APPENDIX H – WORST CASE DISCHARGE

A. General Information

Worst case discharge scenarios were selected based on projected discharge volume, proximity to shorelines, areas of environmental and/or economic sensitivity, and marine and shoreline resources. The lack of significant differences between operations, products, resources, and sensitivities helped to establish potential discharge volume and location as the primary decisive factors for Worst Case Discharge selections.

The following Appendix contains worst case discharge assessments and response plans for a BP facility within 10 miles of shore, outside 10 miles from shore and from an exploratory well. MMS regulations in 30 CFR 254.47 define the parameters for worst case discharge calculations. For an oil production platform facility, the size of the worst case discharge scenario is the sum of:

•	Maximum capacity of all oil storage tanks and flowlines on the facility.
•	The volume of oil calculated to leak from a break in any pipelines connected to the facility considering shutdown time, the effect of hydrostatic pressure, gravity frictional wall forces and other factors.
•	The daily production volume from an uncontrolled blowout of the highest capacity well associated with the facility flowing for 30 days.

The discharge rates from an uncontrolled blowout for oil production facilities were calculated using the following:

•	Reservoir characteristics
•	Reservoir pressure data
•	Reservoir drive mechanisms
•	Reservoir depletion rates
•	Wellbore completion configurations
•	Casing and production tubing sizes
•	Casing and tubing friction factors
•	Production history
•	Static and flowing bottom hole pressures
•	Water intrusion (where appropriate)

In addition to the worst case discharge volumes, the individual summaries also include the following maps and information:

1. Overview Map
2. Land Impact Probability Map
3. On-Water Recovery Response Equipment Location Map
4. On-Water Recovery Response Equipment Status Boards
5. Dispersant Application Map
6. Dispersant Application Status Boards

The location of the nearest response contractor, and estimated time for mobilization and deployment of response resources to Company operated facilities and ROW pipelines has been calculated and included in this section where applicable. Times provided for mobilization and deployment are estimates and will depend on meteorological conditions, sea state, and availability of vessels and manpower.

Worst Case Discharge Scenario Summary Listing

WCD Type	Name of Facility	Area/Block	Distance from Shore (Miles)
< 10 Miles	SP 89 Pipeline	SP 89	9.53
> 10 Miles	MC 778 PDQ	MC 778	68
Exploratory Well	Living Color Well	MC 462	33
Flower Gardens	**N/A**		

B. Worst Case Discharge scenario less than 10 miles

1) Worst Case Summary

BP has determined that its worst case scenario for discharge within 10 miles of shoreline would occur from the SP 89 ROW pipeline. Both the DOT/RSPA worst case discharge calculations and the MMS Pipeline Oil Spill Volume Computer Model program were used in this calculation. Both models were within 15% of each other. The higher volume of 28,033 barrels (based on the DOT/RSPA model) was selected as the WCD for this pipeline.

2) Facility Information

- Area and Block: SP 89
- Latitude: 28° 41' 50.55"
- Longitude: 89° 23' 45.29"
- Distance to Shore: 9.53
- API Gravity: °

3) Worst Case Discharge Volume

Criteria	*Barrels*
Maximum Oil Flow Rate	0.9 bbls/ft
Volume released due to facility pipeline break (drains down from pipeline)	28,033
TOTAL WORST CASE DISCHARGE	**28,033**

4) Land Segment Identification

Land areas that could be potentially impacted by an SP 89 oil spill were determined using the MMS 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. These probabilities indicate, in terms of percentage, the chance 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 Area C56 was utilized as SP 89's point of origin. Land segments identified by the model are listed below:

Area and Spill Site	Land Segment Contact	Percent Impact Chance		
	Land Segment No. & County/ Parish & State	3 Days	10 Days	30 Days
BP Facility	Matagorda, TX	--	--	1
	Galveston, TX	--	--	1
	Jefferson, TX	--	--	1
	Cameron, LA	--	--	3
	Vermillion, LA	--	--	2
	Iberia, LA	--	--	1
	Terrebonne, LA	--	3	5
	LaFourche, LA	1	4	5
	Jefferson, LA	--	1	2
	Plaquemines, LA	6	13	16
	St. Bernard, LA	--	--	1
	Jackson, MS	--	--	1
	Escambia, FL	--	--	1

5) Resource Identification

The land segment that has the highest probability of being impacted by the SP 89 facility is Plaquemines Parish, Louisiana, at 16 percent. Sources listing the resources within Plaquemines Parish, Louisiana are identified in Section 11.

6) Response

BP will make every effort to respond to the Worst Case Discharge as effectively as possible. BP has contracted with National Response Corporation (NRC) and Marine Spill Response Corporation (MSRC) as primary Oil Spill Removal Organizations. Contact information for the OSROs can be found in **Figure 7-7**. Upon notification of the spill, BP would request a partial or full mobilization of the resources identified in the attached **Appendix E**, including, but not limited to, dispersant aircraft from ASI & MSRC and NRC & MSRC skimming vessels. The Qualified Individual, Person in Charge, Incident Commander or designee may contact other service companies if the Unified Command deems such services necessary to the response efforts.

An Adios model was run on a similar product. The results indicate 25% of the product would be evaporated or naturally dispersed within 12 hours, leaving approximately 21,025 barrels on the water.

Tables below outline equipment as well as temporary storage equipment to be considered in order to cope with an initial spill of 28,033 bbls. The list estimates individual t imes needed f or pr ocurement, l oad out , t ravel t ime t o t he si te and deployment.

Offshore response s trategies may i nclude at tempting t o s kim ut ilizing M SRC & NRC's Oil Spill Response Vessels (OSRVs), Oil Spill Response Barges (OSRBs), ID Boats, and Q uick S trike O SRVs, w hich ha ve a combined der ated recovery r ate of 81,877 barrels/day. Temporary storage associated with the identified skimming and temporary storage equipment equals 97,864 barrels.

Dispersants may be a viable r esponse opt ion. I f appr opriate, 4 t o 5 so rties (1,000 gallons per sortie) from the DC-3 and 4 to 5 sorties (2,000 gallons per sortie) from the DC-4 within the first 12 hour operating day of the response. Using a 1:20 application rate, 90% effectiveness, and assuming 4-5 sorties per day the systems could di sperse appr oximately 5, 486 t o 6 ,857 barrels of oi l per day base d on t he NOAA Dispersant Planner. Additionally, 3 to 4 sorties (300 gallons per sortie) from MSRC's BE-90 and one sortie (3250 gallons per sortie) from MSRC's C-130A could be completed within the first 12 hour operating day of the response. Using the same assumptions as above, t hese t wo a ircraft co uld di sperse appr oximately 1, 778 t o 1,907 barrels of oil in the first day. On each subsequent day, the BE-90 and the C-130A would be abl e to complete 4-5 sorties each (300 and 3250 gallons per sortie, respectively), for a total amount of 6,080 to 7,600 barrels of oil per day dispersed.

If the spill went unabated, shoreline impact would depend upon existing environmental co nditions. N earshore response m ay i nclude t he depl oyment o f shoreline boom on beach areas, or protection and sorbent boom on vegetated areas. Strategies would be based upon surveillance and real time trajectories provided by The R esponse Group that depi ct ar eas of po tential i mpact given act ual se a and weather co nditions. S trategies from t he A rea Contingency P lan, T he R esponse Group and U nified C ommand would be co nsulted to ensure that environmental and special eco nomic resources would be co rrectly i dentified and pr ioritized t o ensu re optimal protection. T he Response G roup sh oreline response g uides depict the protection r esponse modes applicable f or oi l sp ill cl ean-up oper ations. E ach response m ode i s schematically r epresented t o sh ow opt imum depl oyment and operation o f the e quipment i n ar eas of en vironmental co ncern. Supervisory personnel hav e t he opt ion t o m odify t he depl oyment and ope ration o f equipment allowing a more effective response to site-specific circumstances. (For more information on resource i dentification, see **Section 11**; f or m ore information on resource protection methods, see **Section 13**.)

C. Worst Case Discharge scenario greater than 10 miles

1) Worst Case Summary

BP has determined that its worst case scenario for discharge in waters greater than 10 miles of shoreline would occur from the MC 778 Thunder Horse operations. MC 778 operations involve development drilling and production of oil. A worst case scenario at this facility could result in a discharge of 177,400 barrels of crude as defined by MMS regulations.

2) Facility Information

- Type of Operation: Production
- Facility Name: MC 778 PDQ
- Area and Block: MC 778
- Latitude: 28° 11' 26.21"
- Longitude: -88° 29' 44.32"
- Distance to Shore: 68
- Maximum Tank and Flowline Capacity: 21,400 + 2,000 barrels
- Volume released due to facility pipeline break: 13,000 bbls
- Daily Production Volume: 141,000 bbls

3) Worst Case Discharge Volume

Criteria	*Barrels*
Maximum tank and flowline capacity	21,400 + 2,000 bbls
Volume released due to facility pipeline break	13,000 bbls
Daily production volume	141,000 bbls
TOTAL WORST CASE DISCHARGE	**177,400 bbls**

4) Land Segment Identification

Land areas that could be potentially impacted by an MC 778 oil spill were determined using the MMS 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. These probabilities indicate, in terms of percentage, the chance 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 A rea 59 was utilized as MC 77 8's point o f o rigin. Land se gments identified by the model are listed below:

Area and Spill Site	Land Segment Contact	Percent Impact Chance		
	Land Segment No. & County/ Parish & State	3 Days	10 Days	30 Days
MC 778 "Thunder Horse" Facility	(13) Cameron	LA	-	-
	(14) Vermillion	LA	-	-
	(17) Terrebonne	LA	-	-
	(18) LaFourche	LA	-	1
	(19) Jefferson	LA	-	-
	(20) Plaquemines	LA	-	5
	(21) St. Bernard	LA	-	-
	(29) Walton	FL	-	1
	(30) Bay	FL	-	-

5) Resource Identification

The land segment that has the highest probability of being impacted by the MC 778 facility is Plaquemines Parish, Louisiana, at 5 percent. Sources listing the resources within Plaquemines Parish are identified in Section 11.

6) Response

BP will make every effort to respond to the Worst Case Discharge as effectively as possible. BP has contracted with Clean Caribbean & Americas (CCA), Marine Spill Response C orporation (MSRC) and t he N ational R esponse C orporation (NRC) as primary Oil Spill Removal Organizations. Contact information for the OSROs can be found in **Figure 7-6A**. Upon notification of the spill, BP would request a partial or full mobilization of t he r esources identified i n t he at tached **Appendix E**, i ncluding, but not l imited t o, di spersant ai rcraft from CCA, ASI & M SRC a nd NRC & MSRC skimming vessels. The Qualified Individual, Person in Charge, Incident Commander or desi gnee may co ntact ot her se rvice co mpanies if the U nified C ommand deem s such services necessary to the response efforts.

An A dios model w as run on a si milar p roduct. The r esults indicate 15% of t he product w ould be ev aporated o r na turally di spersed w ithin 12 hour s, l eaving approximately 150,790 barrels on the water.

Tables below outline equipment as well as temporary storage equipment to be considered in order to cope with an initial spill of 177,400 bbls. The list estimates individual times needed for procurement, load out, travel time to the site and deployment.

Offshore response strategies may include attempting to skim utilizing MSRC & NRC's Oil Spill Response Vessels (OSRVs), Oil Spill Response Barges (OSRBs), ID Boats, and Quick Strike OSRVs, which have a combined derated recovery rate of 339,207 barrels/day. Temporary storage associated with the identified skimming and temporary storage equipment equals 278,030 barrels.

Dispersants may be a viable response option. If appropriate, 4 to 5 sorties (1,000 gallons per sortie) from the DC-3 and 4 to 5 sorties (2,000 gallons per sortie) from the DC-4 within the first 12 hour operating day of the response. Using a 1:20 application rate, 90% effectiveness, and assuming 4-5 sorties per day the systems could disperse approximately 5,486 to 6,857 barrels of oil per day based on the NOAA Dispersant Planner. Additionally, 3 to 4 sorties (300 gallons per sortie) from MSRC's BE-90 and one sortie (3250 gallons per sortie) from MSRC's C-130A could be completed within the first 12 hour operating day of the response. Using the same assumptions as above, these two aircraft could disperse approximately 1,778 to 1,907 barrels of oil in the first day. On each subsequent day, the BE-90 and the C-130A would be able to complete 4-5 sorties each (300 and 3250 gallons per sortie, respectively), for a total amount of 6,080-7,600 barrels of oil per day dispersed.

If the spill went unabated, shoreline impact would depend upon existing environmental conditions. Nearshore response may include the deployment of shoreline boom on beach areas, or protection and sorbent boom on vegetated areas. Strategies would be based upon surveillance and real time trajectories provided by The Response Group that depict areas of potential impact given actual sea and weather conditions. Strategies from the Area Contingency Plan, The Response Group and Unified Command would be consulted to ensure that environmental and special economic resources would be correctly identified and prioritized to ensure optimal protection. The Response Group shoreline response guides depict the protection response modes applicable for oil spill clean-up operations. Each response mode is schematically represented to show optimum deployment and operation of the equipment in areas of environmental concern. Supervisory personnel have the option to modify the deployment and operation of equipment allowing a more effective response to site-specific circumstances. (For more information on resource identification, see **Section 11**; for more information on resource protection methods, see **Section 13**.)

D. Worst Case Discharge scenario for Exploratory Well from Offshore Drilling

1) Worst Case Summary

BP has determined that its worst case scenario for discharge from a mobile drilling rig operation would occur from the Mississippi Canyon 462 lease. MC 462 is a planned exploration well targeted for Miocene oil reservoirs. Given the anticipated reservoir thickness and historical productivity index for the Miocene, worst case discharge is expected to be 250,000 barrels of crude oil per day. Calculations are based on formulas defined by MMS regulations. The oil has an estimated API gravity of 26°.

2) Facility Information

- Area and Block: MC 462
- Latitude: 28° 30' 47.42"
- Longitude: 88° 52' 40.84"
- Distance to Shore: 33 miles
- API Gravity: 26° (Estimated)
- Oil Storage Volume: 0 barrels

3) Worst Case Discharge Volume

Criteria	*Barrels*
Highest capacity well uncontrolled blowout volume associated with exploration well	250,000
TOTAL WORST CASE DISCHARGE	**250,000**

4) Land Segment Identification

Land areas that could be potentially impacted by an MC 462 oil spill were determined using the MMS 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. These probabilities indicate, in terms of percentage, the chance 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 #57 was utilized as MC 462's point of origin. Land segments identified by the model are listed below:

Area and Spill Site	Land Segment Contact	Percent Impact Chance		
	Land Segment No. & County/ Parish & State	3 Days	10 Days	30 Days
Mississippi Canyon 462	Cameron, LA	--	--	1
	Vermilion, LA	--	--	1
	Terrebonne, LA	--	1	2
	Lafourche, LA	--	1	2
	Jefferson, LA	--	--	--
	Plaquemines, LA	4	14	21
	St. Bernard, LA	--	1	3
	Hancock, MS	--	--	1
	Harris, MS	--	--	1
	Jackson, MS	--	--	1
	Mobile, AL	--	--	1
	Baldwin, AL	--	--	1
	Escambia, FL	--	--	1
	Okaloosa, FL	--	--	1
	Walton, FL	--	--	1
	Bay, FL	--	--	1

5) Resource Identification

The land segment that has the highest probability of being impacted by a release from MC 462 is Plaquemines Parish, Louisiana, at 21 percent. Sources listing the resources within Plaquemines Parish are identified in **Section 11**.

6) Response

BP will make every effort to respond to the Worst Case Discharge as effectively as possible. BP has contracted with National Response Corporation (NRC) and Marine Spill Response Corporation (MSRC) as primary Oil Spill Removal Organizations. Contact information for the OSROs can be found in **Figure 7-6A**. Upon notification of the spill, BP would request a partial or full mobilization of the resources identified in the attached **Appendix E**, including, but not limited to, dispersant aircraft from ASI & MSRC and NRC & MSRC skimming vessels. The Qualified Individual, Person in Charge, Incident Commander or designee may contact other service companies if the Unified Command deems such services necessary to the response efforts.

An Adios model was run on a similar product. The results indicate 5% of the product would be evaporated or naturally dispersed within 12 hours, leaving approximately 237,500 barrels on the water.

Tables below outline equipment as well as temporary storage equipment to be considered in order to cope with an initial spill of 250,000 bbls. The list estimates individual times needed for procurement, load out, travel time to the site and deployment.

Offshore response strategies may include attempting to skim utilizing MSRC & NRC's Oil Spill Response Vessels (OSRVs), Oil Spill Response Barges (OSRBs), ID Boats, and Quick Strike OSRVs, which have a combined derated recovery rate of 491,721 barrels/day. Temporary storage associated with the identified skimming and temporary storage equipment equals 299,066 barrels.

Dispersants may be a viable response option. If appropriate, 4 to 5 sorties (1,200 gallons to 2,000 gallons per sortie) from the DC-3 within the first 12 hour operating day of the response. Using a 1:20 application rate, 90% effectiveness, and assuming 4-5 sorties per day the systems could disperse approximately 5,486 to 6,857 barrels of oil per day based on the NOAA Dispersant Planner. Additionally, 3 to 4 sorties (300 gallons per sortie) from MSRC's BE-90 and one sortie (3250 gallons per sortie) from MSRC's C-130A could be completed within the first 12 hour operating day of the response. Using the same assumptions as above, these two aircraft could disperse approximately 1,778 to 1, 907 barrels of oil in the first day. On each subsequent day, the BE-90 and the C-130A would be able to complete 4-5 sorties each (300 and 3250 gallons per sortie, respectively), for a total amount of 6, 080-7,600 barrels of oil per day dispersed.

If the spill went unabated, shoreline impact would depend upon existing environmental conditions. Nearshore response may include the deployment of shoreline boom on beach areas, or protection and sorbent boom on vegetated areas. Strategies would be based upon surveillance and real time trajectories provided by The Response Group that depict areas of potential impact given actual sea and weather conditions. Strategies from the Area Contingency Plan, The Response Group and Unified Command would be consulted to ensure that environmental and special economic resources would be correctly identified and prioritized to ensure optimal protection. The Response Group shoreline response guides depict the protection response modes applicable for oil spill clean-up operations. Each response mode is schematically represented to show optimum deployment and operation of the equipment in areas of environmental concern. Supervisory personnel have the option to modify the deployment and operation of equipment allowing a more effective response to site-specific circumstances. (For more information on resource identification, see **Section 11**; for more information on resource protection methods, see **Section 13**.)