65.6 ft). At the 20 m (65.6 ft) depth, the oil is found only at concentrations several orders of magnitude lower than the amount shown to have an effect on marine organisms, corals, and invertebrates (Lange 1985; McAuliffe et al. 1975 and 1981; Knap et al. 1985).

An accidental release (blowout) at the seafloor could create a crater and resuspend and disperse large quantities of bottom sediments within a 300-m (984-ft) radius of the blowout site, burying both infaunal (live in the sediment) and epifaunal (live on the sediment) organisms and interfering with sessile invertebrates that rely on filter-feeding organs. Even in situations where substantial burial of typical benthic infaunal communities occurred, recolonization from populations from neighboring soft bottom substrate would be expected over a relatively short period of time for all size ranges of organisms, in a matter of days for bacteria and probably less than one year for most all macrofauna species (USDOI MMS 2007; NRC 2003; NRC 2006).

Low concentrations of dispersed oil may occur in areas near a blowout site in offshore waters following the subsea use of dispersants (USDOI BOEMRE 2011a; Joint Analysis Group 2010). The behavior and impacts of subsurface concentrations of dispersed oil are not well known, but such oil could have the potential to contact soft bottom benthic communities beyond the 300- m; 984- ft)

radius estimated by BOEMRE (USDOI BOEMRE 2011a; USDOI MMS 2007 and 2008b) depending on its extent, trajectory, and persistence. Potential impacts on sensitive resources would be an integral part of the decision and approval process for the use of dispersants.

Subsurface spills could result in the formation and settling of oil-saturated material and oil-sediment particles could come into contact with living soft bottom biota tissue. The extent of such impacts will vary depending on, among other factors, the magnitude and duration. Should any of the oil come in contact with soft bottom biota, effects, if any, would be primarily sublethal (Jackson et al. 1989). No significant impact is expected to soft bottom benthic communities. Contact is minimized due to distance and the depth from small spills. Implementation of new BOEMRE environmental and safety regulations will further reduce the probability of the occurrence of a large volume/long duration spill.

3.1.2 Designated Topographic Feature

Affected Resource – Topographic features, along with their associated coral reef communities, are typically located on the shelf edge, shelf, and mid-shelf of the WPA and the CPA of the GOM OCS Region (Figure 1). These hardbottom benthic communities support areas of high biomass, high diversity, and high numbers of plant and animal species. Topographic features also support, either as shelter or food, or both, large numbers of commercially and recreationally important fishes; and they provide a relatively pristine area suitable for scientific research. There are 37 known topographic features in the GOM that support various, diverse reef ecosystems; 21 in the WPA and 16 in the CPA (USDOI MMS 2007 and 2008b; USDOI MMS NTL 2009-G39).

The Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972 established the National Marine Sanctuary Program, which is administered by National Oceanic and Atmospheric Administration (NOAA). The Flower Garden Banks National Marine Sanctuary (FGBNMS), which was designated in 1992, is the only sanctuary that exists in the northern GOM. The East and West Flower Garden Banks and Stetson Bank comprise the FGBNMS and are located in the WPA (USDOI MMS 2002, 2007 and 2008b).

Impact Analysis – The only IPF potentially affecting topographic features is accidental releases. The nearest topographic features is the Elvers Bank, located about 124 kilometers (km) (77 miles (mi)) to the north. The East Flower Garden Bank is about 164 km (102 mi) to the west (Figure 1). The site-specific offshore location of the proposed activities (Keathley Canyon Blocks 292 and 336) is outside the 3-mile zone of any identified topographic feature.

As discussed in Section 3.1.1 sub-sea concentration of dispersed oil may contact benthic organisms such as those represented by the designated topographic features, however due to distance and the depth such impact is not expected. Implementation of new BOEMRE environmental and safety regulations will further reduce the probability of the occurrence of a large volume/long duration spill.

3.1.3 Pinnacle Trend Area Live Bottom

Affected Resource – A region of topographic relief along the northeastern portion of the CPA is known as the "pinnacle trend," at the outer edge of the Mississippi-Alabama shelf between the Mississippi River and DeSoto Canyon (USDOI MMS 2002, 2007 and 2008b) (Figure 2). The pinnacles appear to be carbonate reef structures in an intermediate stage between growth and fossilization (Ludwick and Walton 1957). This area contains a variety of features from low-relief rocky areas to major pinnacles, as well as ridges, scarps, and relict patch reefs. These discrete mounds vary in size and structural complexity.

Impact Analysis – The only IPF potentially affecting pinnacle trend features is an accidental release. None of the blocks in Keathley Canyon are covered by the Live Bottom (Pinnacle Trend) Stipulation. The pinnacle trend area is about 486 km (302 mi) northeast from the lease area, along the shelf edge south of Mississippi and Alabama (Figure 2).

As discussed in Section 3.1.1 sub-sea concentrations of dispersed oil may contact benthic organisms such as those represented by the pinnacle trend, however due to distance and the depth such impact is not expected. Implementation of new BOEMRE environmental and safety regulations will further reduce the probability of the occurrence of a large volume/long duration spill.

3.1.4 Eastern Gulf Live Bottom

Affected Resource – Live-bottoms (low relief features) means seagrass communities; areas that contain biological assemblages consisting of sessile invertebrates living upon and attached to naturally occurring hard or rocky formations with rough, broken, or smooth topography; and areas where a hard substrate and vertical relief may favor the accumulation of turtles, fishes, or other fauna (USDOI MMS NTL 2009-G39). The closest Eastern Gulf live bottom feature is beyond the pinnacle trend area which is greater than 486 km (302 mi).

Impact analysis – The only IPF potentially affecting Eastern Gulf live bottoms would be accidental releases. The lease area is not covered by the Live Bottom (low relief) Stipulation. As discussed in Section 3.1.1 sub-sea concentrations of dispersed oil may contact benthic organisms such as those represented by eastern Gulf live bottoms, however due to distance and the depth such impact is not expected. Implementation of new BOEMRE environmental and safety regulations will further reduce the probability of the occurrence of a large volume/long duration spill.

3.1.5 High Density Deepwater Benthic Communities

Affected Resource – High density deepwater communities are feature or areas that could support high density chemosynthetic communities, deepwater corals, and other associated hard bottom communities (USDOI MMS NTL 2009-G39). Chemosynthetic communities are defined as persistent, largely sessile assemblages of marine organisms dependent upon chemosynthetic bacteria as their primary food source (MacDonald 1992) (Figure 3). A carbon source independent of photosynthesis is used by chemosynthetic communities. Although

the process of chemosynthesis is entirely microbial, chemosynthetic bacteria and their primary production can support thriving assemblages of higher organisms through symbiosis. The occurrence of chemosynthetic organisms dependent on hydrocarbon seepage has been documented in water depths as shallow as 290 m (951.4 ft) (Roberts et al. 1990) and as deep as 2,200 m (7,217.76 ft) (MacDonald 1992). This depth range places chemosynthetic communities in the deepwater region of the GOM.

The communities dominated by vestimentiferan tubeworms, mytilid mussels, vesicomyid clams, and infaunal lucinid or thyasirid clams (USDOI MMS 2002, 2007 and 2008b) (MacDonald 1990). These faunal groups tend to display distinctive characteristics in terms of how they aggregate, the size of aggregations, the geological and chemical properties of the habitats in which they occur and, to some degree, the heterotrophic fauna that occur with them. Many of the species found at cold seep communities in the GOM are new to science and remain undescribed. As an example, at least six different species of seep mussels have been collected, but none are yet described (USDOI MMS 2002, 2007 and 2008b).

Impact Analysis – The IPF potentially affecting high density deepwater communities is an accidental release. None of the known high-density deepwater benthic community locations listed in NTL 2009-G40 are in Keathley Canyon Blocks 292 or 336 (Figure 3). The closest known chemosynthetic community sites were identified in a 2007 remote-operated vehicle (ROV) survey. It identified hard grounds with chemosynthetic communities of mussels and tube worms within the western portion of Keathley Canyon Block 291 more than three miles away (BP 2010a; BP 2010b). Since the proposed activities are in deepwater, Site Clearance Narrative (BP 2010a; BP 2010b) included with the EP was prepared using the guidance in Attachment B of NTL No. 2009-G40, Deepwater Benthic Communities. No geophysical evidence of hydrocarbon seepage sites or areas that could potentially support the presence of chemosynthetic communities are recognized within 2,000 ft around the proposed location (BP 2010a; BP 2010b). The proposed drilling will be done with a dynamically positioned rig, so there are no associated anchors, anchor chain or wire ropes.

As discussed in Section 3.1.1 sub-sea concentrations of dispersed oil may contact benthic organisms such as those represented by high density deepwater benthic communities, however due to distance and the depth such impact is not expected. No significant impact is expected to high density deepwater communities. Contact is minimized due to distance and the depth from small spills. Implementation of new BOEMRE environmental and safety regulations will further reduce the probability of the occurrence of a large volume/long duration spill.

3.1.6 Water Quality

Affected Resource – Deepwater areas in the northern GOM are relatively homogeneous with respect to temperature, salinity, and oxygen (USDOI MMS

2007). Discharges associated with offshore oil and gas exploration and production activities located in the Western and Central GOM must be authorized for discharge under the current *"National Pollutant Discharge Elimination system (NPDES) General Permit for Discharges from the Offshore Subcategory of the Oil and Gas Extraction Category for the Western Portion of the Outer Continental Shelf of the Gulf of Mexico off the Coasts of Louisiana and Texas"*, GMG290000 (USEPA 2007). This general permit sets prohibitions, limitations and monitoring requirements that are established to protect the water quality and marine environment. The discharges associated with offshore oil and gas exploration activities include drilling fluids and cuttings, uncontaminated ballast water, uncontaminated seawater, deck drainage, sanitary wastes, domestic wastes, and other miscellaneous discharges (excess cement slurry, blowout preventer control fluid, uncontaminated freshwater and saltwater, etc.).

Impact Analysis - IPFs that could result in water quality degradation from the proposed operations at Keathley Canyon Blocks 292 and 333 include operational effluents (discharges) and accidents. Refer to Section 6.0 of the EP for a list of operational discharges associated with this operation.

Operational discharges could impact water quality in the immediate vicinity of the point of discharge (less than 100 m regulatory mixing zone boundary). However, any constituents found in these discharges are expected to disperse and dilute rapidly to very near background levels in the water column when discharged in the open GOM (USDOI MMS 2000). Additionally, all effluents discharged are expected to be in compliance with the current NPDES General Permit GMG290000, thereby eliminating significant biological or ecological effects. Further, the U. S. Environmental Protection agency (USEPA) has stated that discharges in compliance with the NPDES Permit, GMG290000 will not cause unreasonable degradation of the water quality and the marine environment (USEPA 2004). Therefore, operational effluent discharges are not expected to have a significant impact to water quality. Support vessels may discharge treated sanitary and domestic wastes. Contracts require support vessel discharges to comply with U. S. Coast Guard (USCG) regulations and, therefore are not expected to have any significant impacts to water quality.

Following the 2010 Macondo incident, there is a large amount of ongoing research and studies being conducted on the impacts to water quality from an oil spill and potential deepwater "clouds" of dispersed oil. For example, Terry Hazen with the Lawrence Berkeley National Laboratory (Berkley Lab) operated by the University of California is studying the impacts and fate of deepwater oil plumes. An initial study result suggests that the potential exists for rapid intrinsic bioremediation (bacterial degradation) of sub-sea dispersed oil in the water column by deep-sea indigenous microbial activity without significant oxygen depletion (Hazen et al. 2010). Other studies lead by David Valentine (University of California, Santa Barbara) and John Kessler (Texas A&M University) are studying the effects of deepwater dissolved hydrocarbon gases (e.g. methane, propane and ethane) and effects to microbial response to a deepwater oil spill. Initial study results suggest deepwater dissolved hydrocarbon gases may promote

rapid hydrocarbon respiration by low-diversity bacterial blooms, and thus priming indigenous bacterial populations for rapid hydrocarbon degradation of sub-sea oil plumes (Kessler et al. 2011; Valentine et al. 2010). These and other studies are ongoing and more data will be generated, analyzed, and final conclusions made. As more information from these studies is made publicly available the impacts to water quality from oil spills and potential deepwater plumes will be addressed and analyzed accordingly by the scientific community. Results to date suggest that sub-surface concentrations of hydrocarbons may be more rapidly degraded by biological means than was previously anticipated.

During a spill or well blowout, the water quality of marine waters could be impacted. The extent of such impacts will vary depending on, among other factors, the magnitude and duration. Implementation of new BOEMRE environmental and safety regulations will further reduce the probability of the occurrence of a large volume/long duration spill. No significant impact is expected to water quality.

3.1.7 Fisheries

Affected Resource – Most fishes inhabiting the GOM, whether benthic or pelagic as adults, have pelagic larval stages. For various lengths of time (10-100 days depending on the species), the pelagic eggs and larvae become part of the planktonic community. Variability in survival and transport of pelagic larval stages is thought to be an important determinant of future year-class strength in adult populations of fishes and invertebrates (Underwood and Fairweather 1989; Doherty and Fowler 1994). In general, the distribution of fish larvae depends on spawning behavior of adults, hydrographic structure at a variety of scales, duration of the pelagic period, behavior of larvae, and larval mortality and growth (Leis 1991). Richards (1990) estimates that there are 200 families with more than 1,700 species whose early life stages may occur in the GOM.

Approximately 46 percent of the southeastern U. S. wetlands and estuaries important to fish resources are located within the GOM (Mager and Ruebsamen 1988). From the shoreline to a depth of about 20 m, the fish fauna is dominated by sea catfishes (Ariidae), lizardfishes (Synodontidae), and sciaenids (drums, seatrout, kingfish and others) (McEachran and Fechhelm 1998). These fish are very dependent on estuaries as nursery grounds (Darnell and Soniat 1979; Darnell 1988). Out to a depth of 40-50 m, on muddy bottoms, the fish fauna is dominated by porgies (Sparidae), batfishes (Ogcocephalidae), sea-robins (Triglidae) sea basses (Serranidae), and left-eyed flounders (Bothidae). These species are also largely dependent on estuaries as nursery grounds. On shell or hard bottoms in the same depth range (20 to 40 or 50 m), a slightly different species group occurs dominated by snappers (Lutjanidae) and other spiny-rayed fishes with a preference for hard substrate (McEachran and Fechhelm 1998).

The remaining OCS, ranging to a depth of approximately 200 m (656 ft), generally has a muddy or silty soft bottom and dominated by hakes (Phycidae), scorpionfishes (Scorpaenidae), and ogcocephalids (batfishes) (McEachran and Fechhelm 1998).

Pelagic fishes occurring from the beach to the open ocean, portioned only by temperature, salinity and turbidity (Hoese and Moore 1977) are divided into coastal pelagic species, oceanic pelagic species, mesopelagic species, and bathypelagic species. Coastal pelagic species traverse shelf waters of the region throughout the year. The major coastal pelagic families occurring in the region are Carcarhinidae (requiem sharks), Elopidae (ladyfish), Engraulidae (anchovies), Clupeidae (herrings), Scombridae (mackerels and tunas), Carangidae (jacks and scads), Mugilidae (mullets), Pomatomidae (bluefish), and Rachycentridae (cobia) (FishBase 2006).

Oceanic pelagic species such as tuna occur throughout the GOM, especially at or beyond the shelf edge and are reportedly associated with hydrographic features such as fronts, eddies, and discontinuities (Power and May 1991). The occurrence of bluefin tuna larvae in the GOM is evidence that these species spawn in the GOM (Richards et al. 1989). Many of the oceanic fishes associate with drifting *Sargassum*, which provides forage areas and/or nursery refuge.

Mesopelagic fish assemblages in the GOM include myctophids (lanternfishes), with gonostomatids (bristlemouths) and sternoptychids (hachetfishes). These fishes make extensive vertical migrations during the night from mesopelagic depths (200-1,000 m or 656-3,281 ft) to feed in higher, food-rich layers of the water column (Hopkins and Baird 1985). Mesopelagic fishes are important ecologically because they transfer substantial amounts of energy between mesopelagic and epipelagic zones over each diel cycle.

The deeper dwelling bathypelagic fishes inhabit the water column at depths greater than 1,000 m (3,281 ft) and seldom migrate into shallower waters. This zone receives no sunlight and temperatures range from 4° Celsius (C) to 10°C. Common species include deep-sea angler fishes (Ceratioidei), gonostomatids (bristlemouths or lightfishes) and scaleless black dragonfishes (Melanostomiidae) (McEachran and Fechhelm 1998).

The Gulf sturgeon (*Acipenser oxyrinchus desotoi*) is the only listed threatened fish species in the GOM that inhabits major rivers and inner shelf waters from the Mississippi River to the Suwannee River, Florida (Barkuloo 1988). Gulf sturgeons are bottom suction feeders that have ventrally located, highly extrusible mouths. Fishes that forage by taste are opportunistic feeders because smell is much more discriminating than taste. Another adaptation of sturgeon to major rivers and offshore waters is mobility (an adaptation to the large habitat scale). The decline of the Gulf sturgeon is believed to be due to overfishing and habitat destruction, primarily the damming of coastal rivers and the degradation of water quality (Barkuloo 1988).

The Gulf sturgeon critical habitat occurs in the estuarine and riverine locations along the Gulf coast east of the Mississippi River in Louisiana, Mississippi, Alabama, and Florida. Critical habitat is defined as special geographic areas that are essential for the conservation of a threatened and endangered species, and that may require special management and protection. Designated Gulf Sturgeon habitat is confined to state waters.

Impact Analysis – IPFs that could affect fisheries include drilling rig presence (noise and lights), effluent discharges, cooling water intakes, and accidents. Fish may be attracted to the drilling rig, as a floating structure in the deepwater environment. Epipelagic fishes such as tunas, dolphin, billfishes, and jacks, are commonly attracted to fixed and drifting surface structures (e.g., Holland et al. 1990; Higashi, 1994; Relini et al. 1994). The feeding of epipelagic predators could be enhanced by attracting and concentrating smaller fish species. The drilling rig is a single, temporary structure; therefore, impacts on fish populations, whether beneficial or adverse, would be considered insignificant.

Discharges associated with the proposed action to marine waters are muds and cuttings resulting from drilling activities. The plume is expected to disperse rapidly, is very near background levels at a distance of 1,000 m (3,281 ft), and is usually undetectable at distances greater than 3,000 m (9,843 ft) (USDOI MMS 2002 and 2007). No significant impact is expected.

Cooling Water Intakes Structures (CWIS) on new offshore facilities are regulated by Section 316(b) of the Clean Water Act. The West Sirius drilling rig is not considered a new facility and therefore NPDES permit (GMG290000) design requirements for CWIS are not applicable. Regardless, no significant entrainment or impingement impact on key species is expected based on the findings of the 2009 desktop CWIS Source Water Biological Baseline Characterization Study, as required in the NPDES permit, Part I.B.12.a.

A well blowout scenario could introduce oil to surface or subsurface waters. Behavior science associated with adult fish indicate that they would likely avoid the area of a spill, but fish eggs and larvae within the spill area of the northern GOM could be killed (USDOI MMS 2002 and 2007).

Regardless of spill size, adult fish are likely to actively avoid an oil spill, thereby limiting the effects and lessening the extent of damage (Baker et al. 1991; Malins et al. 1982). Observations at oil spills around the world, including the *Exxon Valdez* spill in Prince William Sound, indicate that free-swimming fish ordinarily avoid harm from oil spills (NRC 1985). Some work has demonstrated avoidance of extremely small concentrations of hydrocarbons. Farr et al. (1995) reported the behavioral avoidance of dissolved concentrations of a polycyclic aromatic hydrocarbon (PAH) as low as 14.7 micrograms per liter (µg/l) by a species of minnow.

Adult fish must experience continual exposure to relatively high levels of hydrocarbons over several months before secondary toxicological compounds that represent biological harm are detected in the liver (Payne et al. 1988). The direct effects of spilled oil on fish occur through the ingestion of oil or oiled prey and through the uptake of dissolved petroleum products through the gills and epithelium by adults and juveniles (NRC 1985). Upon exposure to spilled oil, liver enzymes of fish oxidize soluble hydrocarbons into compounds that are easily excreted in the urine (Spies et al. 1982). Ordinary changes in salinity, temperature, and food abundance (Evans and Rice 1974; NRC 1985) have little effect. Migratory species could be impacted if oil spills covered large areas of

nearshore open waters. One of the few adult fish-kills on record following an oil spill was on the French coast in 1978 when several tons of small rock-clinging fish (not commercially harvested) were killed at the site of the *Amoco Cadiz* wreck (USDOI MMS 2002).

For OCS-related oil spills to have a substantial effect on a commercial fishery resource, whether estuary dependent or not, eggs and larvae would have to be concentrated in the immediate spill area. This area could be very large considering the maximum blowout discharge volume. Oil components also would have to be present in highly toxic concentrations when both eggs and larvae are in the pelagic stage (Longwell 1977). When contacted by spilled oil, floating eggs and larvae (with their limited mobility and physiology), and most juvenile fish are killed (Linden et al. 1979; Longwell 1977). However, fish overproduce eggs on an enormous scale and the overwhelming majority of them die at an early stage, generally as food for predators. It is likely that even a heavy death toll from a single large oil spill would not have a long lasting effect on the adult populations that are exploited by commercial fisheries (USDOI MMS 2002). This has been confirmed during and after the *Torrey Canyon* spill off Southwest England and the *Argo Merchant* spill off Nantucket. In both cases, a 90 percent death of fish eggs and larvae, pilchard and pollack, respectively, was observed in the affected area, but this had no impact on the regional commercial fishery (Baker et al. 1991).

It was noted in the Final Supplemental EIS (USDOI MMS 2008b) that BOEMRE has reexamined the analysis for Gulf sturgeon presented in the Multisale EIS (USDOI MMS 2007), and concluded that an area nearly 130 mi (209 km) from the nearest coast, and not located within designated critical habitat for Gulf sturgeon, that it was unlikely there will be any sturgeon in the area due to water depths that far exceed the recorded depths preferred by Gulf sturgeon. Additionally, substrate type and potential forage base associated with bottom types at these depths are not conducive for sustaining a Gulf sturgeon forage base. Therefore, because of the floating nature of oil and the small tidal range of the GOM, oil spills alone would typically have very little impact on benthic feeders such as the Gulf sturgeon.

Implementation of new BOEMRE environmental and safety regulations will further reduce the probability of the occurrence of a large volume/long duration spill. No significant impact is expected to fishery resources.

3.1.8 Marine Mammals

Affected Resource – Twenty-eight cetacean (whales and dolphins) and one sirenian (manatee) species have confirmed occurrences in the GOM. Cetaceans are divided into two major suborders: Mysticeti (i.e., baleen whales) and Odontoceti (i.e., toothed whales, dolphins and their allies). Of the seven baleen whale species occurring in the GOM, five are listed as endangered or threatened (northern right [*Eubalaena glacialis*], blue [*B. musculus*], fin [*B. physalus*], sei [*B. borealis*], and humpback [*Megoptera novaeangliae*]). Of the 21 toothed species occurring in the GOM, only the sperm whale (*Physeter macrocephalus*), is listed

as endangered. The only member of the Order Sirenia found in the GOM is the endangered West Indian manatee (*Trichechus manatus*). All marine mammals are protected species under the MMPA. There are no critical habitats designated within the offshore GOM for the threatened and endangered species of mammals listed above.

Additionally, acoustic recordings of shelf-edge and deepwater species were made. The GOM Cetacean Program (GulfCet) I study showed that several poorly known species are moderately common (beaked whales [*Meoplodon and Ziphius sp.*], pygmy and dwarf sperm whales [*Kogia sp.*], melon-headed whale [*Peponocephala sp.*], and Fraser's [*Lagenodelphis sp.*] and Clymene dolphins [*Stenella sp.*]). The GulfCet II Study (surveys conducted 1996-1997), administered by the U.S. Geological Survey, Biological Resources Division (BRD 1999), continued work on patterns of distribution and abundance of GOM cetaceans and identified possible associations between high-use habitats and the ocean environment (Davis et al. 2000).

Within the northern GOM, many of the environmental and biotic factors influencing the distribution of cetaceans are affected by various hydrological circulation patterns. River discharge, wind, and the loop current generally drive these patterns. Most of the river discharge into the northern GOM is transported west and along the coast. Circulation on the continental shelf is largely wind-driven, with localized effects from freshwater (i.e., riverine) discharge (Mullin et al. 1994; Davis et al. 2000).

Studies conducted during the GulfCet I and GulfCet II programs demonstrated a correlation of cetacean distribution patterns with certain geomorphic features such as seafloor depth or topographic relief. These studies suggested that seafloor depth was the most important variable in habitat partitioning among cetacean species in the northern GOM (Baumgartner 1995; Davis et al. 1998 and 2000; Mullin et al. 1994; Jefferson 1995).

The West Indian manatee (*Trichechus manatus*) is the only sirenian known to occur in tropical and subtropical coastal waters of the southeastern GOM, Caribbean Sea, and the Atlantic coast of northern and northeastern South America (Reeves et al. 1992; Jefferson et al. 1993; O'Shea et al. 1995). There are two subspecies of the West Indian manatee: the Florida manatee *(T. m. latirostris*). During warmer months, manatees are common along the west coast of Florida from the Everglades National Park northward to the Suwannee River in northwestern Florida. In winter, the population moves southward to warmer waters. The winter range is restricted to smaller areas at the southern tip of Florida and to waters near localized warm-water sources. Crystal River, in Citrus County, is typically the northern limit of the manatee's winter range on the Gulf coast. Manatees are uncommon along the Florida Panhandle and are infrequently found (strandings and sightings) as far west as Louisiana and Texas (Powell and Rathbun 1984; Rathbun et al. 1990; Schiro et al. 1998).

Impact Analysis – IPFs for marine mammals include increased vessel traffic, degradation of water quality from operational discharges, helicopter and vessel

traffic noise, drillship noise, accidental releases, and loss of debris from service vessels.

Oil spills could affect marine mammals through various pathways: surface contact, inhalation, ingestion, and baleen fouling (Geraci, 1990). Direct contact with oil for marine mammals can lead to irritation and damage of skin and soft tissues (such as mucous membranes of the eyes). In cetations, fouling of baleen plates can occur so as to hinder the flow of water and interfere with feeding, and incidental ingestion of oil and/or tar. Studies by Geraci and St. Aubin (1982) have shown that the cetacean epidermis functions as an effective barrier to noxious substances found in petroleum. Contact is minimized due to distance and the depth from small spills.

Crude oil or volatile distillates release toxic vapors that, when inhaled, can lead to irritation of respiratory membranes, lung congestion, and pneumonia. Subsequent absorption of volatile hydrocarbons into the bloodstream may accumulate into such tissues as the brain and liver, causing neurological disorders and liver damage (Geraci and St. Aubin 1982; Hansen 1985; Geraci 1990). Toxic vapor concentrations just above the water's surface (where cetaceans draw breath) may reach critical levels for the first few hours after a spill, prior to evaporation and dispersion of volatile aromatic hydrocarbons and other light components (Geraci and St. Aubin 1982). Cetaceans may consume oil contaminated prey (Geraci 1990) or incidentally ingest oil (USDOI MMS 2007).

There have been no experimental studies and only a handful of observations suggesting that oil has harmed any manatees or dugongs (St. Aubin and Lounsbury 1990). Direct contact with discharged oil probably does not impact adult manatees' thermoregulatory abilities because they use blubber for insulation (USDOI MMS 2008b). Manatees are nonselective, generalized feeders that might consume tarballs along with their normal food; such occurrences have been rarely reported (review in St. Aubin and Lounsbury 1990). Contact is minimized due to distance and the depth from small spills. Implementation of new BOEMRE environmental and safety regulations will further reduce the probability of the occurrence of a large volume/long duration spill. No significant impact is expected.

Another factor of concern is the lack of ability that cetaceans (more specifically, sperm whales) possess for detecting and avoiding the various flowlines, risers, umbilicals, and mooring lines (USDOI MMS 2002 and 2007). Sperm whales are known to get entangled in deep-sea cables (Heezen 1957). The net result of any disturbance would depend on the size and percentage of the population affected, ecological importance of the disturbed area, environmental and biological parameters that influence an animal's sensitivity to disturbance and stress, and the accommodation time in response to prolonged disturbance (Geraci and St. Aubin 1980; St. Aubin 2001). Sperm whales are one of 11 whale species that are hit commonly by ships (Laist et al. 2001). Collisions between cetaceans and ships could cause serious injury or death (Laist et al. 2001). Collisions between OCS vessels and cetaceans in the project area are expected to be unusual events.

Compliance with NTL 2007-G04 is expected to result in no significant impact. Refer to Section 1.0 for additional information.

Sound from drilling activities, support vessels and helicopters may elicit a startle reaction from marine mammals. This reaction may lead to disruption of marine mammals' normal activities. Stress may make them more vulnerable to parasites, disease, environmental contaminants, and/or predation (Majors and Myrick 1990). There is little conclusive evidence for long-term displacements and population trends for marine mammals relative to sound; therefore, no significant impact is expected.

Entanglement and ingestion of debris have caused death or serious injury to marine mammals (Laist 1997). Compliance with NTL 2007-G03 is expected to result in no significant impact. Refer to Section 1.0 for additional information.

3.1.9 Sea Turtles

Affected Resource – Five species of sea turtle are found in the waters of the GOM: Kemp's ridley (*Lepidochelys kempi*), loggerhead (*Caretta caretta*), green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), and hawksbill (*Eretmochelys imbricate*). All are protected under the ESA; and all except the loggerhead turtle (threatened) are listed as endangered. Sea turtles spend nearly all of their lives in the water. Females must emerge periodically from the ocean to nest on beaches. Sea turtles are long-lived, slow-reproducing animals. It is generally believed that all sea turtle species spend the first few years of their lives in pelagic waters, occurring in driftlines and convergence zones (in sargassum rafts) where they find refuge and food in items that accumulate in surface circulation features (Carr 1987). No critical habitat has been designated for these species in the Gulf of Mexico.

Adult turtles in the GOM are apparently less abundant in the deeper waters of the GOM than they are in waters less than 27-50 m (80-160 ft) deep (NRC 1990). More sea turtles are sighted in the northeastern GOM than in the northwestern GOM (Thompson 1999). Sea turtle abundance in the GOM appears to increase dramatically east of Mobile Bay (Davis et al. 2000). Factors such as water depth, bottom sediments, and prey availability may account for this. In the offshore GOM, sea turtle distribution has been linked to zones of convergence.

GulfCet II studies sighted most loggerhead, Kemp's ridley and leatherback sea turtles over shelf waters. Historically these species have been sighted up to the shelf's edge. They appear to be more abundant east of the Mississippi River than they are west of the river (Fritts et al. 1983b; Lohoefener et al. 1990). Deep waters may be used by all species as a transitory habitat.

The green turtle has a global distribution in tropical and subtropical waters. Important feeding areas for green turtles in Florida include the Indian River, Florida Bay, Homosassa River, Crystal River, and Cedar Key (USDOC NMFS 1993). Green turtles in the western GOM are primarily restricted to the lower Texas coast where seagrass meadows and algae-laden jetties provide developmental habitat, especially during warm months (Landry and Costa 1999).

The leatherback is the most pelagic and most wide-ranging of sea turtles, undertaking extensive migrations following depth contours for hundreds, even thousands, of kilometers (Morreale et al. 1996; Hughes et al. 2001). It is commonly found in relatively shallow continental shelf waters along the U.S. Atlantic coast (Hoffman and Fritts 1982; Knowlton and Weigle 1989; Shoop and Kenney 1992) and northern GOM (Leary 1957; Fritts et al. 1983a; Lohoefener et al. 1988, 1990; Collard 1990; Davis et al. 2000).

The hawksbill occurs in tropical and subtropical seas of the Atlantic, Pacific, and Indian Oceans. The species is widely distributed in the Caribbean Sea and western Atlantic Ocean. In the continental U.S., the species is recorded from all the GOM States and from along the eastern seaboard as far north as Massachusetts, with the exception of Connecticut; however, sightings north of Florida are rare (USDOC NMFS 1993). Texas and Florida are the only states where hawksbills are sighted with any regularity (USDOC NMFS 1993).

The Kemp's ridley is the most imperiled in the GOM. In the GOM, Kemp's ridleys inhabit nearshore areas, being most abundant in coastal waters from Texas to west Florida (Ogren 1989; Marquez 1990 and 1994; Rudloe et al. 1991). Kemp's ridleys display strong seasonal fidelity to tidal passes and adjacent beachfront environs of the northern GOM (Landry and Costa 1999).

The loggerhead sea turtle occurs throughout the inner continental shelf from Florida through Cape Cod, Massachusetts (Dodd 1988; Plotkin et. al 1993; Fritts and Reynolds 1981; Fritts et al. 1983a; Davis et al. 2000). Aerial surveys indicate that loggerheads are largely distributed in water depths less than 100 m (328 ft) (Shoop et al. 1981; Fritts et al. 1983a; Davis et al. 2000).

Impact Analysis – IPFs for sea turtles include increased vessel traffic, degradation of water quality from operational discharges, helicopter and vessel traffic noise, drillship noise, accidental releases, and loss of debris from service vessels.

Disturbance (e.g., noise) and/or exposure to sublethal levels of biotoxins and anthropogenic contaminants may stress animals, weaken their immune systems, and make them more vulnerable to parasites and diseases that normally would not be fatal (USDOI MMS 2002, 2007 and 2008b). Sound from drilling activities, support vessels, and helicopters may elicit a startle reaction from sea turtles, but this is a temporary disturbance. No significant impact is expected to sea turtles.

Drilling fluids and cuttings discharges are not known to be lethal to sea turtles. Any potential impact from drilling fluids would be indirect, either as a result of impacts on prey items or possibly through ingestion in the food chain (API 1989). No significant impact is expected to sea turtles.

Sea turtle habitat in the GOM includes inshore, coastal, and oceanic waters, as well as numerous beaches in the region, sea turtles could be impacted by accidental spills (USDOI MMS 2002 and 2007). Depending on the timing of the spill's occurrence in coastal waters, its impact and resulting cleanup may interrupt sea turtle migration, feeding, mating, and/or nesting activity for extended periods

(days, weeks, months; USDOI MMS 2007). Exposure to hydrocarbons persisting in the sea following an oil slick will result in sublethal and lethal impacts (e.g., decreased health, reproductive fitness, and longevity; and increased vulnerability to disease) to sea turtles (USDOI MMS 2002 and 2007). Sea turtle hatchling exposure to, fouling by, or consumption of tarballs persisting in the sea following the dispersal of an oil slick by would likely be fatal (USDOI MMS 2002 and 2007). The net result of any disturbance would depend on the size and percentage of the population affected, ecological importance of the disturbed area, environmental and biological parameters that influence an animal's sensitivity to disturbance and stress, and the accommodation time in response to prolonged disturbance (St. Aubin 2001). Contact is minimized due to distance and the depth from small spills. Implementation of new BOEMRE environmental and safety regulations will further reduce the probability of the occurrence of a large volume/long duration spill. No significant impact is expected to sea turtles.

Entanglement in, and ingestion of, debris has caused the death or serious injury of sea turtles (Balazs 1985). Compliance with NTL 2007-G03 is expected to result in no significant impact. Refer to Section 1.0 for additional information.

Collisions between OCS vessels and sea turtles within the project area are expected to be unusual events (Laist et al. 2001). Compliance with NTL 2007-G04 is expected to result in no significant impact. Refer to Section 1.0 for additional information.

3.1.10 Air Quality

Affected Resource - Winds in the region are driven by the clockwise circulation around the Bermuda High (USDOI MMS 2007). The Gulf of Mexico is located to the southwest of this center of circulation, resulting in a prevailing southeasterly to southerly flow, which is conducive to transporting emissions toward shore. This circulation is affected by tropical cyclones (hurricanes) during summer and fall and by extratropical cyclones (cold fronts) during winter. The air over the OCS water is not classified, but it is presumed to be better than the National ambient Air Quality Standards (NAAQS) for all criteria pollutants (USDOI MMS 1997).

The proposed activities have the potential to emit particulate matter (PM), Sulfur Oxides (SO_x), Nitrogen Oxides (NO_x), Volatile Organic Compounds (VOC), and Carbon Monoxide (CO) during operations. Combustion engines (located on drilling rig and support vessels) emit the majority of the emissions during a drilling operation.

Impact Analysis – IPF for offshore air pollutant emissions will result from the drilling rig operations, helicopters and service vessels and an accidental release. Emissions occur mainly from combustion or burning of diesel fuel. The combustion of fuels occurs primarily on generators, pumps, or motors and from lighter fuel motors. Primary air pollutants typically associated with OCS activities are suspended PM, SOx, NOx, VOCs, and CO. The proposed activities are located approximately 200 miles from the nearest shoreline. Due to the distance from shore-based pollution sources, offshore air quality is expected to be

good. Emissions from the proposed activities have been projected and are well below the BOEMRE exemption levels (See Section 7 of the EP for additional information). There would be a limited degree of air quality impacts in the immediate vicinity of the proposed activities. Air emissions will be emitted by the Mobile Offshore Drilling Unit (MODU) during drilling and by vessels in support of drilling.

The projected air emissions are not expected to affect the air quality of the OCS primarily due the distance to the shore or to any Prevention of Significant Deterioration Class I air quality area such as the Breton Wilderness Area. Keathley Canyon Blocks 292 and 336 are beyond the 200 kilometer (124 mile) buffer for the Breton Wilderness Area and are about 220 miles from the coastline. During the recent Macondo event extensive air sampling conducted by the EPA found no evidence of onshore levels of contaminants that are of significant concern for the long term health of residents of coastal communities (www.epa.gov/bpspill/air.html and www.epa.gov/bpspill/air-mon.html).

Accidents and blowouts can release hydrocarbons or chemicals, which could cause the emission of air pollutants. However, these releases are not expected to impact onshore air quality because of the prevailing atmospheric conditions, emission height, emission rates, and the distance of Keathley Canyon Blocks 292 and 336 from the coastline. Impacts are minimized due to distance from small spills. Implementation of new BOEMRE environmental and safety regulations will further reduce the probability of the occurrence of a large volume/long duration spill. No significant impact is expected to air quality.

3.1.11 Shipwreck Sites (known or potential)

Affected Resource – A historic shipwreck is defined as a submerged or buried vessel, at least 50 years old, that has foundered, stranded, or wrecked and is presently lying on or embedded in the seafloor including vessels that exist intact or as scattered components on or in the seafloor. Several studies (Garrison et al. 1989; Pearson et al. 2003) have been conducted to model areas in the GOM where historic shipwrecks were most likely to exist. A study in 1977 concluded that two-thirds of the total number of shipwrecks in the northern GOM lie within 1.5 km (1 mi) of shore and most of the remainder lie between 1.5 and 10 km (1 and 6 mi) of the coast (CEI 1977). In 1989 a study found that frequency of shipwrecks in the open sea of the Eastern GOM to nearly double that of the Central and Western GOM (Garrison et al. 1989). The highest observed frequencies of shipwrecks were within areas of intense marine traffic, such as the approaches and entrances to seaports and the mouths of navigable rivers and straits. The most recent study in 2003 used about 15 years of high-resolution shallow hazard surveys in lease blocks and along pipeline routes. Some of these surveys (almost exclusively for pipeline routes) were conducted in deep water. Several of these pipeline hazard surveys succeeded in locating historic ships, ranging in age from an 18th-century armed sailing ship to a World War II German U-boat.

In addition to the above studies, historic shipwrecks have, to date, been discovered through oil industry sonar surveys in water depths up to 1,981 m

(6,500 ft). Over a dozen shipwrecks have been located in deep water and nine of these ships have been confirmed visually as historic vessels. Many of these wrecks were not previously known to exist in these areas from the historic record. Taking these discoveries into account, the 2003 study then recommended including some deepwater areas, primarily on the approach to the Mississippi River, among those lease areas requiring archaeological investigation. Because of this, BOEMRE revised its guidelines for conducting archaeological surveys and added about 1,200 lease blocks to the list of blocks requiring an archaeological survey and assessment (NTL 2005-G07 and NTL 2008-G20). Since implementation of these new lease blocks there have been at least 10 possible historic shipwrecks reported in this area. Pearson et al. (2003) lists numerous shipwrecks that fall within the CPA and WPA. Most of these wrecks are known only through the historical record and, to date, have not been located on the ocean floor. The BOEMRE Shipwreck Database lists 911 wrecks in the CPA and 494 wrecks in the WPA (USDOI MMS 2007).

Impact Analysis – IPFs for shipwrecks will result from accidental releases. Keathley Canyon Blocks 292 and 336 are not stipulated as requiring archaeological resource surveys and reports (NTL 2005-G07 and 2008-G20). A review of the Site Clearance Narrative (BP 2010a and BP 2010b) was conducted and indicates there is no known or potential shipwreck sites located within the survey area. Should BP discover man-made debris that appears to indicate the presence of a shipwreck within or adjacent to our lease area, BP will immediately halt operations. The proposed drilling will be done with a dynamic positioned rig which does not have associated anchors, anchor chains or wire ropes; therefore, no impacts on such sites are expected as a result of the proposed operations.

An accidental release (blowout) at the seafloor could create a crater and resuspend and disperse large quantities of bottom sediments within a 300-m (984-ft) radius of the blowout site, burying shipwrecks. Subsurface spills could result in the formation and settling of oil-saturated material, and oil-sediment particles could come into contact with shipwrecks. The extent of such impacts will vary depending on, among other factors, the magnitude and duration. No significant impact is expected to shipwrecks. Contact is minimized due to distance and the depth from small spills. Implementation of new BOEMRE environmental and safety regulations will further reduce the probability of the occurrence of a large volume/long duration spill.

3.1.12 Prehistoric Archaeological Sites

Affected Resource – Archaeological resources are any material remains of human life or activities that are at least 50 years of age and that are of archaeological interest (30 Code of Federal Regulations [CFR] 250.105). The Archaeological Resources Regulation (30 CFR 250.194) provides specific authority to each BOEMRE Regional Director to require archaeological resource surveys, analyses, and reports. Surveys are required prior to any exploration or development activities on leases within areas determined to have a high potential for archaeological resources (NTL 2005-G07 and NTL 2008-G20).

Available evidence suggests that sea level in the northern GOM was at least 90 m, and possibly as much as 130 m (427 ft), lower than present sea level during the period 20,000-17,000 years before present (Nelson and Bray 1970). Sea level in the northern GOM reached its present stand around 3,500 years before present (Pearson et al. 1986).

The arrival of early man into the GOM region is accepted to be around 12,000 years before present (Aten 1983). Sea-level for the northern GOM would have likely been approximately 45-60 m (148-197 ft) below the present day sea level (CEI 1977 and 1982). The continental shelf shoreward of the 45 to 60 m (148 to 197 ft) bathymetric contours has potential for prehistoric sites dating after 12,000 years before present. Due to uncertainties in both the depth of sea level and the entry date of prehistoric man into North America, BOEMRE adopted the 60 m (197 ft) water depth as the seaward extent for archaeological site potential in GOM.

Geomorphic features that have a high potential for associated prehistoric sites include barrier islands and back-barrier embayments, river channels and associated floodplains and terraces, and salt-dome features. Remote-sensing surveys have identified these types of geographic features, which have a high potential for associated prehistoric sites. Investigations in Louisiana and Florida indicate the mound building activity by prehistoric inhabitants may have occurred as early as 6,200 years before present (Hagg 1992; Saunders et al. 1992; Russo 1992); therefore, manmade features may also exist in the shallow inundated portions of the OCS.

The McFaddin Beach site, east of Galveston in the McFaddin National Wildlife Refuge, has produced late Pleistocene megafaunal remains and lithics, including a large percentage of Paleo-Indian artifacts (Stright et al. 1999). Five types of relict landforms were identified in the Sabine-Calcasieu River Valley and evaluated for archaeological potential 1986 (CEI 1986). Surveys from other areas of the western part of the CPA have produced evidence of floodplains, terracing, and point-bar deposits in association with relict late Pleistocene fluvial systems. Prehistoric sites associated with these features would have a high potential for preservation. Salt diapirs with bathymetric expression have also been recorded during lease-block surveys in this area. Solution features at the crest of these domes would have a high potential for preservation of associated prehistoric sites. The Salt Mine Valley site on Avery Island is a Paleo-Indian site associated with a salt-dome solution feature (CEI 1977). The proximity of most of these relict landforms to the seafloor facilitates further investigation and data recovery.

Impact Analysis - IPFs for archaeological resources will result from accidental releases. Keathley Canyon Blocks 292 and 336 are not stipulated as requiring archaeological resource surveys and reports (NTL Nos. 2005-G07 and 2008-G20). A review of the Site Clearance Narrative (BP 2010a and BP 2010b) was conducted and indicates there are no known or potential archaeological sites located within the survey area. Therefore, no impacts on such sites are expected as a result of the proposed operations.

An accidental release (blowout) at the seafloor could create a crater and resuspend and disperse large quantities of bottom sediments within a 300-m (984-ft) radius of the blowout site, burying archaeological resources. Subsurface spills could result in the formation and settling of oil-saturated material, and oil-sediment particles could come into contact with archaeological resources. The extent of such impacts will vary depending on, among other factors, the magnitude and duration. No significant impact is expected to archaeological resources. Contact is minimized due to distance and the depth from small spills. Implementation of new BOEMRE environmental and safety regulations will further reduce the probability of the occurrence of a large volume/long duration spill.

3.2 Vicinity of Offshore Location

3.2.1 Essential Fish Habitat

Affected Resource – An Essential Fish Habitat (EFH) is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, and growth to maturity. Due to the wide variation of habitat requirements for all life history stages, EFH for the GOM includes all estuarine and marine waters and substrates from the shoreline to the seaward limit of the Exclusive Economic Zone (EEZ).

The Magnuson-Stevens Fishery Conservation and Management Act of 1976, as amended through 1998, places requirements on any Federal agency with respect to EFH, and requires the development of management plans for all managed fish species. The Gulf of Mexico Fisheries Management Council (GMFMC) currently maintains Fishery Management Plans (FMP) for a variety of bay and estuarine species that spend a large part of their life cycles in these nearshore environments. Occurrence of these managed species, along with major adult prey species and relationships with estuary and bay systems in the Eastern GOM, is outlined in the Final EIS for Central and Western GOM Multisale Lease Areas (USDOI MMS 2002) and Final EIS for Western and Central GOM Multisale Lease Areas (USDOI MMS 2007 and 2008b).

The GMFMC currently describes FMP's for the following species in the GOM: red grouper (*Epinephelus morio*), gag grouper (*Mycteroperca microlepis*), scamp grouper (*Mycteroperca phenax*), red snapper *(Lutjanus campechanus*), gray snapper (*Lutjanus griseus*), yellowtail snapper (*Ocyurus chrysurus*), lane snapper (*Lujanus syngagris*), gray triggerfish (*Balistes capriscus*), greater amberjack (*Seriola dumerili*), lesser amberjack (*Seriola fasciata*), king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*Scomberomorus maculates),* cobia (*Rachycentron canadum*), dolphin fish (*Coryphaena hippurus*), stone crab (*Menippe spp*.), and spiny lobster (*Panulirus spp*.). Occurrences of these managed species are generally within the estuary and bay systems in the GOM. None of the stocks managed by the GMFMC are endangered or threatened.

Migratory species that are likely to be encountered include tuna (Scombridae), billfish (Istiophoridae), swordfish (Xiphiidae), and sharks (Squaliformes). These groups are under the direct management of NOAA Fisheries and are not included as GMFMC managed species. The EFH areas for these highly migratory species are described in separate FMP's, including the FMP for Atlantic tunas, swordfish,

and sharks (USDOC NMFS 2009) and the Atlantic billfish FMP Amendment 1 (USDOC NMFS 1999b). Highly migratory species with EFH at or near the lease area include the following (USDOC NMFS 2009):

- Bigeye tuna (juvenile, adult)
- Atlantic bluefin tuna (spawn, eggs, larvae, adults)
- Atlantic skipjack tuna (spawn, eggs, larvae, adults)
- Yellowfin tuna (all)
- Swordfish (all)
- Blue marlin (juveniles, adults)
- White marlin (juveniles, adults)
- Sailfish (juveniles, adults)
- Longbill spearfish (juveniles, adults)
- Great hammerhead shark (all)
- Tiger shark (adult)
- Whale shark (all)
- Longfin mako shark (all)
- Shortfin mako shark (all)
- Bigeye thresher shark (all)
- Common thresher shark (all)

In addition, NMFS (USDOC NMFS 2009) designated a Habitat Area of Particular Concern (HAPC) for spawning Atlantic bluefin tuna, and this covers much of the deepwater Gulf of Mexico.

HAPC include the near shore areas of intertidal and estuarine habitats that may provide food and rearing for juvenile fish and shell fish; offshore areas with substrates of high habitat value or vertical relief, which serve as cover for fish and shell fish; and marine and estuary habitat used for migration, spawning, and rearing of fish and shellfish.

As described by NOAA Fisheries documents (USDOC NMFS 2009), the current status of the scientific knowledge of these species is such that habitat preferences are largely unknown or are difficult to determine. As in the case with shark species, it is difficult to define the habitat of sharks of this temperate zone in the GOM because most species are highly migratory, using diverse habitats in apparently nonspecific or poorly understood ways. Temperature is a primary factor affecting the distribution of sharks, and their movement in coastal waters is usually correlated with unpredictable seasonal changes in water temperature. Some of the highly migratory species occurring offshore beyond the 200-m isobath, and many, such as billfishes, are associated with upwelling areas where canyons cause changes in current flow (upwelling) and create areas of higher productivity.

Impact Analysis - IPFs that could cause impacts to EFH as a result of the proposed operations in Keathley Canyon Blocks 292 and 336 include rig presence (noise and lights), effluents and accidents. EFH includes all estuarine and marine waters and substrates in the GOM.

Epipelagic fishes such as tunas, dolphin, billfishes, and jacks, are commonly attracted to fixed and drifting surface structures (e.g., Holland et al., 1990; Higashi, 1994; Relini et al. 1994). The feeding of epipelagic predators could be enhanced by attracting and concentrating smaller fish species. The drilling rig is a single; therefore, temporary structure, impacts on fish populations, whether beneficial or adverse, would be considered insignificant.

Discharges associated with the proposed action to marine waters are muds and cuttings resulting from drilling activities. The plume is expected to disperse rapidly, is very near background levels at a distance of 1,000 m (3,281 ft), and is usually undetectable at distances greater than 3,000 m (9,843 ft) (USDOI MMS 2002 and 2007). No significant impact is expected.

A well blowout scenario could introduce oil to surface or subsurface waters. Behavior science associated with adult fish indicate that they would likely avoid the area of a spill, but fish eggs and larvae within the spill area of the northern GOM could be killed (USDOI MMS 2002 and 2007).

Marine sanctuaries and national estuary reserves are considered to be HAPC that meet these general HAPC guidelines. The proposed project is located approximately 200 miles from shore, in water depths approximately 6,000 ft and is not near a marine sanctuary or national estuary reserve. The live bottom low relief stipulation, the live bottom (pinnacle trend) stipulation, and the eastern Gulf pinnacle trend stipulation would prevent most of the potential impacts on live-bottom communities from operational waste discharges. Further discussion can be found in Section 3.1.1, 3.1.2, 3.1.3, 3.1.4, and 3.1.5. Additional information of fisheries resources can also be found in Section 3.1.7.

The extent of such impacts will vary depending on, among other factors, the magnitude and duration. No significant impact is expected to EFH resources. Implementation of new BOEMRE environmental and safety regulations will further reduce the probability of the occurrence of a large volume/long duration spill.

3.2.2 Marine and Pelagic Birds

Affected Resource – The offshore waters, coastal beaches, and contiguous wetlands of the northern GOM are populated by both resident and migratory species of coastal and marine birds that can be separated into five major groups: diving birds, shorebirds, marsh birds, wading birds and water fowl.

Seabirds are a diverse group of birds that spend much of their lives on or over saltwater; they live far from land most of the year, except at breeding time when they return to nesting areas along coastlines (Terres 1991). Species diversity and overall abundance is highest in the spring and summer and lowest in the fall and winter. Four ecological categories of seabirds have been documented in the deepwater areas of the GOM: summer migrants (e.g., shearwaters, storm petrels and boobies), summer residents that breed in the GOM (e.g., sooty, least, and sandwich tern, and frigate birds), winter residents (e.g., gannets, gulls, and jaegers), and permanent resident species (e.g., laughing gulls and royal and

bridled terns) (Hess and Ribic 2000). Collectively, they live far from land most of the year, roosting on the water surface, except at breeding time when they return to nesting areas along coastlines (Terres 1991). Seabirds typically aggregate in social groups called colonies; the degree of colony formation varies between species (Parnell et al. 1988). They also tend to associate with various oceanic conditions including specific sea-surface temperatures, salinities, areas of high planktonic productivity, or current activity. Seabirds obtain their food from the sea with a variety of behaviors including piracy, scavenging, dipping, plunging, and surface seizing.

Impact analysis – IPFs that could affect marine and pelagic birds include drilling rig presence (noise and lights), effluent discharge, marine debris, support vessel and helicopter traffic, and accidents. Birds may use offshore structures and platforms for resting, feeding, or as temporary shelter from inclement weather (Russell 2005). Effluent discharges are likely to have negligible impacts on the birds due to rapid dispersion, the small area of ocean affected, the intermittent nature of the discharges, and the mobility of these animals.

Helicopter and service-vessel traffic could sporadically disturb feeding, resting, or nesting behavior of birds or cause abandonment of preferred habitat. These impact-producing factors could contribute to indirect population loss through reproductive failure resulting from nest abandonment. The Federal Aviation Administration (FAA) (Advisory Circular 91-36C) and corporate helicopter policy specify minimum altitude over populated areas and biologically sensitive areas such as wildlife refuges and national parks. It is expected that approximately 10 percent of helicopter trips would occur at altitudes somewhat below the minimums listed above as a result of inclement weather. Due to the short term duration and sporadic frequency, no significant impact is expected.

Service vessels would use selected nearshore and coastal (inland) navigation waterways, or corridors, and adhere to protocol set forth by the USCG for reduced vessel speeds within these inland areas. Routine presence and low speeds of service vessels within these waterways would diminish the effects of disturbance from service vessels on nearshore and inland populations of coastal and marine birds. The effects of service-vessel traffic on birds offshore would not be significant.

Marine birds can become entangled and snared in discarded trash and debris. In addition, many species will readily ingest small plastic debris, either intentionally or incidentally. Interaction with plastic materials is therefore very serious and can lead to permanent injuries and death. Compliance with NTL 2007-G03 is expected to result in no significant impact with trash and debris. Refer to Section 1.0 for additional information.

Physical oiling of individuals or local groups of birds, depending on the extent and concentration could result in some degree of acute and chronic physiological stress (USDOI MMS 2002, 2007 and 2008b). In addition, recent spill experience showed that bird mortality is expected to occur during a large volume/long duration spill (USDOI BOEMRE 2010b).

Stress, trauma, and shock enhance the effects of exposure and poisoning (USDOI MMS 2002, 2007 and 2008b). Low levels of oil could stress birds by interfering with food detection, feeding impulses, predator avoidance, territory definition, homing of migratory species, susceptibility to physiological disorders, disease resistance, growth rates, reproduction, and respiration (USDOI MMS 2002, 2007 and 2008b).

Contact is minimized due to distance and the depth from small spills. Implementation of new BOEMRE environmental and safety regulations will further reduce the probability of the occurrence of a large volume/long duration spill. No significant impact is expected to marine and pelagic birds.

3.2.3 Public Health and Safety

The one anticipated IPF for public health and safety is an accidental release. An accidental H_2S release from the proposed activities is not expected that could impact public health and safety. This project does not expect to encounter the presence of H_2S in concentrations greater than 500 parts per million (ppm). In accordance with 30 CFR 250.67(c) BP has submitted information to justify our request that the area of our proposed activities continue to be classified by BOEMRE as H_2S absent. Refer to Section 4 of the EP.

The public could be exposed to oil on the water and along the shoreline, including skin contact or breathing volatile organic compounds. The amount of exposure will depend on the magnitude and duration, the physical/chemical characteristics of the material, the oceanic conditions and the effectiveness of the spill response.

Wildlife cleaning and rehabilitation workers have reported concerns including scrapes and cuts, itchy or red skin or rash, and symptoms of headache or feeling faint, dizzy, or fatigued. Hand, shoulder, or back pain was also reported by some wildlife cleaning workers (Centers for Disease Control and Prevention 2010). Spill response workers are also exposed to heat stress and acute exposure to hydrocarbons or hydrogen sulfide. Typical symptoms include: headaches, dizziness, nausea, vomiting, cough, respiratory distress, and chest pain (Solomon and Janssen 2010).

No significant impact is expected to public health and safety. Implementation of new BOEMRE environmental and safety regulations will further reduce the probability of the occurrence of a large volume/long duration spill.

3.3 Coastal and Onshore

3.3.1 Beaches

Affected Resource – The description, physical location, and formative processes that create the various coastal beaches and barrier island complexes are described in Chapter 3.2.1.1 of the Multisale EIS (USDOI MMS 2007). Coastal barriers of the Western GOM are generally divided into two physiographic areas: the Chenier Plains and barrier islands. These coastal barriers are relatively low landmasses that can be divided into several interrelated environments, including the unvegetated foreshore, the dune zone, and the backshore. When coastal storms occur, GOM waters may become elevated enough to overwash a coastal barrier,

leveling the areas of beach and dunes, creating overwash fans or terraces. Within a week, overwashed beaches may reestablish their typical structure. Over longer periods, terraces will become revegetated by opportunistic species, and the formation of dunes will begin again with the availability and nature of wind-blown sand at each terrace. Landform changes can be seasonal and cyclical. Coastal barriers are dynamic habitats and provide a variety of niches that support many avian, terrestrial, aquatic, and amphibian species, some of which are endangered or threatened (USDOI MMS 2002 and 2007).

Accumulations and movements of sediments that make up barrier landforms are often described in terms of transgressive and regressive sequences. A transgressive sequence moves the shore landward allowing marine deposits to form on terrestrial sediments. A regressive sequence is one in which terrestrial sediments are deposited over marine deposits as land builds out, into the sea. Although transgressive landforms are dominant in the western and northern GOM, both transgressive and regressive barriers may occur in the region (USDOI MMS 2002 and 2007).

Barrier islands have incurred damage from hurricanes. The areas have experienced varying degrees of erosion, land and vegetation loss, loss in elevation or beach profile and, in some cases, movement toward shore as a result of the previous hurricane seasons. The resulting change in elevation and island profiles reduces the ability of these features to provide the pre-storm coastal protection to the mainland beaches and wetlands. While these barriers can rebuild to some extent naturally over time, it is the intent of both Federal and State coastal restoration initiatives like the Coastal Wetlands Protection, Planning & Restoration Act (CWPPRA), Louisiana Coastal Resources Program (LCRP), and Coastal Impact Assistance Program (CIAP) to assist in these barrier island restorations (USDOI MMS 2002 and 2007).

Impact Analysis - The IPFs associated with this project include vessel traffic, marine debris, and accidental releases. The distance to the shore is about 200 miles (Figure 4).

An increase in the number of vessel trips, could result in minor incremental impacts to channels and coastal erosion rates. Standard activities associated with exploration, development and production have been documented and typically have a limited number of vessels required and a relatively short timeframe for each phase resulting in impacts being short term and localized (USDOI MMS 2002, 2007 and 2008b). No significant impacts are expected.

Trash on the beach is recognized as a major threat to the enjoyment and use of beaches. Only a limited amount of marine debris, if any, should result from the proposed activities. Compliance with NTL 2007-G03 is expected to result in no significant impact with trash and debris. Refer to Section 1.0 for additional information.

Offshore oil spills of large volume and long duration could pose problems for beaches and nearshore barrier islands. Oil and gas infrastructure such as pipelines and well heads also pose a higher probability regarding inshore oil spill threat

(USDOI MMS 2007 and 2008b). The extent of such impacts will vary depending on, among other factors, the magnitude and duration.

Meteorological and hydrological conditions at the time of the spill coupled with the quantity and location of the spill determines the fate of accidental oil spills (USDOI MMS 2002, 2007 and 2008b). Spilled oil would need strong southerly winds to persist for an extended time prior to or immediately after the spill to elevate water levels to move onto beaches or across dunes. Strong winds would accelerate oil-slick dispersal, spreading, and weathering, thereby reducing impact severity at a landfall site. A study in Texas showed that oil disposal on sand and vegetated sand dunes had little harmful effects on the existing vegetation or on the recolonization of the oiled sands by plants (Webb et al. 1981 and 1985). Oil or its components that remain in the sand after cleanup may be (1) released periodically when storms and high tides resuspend or flush beach sediments, (2) decomposed by biological activity, or (3) volatilized and dispersed during hot or sunny days (USDOI MMS 2002, 2007 and 2008b).

According to a Site Specific EA for a floating production, storage and offloading (FPSO) facility (USDOI MMS 2008a) located in an adjacent area to the east, oil spills from the operations could produce either adverse (but not significant) or extended (but not irreversible) impacts on coastal barrier beaches, depending upon spill size, the nature of the oil coming ashore (e.g., highly vs. lightly weathered), and the location and characteristics of the coastal barrier beach. Impacts may be long term, depending upon spill location and the relative position of sensitive resources.

No significant impact is expected to coastal beaches. Contact is minimized due to distance and the depth from small spills. Implementation of new BOEMRE environmental and safety regulations will further reduce the probability of the occurrence of a large volume/long duration spill.

3.3.2 Wetlands

Affected Resource – Wetland habitats found specifically along the Gulf coast include fresh, brackish, and saline marshes; mud and sand flats; and forested wetlands of mangrove swamps, cypress-tupelo swamps, and bottomland hardwoods. These can support mixed communities of plant species or pure stands of single species. Coastal wetlands are characterized by high organic productivity, high detritus production, and efficient nutrient recycling. Wetlands provide habitat for a great number and wide diversity of invertebrates, fish, reptiles, birds, and mammals, and are particularly important nursery grounds for many economically important fish and shellfish (USDOI MMS 2002, 2007 and 2008b).

The Deltaic Plain wetlands are on a series of overlapping riverine deltas that have extended onto the continental shelf during the past 6,000 years. Historically, the deltaic plain areas that were located near the active Mississippi River channel tended to build outward, and marsh areas tended to expand. At the same time, areas located near inactive, abandoned channels tended to deteriorate and erode as a result of the lack of sediment. Today, the Mississippi River is leveed, which

greatly reduces the once natural formation of Deltaic Wetlands (USDOI MMS 2002, 2007 and 2008b).

The Chenier Plain, found in Texas and Louisiana, is the largest concentration of coastal wetlands in the region. The Chenier Plain is located west of the Atchafalaya Bay in the western part of coastal Louisiana and is a series of separate ridges of shell and sand oriented parallel or oblique to the Gulf coast. These ridges are separated by progradational mudflats that are now marshes or open water. The mudflats were built during times when the Mississippi River Channel was located on the western side of the Deltaic Plain or when minor changes in localized hydrologic and sedimentation patterns favored deposition on the Chenier Plain (USDOI MMS 2002, 2007 and 2008b).

Along the Texas coast in the vicinity of southern Padre Island, marshes are minimal and unstable, compared with the more northern GOM. Brackish marshes occur in less saline, inland areas and are divided into frequently and infrequently flooded marshes. Infrequently flooded marshes contain an assemblage of plants that are much more tolerant of dry conditions.

Freshwater marshes in Texas occur inland above tidally delivered saline waters, in association with streams, lakes, and catchments. Broken bands of black mangroves (*Avicennia germinans*) also occur in this area (Brown et al. 1977; White et al. 1986). Wind-tidal flats of mud and sand are mostly found around shallow bay margins and in association with shoals. South of Corpus Christi and into Tamaulipas, flats increasingly replace lagoonal and bay marshes. Laguna Madre of Texas is divided into northern and southern parts by the wind-tidal flats of the Land-Cut Area, just south of Baffin Bay. The Intracoastal Waterway is dredged through this area, as are a series of well access channels. Dredging has caused topographic and vegetative changes among the flats of Laguna Madre. Inland beaches of sand and shells are found along the shores of bays, lagoons, and tidal streams. The structure of these beaches is similar to, but much narrower and smaller in scale than, barrier beaches. Compared with sand beaches, shell features are typically stacked to higher elevations by storm waves and are generally more stable (Brown et al. 1977; White et al. 1986).

Several factors contribute to wetland loss in coastal Louisiana. Sediment deprivation is a result of a 50 percent decreases in the suspended-sediment load of the river since the 1950's, the channelization of the river, and the primary cause, the construction of the flood protection levees. Subsidence and sea level rise have caused submergence of lower wetland areas. Construction of ring levees allowed drainage and development of extensive wetlands. Development activities in low areas, outside leveed areas, have caused the filling of wetlands. Construction of canals converted wetlands to open water and upland spoil banks. Canals and subsidence also contributed to increased tidal influence and salinities in freshwater and low salinity wetlands, which in turn has increased erosion and sediment export (USDOI MMS 2002, 2007 and 2008b).

Impact Analysis – The IPFs associated with this project include vessel traffic and accidental releases. Only a slight increase in vessel traffic is expected to occur,

but vessel size may increase due to supply needs and open-sea conditions. Currently, existing ports, production facilities, and navigation channels would be used, eliminating the need for the expansion or construction of facilities into wetland areas. Vessel support would likely use armored coastal channels, as well as existing offshore channels and sea lanes. No significant impact is expected.

The primary accidental IPF associated with the potential to impact coastal wetlands is oil spills Barrier islands can provide protection or reduce the severity of an oil spill by intercepting the spill before it reaches the wetlands located either behind (on mainland shore) or within the interior of the islands. Should a spill occur inshore or in nearshore waters, it presents a much greater potential for adversely impacting wetlands than an offshore deepwater spill simply due to proximity.

The works of several investigators (Webb et al. 1981 and 1985; Alexander and Webb 1983, 1985, and 1987; Lytle 1975; Delaune et al. 1979; Fischel et al. 1989) evaluated the effects of potential spills to wetlands. The primary reason for vegetation loss and ultimately facilitating land loss associated with an oil spill is impact to the vegetation root system. Vegetation diebacks may only happen for one growing season depending upon the concentration and the season during which contact occurs. The extent of such impacts will vary depending on, among other factors, the magnitude and duration. The larger the spill with longer duration may result in more impact.

Distant offshore spills have a further diminished probability of impacting inland wetland shorelines and seagrasses, largely due to their sheltered locations (USDOI MMS 2002, 2007 and 2008b). An inland fuel-oil spill may occur at a shore base or as a result of a vessel collision, though the probability is likely also very small. Should a spill occur inshore or in nearshore waters, it presents a much greater potential for adversely impacting wetlands and seagrasses, due to their proximity to the spill. Oil could accumulate in sheens and thick layers in the marsh and in protected pools and embayments (USDOI MMS 2002, 2007 and 2008b).

No significant impact is expected to wetlands. Contact is minimized due to distance and the depth from small spills. Implementation of new BOEMRE environmental and safety regulations will further reduce the probability of the occurrence of a large volume/long duration spill.

3.3.3 Shore Birds and Coastal Nesting Birds

Affected Resource – The offshore waters, coastal beaches, and contiguous wetlands of the northeastern GOM are populated by both resident and migratory species of coastal and marine birds. This analysis assumes five major groups in the area of concern: seabirds, shorebirds, marsh and wading birds, waterfowl, and raptors. Many species are mostly pelagic and, therefore, are rarely sighted nearshore. Fidelity to nesting sites varies from year to year along the Gulf coast (Martin and Lester 1991). Birds may abandon sites along the northern Gulf coast because of altered habitat and excessive human disturbance.

Shorebirds are those members of the order Charadriiformes generally restricted to coastline margins (beaches, mudflats, etc.). GOM shorebirds comprise five taxonomic families; Jacanidae (jacanas), Haematopodidae (oystercatchers), Recurvirostridae (stilts and avocets), Charadriidae (plovers), and Scolopacidae (sandpipers, snipes, and allies) (Hayman et al. 1986). An important characteristic of almost all shorebird species is their strongly developed migratory behavior, with some shorebirds migrating from nesting places in the far north to the southern part of South America (Terres 1991). Along the Gulf coast, observers have recorded 44 species of shorebirds. Six species nest in the area; the remaining species are wintering residents and/or "staging" transients (Pashley 1991).

The term wading birds refers to birds that have adapted to living in marshes and shallow water. Seventeen species of wading birds in the order Ciconiiformes currently nest in the U.S., and all except the wood stork nest in the northern GOM coastal region (Martin 1991; Terres 1991). These families have representatives in the northern GOM: Ardeidae (herons, bitterns, and egrets), Ciconiidae (storks), Threskiornithidae (ibises and spoonbills), Gruidae (crane), and Rallidae (rails, moorhens, gallinules, and coots).

Waterfowl belong to the taxonomic order Anseriformes and include swans, geese, and ducks. A total of 27 species are regularly reported along the north-central and western Gulf coast (Clapp et al. 1982; National Geographic Society 1983; Madge and Burn 1988). Many species usually migrate from wintering grounds along the Gulf coast to summer nesting grounds in the northern U.S. waterfowl migration pathways have traditionally been divided into four parallel north-south paths, or "flyways," across the North American continent. The Gulf coast serves as the southern terminus of the Mississippi (Louisiana, Mississippi, and Alabama) flyway. Waterfowl are social and have a diverse array of feeding adaptations related to their habitat (Johnsgard 1975).

There are three main groups of diving birds, respectively: cormorants and anhingas, loons, and grebes. Of the two pelican species in North America, only the brown pelican is listed as endangered.

Several other birds that inhabit or frequent the northern GOM coastal areas are recognized by U. S. Fish and Wildlife Service (FWS) as either endangered or threatened: interior least tern, Mississippi sandhill crane, piping plover, whooping crane, and wood stork. Detailed descriptions of the endangere and threatened birds can be found in the Final EIS for Central and Western GOM Multisale Lease Areas (USDOI MMS 2002) and Final EIS for Western and Central GOM Multisale Lease Areas (USDOI MMS 2007 and 2008b).

On July 10, 2001, the final rule was published for critical habitat for the wintering population of piping plover in 82 areas from west Florida south to Tampa Bay, Alabama, Louisiana, and Texas. Critical habitat identifies specific areas that are essential to the conservation of a listed species and that may require special management consideration or protection. The primary constituent needs for the piping plover are those habitat components that are essential for the primary

biological needs of foraging, sheltering, and roosting. The least tern is not considered federally endangered or threatened within 50 mi of the GOM. Only the interior nesting colonies are endangered (USDOI MMS 2002, 2007 and 2008b). Two other coastal species (Bald Eagle and Brown Pelican) discussed by MMS (2007b) are no longer listed as endangered or threatened; these are included under Shore Birds and Coastal Nesting Birds.

Impact Analysis - IPFs potentially affecting shore birds and coastal nesting birds include marine debris, helicopter traffic, and accidental release. An accidental oil spill from the proposed activities could cause impacts to shore birds and coastal nesting birds if contact is made. The distance to shore is about 200 miles (Figure 4).

Helicopter and service-vessel traffic related to the proposed action could sporadically disturb feeding, resting, or nesting behavior of birds or cause abandonment of preferred habitat. These IPFs could contribute to indirect population loss through reproductive failure resulting from nest abandonment. The FAA (Advisory Circular 91-36C) and corporate helicopter policy specify minimum altitude over populated areas and biologically sensitive areas such as wildlife refuges and national parks. Although these incidents are very short term in duration and sporadic in frequency, they can disrupt coastal bird behavior and, at worst, possibly result in habitat or nest abandonment. No significant impact is expected.

Service vessels should use selected nearshore and coastal (inland) navigation waterways, or corridors, and adhere to protocol set forth by the USCG for reduced vessel speeds within these inland areas. Routine presence and low speeds of service vessels within these waterways would diminish the effects of disturbance from service vessels on nearshore and inland populations of coastal and marine birds. The effects of service-vessel traffic on birds offshore would result in no significant impact.

Coastal and marine birds can become entangled and snared in discarded trash and debris. Additionally, many species will ingest small plastic debris, either intentionally or incidentally. Compliance with NTL 2007-G03 is expected to result in no significant impact with trash and debris. Refer to Section 1.0 for additional information.

Oil-spill cleanup methods often require heavy trafficking of beaches and wetland areas, application of oil dispersant and bioremediation chemicals, and the distribution and collection of oil containment booms and absorbent material. The presence of humans, along with boats, aircraft, and other technological creations, will also disturb coastal birds after a spill. Investigations have shown that oil-dispersant mixtures are similar to that of oil alone in its effects to successful reproduction in birds (Albers 1979; Albers and Gay 1982). The external exposure of adult birds to oil/dispersant emulsions may reduce chick survival more than exposure to oil alone; however, successful dispersal of a spill will generally reduce the probability of exposure of coastal and marine birds to oil (Butler et al. 1988). It is possible that changes in the size of an established breeding population

may also be a result of disturbance in the form of increased human activity for cleanup and monitoring efforts or to the intensified research activity after the oil spills (Maccarone and Brzorad 1994).

If physical oiling of individuals or local groups of birds occurs, some degree of both acute and chronic physiological stress associated with direct and secondary uptake of oil would be expected (USDOI MMS 2002, 2007 and 2008b). In addition, recent spill experience showed that bird mortality is expected to occur during a large volume/long duration spill (USDOI BOERME 2010b).

Stress, trauma, and shock enhance the effects of exposure and poisoning (USDOI MMS 2002, 2007 and 2008b). Low levels of oil could stress birds by interfering with food detection, feeding, predator avoidance, territory definition, homing of migratory species, susceptibility to physiological disorders, disease resistance, growth rates, reproduction, and respiration (USDOI MMS 2002, 2007 and 2008b). Preventative methods, such as permitted hazing from the path of an approaching oil slick or the use of booms to protect sensitive colonies in an emergency, have limited applicability (Clark 1984).

No significant impact is expected to shore birds and coastal nesting birds. Contact is minimized due to distance from small spills. Implementation of new BOEMRE environmental and safety regulations will further reduce the probability of the occurrence of a large volume/long duration spill.

3.3.4 Coastal wildlife Refuges

Affected Resource – The National Wildlife Refuge (NWR) System, managed by the FWS, is a system of public lands and waters set aside to conserve wildlife and fisheries resources. There are about 12 NWRs (Laguna Atacosa, Aransas, Big Boggy, San Bernard, Brazoria, Moody, Anahuac, McFadden, Texas Point, Shell Keys Delta, Breton and St. Bernard) that are located along the Northern GOM along the coast.

In addition to the NWR system, the National Estuarine Research Reserve (NERR) System is a network of protected areas established for longterm research, education, and stewardship. This partnership program between NOAA and coastal states has established five reserves (Grand Bay NERR, Weeks Bay NERR, Rookery Bay NERR, Apalachicola NERR, and Mission-Aransas NERR) in the GOM.

Impact Analysis – An accidental oil spill from the proposed activities could cause impacts to coastal wildlife refuges. However, due to the distance to shore (about 200 miles; Figure 4) and the response capabilities that would be implemented, no significant adverse impacts are expected. Contact is minimized due to distance from small spills. Implementation of new BOEMRE environmental and safety regulations will further reduce the probability of the occurrence of a large volume/long duration spill.

3.3.5 Wilderness Areas

Affected Resource – In addition to the NWRs and NERRs, the coastal areas along the northern GOM, with their marine fishing and beach related activities are

a major recreational region of the U.S. These coastal areas provide diverse natural and developed landscapes and seascapes. The coastal beaches, barrier islands, estuarine bays and sounds, river deltas, and tidal marshes are used for recreational activity. Publically owned national seashores, parks, beaches, wildlife lands, historic sites, wilderness areas, wildlife sanctuaries, and scenic rivers attract users throughout the year.

Impact Analysis – An accidental oil spill from the proposed activities could cause impacts to coastal wilderness areas. However, due to the distance from shore (about 200 miles; Figure 4) and the response capabilities that would be implemented, no significant adverse impacts are expected. Contact is minimized due to distance from small spills. Implementation of new BOEMRE environmental and safety regulations will further reduce the probability of the occurrence of a large volume/long duration spill.

3.3.6 Other Environmental Resources Identified

Other environmental resources identified were socioeconomic and groundwater and onshore surrounding environments.

3.3.6.1 Socioeconomics

Affected Resource – The GOM provides more than 34 percent of the commercial fish landings in the continental United States (USDOC NMFS 2006). Commercially important species include the estuary-dependent species such as Atlantic menhaden, shrimps, oyster, crabs, and sciaenids (Benson 1982; Hoese and Moore 1977). Menhaden, with landings of about 1.02 billion pounds and valued at $44.9 million, was the most important GOM species in quantity landed during 2004. Shrimp, with landings of nearly 257 million pounds and valued at about $367 million, was the most important GOM species in value landed during 2004. The 2004 GOM oyster fishery accounted for nearly 93 percent of the national total with landings of 25 million pounds of meats, valued at about $61 million. The GOM blue crab fishery accounted for 36 percent of the national total with landings of 60 million pounds, valued at about $41 million (USDOC NMFS 2006). In 2008 commercial fishermen in the Gulf harvested more than 1 billion pounds of finfish and shellfish (USDOC NOAA 2010b).

In 2008, over 24 million recreational fishing trips were taken in the Gulf of Mexico, which generated about $12 billion in sales, over $6 billion in value added impacts, and over 100,000 jobs (USDOC NMFS 2010a). Unlike commercial fishing, recreational fishing is concentrated during the summer months. Loss of millions of recreational fishing trips and billions in subsequent sales could be lost if a large accidental release were to occur during the months that have been scheduled fishing tournaments.

Tourism and recreation are integral components of the economy of the GOM. Visitors to Texas, Louisiana, Mississippi, Alabama, and Florida spent approximately $145 billion in 2008 (USDOI BOERME 2011a). This spending helped to support approximately 2.4 million jobs in recreation-based industries statewide. Approximately, 600,000 of these jobs are in counties that are directly

along the coast. Recreational jobs account for 14.8 percent of Gulf Coast employment, greater than the national average of 12.4 percent (USDOI BOERME 2011a). Gulf Coast recreational employment is reasonably cyclical, with the peak months during the past few years occurring between March and June (USDOI BOERME 2011a).

The importance of the oil and gas industry to the coastal communities of the GOM is significant, especially in Louisiana, eastern Texas and coastal Alabama (USDOI MMS 2007 and 2008b). Oil service related employment is concentrated in coastal Louisiana Parishes (St. Mary, Terrebone, Lafourche, Iberia, and Plaquemines) and drilling related employment is most concentrated in Harris County, Texas and Lafayette Parish Louisiana (USDOI BOERME 2011a). Changes in OCS oil and gas activities have significant employment implications to the communities, especially those directly or indirectly related to oil and gas development (USDOI MMS 2007 and 2008b).

Sufficient land is designated in commercial and industrial parks and adjacent to the existing ports to minimize potential disruption to current residential and business use patterns (USDOI MMS 2007 and 2008b). The high level of offshore oil and gas activity in the GOM is accompanied by development of onshore service and support facilities. This onshore infrastructure includes gas processing plants, navigation channels, oil refineries, pipelines, storage yards, fabrication yards, separation facilities, service bases, and terminals as well as landfills and disposal sites for drilling and production wastes (USDOI MMS 2007 and 2008b).

Archaeological sites provide recreational opportunities (e.g. tourism and diving) both offshore and onshore. Damage by an accidental release on corals and other organisms on archaeological resources (i.e. shipwreck sites) could change the surrounding site and increase degradation. Additionally, onshore habitat could degrade and erode, which would increase exposure to and subsidence of prehistoric and historic sites. Archaeological resources affected from the release or cleanup activities cannot be reversed, therefore leading to a loss of archaeological data.

Impact Analysis – A large/long duration accidental release has the potential to impact on recreation and tourism; recreational and commercial fishing and employment. Tourism impact would depend on the extent to which any structural/ecological damage can be repaired, as well as on the extent to which public confidence in the tourism industry can be restored (USDOI BOEMRE 2011a). For example, a catastrophic oil spill would likely affect the fish populations in the affected waters to some extent. The most direct impact of this would be to lessen recreational fishing activity in a region to the extent that the fish population has decreased. An accidental release may or may not result in fishery closures, depending on the magnitude and duration of the spill, the oceanographic and meteorological conditions at the time, and the effectiveness of spill response measures.

There are no known recreational uses near the drill sites. Recreational resources and tourism in coastal areas would not be affected by any routine activities due to

the distance from shore. Compliance with NTL 2007-G03 will minimize the chance of trash or debris being lost overboard from the drilling rig and subsequently washing up on beaches. Impacts on recreation and tourism would vary depending on the duration of the spill and its fate including the effectiveness of response measures. A large spill that reached coastal waters and shorelines could adversely affect recreation and ease area.

The project will have support from existing shore base facilities in Louisiana. No new or expanded facilities will be constructed, and no new employees are expected to move permanently into the area. The project will have a negligible impact on socioeconomic conditions such as local employment, existing offshore and coastal infrastructure (including major sources of supplies, services, energy, and water), and minority and lower income groups. Levels of boat and helicopter traffic, as well as demand for goods and services including scarce coastal resources, will represent a small fraction of the level of activity occurring at the shore base. The response to a release would be staged primarily out of existing facilities; however, there could be limited temporary impacts on land use along the coast if additional staging areas were needed. These areas would eventually return to their original use as the response is demobilized.

No significant impact is expected to socioeconomic resources. Implementation of new BOEMRE environmental and safety regulations will further reduce the probability of the occurrence of a large volume/long duration spill.

3.3.6.2 Groundwater and Onshore Environments

Affected Resource – Offshore drilling operations generate several types of wastes such as municipal trash (paper, plastic, wood, food wrappings, etc.), scrap metal, used drilling fluids and chemicals. A large majority of the waste generated is associated with offshore food service operations, as well as drilling operations and maintenance activities of the rig. These waste types are identified in the various tables submitted in the EP and are managed in accordance with USEPA's and applicable state waste regulations. Refer to Section 6.0 of the EP for additional information regarding wastes types and amounts. Operational waste is collected and stored until it is shipped to shore for disposal or recycling at BP approved landfills or disposal companies.

An accidental release of oil could generate large quantities of additional waste materials and debris. This could include: tar balls, oiled vegetation and sand, used personal protective equipment (PPE), oil and oily water, and oiled sorbent materials (e.g. rags, boom and absorbent pads) (USEPA, 2010). The amount of material generated will depend on the magnitude and duration, the physical/chemical characteristics of the material, the oceanic conditions and the effectiveness of the spill response. The waste generated would be segregated by waste type and sent to an appropriate permitted and BP approved disposal facility to receive and manage such wastes.

Based on information provided in Gulf of Mexico OCS Oil and Gas Scenario Examination: Onshore Waste Disposal (Dismukes et al. 2007), current landfills located in Texas, Louisiana, Mississippi, and Alabama have an estimated

permitted capacity of 386,545,904 tons and an average useful life of 32 years. Those with useful life of greater than 40 years have a remaining permitted capacity of 170,058,951 tons, which represents 44 percent of the total capacity for the GOM region. Activities covered in this EP will only utilize one landfill located in Louisiana. Refer to Section 6.0 of the EP for additional information regarding approved waste disposal venders and sites.

Impact Analysis: IPFs that could affect ground water and onshore environments are onshore waste disposal. Landfills are state permitted waste management facilities and must comply with the Resource Conservation and Recovery Act (RCRA) regulations at the federal, state and local levels. The regulations include design criteria for the protection of groundwater and the surrounding environments such as: Location restrictions, composite liner requirements, leachate collection and removal systems, operating practices, groundwater monitoring requirements, closure and post-closure care requirements, corrective action provisions, and financial assurance. BP conducts routine independent audits of commercial waste disposal facilities to ensure their management of waste and protection of the environment is acceptable.

BP will operate in accordance with the regulations and also avoid accidental loss of solid waste items by maintaining waste management plans, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste in accordance with NTL 2007-G03. Refer to Section 1.0 for additional information. Special caution will be exercised when handling and disposing of small items and packaging materials, particularly those made of non-biodegradable, environmentally persistent materials such as plastic or glass.

BP has developed waste management plans for the collection, handling, management and disposal of such wastes. These plans are written to ensure wastes are handled safely and in accordance with existing applicable federal, state and local rules and regulations.

In addition BP seeks out options to minimize waste that is generated and recycles as much as possible. Waste items like plastic drinking bottles, cardboard, paper, and tin aluminum are sent for recycling rather than disposal in a landfill. Used oil, oily rags/pads, filter, and empty buckets are also sent for recycling rather than landfill disposal.

The Dismukes et al. (2007) study stated that landfill capacities do not appear to be a constraint in any fashion to the ongoing or future development of offshore oil and gas activities. Environmental regulators in the region indicated that existing facilities have ample capacity and see no future constraints. The USEPA recently stated that landfills receiving wastes have abundant capacity to handle the expected wastes from large response efforts and; therefore, the addition of the waste generated from large response efforts would significantly shorten the expected life-span of the landfills (USEPA 2010).

Therefore, there are no significant impacts expected from onshore waste disposal to groundwater and the onshore environments.

4.0 CUMULATIVE IMPACT ANALYSIS

The BOERME fully addressed the cumulative effects of OCS (i.e., oil and gas leasing, exploration, development, and production) and non-OCS related activities for the CPA and WPA as well as the Gulf Coast region as part of the NEPA documentation completed for proposed multi-sale lease activities. OCS related activities include routine operations (e.g., drill rig presence (noise and lights), bottom disturbing activities, vessel traffic, operational discharges, noise generated by platforms, drillships, helicopters and vessels, seismic surveys, explosive structure removals) and accidental events (e.g., oil spills, oil-spill-response activities, vessel collisions loss of debris from service vessels and OCS structures). Non-OCS related activities such as crude oil import tankering, State oil and gas activity, recreational and commercial fishing, coastal development, natural processes (hypoxia), and recreational, commercial and military vessel traffic. These OCS and non-OCS activities are considered in this section in so far as they could contribute to the cumulative environmental and socioeconomic impacts pertinent to the proposed activities here.

Cumulative impacts from OCS and non-OCS related activities are discussed in Chapter 4.5 of the multi-sale EIS (USDOI MMS 2002 and 2007) and Chapter 4.1 of the supplemental EIS (USDOI MMS 2008b). Additional impacts from accidental releases are discussed in Chapter 4 of the multi-sale EIS's (USDOI MMS 2002 and 2007) and the Supplemental EIS (USDOI MMS 2008b).

The proposed activities described in the EP are similar to those addressed in previous multisale EISs (USDOI MMS 2002, 2007 and 2008b) and a recent site specific EA (USDOI BOEMRE 2011a). That EA analyzes impacts upon environmental and socioeconomic resources, including cumulative impacts, against new information related to the Macondo incident. The cumulative impacts discussed in these BOEMRE NEPA documents include both the project specific work proposed in these documents and other reasonably foreseeable activities expected to take place in the GOM. Incremental impacts from the work planned in this EP are expected to be negligible as a result of conforming to the laws, regulations, lease stipulations, and NTLs, and the limited geographic scope and duration.

Although regulatory uncertainties continue to affect the approval of new exploration and development plans, and the issuance of new permits to drill, additional projects are expected to proceed. The closest existing production facility is in Garden Banks Block 783, about 48 miles away. The closest approved drilling activity is in Keathley Canyon Block 736, about 30 miles away. BP is currently not aware of any other project in the immediate vicinity of the proposed EP activity. Discussions below address how the impacts, if any, from the proposed EP activities are expected to contribute to the cumulative impacts of this and other similar projects.

The Gulf Coast has survived major natural and manmade disasters (i.e., hurricanes and oil spills), through which the people and environmental resources of the GOM and the Gulf Coast have repeatedly demonstrated their resiliency.

While environmental and socioeconomic resources may recover from a natural or manmade disaster if given enough time between disasters, disasters happening in unison or within short periods of each other would make recovery more difficult (USDOI BOERME 2011a).

The magnitude of OCS and non-OCS activity in the GOM is so immense that routine activities associated with a single OCS oil and gas activity (e.g., single lease sale, single well) have a minor to no incremental contribution to the impacts of cumulative activities. However, a large blowout and spill could make a significant contribution to cumulative impacts on a variety of GOM resources (USDOI BOERME 2011a).

Benthic Communities (Soft Bottom Benthic Communities, High Density Deepwater Benthic Communities, Designated Topographic Feature, Pinnacle Trend, and Eastern Gulf Live Bottoms) - The proposed drilling is expected to result in no physical impacts due to the use of a dynamically positioned rig. Slight increases in turbidity from drilling mud and cuttings are expected to be localized and temporary (USDOI BOERME 2011a). Subsurface spills, including a catastrophic event, could result in sediment or oily material coming into contact with the benthic communities. However, the chance of a large blowout is very low and would only damage benthic communities where concentrated oil makes direct contact (USDOI BOERME 2011a). Recolonization from populations of neighboring soft bottom substrate would be expected (USDOI MMS 2003).

Areas that may support high-density deepwater benthic communities will be avoided as required by NTL 2009-G40. The site clearance narrative did not reveal evidence of hydrocarbon seepage within 2,000 ft of the proposed drilling location (BP 2010a and BP 2010b).

Mitigation measures such as those required by laws, regulations, lease stipulations and NTLs are expected to result in localized and short term impacts. No significant incremental cumulative impacts to these benthic features and communities are expected as a result of the proposed activities as well as other reasonably foreseeable future activities in the area.

Water Quality - Slight increases in turbidity from drilling mud and cuttings are expected to be localized and temporary. According to a recent site specific EA, "spills of oil, diesel fuel, and other materials may occur from vessels transporting crude oil and petroleum products; from vessels involved in commercial fishing, freight or passenger transport; and from OCS operations (USDOI BOERME 2011a)." During a well blowout the water quality of marine waters could be impacted by increase turbidity and the release of oil (USDOI BOEMRE 2011a). Short-term, localized changes in water quality would be expected from an oil spill ≥1,000 bbl and cumulative impacts would be negligible (USDOI BOERME 2011a). The extent of such impacts will vary depending on, among other factors, the magnitude and duration.

Mitigation measures such as those required by laws, regulations, lease stipulations and NTLs are expected to result in short term impacts. No significant incremental

cumulative impacts to water quality are expected as a result of the proposed activities as well as other reasonably foreseeable future activities in the area.

Fisheries and EFH – The BOERME identified cumulative activities such as State oil and gas activity, coastal development, crude oil imports by tanker, commercial and recreational fishing, hypoxia (i.e., red or brown tides), removal of OCS structures, and offshore discharges of drilling muds and produced waters that could impact fisheries and EFH (USDOI BOERME 2011a). The drilling rig is a single, temporary structure; therefore, impacts on fish populations, whether beneficial or adverse, would be considered insignificant. Slight increases in turbidity from drilling mud and cuttings are expected to be localized and temporary. A well blowout scenario could introduce oil to surface or subsurface waters. Behavior science associated with adult fish indicate that they would likely avoid the area of a spill, but fish eggs and larvae within the spill area of the northern GOM could be killed (USDOI MMS 2002 and 2007).

Mitigation measures such as those required by laws, regulations, lease stipulations and NTLs are expected to minimize impacts. No significant incremental cumulative impacts to fisheries and EFH are expected as a result of the proposed activities as well as other reasonably foreseeable future activities in the area.

Marine Mammals and Sea Turtles – Oil and gas leasing, exploration, development and production activities including the degradation of water quality resulting from operational discharges, vessel traffic, noise generated by platforms, drillships, helicopters and vessels, seismic surveys, explosive structure removals, oil spills, oil-spill-response activities, loss of debris from service vessels and OCS structures, commercial fishing, capture and removal, and pathogens may contribute to cumulative impacts that could affect marine mammals and sea turtles (USDOI BOERME 2011a). Disturbances from OCS-related activities could stress and/or weaken individuals of a local group or population and make them more vulnerable to infection from natural or anthropogenic sources (USDOI BOEMRE 2011a). Few deaths are expected from chance vessel collisions, ingestion of plastic material by compliance with NTL 2007-G03 and NTL 2007-G04.

Mitigation measures such as those required by laws, regulations, lease stipulations and NTLs are expected to minimize impacts. No significant incremental cumulative impacts to marine mammals and sea turtles are expected as a result of the proposed activities as well as other reasonably foreseeable future activities in the area.

Air Quality - The proposed activities are located approximately 212 miles offshore from Port Fourchon. Cumulative impacts on air quality within the offshore area would come primarily from non-OCS oil/gas activities in the Gulf as well as sources on land such as generated outside the OCS and include emissions from industrial plants, power generation, and urban transportation (USDOI BOERME 2011a).

The projected air emissions are not expected to affect the air quality of the OCS primarily due the distance to the shore or to any Prevention of Significant

Deterioration Class I air quality area such as the Breton Wilderness Area. Keathley Canyon Blocks 292 and 336 are beyond the 200 kilometer (124 mile) buffer for the Breton Wilderness Area and are about 220 miles from the coastline. Portions of the Gulf Coast have ozone levels that exceed the Federal air quality standard (USDOI MMS 2007 and 2008b).

Mitigation measures such as those required by laws, regulations, lease stipulations and NTLs are expected to minimize impacts. No significant incremental cumulative impacts to air quality are expected as a result of the proposed activities as well as other reasonably foreseeable future activities in the area.

Shipwreck Sites (known or potential) and Prehistoric Archaeological Sites - Several impact-producing factors may threaten historic archaeological resources. An impact could result from a contact between a historic shipwreck and an OCS activity (pipeline and platform installations, drilling rig emplacement and operation, dredging, and anchoring activities) (USDOI BOERME 2011a). Keathley Canyon Blocks 292 and 336 are not stipulated as requiring archaeological resource surveys and reports (NTL 2005-G07 and 2008-G20). A review of the Site Clearance Narrative (BP 2010a and BP 2010b) was conducted and indicates there is no known or potential shipwreck sites located within the survey area. The proposed drilling will be done with a dynamic positioned rig which does not have associated anchors, anchor chains or wire ropes; therefore, no impacts on such sites are expected as a result of the proposed operations.

During oil and gas exploration and development as well as during fishing or other maritime activities, the loss or discard of ferromagnetic debris may occur that could result in the masking of historic shipwrecks or the introduction of false targets that could be mistaken in the remote sensing record as historic resources (USDOI BOERME 2011a).

Mitigation measures such as those required by laws, regulations, lease stipulations and NTLs are expected to minimize impacts. No significant incremental cumulative impacts to shipwrecks and prehistoric archaeological sites are expected as a result of the proposed activities as well as other reasonably foreseeable future activities in the area.

Marine, Pelagic, Coastal Nesting and Shore Birds – The majority of effects resulting from the proposed project on marine, pelagic, coastal nesting and shore birds are expected to be sublethal: behavioral effects, sublethal exposure to or intake of OCS-related contaminants or discarded debris, temporary disturbances, and displacement of localized groups from impacted habitats (USDOI MMS 2007). Chronic sublethal stress, however, is often undetectable in birds. As a result of stress, individuals may weaken, facilitating infection and disease (USDOI MMS 2007).

Birds may use offshore structures and platforms for resting, feeding, or as temporary shelter from inclement weather (Russell, 2005). Effluent discharges are likely to have negligible impacts on the birds due to rapid dispersion, the small area of ocean affected, the intermittent nature of the discharges, and the

mobility of these animals. Compliance with NTL 2007-G03 is expected to result in reduced interaction with discarded trash and debris.

Oil-spill cleanup methods often require heavy trafficking of beaches and wetland areas, application of oil dispersant and bioremediation chemicals, and the distribution and collection of oil containment booms and absorbent material. The presence of humans, along with boats, aircraft, and other technological creations, could also disturb coastal birds after a spill.

Mitigation measures such as those required by laws, regulations, lease stipulations and NTLs are expected to minimize impacts. No significant incremental cumulative impacts to marine, pelagic, coastal nesting and shore birds are expected as a result of the proposed activities as well as other reasonably foreseeable future activities in the area.

Public Health and Safety - An accidental H_2S release from the proposed activities is not expected. The public could be exposed to oil on the water and along the shoreline, including skin contact or breathing volatile organic compounds. The amount of exposure will depend on the magnitude and duration, the physical/chemical characteristics of the material, the oceanic conditions and the effectiveness of the spill response.

Mitigation measures such as those required by laws, regulations, lease stipulations and NTLs are expected to minimize impacts. No significant incremental cumulative impacts to public health and safety are expected as a result of the proposed activities as well as other reasonably foreseeable future activities in the area.

Beaches, Wetlands, Coastal Wildlife Refuges and Wilderness Areas - The distance to the shore is about 200 miles (Figure 4). An increase in the number of vessel trips, could result in minor incremental impacts to channels and coastal erosion rates. Currently, existing ports, production facilities, and navigation channels would be used, eliminating the need for the expansion or construction of facilities into wetland areas.

Offshore oil spills of large volume and long duration could produce impacts on beaches and nearshore barrier islands. Implementation of new BOEMRE environmental and safety regulations will further reduce the probability of the occurrence of a large volume/long duration spill.

Mitigation measures such as those required by laws, regulations, lease stipulations and NTLs are expected to minimize impacts. No significant incremental cumulative impacts to beaches, wetlands, coastal wildlife refuges and wilderness areas are expected as a result of the proposed activities as well as other reasonably foreseeable future activities in the area.

Socioeconomics - Tourism impact would depend on the extent to which any structural/ecological damage can be repaired, as well as on the extent to which public confidence in the tourism industry can be restored (USDOI BOEMRE 2011a). Recreational resources and tourism in coastal areas would not be affected by any routine activities due to the distance from shore.

The magnitude of OCS and non-OCS activity in the Gulf of Mexico is so immense that routine activities associated with a single OCS oil and gas activity (e.g., single lease sale, single well) have a minor to no incremental contribution to the impacts of cumulative activities. However, a large blowout and spill could make a significant contribution to cumulative impacts (USDOI BOEMRE 2011a). The project will have support from existing shore base facilities in Louisiana. No new or expanded facilities will be constructed, and no new employees are expected to move permanently into the area. The project will have a negligible impact on socioeconomic conditions such as local employment, existing offshore and coastal infrastructure (including major sources of supplies, services, energy, and water), and minority and lower income groups.

Mitigation measures such as those required by laws, regulations, lease stipulations and NTLs are expected to minimize impacts. No significant incremental cumulative impacts to socioeconomics are expected as a result of the proposed activities as well as other reasonably foreseeable future activities in the area.

5.0 ENVIRONMENTAL HAZARDS

The proposed activities could be adversely impacted by strong environmental phenomena (e. g. hurricanes). BP's Severe Weather Contingency Plan identifies the thresholds (e. g. wind speed, current speed) at which such impacts may occur and describes the consequences and measures BP will take to mitigate those impacts.

6.0 ALTERNATIVES

No Action Alternative - This alternative would result in no impact from the proposed action but could discourage the development of much needed hydrocarbon resources, and thereby result in a loss of royalty income for the United States and energy for America. This alternative was not selected for analysis.

Approval of the Proposed Action - Measures that BP proposes to implement to limit potential environmental effects are discussed in the EP. The BOEMRE's lease stipulations, OCS Operating Regulations, NTLs, and other regulations and laws were identified throughout this environmental impact analysis as existing mitigation to minimize potential environmental effects associated with the proposed action. Considering the mitigative measures, this alternative was selected for evaluation in this EIA.

7.0 MITIGATION MEASURES

The EP contains numerous mitigation measures required by laws and regulations, lease stipulations and NTL's. Additional mitigation measures include:

- Low sulfur fuel to be used.
- NPDES permit compliance will minimize potential environmental impact.
- Water treatment equipment will be effectively operated and maintained to reduce pollutant discharge.
- A waste minimization plan will be followed for ongoing operations to recycle and source reduce waste.

BP is covered by a Regional OSRP approved by the BOEMRE. BP has contracts in-place with three (3) Oil Spill Removal Organizations (OSRO's): The National Response Corporation (NRC), the Marine Spill Response Organization (MSRC), and Clean Gulf Associates (CGA). NRC, MSRC and CGA will provide both equipment and trained personnel in the event an oil spill response is mounted as a result of BP's proposed activities described in the Plan. BP has a contract in place with Marine Well Containment Company (MWCC) which provides well containment capabilities.

8.0 CONSULTATION

No agencies or persons were consulted regarding potential impacts associated with the proposed activities.

9.0 PREPARERS

The EIA was prepared by the following:

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10.0 REFERENCES

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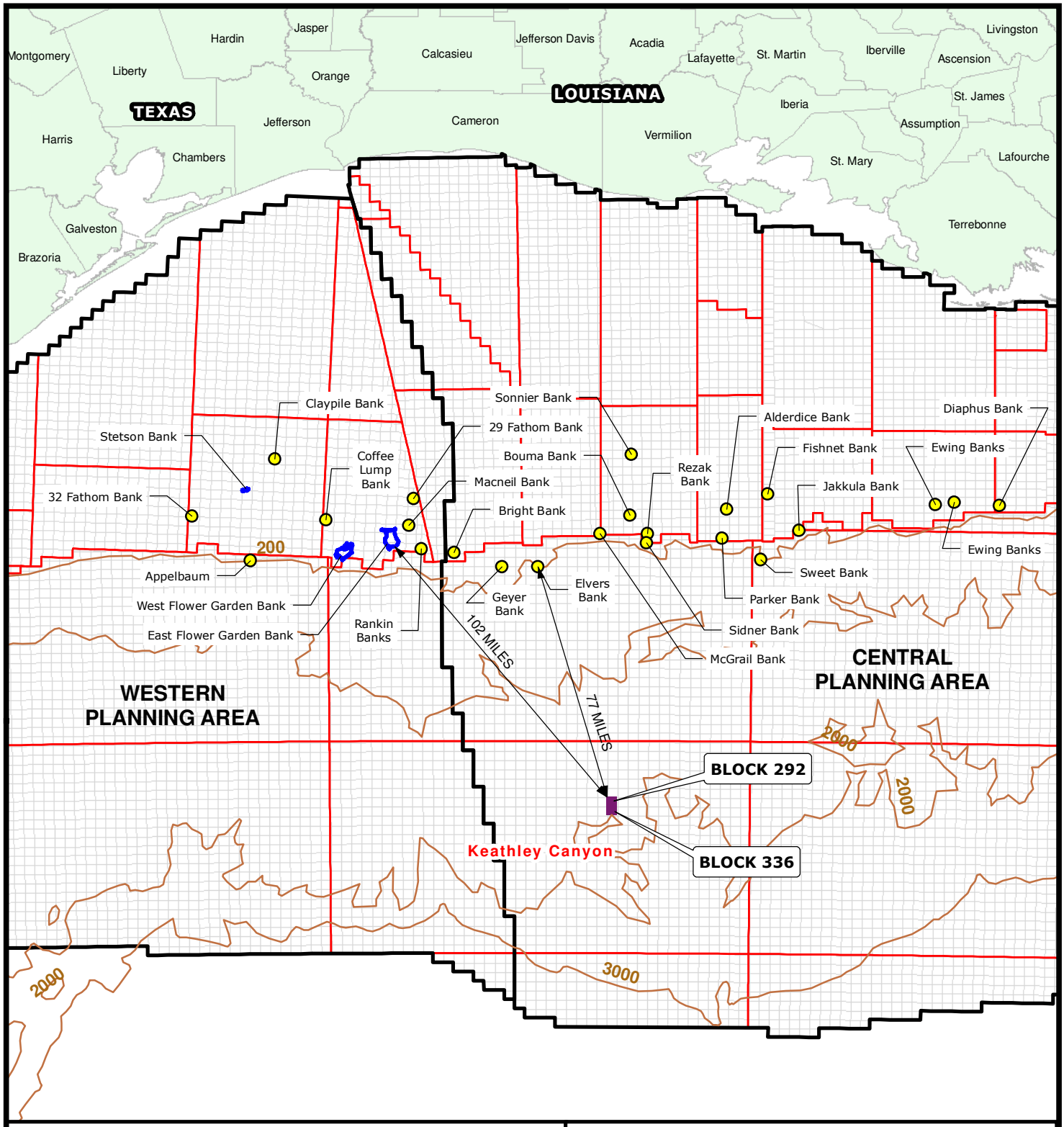
FIGURES

FIGURE 1

SITE LOCATION MAP
GREEN CANYON



Legend

- Bank Location
- Bathymetric Contour
- Planning Areas
- Protraction Areas
- Blocks

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Miles

SOURCES

Minerals Management Service - Gulf of Mexico Region (MMS - GOMR) GulfOfMexico.mdb

BP EXPLORATION AND PRODUCTION, INC.
HOUSTON, TEXAS

ENVIRONMENTAL IMPACT ANALYSIS

DESIGNATED TOPOGRAPHIC FEATURES

GULF OF MEXICO

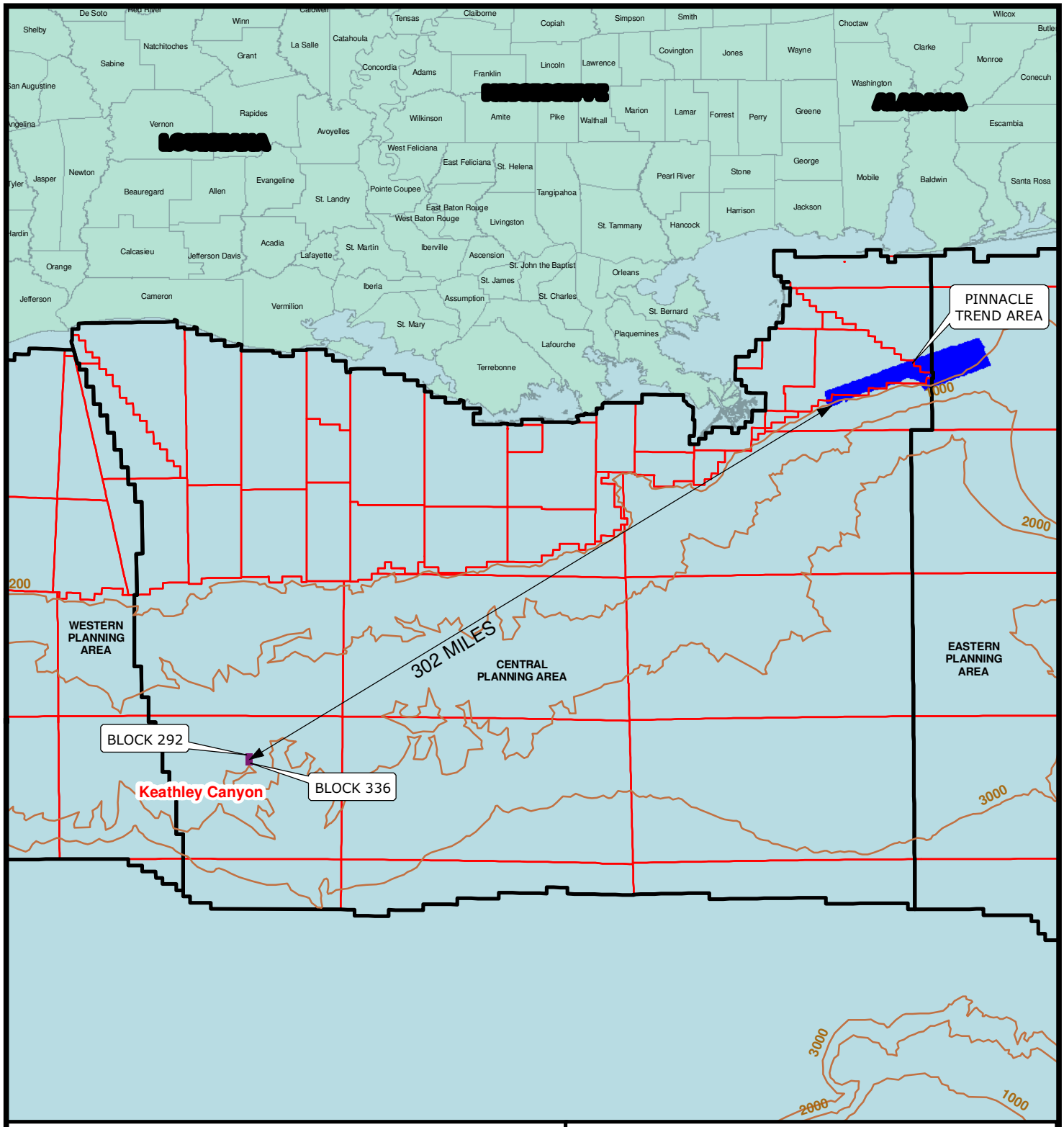
C-K ASSOCIATES, LLC
ENVIRONMENTAL & ENGINEERING CONSULTANTS

Drawn:	CAL/AM9.2
Checked:	BM
Approved:	BM
Date:	10/12/10
Dwg. No.:	A6148E-01

FIGURE 1

FIGURE 2

SITE LOCATION MAP
PINNACLE TREND AREA



Legend

- Bathymetric Contour
- Planning Areas
- Protraction Areas

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SOURCES

Minerals Management Service - Gulf of Mexico Region (MMS - GOMR) GulfOfMexico.mdb

BP EXPLORATION AND PRODUCTION, INC.
HOUSTON, TEXAS

ENVIRONMENTAL IMPACT ANALYSIS

PINNACLE TREND AREA

GULF OF MEXICO

C-K ASSOCIATES, LLC
ENVIRONMENTAL & ENGINEERING CONSULTANTS

Drawn:	CAL/AM9.2
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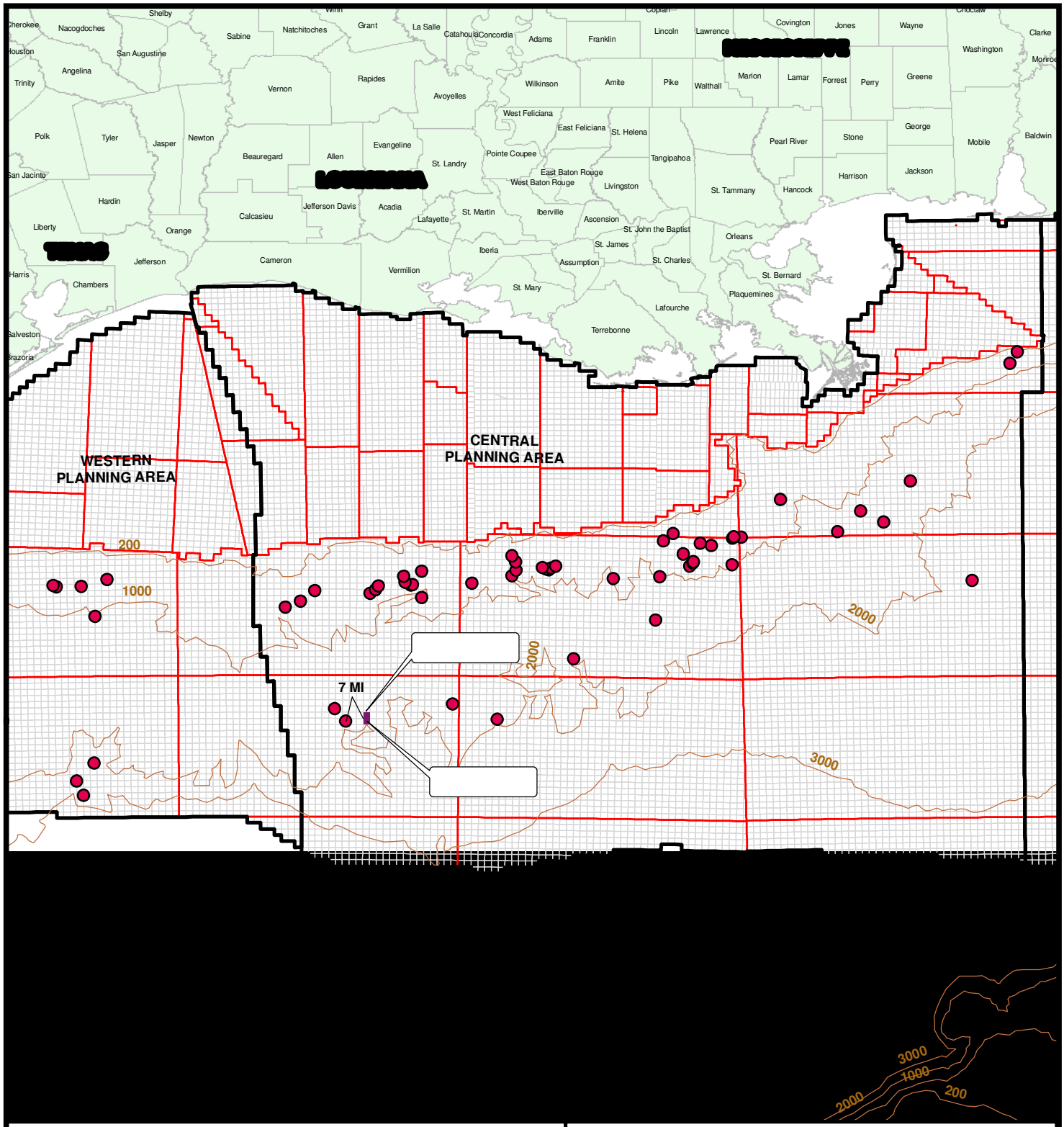
Date:	10/12/10
Dwg. No.:	A6148E-02

FIGURE 2

FIGURE 3

SITE LOCATION MAP
CHEMOSYNTHETIC COMMUNITIES



Legend

- Known Chemosynthetic Community Listed in NTL 2009-G40
- Bathymetric Contour
- Planning Area
- Protraction Areas
- Blocks

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SOURCES

Minerals Management Service - Gulf of Mexico Region (MMS - GOMR) GulfOfMexico.mdb

BP EXPLORATION AND PRODUCTION, INC.
HOUSTON, TEXAS

ENVIRONMENTAL IMPACT ANALYSIS

CHEMOSYNTHETIC COMMUNITIES

GULF OF MEXICO

C-K ASSOCIATES, LLC
ENVIRONMENTAL & ENGINEERING CONSULTANTS

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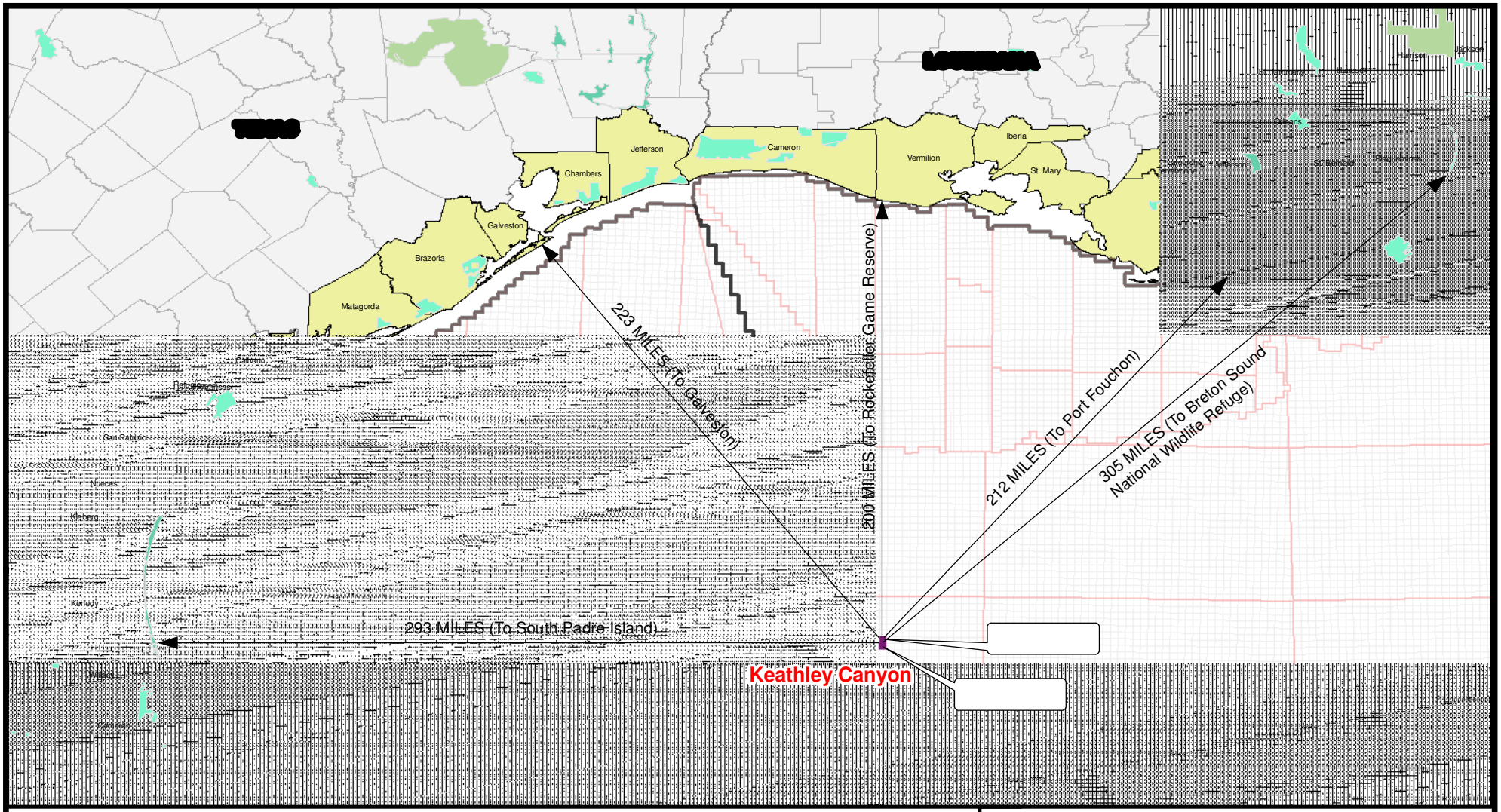
FIGURE 3

FIGURE 4

SITE LOCATION MAP
GULF OF MEXICO



Legend

- Planning Area
- Protraction Areas
- Blocks
- Gulf County / Parish
- Forest Service
- Fish and Wildlife Service
- National Park Service

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SOURCES

Minerals Management Service - Gulf of Mexico Region (MMS - GOMR) GulfOfMexico.mdb

BP EXPLORATION AND PRODUCTION, INC.
HOUSTON, TEXAS

ENVIRONMENTAL IMPACT ANALYSIS

COASTAL WILDLIFE REFUGES

GULF OF MEXICO

CAK ASSOCIATES, LLC
ENVIRONMENTAL & ENGINEERING CONSULTANTS

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FIGURE 4

Appendix G: Oil Spill Discussion

Worst Case Discharge scenario for Kaskida, KC 292

1) Worst Case Summary

BP has estimated that its worst case scenario for discharge from a mobile drilling rig operation that may occur from Kaskida, Well B. Given the anticipated reservoir thickness and historical productivity index the worst case discharge is estimated to be 27,459 barrels of crude oil per day. Calculations are based on formulas defined by BOEMRE regulations.

2) Facility Information

- Type of Operation: Exploration
- Facility Name: Kaskida
- Area and Block: KC 292
- NAD83
  - Latitude: 26° 40’ 39.58”
  - Longitude: -92° 34’ 20.75”
- NAD27
  - Latitude: 26° 40’ 38.52”
  - Longitude: -92° 34’ 20.45”
- Distance to Shore: 191 miles
- Water Depth: Approximately 6,800 feet
- API Gravity: 25.4°
- Oil Storage Volume: 0 barrels

3) Worst Case Discharge Volume

Criteria	***Barrels***
Estimated highest capacity well uncontrolled blowout volume associated with exploration well (barrels per day)	27,459
TOTAL WORST CASE DISCHARGE (barrels per day)	**27,459**

4) Land Segment Identification

In compliance with NTL 2006-G21, BP has determined the land areas that could be potentially impacted by a potential KC 292 oil spill using the BOEMRE Oil Spill Risk Analysis Model (OSRAM) trajectory results. The OSRAM estimates the probability that oil spills from designated locations would contact shoreline and offshore natural resources. (Whether and where a particular spill would reach shore is dependent on various factors, such as weather, currents and product characteristics and, as a result, actual oil movement in the event of a spill may vary from the OSRAM results.) These probabilities are intended to indicate, in terms of percentage, the computed likelihood that an oil spill occurring in a particular launch area will contact a certain county or parish within 3, 10, and 30 days.

OCS Launch Block #26 was utilized as Kaskida's point of origin. Land segments identified by the model are listed below (referenced from "Oil-Spill Risk Analysis: Contingency Planning Statistics for Gulf of Mexico OCS Activities" – OCS Report MMS 2004-026):

Area and Spill Site	Land Segment Contact	Percent Impact Chance (Days)		
Keathley Canyon 292	Land Segment No. & County/ Parish & State	3	10	30
	Cameron, TX	--	--	1
	Kenedy, TX	--	--	1
	Kleberg, TX	--	--	1
	Aransas, TX	--	--	1
	Calhoun, TX	--	--	1
	Matagorda, TX	--	--	3
	Brazoria, TX	--	--	1
	Galveston, TX	--	--	2
	Jefferson, TX	--	--	2
	Cameron, LA	**--**	**--**	**4**
	Vermilion, LA	--	--	2
	Iberia, LA	--	--	1
	Terrebonne, LA	--	--	1

5) Resource Identification

The land segment that has the highest computed probability of being impacted by a release from KC 292 within 30 days is Cameron Parish, Louisiana, at 4 percent. Sources which may be used to identify the sensitive resources located within Cameron Parish are identified in the Regional OSRP, **Section 11**.

6) Response

BP GoM has contracted with OSROs as identified in **Section IX, Part A-3.**

Release Modeling

A portion of the release will either naturally disperse or evaporate. An ASA Spill Impact Model Application Package (SIMAP) analysis (in conjunction with its blowout model) was completed for a deepwater spill of medium crude (with a Gas-to-Oil Ratio [GOR] of 1:1) release from 5,000 feet below the surface. The SIMAP model uses environmental data and transport and weathering algorithms to calculate the mass of oil components in various environmental compartments (water surface, shoreline, water column, atmosphere, sediments, etc.), oil pathway over time (trajectory), surface oil distribution, and concentrations of the oil components in the water and sediments. Due to the deepwater nature of the release site in this scenario, the ASA SIMAP model was selected to predict the behavior of a release from KC 292.

Based on the ASA SIMAP analysis, the amounts of the released oil that have dispersed into the water column, evaporated or naturally decayed will leave no more than roughly 50% of the oil present at the surface. Using the results of this model, this would leave an estimated 13,730 barrels/day to be addressed by the response technologies discussed below.

Response Technologies Discussion

This section discusses various response technologies (in no prioritized order) that might be employed during a response to a release of oil from KC 292. The particular response technologies applied during a spill event will be coordinated based on the most accurate and up-to-date knowledge of the situation which will determine the types of technology to be used, the locations at which particular technologies are applied, and the implementation of simultaneous operations (SIMOPS).

The status boards below set forth a representative list of equipment and are not meant to be exhaustive. The status boards outline on-water containment; on-water recovery; temporary storage; aerial, vessel and subsea dispersant application; in-situ burning and shoreline protection equipment identified as most relevant in addressing the volume of oil that does not either evaporate or naturally disperse into the water column. These status boards estimate times needed for procurement, load out, travel time to the site and deployment.

Surveillance

Upon notification of a release and mobilization of the response, either a fixed-wing aircraft or a field-support helicopter would be dispatched as promptly as possible (considering available daylight hours, weather conditions and if other safety factors) in order to conduct visual surveillance at the source of the spill. If necessary, visual surveillance could be supplemented through use of field vessels. The effectiveness of many response technologies (such as in-situ burning, dispersant application and mechanical recovery) may be increased through collaboration with air-based spotters, who can guide these systems to oil concentrations and coordinate simultaneous operations (SIMOPS). Air-based spotters may be equipped with air to marine/ground communication equipment to facilitate immediate communications with marine- and land-based response assets. Vessel locations may also be monitored in real-time using vessel-tracking technologies (such as Automated Identification Systems (AIS) data, GPS-based tracking, cell phone data, etc.), which can facilitate vessels being deployed for optimal recovery. Further information regarding methods of identifying and tracking a spill on water are discussed in the Regional OSRP, in **Section 10.**

Source Containment/Source Control

Source containment and source control operations would be implemented simultaneously with the above response technologies to either reduce or stop the flow of the well into the environment. Source containment is designed to temporarily stop or redirect the flow from the well. Source control addresses the original source through either well-kill operations or the drilling of a relief well to permanently stop the flow of oil from the well.

The steps applied to achieve flow containment will be very dependent on the specific characteristics and nature of the spill at hand. This could include multidisciplinary initiatives to recover flow to the surface for contained processing and disposal, efforts to shut-in flow at the source using pressure rated, tight seal fit for purpose assemblies, and techniques to kill (cease pressure source) the well. See Regional OSRP **Section 6** for a non-exhaustive list of potentially applicable techniques.

Slick (Fresh Oil) Containment Systems

Slick (fresh oil) containment systems may be deployed (provided it is safe to do so) in thick, fresh oil to minimize further spreading of oil on the water's surface. These systems would typically consist of two offshore vessels (capable of trolling speeds of 0.5 knots) towing between 1,000-1,500 feet of offshore boom in a "U" or "V" configuration. The containment systems may allow fresh oil to be contained, concentrated and diverted to both skimming systems and in-situ burn task forces, as appropriate, increasing their encounter rate and containment efficiency to support enhanced skimming and burning operations.

Mechanical Recovery

Mechanical recovery equipment, include Oil Spill Response Vessels (OSRVs) Oil Spill Response Barges (OSRBs) and Vessel of Opportunity Skimming Systems (VOSS) may be mobilized from contracted OSROs. As necessary, response equipment could be cascaded from locations along the Gulf of Mexico and other regions of the United States, as well as from international locations, This equipment could be deployed either at the source of the release or in concentrations of recoverable oil. Offshore mechanical recovery assets could be organized according to span of control concepts within ICS. Vessels should be organized into task forces or groups with consideration for effective communication and control. As operations increase in scale or complexity, dedicated command/control vessel(s) may be considered for each major operating area or mission. These vessels could provide response activity coordination of all marine assets under their control, as well as provide communication between marine and air assets.

Additionally, other technologies (like GPS-based vessel tracking systems) may be used to facilitate coordination of marine assets. Positioning this equipment can be facilitated by collaboration with air-based spotters, who can guide these systems to oil concentrations. During night-time operations, skimming activities could be facilitated through the use of alternative spill

surveillance technologies (such as infrared [IR] and X-band radio systems) to guide skimming vessels to sufficient concentrations of oil. The specific technologies used will be chosen based on availability suitability, OSRO recommendations, and other situation-specific considerations.

The Offshore On-Water Recovery Equipment and Offshore On-Water Storage status boards below identify response resources that could be mobilized to address a release from KC 292. The combined Effective Daily Recovery Capacity (EDRC) for dedicated skimming vessel systems is 110,777 barrels; total storage volume for these dedicated systems is 132,245 barrels. (EDRC represents a planning standard mandated by governing regulations [30 CFR § 254.44(a)] and is required to be specified in an OSRP like this one. Actual performance of mechanical recovery systems in responding to an oil spill will depend on many situation-specific factors, such as: oil encounter rates, access to heavy concentrations of fresh oil, oil emulsification and others. As a result, oil volumes recovered may be significantly lower than stated EDRC volumes.)

Aerial Dispersant Application

Aerial dispersants may be a response option depending on the circumstances of the release. Aerial dispersants are applied under the direction and approval of a designated Federal On-Scene Coordinator (FOSC), and in a manner consistent with the National Contingency Plan and the applicable Regional Response plan(s) and/or Area Contingency Plans (ACPs). Spotter aircraft could be activated along with aerial dispersant aircraft to coordinate more precise dispersant application on concentrations of free-floating oil and ensure that dispersant operations do not impact other ongoing response technologies during SIMOPS. The table below identifies aerial dispersant application aircraft to which BP GoM has contractual access, as well as their response capacities. A table listing the dispersant stockpile available to BP GoM may be found in **Section 18** of the Regional OSRP

Aircraft	Owner/ Contractor	Dispersant Capacity	Possible Sorties/Day
Regional Assets			
DC-3	ASI (through CGA)	1,200 gallons	1-2
BT-67 (DC-3 Turboprop)	ASI (through CGA)	2,000 gallons	1-2
C-130	MSRC	3,250 gallons	1-3
Out-of-Region Assets			
C-130	CCA	5,000 gallons	1-3
Hercules L382G	OSR	5,000 gallons	1-3

For planning purposes, BP GoM assumes a 1:20 application rate and approximately a 50 to 75% effectiveness rate. Based on the estimates regarding aircraft dispersant capacities identified in the table above, 16,450 to 65,800 gallons of dispersant could be applied per day, which translates to approximately 3,917 to 23,500 barrels/day.

Vessel-Based Dispersant Application

Vessel-based dispersant application may be another available response option. In previous responses, boat-spray systems were used for both dispersing oil and suppressing vapors on the water surface near the spill source. Vessel-based dispersants are also applied under the direction and approval of a designated Federal On-Scene Coordinator (FOSC), and in a manner consistent with the National Contingency Plan and the applicable Regional Response Plan(s) and/or Area Contingency Plans (ACPs). If appropriate, vessel spray systems can be installed on offshore vessels of opportunity to apply dispersants at the source or at other areas where there are significant concentrations of oil. Using inductor nozzles installed on fire-water monitors, skid mounted systems, or purpose-built boom-arm spray systems, vessels can initially apply dispersant beginning in the first 12 to 24 hours of the response, and thereafter as needed.

Subsea Dispersant Application

Depending on the circumstances, the use of a subsea dispersant application system may provide a response option in the event of a subsurface well blowout or other ongoing subsurface release. A modular Subsea Dispersant Application Unit (SDAU)—including an integrated chemical storage, distribution and deployment system—may be installed at the spill site in close proximity to the release.

The subsea application of dispersants is a new variation on proven dispersant technology. Therefore, certain assumptions, including application rates and effectiveness, have been made based on recent experience. However, additional data collection, laboratory tests, and field tests are likely to be undertaken by industry, government, and/or academia, and will help evaluate further the optimal application rates and anticipated effectiveness rates for subsea application of dispersants. For planning purposes, and subject to obtaining regulatory approval, BP assumes a 1:75 application rate, at 50% to 75% effectiveness, and a system flow rate of 8 to 11 gallons per minute (approximately 11,500 to 16,000 gallons of dispersant per day). (During a recent response, the EPA limited sub surface dispersant usage to 15,000 gallons per day.) Under those assumptions, the system might be capable of dispersing approximately 10,268 to 21,429 barrels of oil per day. A table listing the dispersant stockpile available to BP GoM may be found in **Section 18** of the OSRP.

In-Situ Burning

Open-water in-situ burning (ISB) also may be used as a response strategy depending on the circumstances of the release. ISB services may be provided by the primary OSRO contractors. If appropriate conditions exist and approvals are granted, one or multiple ISB task forces could be deployed offshore. Task forces typically consist of two to four fire teams, each with two vessels capable of towing fire boom, guide boom or tow line with either a handheld or aerially-deployed oil ignition systems. At least one

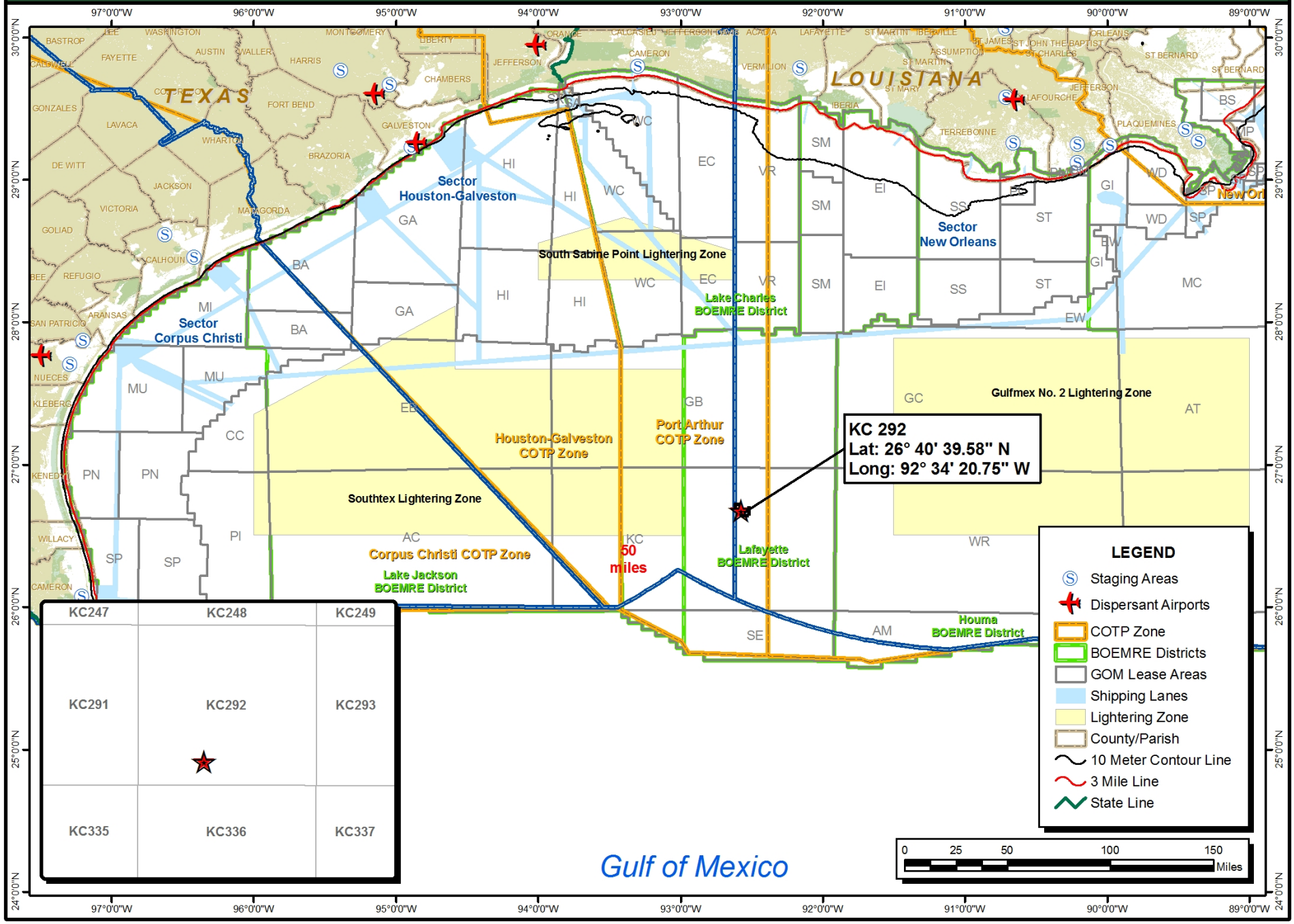
support/safety boat would be present during active burning operations to provide logistics, safety and monitoring support. Depending upon a number of factors, including the weather conditions and the nature and distribution of oil, up to 4 burns per 12-hour day could be completed per ISB fire team. Depending on weather and fire intensity, most fire boom systems can be used for approximately 8 to 12 burns before being replaced. Although the number of barrels eliminated per burn is dependent on many factors, experience suggests that a typical burn might eliminate approximately 600 to 750 barrels. Based on those assumptions, a single task force of two fire teams assuming appropriate conditions including weather and safety—each completing four burns per day—might be capable of removing up to approximately 4,800 to 6,000 barrels of oil per day. (See e.g., August 2010 reports: "Deepwater Horizon MC252 Gulf Incident Oil Budget" and "BP Deepwater Horizon Oil Budget: What Happened to the Oil?") Additional information on ISB is presented in **Section 19** of the Regional OSRP

Shoreline Response

While historical trajectory modeling is important for planning response tactics, the potential direction and impact of a spill depends heavily upon existing environmental conditions during an actual response. Strategies developed during tactical planning would be based upon surveillance and real time trajectories that depict areas of potential impact given actual sea and weather conditions. Near shore response may include the deployment of shoreline boom to protect beach areas, or protection and sorbent boom for vegetated areas. The Area Contingency Plan and relevant agencies—including, as appropriate, "branch offices" similar to those stood in previous responses—should be consulted to ensure that environmental, special economic and cultural resources are correctly identified and prioritized to ensure optimal protection. If impact does occur, onshore cleanup response may include specialized beach and marsh cleanup.

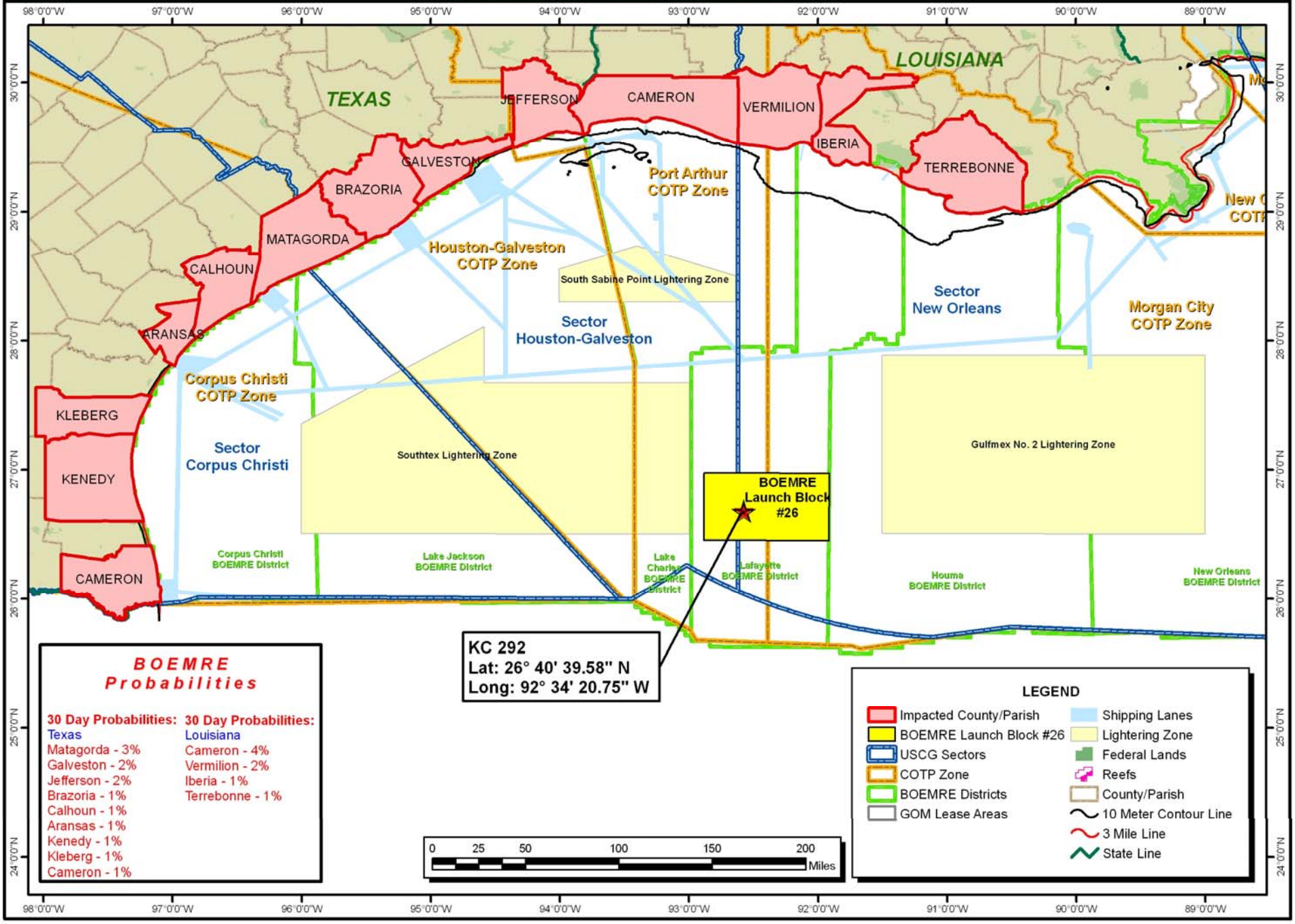
The Response Group's Shoreline Response Guides identify response strategies including equipment and personnel needs, possible tactics, and detailed job descriptions (ICS 204 Field Assignments) applicable for oil spill protection and clean-up operations. The guides are a tool for operational planning and logistics to initiate the procurement and deployment of resources while branch operations are established. Early tactical planning and deployment of advance (forward) teams should be considered to establish locations for branch offices as needed. For more information on resource identification, see **Section 11** of the GoM Regional OSRP. In addition, **see Section 13 and 14** for information on resource protection methods and the mobilization of equipment.

Keathley Canyon Block 292
Overview Map

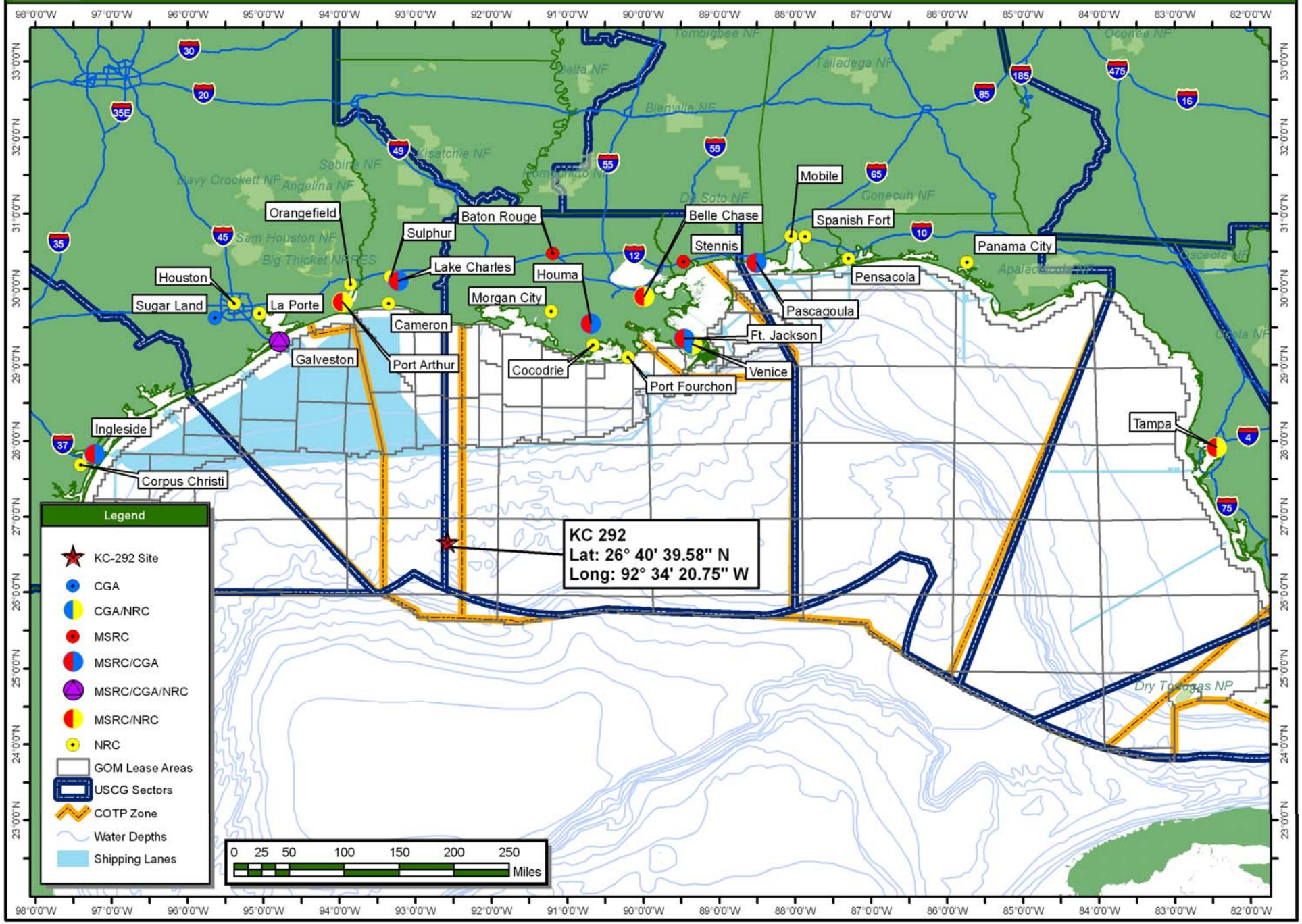


KEATHLEY CANYON BLOCK #292
BOEMRE Block # 26 Probability Map

[Probablities (expressed as percent chance) that an oil spill started within a Launch Area will contact a county/parish within 3, 10, or 30 days]



KEATHLEY CANYON BLOCK # 292
MSRC / CGA / NRC Equipment Location Map



KC 292 Exploratory WCD
Potential Offshore Slick Containment Status Board

Skimming System	Supplier & Phone	Warehouse	Containment Package	Quantity	Staging Area	Distance to Site from Staging (Miles)	Response Times (Hours)				
							Staging ETA	Loadout Time	ETA to Site	Deployment Time	Total ETA**
Offshore Slick Containment System	CGA 888-242-2007	Houma, LA	42" Auto Boom (ft)	1000	Port Fourchon, LA	224	4	1	16	1	22
			* >110' Utility Boat	2							
			Personnel	8							
			Safety Monitor	2							
Offshore Slick Containment System	CGA 888-242-2007	Belle Chasse, LA	42" Auto Boom (ft)	1000	Port Fourchon, LA	224	4.5	1	16	1	23
			* >110' Utility Boat	2							
			Personnel	8							
			Safety Monitor	2							
Offshore Slick Containment System	CGA 888-242-2007	Belle Chasse, LA	42" Auto Boom (ft)	1000	Port Fourchon, LA	224	4.5	1	16	1	23
			* >110' Utility Boat	2							
			Personnel	8							
			Safety Monitor	2							
Offshore Slick Containment System	MSRC 800-OIL-SPIL	Belle Chasse, LA	67" Sea Sentry II Boom (ft)	1320	Port Fourchon, LA	224	4.50	1	16	1	23
			* >110' Utility Boat	2							
			Personnel	8							
			Safety Monitor	2							
Offshore Slick Containment System	NRC 800-899-4672	New Iberia, LA	42" Inflatable Boom (ft)	1000	Port Fourchon, LA	224	4.75	1	16	1	23
			* >110' Utility Boat	2							
			Personnel	8							
			Safety Monitor	2							
Offshore Slick Containment System	NRC 800-899-4672	New Iberia, LA	42" Inflatable Boom (ft)	1000	Port Fourchon, LA	224	4.75	1	16	1	23
			* >110' Utility Boat	2							
			Personnel	8							
			Safety Monitor	2							
Offshore Slick Containment System	NRC 800-899-4672	New Iberia, LA	42" Inflatable Boom (ft)	1000	Port Fourchon, LA	224	4.75	1	16	1	23
			* >110' Utility Boat	2							
			Personnel	8							
			Safety Monitor	2							
Offshore Slick Containment System	NRC 800-899-4672	New Iberia, LA	42" Inflatable Boom (ft)	1000	Port Fourchon, LA	224	4.75	1	16	1	23
			* >110' Utility Boat	2							
			Personnel	8							
			Safety Monitor	2							
Offshore Slick Containment System	CGA 888-242-2007	Pascagoula, MS	42" Auto Boom	1000	Port Fourchon, LA	224	6	1	16	1	24
			* >110' Utility Boat	2							
			Personnel	8							
			Safety Monitor	2							
Offshore Slick Containment System	MSRC 800-OIL-SPIL	Pascagoula, MS	67" Sea Sentry II Boom (ft)	1320	Port Fourchon, LA	224	6	1	16	1	24
			* >110' Utility Boat	2							
			Personnel	8							
			Safety Monitor	2							
Offshore Slick Containment System	MSRC 800-OIL-SPIL	Lake Charles, LA	67" Sea Sentry II Boom (ft)	1320	Port Fourchon, LA	224	6.5	1	16	1	25
			* >110' Utility Boat	2							
			Personnel	8							
			Safety Monitor	2							
Offshore Slick Containment System	MSRC 800-OIL-SPIL	Galveston, TX	67" Sea Sentry II Boom (ft)	1320	Port Fourchon, LA	224	9	1	16	1	27
			* >110' Utility Boat	2							
			Personnel	8							
			Safety Monitor	2							
TOTAL SLICK CONTAINMENT BOOM AVAILABLE (FEET)											13,280

** Additional equipment to be procured by OSROs for deployment*

*** These ETAs are rounded up to the next hour.*

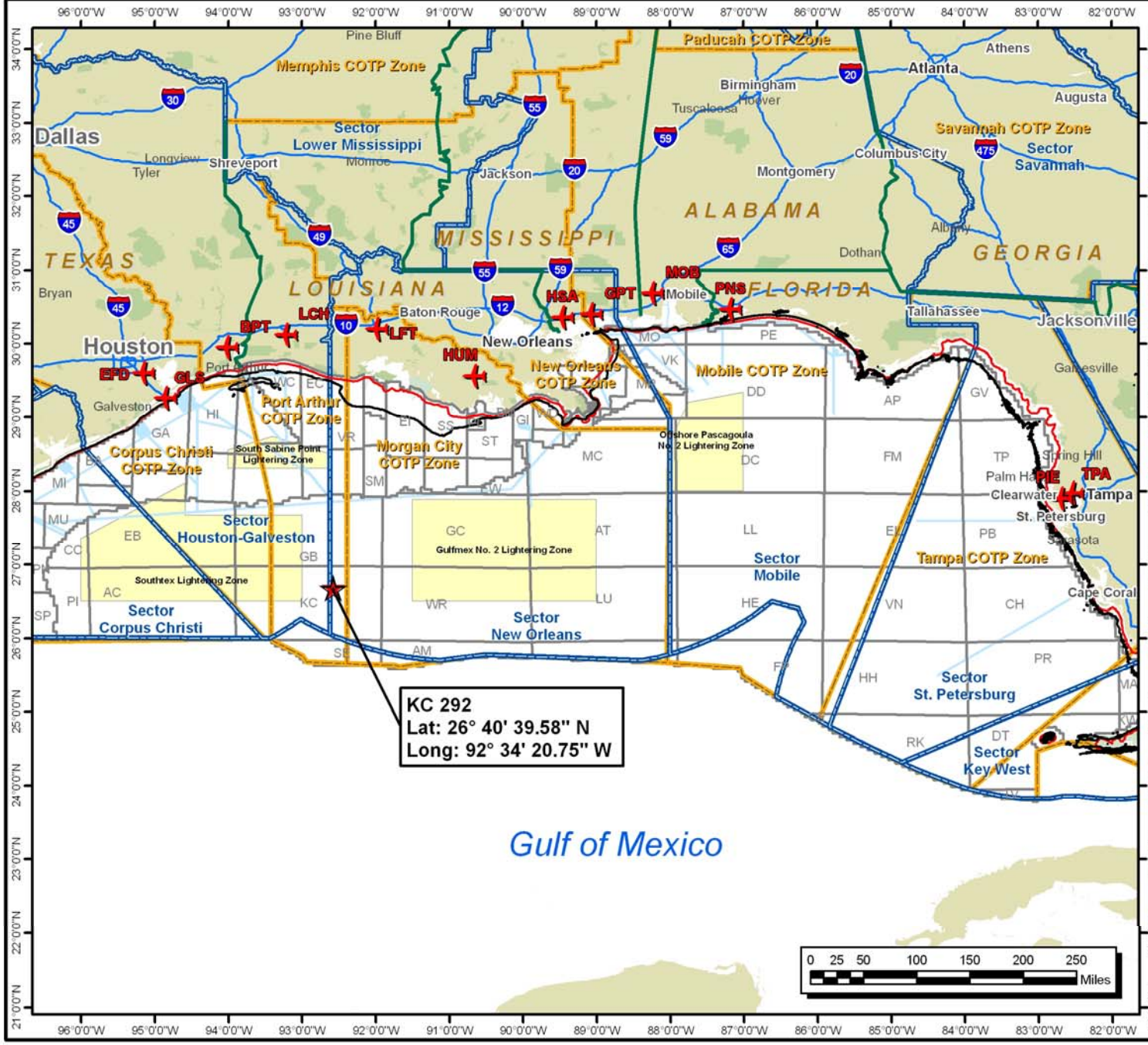
KC 292 Exploratory WCD
Potential Offshore On-Water Recovery (Dedicated) Status Board

Skimming System	Supplier & Phone	Warehouse	Skimming Package	Quantity	Effective Daily Recovery Capacity (EDRC in Bbls/Day)	Storage (Barrels)	Staging Area	Distance to Site from Staging (Miles)	Response Times (Hours)				
									Staging ETA	Loadout Time	ETA to Site	Deployment Time	Total ETA**
NRC "Energy" Vessel	NRC 800-899-4672	Morgan City, LA	Vikoma Sea Skim	1	1,509	300	Morgan City, LA	228	2	1	16.5	1	21
			43" Boom	2100'									
			Personnel	4									
			17' Boom Boat	1									
			110' Utility Boat	1									
Texas Responder Transrec-350	MSRC 800-OIL-SPIL	Galveston, TX	Transrec/Stress I Skimmer	2	10,567	4,000	Galveston, TX	232	2	1	16.5	1	21
			67" Boom	2640'									
			210' Vessel	1									
			Personnel	12									
			32' Support Boat	1									
NRC "ADMIRAL" OSRV	NRC 800-899-4672	Galveston, TX	Offshore Skimmer	1	24,000	300	Galveston, TX	232	2	1	16.5	1	21
			42" Boom	2200'									
			Personnel	6									
			110' Utility Boat	1									
			Deployment Boat	1									
Gulf Coast Responder Transrec-350	MSRC 800-OIL-SPIL	Lake Charles, LA	Transrec/Stress I Skimmer	2	10,567	4,000	Lake Charles, LA	255	2	1	18	1	22
			67" Boom	2640'									
			210' Vessel	1									
			Personnel	12									
			32' Support Boat	1									
NRC (MRN - Hornbeck) Energy 6503	NRC 800-899-4673	Morgan City. LA	Offshore Barge	1	N/A	65,145	Morgan City, LA	228	4	1	16.5	1	23
			Personnel	4									
			Offshore Tug	1									
Louisiana Responder Transrec-350	MSRC 800-OIL-SPIL	Fort Jackson, LA	Transrec/Stress I Skimmer	2	10,567	4,000	Fort Jackson, LA	286	2	1	20.5	1	25
			67" Boom	2640'									
			210' Vessel	1									
			Personnel	12									
			32' Support Boat	1									
Southern Responder Transrec-350	MSRC 800-OIL-SPIL	Ingleside, TX	Transrec/Stress I Skimmer	2	10,567	4,000	Ingleside, TX	303	2	1	21.5	1	26
			67" Boom	1980'									
			210' Vessel	1									
			Personnel	12									
CGA-200 HOSS OSRB	CGA 888-CGA-2007	Houma, LA	Belt Skimmer	1	43,000	4,000	Houma, LA	244	4	1	29.5	1	36
			43" Expandi Boom	2000'									
			Personnel	8									
			Tug - 1,200 HP	2									
			Tug - 1,800 HP	1									
CTCo-2603 Offshore Barge	CGA 888-CGA-2007	Houma, LA	Offshore Barge	1	N/A	24,000	Houma, LA	244	4	1	29.5	1	36
			Personnel	4									
			Offshore Tug	1									
CTCo-2604 Offshore Barge	CGA 888-CGA-2007	Houma, LA	Offshore Barge	1	N/A	22,500	Houma, LA	244	4	1	29.5	1	36
			Personnel	4									
			Offshore Tug	1									

DERATED RECOVERY RATE (BBLS/DAY)	110,777
SKIMMING VESSEL STORAGE CAPACITY (BARRELS)	132,245

KEATHLEY CANYON BLOCK #292
Dispersant Application Map

The Response Group
Emergency Response Pre-Planning & Support



Legend

- Dispersant Airports
- USCG Sectors
- COTP Zone
- GOM Lease Areas
- Shipping Lanes
- Lightering Zone
- Federal Lands
- 10 Meter Contour Line
- 3 Mile Line
- State Line

Airports

EFD - Ellington Field
GLS - Sholes Field
BPT - Jefferson County
LCH - Lake Charles Regional
LFT - Lafayette Regional
HUM - Houma - Terrebonne
HSA - Stennis Intl
GPT - Gulfport Regional
MOB - Mobile Regional
PNS - Pensacola Regional
TPA - Tampa International
PIE - Clearwater International

Dispersant Application Systems

Airborne Support, Inc. (ASI)
(985) 851-6391
BT-67 (DC-3) Aircraft - 1 (1,200 gal cap.)
DC-3 Aircraft - 1 (2,000 gal cap.)
MSRC - 800-OIL-SPIL
C130 Aircraft - 1 (3,250 gal cap.)
OSR - 44-0-1224-72-6859
L-382 ADDS Pack - 2 (5,000 gal cap.)
Clean Carribean - 985-851-6391
C-130 ADDS Pack - 2 (5,000 gal cap.)

Time Calculations for Applications

Application System	Aircraft & Crew	Flight Distance / Air Speed	Total Time
BT-67	2 Hrs	300 miles / 194 mph	4.8 Hrs
DC-3	2 Hrs	300 miles / 150 mph	4.6 Hrs
C-130-A	8 Hrs	432 miles / 342 mph	10.1 Hrs
L-382 ADDS Pack - OSR	24-48 Hrs	485 miles / 330 mph	27-51 Hrs
C-130 ADDS Pack - CCA	6-24 Hrs	4550 miles / 330 mph	22.3-42.3 Hrs

Prepared By:
The Response Group

KC 292 Exploratory WCD
Potential Offshore Aerial Dispersant Status Board

Aerial Dispersant System	Supplier & Phone	Warehouse	Aerial Dispersant Package	Quantity	Staging Area	Distance to Site from Staging (Miles)	Response Times (Hours)				
							Staging ETA	Loadout Time	ETA to Site	Deployment Time	Total ETA
Aero Commander Air Speed - 288 MPH	Airborne Support 985-851-6391	Houma, LA	Aero Commander	1	Houma, LA	229	2	0.4	0.80	0.2	**3.40**
			Spotter Personnel	2							
			Crew - Pilots	1							
DC-3 (BT-67) Aircraft Air Speed - 194 MPH	Airborne Support 985-851-6391	Houma, LA	DC-3 Dispersant Aircraft	1	Houma, LA **1st Flight**	229	2	0.5	1.18	0.3	**4.00**
			Dispersant - Gallons	2000							
			Spotter Aircraft	1							
			Spotter Personnel	2	Houma, LA **2nd Flight**	229	1.18	0.5	1.18	0.3	**3.20**
			Crew - Pilots	2							
DC-3 Aircraft Air Speed - 150 MPH	Airborne Support 985-851-6391	Houma, LA	DC-3 Dispersant Aircraft	1	Houma, LA **1st Flight**	229	2	0.5	1.53	0.3	**4.35**
			Dispersant - Gallons	1200							
			Spotter Aircraft	1							
			Spotter Personnel	2	Houma, LA **2nd Flight**	229	1.53	0.5	1.53	0.3	**3.90**
			Crew - Pilots	2							
C130-A Aircraft Air Speed - 342 MPH	MSRC 800-OIL-SPIL	Coolidge, AZ	C130-A Dispersant Aircraft	1	Ellington Field, TX **1st Flight**	255	8	0.3	0.75	0.5	**9.60**
			Dispersant - Gallons	3250							
			Spotter Aircraft	1							
			Spotter Personnel	2	Stennis INTL., MS **2nd Flight**	319	0.93	0.3	0.93	0.5	**2.70**
			Crew - Pilots	2							
ADDS PACK Air Speed - 330 MPH	Oil Spill Response +44 (0) 1224-72-6859	South Hampton, UK	L-382 Hercules Aircraft	1	Stennis INTL, MS **1st Flight**	4,867	6-24	2-4	14.75	0.5	**23.25 to 43.25**
			ADDS PACK	1							
			Dispersant - Gallons	5000							
			Spotter Aircraft	1	Stennis INTL, MS **2nd Flight**	319	0.97	0.3	0.97	0.5	**2.73**
			Spotter Personnel	2							
			Crew - Pilots	2							
ADDS PACK Air Speed - 330 MPH	Clean Carribean 985-851-6391	Pt. Everglades, FL	C-130 Aircraft (contractor)	1	Clearwater, FL **1st Flight**	610	24-48	1	1.85	0.5	**27.35 to 51.35**
			ADDS PACK	1							
			Dispersant - Gallons	5000							
			Spotter Aircraft	1	Stennis INTL, MS **2nd Flight**	319	0.97	0.3	0.97	0.5	**2.73**
			Spotter Personnel	2							
			Crew - Pilots	2							

KC 292 Exploratory WCD
Potential Offshore Boat Spray Dispersant Status Board

Boat Spray Dispersant System	Supplier & Phone	Warehouse	Boat Spray Dispersant Package	Quantity	Staging Area	Distance to Site from Staging (Miles)	Response Times (Hours)				
							Staging ETA	Loadout Time	ETA to Site	Deployment Time	Total ETA**
Fire Monitor Induction Dispersant Spray System	AMPOL 800-482-6765	Fourchon, LA	Dispersant Spray System	1	Fourchon, LA	224	4	0.5	16	1	22
			Dispersant (Gallons)	500							
			Personnel	4							
			* Crew Boat	1							
Vessel Based Dispersant Spray System	NRC 800-899-4672	Morgan City, LA	Dispersant Spray System	1	Fourchon, LA	224	4	0.5	16	1	22
			Dispersant (Gallons)	500							
			Personnel	4							
			* Offshore Vessel	1							
Skid-mounted Boat-Spray Dispersant System	CGA 888-CGA-2007	Houma, LA	Dispersant Spray System	1	Houma, LA	244	4	0.5	17.5	1	23
			Dispersant (Gallons)	330							
			46' Vessel	1							
			Personnel	4							
USCG SMART Team	USCG	Mobile, AL	Personnel	4	Fourchon, LA	224	6.25	1	16	0.5	24
			* Offshore Vessel	1							
Fire Monitor Induction Dispersant Spray System	AMPOL 800-482-6765	Cameron, LA	Dispersant Spray System	1	Fourchon, LA	224	7	0.5	16	1	25
			Dispersant (Gallons)	500							
			Personnel	4							
			* Offshore Vessel	1							
Skid-mounted Boat-Spray Dispersant System	CGA 888-CGA-2007	Venice, LA	Dispersant Spray System	1	Venice, LA	278	4	0.5	20	1	26
			Dispersant (Gallons)	300							
			46' Vessel	1							
			Personnel	4							

** Additional equipment to be procured by OSROs for deployment*

*** These ETAs are rounded up to the next hour.*

KC 292 Exploratory WCD
Potential In-Situ Burn Equipment Status Board

Skimming System	Supplier & Phone	Warehouse	Skimming Package	Quantity***	Staging Area	Distance to Site from Staging (Miles)	Response Times (Hours)				
							Staging ETA	Loadout Time	ETA to Site	Deployment Time	Total ETA**
Fire Team (In-Situ Burn Fire System)	CGA 888-CGA-2007	Port Fourchon, LA	Fire Boom (ft)	500	Port Fourchon, LA	224	1	1	16	1	19
			Guide Boom/Tow Line (ft)	400							
			* Offshore Vessel (0.5 kt capability)	2							
			Personnel	6							
			Ignition Device	10							
Fire Team (In-Situ Burn Fire System)	CGA 888-CGA-2007	Port Fourchon, LA	Fire Boom (ft)	500	Port Fourchon, LA	224	1	1	16	1	19
			Guide Boom/Tow Line (ft)	400							
			* Offshore Vessel (0.5 kt capability)	2							
			Personnel	6							
			Ignition Device	10							
ISB Fire Team (In-Situ Burn Fire System)	NRC 800-899-4672	Morgan City, LA	Fire Boom (ft)	500	Port Fourchon, LA	224	4	1	16	1	22
			Guide Boom/Tow Line (ft)	400							
			* Offshore Vessel (0.5 kt capability)	2							
			Personnel	6							
			Ignition Device	10							
Fire Team (In-Situ Burn Fire System)	NRC 800-899-4672	Morgan City, LA	Fire Boom (ft)	500	Port Fourchon, LA	224	4	1	16	1	22
			Guide Boom/Tow Line (ft)	400							
			* Offshore Vessel (0.5 kt capability)	2							
			Personnel	6							
			Ignition Device	10							
Fire Team (In-Situ Burn Fire System)	CGA 888-CGA-2007	Harvey, LA	Fire Boom (ft)	500	Port Fourchon, LA	224	4.25	1	16	1	23
			Guide Boom/Tow Line (ft)	400							
			* Offshore Vessel (0.5 kt capability)	2							
			Personnel	6							
			Ignition Device	10							
Fire Team (In-Situ Burn Fire System)	CGA 888-CGA-2007	Harvey, LA	Fire Boom (ft)	500	Port Fourchon, LA	224	4.25	1	16	1	23
			Guide Boom/Tow Line (ft)	400							
			* Offshore Vessel (0.5 kt capability)	2							
			Personnel	6							
			Ignition Device	10							
SMART In-Situ Burn Monitoring Team	USCG	Mobile, AL	Air Monitoring Equipment	1	Port Fourchon, LA	224	6.25	1	16	1	25
			* Offshore Vessel	1							
			Personnel	4							
Fire Team (In-Situ Burn Fire System)	MSRC 800-OIL-SPIL	Lake Charles, LA	Fire Boom (ft)	1500	Port Fourchon, LA	224	7	1	16	1	25
			Guide Boom/Tow Line (ft)	400							
			* Offshore Vessel (0.5 kt capability)	2							
			Personnel	6							
			Ignition Device	10							
Fire Team (In-Situ Burn Fire System)	CGA 888-CGA-2007	Houston, TX	Fire Boom (ft)	500	Port Fourchon, LA	224	9	1	16	1	27
			Guide Boom/Tow Line (ft)	400							
			* Offshore Vessel (0.5 kt capability)	2							
			Personnel	6							
			Ignition Device	10							
Fire Team (In-Situ Burn Fire System)	CGA 888-CGA-2007	Houston, TX	Fire Boom (ft)	500	Port Fourchon, LA	224	9	1	16	1	27
			Guide Boom/Tow Line (ft)	400							
			* Offshore Vessel (0.5 kt capability)	2							
			Personnel	6							
			Ignition Device	10							
										TOTAL FIRE BOOM AVAILABLE (FEET)	5,500

** Additional equipment to be procured by OSROs for deployment*

*** These ETAs are rounded up to the next hour.*

**** See Section 19 of the GOM Regional OSRP for other pre-identified ISB boom stockpiles.*

KC 292 Exploratory WCD
Sample Shoreline Protection & Wildlife Support List

Supplier & Phone (MSRC Star Contractor)	Warehouse	Equipment Listing	Quantity	Staging Area	Response Times (Hours,			
					Staging ETA	Loadout Time	Deployment Time	Total ETA
ES&H Environmental 877-437-2634	Fourchon	Containment Boom - 18" to 24"	1000'	Port Fourchon, LA	2	1	1	**4**
		Containment Boom - 6" to 10"	200'					
		Response Boats - 14' to 20'	3					
		Portable Skimmers	3					
		Response Personnel	2					
ES&H Environmental 877-437-2634	Houma, LA	Containment Boom - 18" to 24"	27,000'	Port Fourchon, LA	3.5	1	1	**5.5**
		Containment Boom - 6" to 10"	15,000'					
		Response Boats - 14' to 20'	38					
		Response Boats - 21' to 36'	12					
		Portable Skimmers	25					
		Shallow Water Skimmers	1					
		Bird Scare Cannons	200					
		Response Personnel	11					
WR&E 281-731-8826	Baton Rouge, LA	Wildlife Specialist - Personnel	6 to 20	Port Fourchon, LA	5	1	0	**6**
AMPOL 800-482-6765	Harvey, LA	Containment Boom - 18" to 24"	19,500'	Port Fourchon,	4.25	1	1	**6.25**
		Response Boats - 14' to 20'	2					
Oilmop 800-645-6671	Belle Chasse, LA	Containment Boom - 18" to 24"	21,000'	Port Fourchon, LA	4.5	1	1	**6.5**
		Containment Boom - 6" to 10"	500'					
		Response Boats - 14' to 20'	19					
		Response Boats - 21' to 36'	7					
		Portable Skimmers	22					
		Shallow Water Skimmers	1					
		Bird Scare Cannons	20					
		Response Personnel	18					
USES Environmental 888-279-9930	Meraux, LA	Containment Boom - 18" to 24"	6000'	Port Fourchon, LA	4.5	1	1	**6.5**
		Containment Boom - 6" to 10"	1000'					
		Response Boats - 14' to 20'	13					
		Response Boats - 21' to 36'	4					
		Portable Skimmers	3					
		Response Personnel	44					
CGA 888-CGA-2007	Houma, LA	Wildlife Trailer	1	Port Fourchon, LA	3.5	1	2	**6.5**
		Contract Truck (Third Party)	1					
		Personnel (Responder/Mechanic)	1					
USES Environmental 888-279-9930	Geismar, LA	Containment Boom - 18" to 24"	1000'	Port Fourchon, LA	4.75	1	1	**6.75**
		Response Boats - 14' to 20'	3					
		Portable Skimmers	2					
		Response Personnel	9 to 18					
AMPOL 800-482-6765	New Iberia, LA	Containment Boom - 18" to 24"	43,250'	Port Fourchon, LA	4.75	1	1	**6.75**
		Response Boats - 14' to 20'	4					
		Response Boats - 21' to 36'	6					
		Portable Skimmers	33					
		Shallow Water Skimmers	1					
		Bird Scare Cannons	7					
		Response Personnel	70					
Oilmop 800-645-6671	New Iberia, LA	Containment Boom - 18" to 24"	3,500'	Port Fourchon, LA	4.75	1	1	**6.75**
		Containment Boom - 6" to 10"	500'					
		Response Boats - 14' to 20'	6					
		Response Boats - 21' to 36'	2					
		Portable Skimmers	2					
		Shallow Water Skimmers	2					
		Response Personnel	8					
MSRC 800-OIL-SPIL	Lake Charles, LA	Wildlife Trailer	1	Port Fourchon, LA	6.5	1	2	**9.5**
		Contract Truck (Third Party)	1					
		Personnel (Responder/Mechanic)	1					
WR&E 281-731-8826	Houston, TX	Wildlife Specialist - Personnel	6 to 20	Port Fourchon, LA	9	1	0	**10**
TRI-STATE 302-737-9543	Newark, DE	Wildlife Specialist - Personnel	6 to 12	Port Fourchon, LA	23.25	1	0	**24.25**

Appendix H: Fee Recovery

Laplante, Anne-Renee

From: paygovadmin@mail.doc.twai.gov
Sent: Wednesday, July 06, 2011 8:59 AM
To: Laplante, Anne-Renee
Subject: Pay.Gov Payment Confirmation

THIS IS AN AUTOMATED MESSAGE. PLEASE DO NOT REPLY.

Your transaction has been successfully completed.

Transaction Summary

Application Name: MMS Exploration Plan - BF Pay.gov Tracking ID: 253QGU7P Agency Tracking ID: 74216667386 Transaction Type: Sale Transaction Date: Jul 6, 2011 9:59:26 AM

Account Holder Name: Anne Renee Laplante Transaction Amount: $6,884.00 Billing Address: 200 Westlake Park Blvd.
City: Houston
State/Province: TX
Zip/Postal Code: 77079
Country: USA
Card Type: AmericanExpress
Card Number: **********1009

Region: Gulf of Mexico
Contact: Anne Renee Laplante 2813665155
Company Name/No: BP Exploration Production Inc., 02481 Lease Number(s): 25792, 19555, , , Area-Block: Keathley Canyon KC, 292: Keathley Canyon KC, 366: , : , : , Surface Locations: 2

Laplante, Anne-Renee

From: RefundRequest@boemre.gov
Sent: Wednesday, July 06, 2011 8:53 AM
To: Laplante, Anne-Renee
Subject: Refund Request for Pay.Gov

Payment Method = Credit Card

Application Name = BOEMRE Exploration Plan

Date of Original Payment = 09/09/2010

Contact Name = Anne Renee Laplante

Fee Amount Paid = 13768

Phone Number = 2813665155

EMail Address = laplanta@bp.com

Pay.Gov Tracking ID = 251EM8RV

Agency Tracking ID = 74137150336

The reason for this refund request is: Paid for 4 EP lcoations. Have been told by BOEMRE Plans Unit that payment was only necessary for two and that the payment should be canceleld and re-issued.