Offshore Information for Area Contingency Planning

Gulf of Mexico

Worst Case Discharge Scenario Modeling Overview

and

ACP-Specific WCD Scenario Appendices (2A-2F)

Technical Document #2
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1 Introduction

1.1 Purpose

In 2019, the Bureau of Safety and Environmental Enforcement (BSEE) sponsored a project in cooperation with the United States Coast Guard (USCG) to improve the content of the coastal zone area contingency plans (ACPs) with respect to the information necessary to effectively plan for and respond to large oil spills from offshore oil and gas facilities. This collaboration between BSEE, USCG District Eight, resource trustees, state agencies, oil spill removal organizations (OSROs), and Area Committees resulted in a series of technical documents that provide offshore information for the Gulf of Mexico (GOM) on:

- Oil and Gas Infrastructure (GOM Technical Document #1)
- Worst Case Discharge Scenarios (GOM Technical Document #2 and Appendices 2A-F)
- Response Concept of Operations (GOM Technical Document #3)
- Response Strategies and BMPs (GOM Technical Document #4)
- Sensitive Species Profiles (GOM Technical Document #5).

These documents were developed specifically for incorporation by reference into the coastal zone ACPs and are hosted on the BSEE Oil Spill Preparedness Division's (OSPD) website. In addition to the above technical documents, an inventory of offshore spill response equipment and a set of offshore Environmental Sensitivity Indices (ESI) maps were created and embedded in NOAA's Environmental Response Management Application (ERMA). Collectively, these materials provide a foundation of risk assessment, resources at risk, and conceptual response information to inform coastal zone ACP planning and responses to a significant offshore facility oil spill incident.

The WCD scenario information in this technical document is organized into three main components: Section contains a description of key modeling concepts and reference scales that are useful for understanding the oil spill trajectory data and figures that have been developed for each of the WCD scenarios. Section 3 contains a series of tables that collate and summarize key information regarding all of the WCD scenarios that were developed for the GOM. Appendices 2A – 2F contain specific, more detailed WCD scenario modeling data and trajectory figures for each of the ACP Planning Areas (see hyperlinks below).

- Appendix 2A - South Texas Coastal Zone (Corpus Christi)
  a. White Marlin Storage Tank, Pipeline, and Well Blowout
  b. Shell Perdido Drilling Well Blowout
- Appendix 2B - Central Texas Coastal (Houston-Galveston)
  a. American Midstream Pipeline Discharge
  b. Kosmos Energy Drilling Well Blowout
- Appendix 2C - Southeast Texas and Southwest Louisiana (Port Arthur)
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b. Kosmos Sioux Falls SL 1 Well Blowout

- Appendix 2D - South-central Louisiana (Houma)
  a. Talos Drilling, No. 69 Well Blowout
  b. Fieldwood Drilling TA009 Well Blowout
- Appendix 2E - Southeast Louisiana (New Orleans)
  a. Energy XXI Platform J Storage Tank, Pipeline, and Well J-5 Blowout
  b. Chevron Drilling Hoffe Park Well Blowout
- Appendix 2F- Alabama, Mississippi, and Northwest Florida (Mobile)
  a. Panther Operating Pipeline Discharge
  b. Anadarko Drilling King North Well H Blowout

NOTE: Many of these offshore WCD scenarios have oiling impacts that extend far beyond the boundaries of the ACP Planning Area in which they originate, and therefore will have relevance to other ACP Planning Areas throughout the GOM.

1.2 Project History and Participating Organizations

The Offshore ACP Project Team, consisting of personnel from the BSEE Oil Spill Preparedness Division (OSPD), the USCG Eighth District (USCG D8), the Bureau of Ocean Energy Management (BOEM), State representatives, and RPS Group, conducted a comprehensive review of the current offshore oil and gas activities located within the U.S. portion of the GOM waters. The activities within the data set includes current and planned exploratory drilling activities, pipelines, subsea infrastructure, and platforms with associated production wells, pipelines and storage tanks. The information regarding facilities within state waters seaward of the baseline was incomplete; however, the team used any data that could be acquired from each state government. The goal of the review was to identify a group of four scenarios in each ACP Planning Area that was representative of the most significant WCDs located within their boundaries. Given that offshore facilities can be found from state waters out to the limits of the Exclusive Economic Zone (EEZ), and the expected environmental impacts (and the subsequent spill response efforts) are likely to be very different depending on the location of the facility, an effort was made to select scenarios from across this geographic range in each ACP Planning Area.

RPS Group conducted an oil spill fate and trajectory analysis for each scenario in order to estimate the projected level of oiling for the water surface, water column, and affected shorelines if no response actions were taken. A single deterministic trajectory simulation was developed for each scenario, using metocean data for each location that in past analyses had yielded the highest levels of shoreline oiling. In the summer of 2020, three virtual meetings were held with federal and state stakeholders to determine which scenarios would be selected for inclusion in the ACPs within the Eighth Coast Guard District. Figure 1 shows the factors and scoring used by the Project Team and stakeholders to conduct a comparative analysis and select the scenarios for further development in the ACPs. The WCD scenarios in this technical document are the 12 WCD scenarios that were chosen by the stakeholders at those meetings.

Rationale for Rating Scenario Parameters & Environmental Oil Exposure					
Parameters	**Red (Most Significant)**	**Orange**	**Yellow**	**Green (Least Significant)**	**Comments**
Discharge Volume	Millions of Barrels. The largest discharge volume is red.	Second largest discharge in a zone when over 1 million bbls	Greater than 10,000 bbls Less than 1 million bbls	Less than 10,000 bbls	Relative ratings by size. The scenario with largest volume discharge in each zone is automatically selected and scored red.
Discharge Depth	Deepest subsea discharges	Deep subsea discharges	Shallow subsea discharges	Surface discharges	Deeper subsea discharges are rated higher due to the increased difficulty in securing the source quickly.
Distance to Shore	Very close to shore, less than 10 nautical miles	Greater than 100 nautical miles from shore	Less than 100 nautical miles from shore	N/A	Discharges less than 10 nm from shore are rated **red** due to rapid response times required. Discharges further than 100 nm from shore are rated **orange** due to the logistical challenges present with responding to a spill that far offshore.
Time to Shore	Discharges with shoreline impacts that occur in less than one day	Shoreline impacts in less than 10 days	Shoreline impacts in less than 20 days	Shoreline impacts after 20 days	Spills with the shortest response times for shoreline impact received highest rating.
Oil Type/API Gravity (persistence)	Heavy Crudes	Medium Crudes & Medium-Light Crudes less than 35 API Gravity	Medium-Light Crude greater than 35 API Gravity & Light Crudes	Condensates are ultra-light, non-persistent hydrocarbons that initially exist in a gaseous state but have liquefied due to changes in temperature or pressure. API Gravity approaching or exceeding 50.	The heavier the grade of crude oil, the more persistent it will be in the environment.
Surface Oil Concentrations – 0.04 μm*	Greater than 50,000 $mi.^2$	Greater than 10,000 $mi.^2$	Greater than 100 $mi.^2$	Less than 100 $mi.^2$	
Surface Oil Concentrations – 10 μm*	Greater than 5,000 $mi.^2$	Greater than 1,000 $mi.^2$	Greater than 5 $mi.^2$	Less than 5 $mi.^2$	
Shoreline Oil Concentrations	Greater than 1,000 miles	Greater than 250 miles	Greater than 50 miles	Less than 50 miles	
Water Column Oil Concentrations *	Greater than 100,000 million cubic meters	Greater than 50,000 million cubic meters	Greater than 500 million cubic meters	Less than 500 million cubic meters	

Notes for Consideration when Selecting Scenarios for Inclusion in the ACP:

* The numerical scales for comparing oil concentrations on the water surface and in the water column were revised to reduce "double counting" of areas that were oiled by overlapping spillets in the model calculations.

1. The scenario with the largest volume discharge in each Area is automatically scored red and is the first choice for selection. All are exploratory drilling scenarios with extensive wide area impacts (some even have international implications), especially in oil concentrations on the ocean surface; significant water column oil concentrations and long lead times prior to making landfall.
2. The choice of a second scenario should weigh a combination of the above factors and their respective ratings. This would include a comparison of the degree of oil concentrations in the different environmental compartments, including the rapidity and severity of shoreline oil concentrations – which is also related to distance from shore, time to shore, and the expected persistence of the oil in the environment.

Figure 1. Rationale for Rating Scenario Parameters & Environmental Oil Exposure.

2 Oil Spill Modeling Information

2.1 Models Used

2.1.1 OILMAPDeep

The OILMAPDeep Model is a tool to evaluate potential accidental discharges of oil and gas from a deep-water well blowout. The results provide a description of the behaviour of the blowout plume, its evolution within the water column and the expected initial dilution (concentration decrease) with distance from the wellhead (seafloor). It provides information about the termination ("trap") height of the plume and the oil droplet size distribution(s) associated with the discharge. These results are used as initial conditions for modeling the far-field fate and trajectory modeling of the resulting subsurface plume and surface oil slick.

2.1.2 Spill Impact Model Application Package (SIMAP)

RPS' oil spill modeling system, SIMAP, or Spill Impact Model Application Package, was used to evaluate transport and weathering of oil in the far-field. SIMAP uses site-specific wind data and current data, and state-of-the-art transport and oil weathering algorithms. SIMAP was used to quantify areas swept by floating surface oil of varying thicknesses, concentrations of subsurface oil components (dissolved and particulate) in space and over time, and areas of shoreline impacted to varying degrees.

Processes simulated in the SIMAP include oil spreading (gravitational and by shearing), evaporation, transport, vertical and horizontal dispersion, emulsification, entrainment (natural and facilitated by dispersant), dissolution, volatilization of dissolved hydrocarbons from the surface water, adherence of oil droplets to suspended sediments, adsorption of soluble and sparingly-soluble aromatics to suspended sediments, sedimentation, and degradation (Figure 2). SIMAP is unique in that it not only models particulate oil content at the surface and in the water column, but it also accounts for the dissolved component of oil. SIMAP calculates the dissolved in-water concentrations and tracks them over time.

The SIMAP model was run for 45 days for instantaneous discharges, such as spills from pipelines, and for 75 days for continuous discharges from well blowouts (30 days continuous discharge + 45 days simulation time).

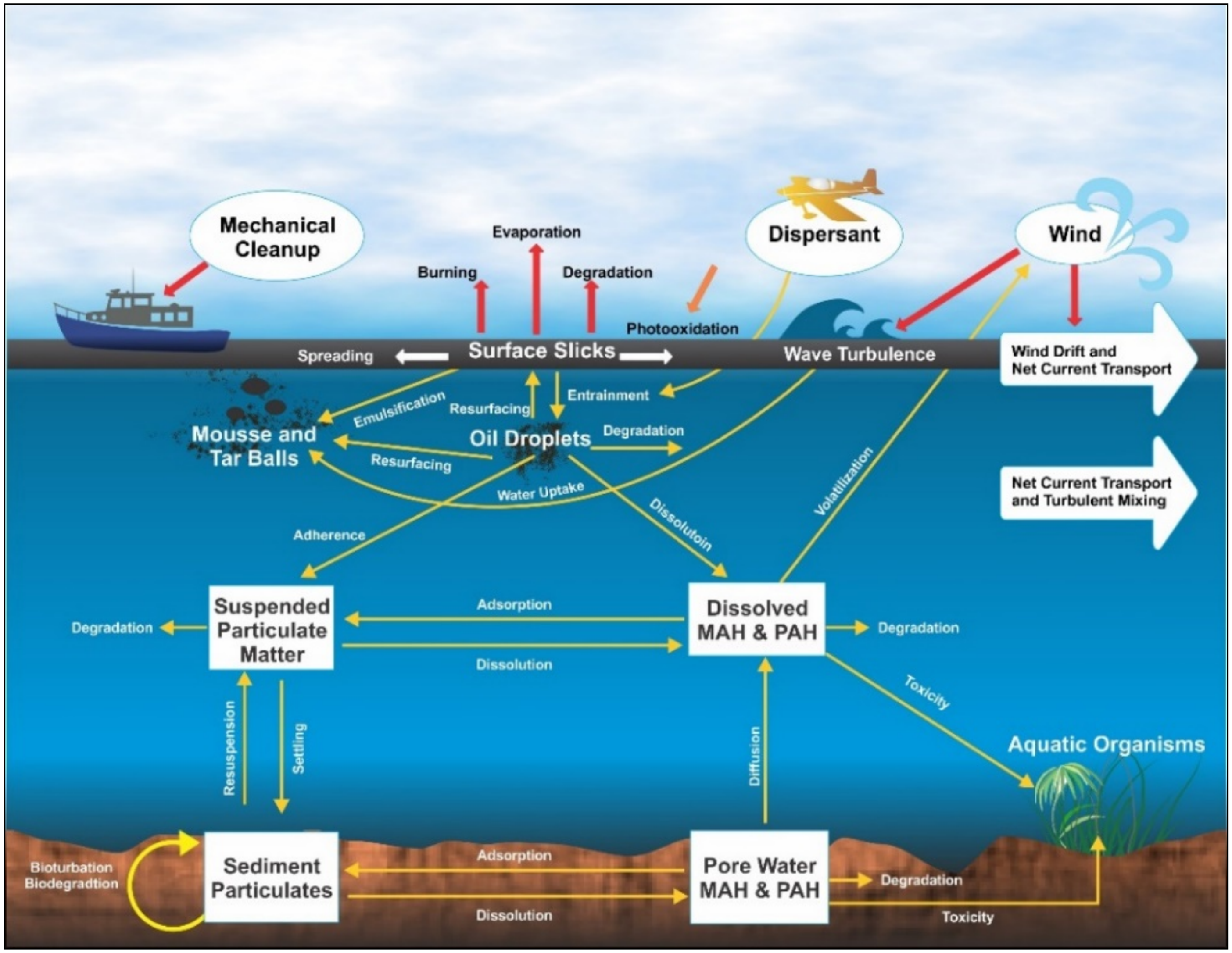

Figure 2. Open water oil fates and behavior processes simulated in the SIMAP modeling system.

2.2 Modeling Thresholds

The trajectory footprints for oiling and "minimum travel time" contours were calculated for specific thresholds where a minimum amount of oil thickness or waterborne concentrations were present (Table 1). Only those regions with oiling above the thresholds are shown in the figures.

Table 1. Thresholds used in the oil spill modeling.

Environmental Compartment	Surface Oiling	Surface Oiling	Surface Oiling	Shoreline Oiling	Water Column Oil Exposure
Threshold Amount	0.04 µm	10 µm	50 µm	10 µm	10 ppb Dissolved PAH*
Rationale For Threshold	A conservative threshold used to determine effects on socioeconomic resources (e.g., fishing may be prohibited when sheens are visible on the sea surface).	A conservative threshold for consideration of potential effects on birds, marine mammals, and sea turtles from floating oil	Industry-standard surface thickness for recoverable oil	A conservative screening threshold for potential ecological effects on shoreline fauna. Potential lethal effects threshold for birds on the shoreline.	Water column impacts (lethal) to plankton in the upper 20 m, and sublethal to lethal to other water column biota (adult, juvenile fish and invertebrates)
Visual Appearance	Fresh oil at this minimum thickness corresponds to a slick being barely visible as a colorless or silvery/grey sheen.	Fresh oil at this minimum thickness corresponds to a slick being barely visible or scattered sheen (colorless or silvery/grey), scattered tarballs, or widely scattered patches of thicker oil.	Heavy metallic sheen with patches of discontinuous brown oil	Transparent or Iridescent Films/Sheens	N/A

*10 ppb (µg/L) of whole oil Total hydrocarbon Concentration (THC) in the water column corresponds to ~0.1 ppb (µg/L) of dissolved Polycyclic Aromatic Hydrocarbons (PAHs) for fresh unweathered crude oil types (the soluble PAHs are approximately 1% of the total mass of fresh oil). This threshold can result in lethal water column impacts to fish larvae in deep waters (without UV exposure) and sublethal impacts to fish larvae in the upper 20 m.

2.3 Stochastic Modeling Outputs

Stochastic simulations provide insight into the probable behavior of an oil spill in response to temporally and spatially varying meteorological and oceanographic conditions. The stochastic model computes oil fate and transport for an ensemble of hundreds of individual simulations for each scenario, sampling the variability in regional and seasonal wind and current forces by starting each simulation on different dates within the chosen time period. It then summates the results of all the simulations into a spatially-based probabilistic footprint for oiling at a specified threshold.

The stochastic analysis provides two main types of information: 1) footprints for the water's surface, water column, and shorelines, based on the associated probabilities that each area that might be oiled, and 2) the shortest time required for oil to reach any point within the areas predicted to be oiled. It is important to note that any single simulation may encounter only a relatively small portion of this footprint.

2.3.1 Probability of surface oil exposure at the chosen threshold:

These maps define the area and probability in which the sea surface may be oiled at a particular concentration based on the summation of the resulting trajectories from the ensemble of simulations. The map does not imply that the entire contoured area would be covered with oil in the event of a spill. The map also does not provide any information on the quantity of oil in a given area.

2.3.2 Minimum travel times:

The footprint on these maps corresponds to the probability map and illustrates the shortest time required for surface oil to reach any point within the footprint at a chosen threshold. These results are also based on the ensemble of all individual simulations. The stochastical data also provides estimates of the average time for oil to make landfall.

2.3.3 Probability of shoreline oil exposure at the chosen threshold:

The map defines the area in which shoreline oiling may be expected and the associated probability of oiling based on summation of the resulting trajectories from the ensemble of individual simulations run. The map does not imply that the entire contoured area would be covered with oil in the event of a spill. The map also does not provide any information on the quantity of oil in a given area. The stochastical data also provides estimates for the percentage of simulations where oil makes landfall, and the maximum and average percentages of the oil discharge to make landfall.

2.3.4 Probability of water column oil exposure at the chosen threshold:

The map defines the area in which subsurface oiling may be expected and the associated probability of oiling based on the summation of the resulting trajectories from the ensemble of simulations.

2.4 Deterministic Modeling Outputs

For each spill scenario, one deterministic trajectory/fate simulation was run to investigate the specific "worst case" simulation that could potentially occur using the metocean data from the corresponding stochastic simulations. The worst case simulation was selected based on the start date and ensuing winds and currents that resulted in the largest amount of shoreline oiling. The "total length of shoreline oiled" was used as the indicator to compare and assess the degree of shoreline oiling.

2.4.1 Color Codes for Maximum Surface Oil Concentrations

Table 2 shows the figure colors, and corresponding oil appearance for the maximum *surface* oil concentrations that occurred, at any given location over the period of the simulation. The scale used in these deterministic figures for *water surface* oil concentrations is loosely based on the equivalent oil thicknesses described in the Bonn Agreement Oil Appearance Code (BAOAC) and are summarized as follows:

Table 2. Figure colors and corresponding oil appearance for the maximum surface oil concentrations.

Oil Concentrations on Water Surface (g/m^2)	Figure Color	Oil Appearance
1-5	Purple	Silver to Rainbow Sheen
5-25	Light Blue	Light Metallic Sheen
25-50	Light Brown	Heavy Metallic Sheen
50-100	Dark Brown	Discontinuous Dark Oil
100-200	Gray	Heavy Discontinuous Dark Oil
> 200	Black	Continuous Dark Oil

Note: Each g/m^2 of surface oil concentration is equal to 1 micrometer (µm) of surface oil thickness on average over the grid cell (i.e., 1 µm = 1 g/m^2).

This information is useful when viewing the nature/severity of the deterministic surface oil trajectories shown in each of the WCD scenarios. For example, the area in purple (1-5 g/m^2) would represent areas that experienced maximum concentrations mainly in the range of silver and rainbow sheens. This observation should be caveated, however, by the fact that the concentration shown is based on an average oil thickness/concentration for the area. In actuality, areas shown in purple may also contain patches of heavier and lighter oiling, as slicks are rarely uniform in their distribution. As such, where an area is depicted in purple for silver/rainbow sheen, it may have also experienced some smaller, thicker patches of oil in the metallic or dark range surrounded by larger areas of silver sheen or no oil, etc.

2.4.2 Color Codes for Shoreline Oil Concentrations

Table 3 shows the figure colors and corresponding oil appearance for the maximum shoreline concentrations of oiling that occurred at any given location over the period of the simulation. This scale can be used as visual reference points for the deterministic figures with regard to *shoreline* oil concentrations.

Table 3. Figure colors and corresponding oil appearance for the maximum shoreline oil concentrations.

Oiling on Shorelines (g/m^2)	Figure Colors	Oil Appearance
Less than 100	Dark Green	Transparent or Iridescent Films/Sheens
100	Light Green	Visible oil stains that are too thin to scrape off
100-1,000	Light Green – Yellow Green	Stains to oil coatings that can be scraped off
1,000-10,000	Yellow – Dark Orange	Increasingly Thick Oil Cover
> 10,000	Red	Areas of Pooled Oil

2.4.3 Maximum Oil Concentration Maps:

These figures show the maximum surface and shoreline concentrations that occur at any time and place over the entire period of the simulation. It is important to note that the deterministic trajectories of the spills for any single timestep will usually be much smaller in size, and in many areas less concentrated, than what is shown in the compilation maps. To illustrate this point, Figure 3 shows different timesteps of a slick trajectory from Day 2, Day 10, Day 20, Day 40, and Day 75. At the bottom right of the figure is the compilation map that shows the single highest oil concentrations that were recorded for any given time during the full 75 days of the simulation across the entire impacted area.

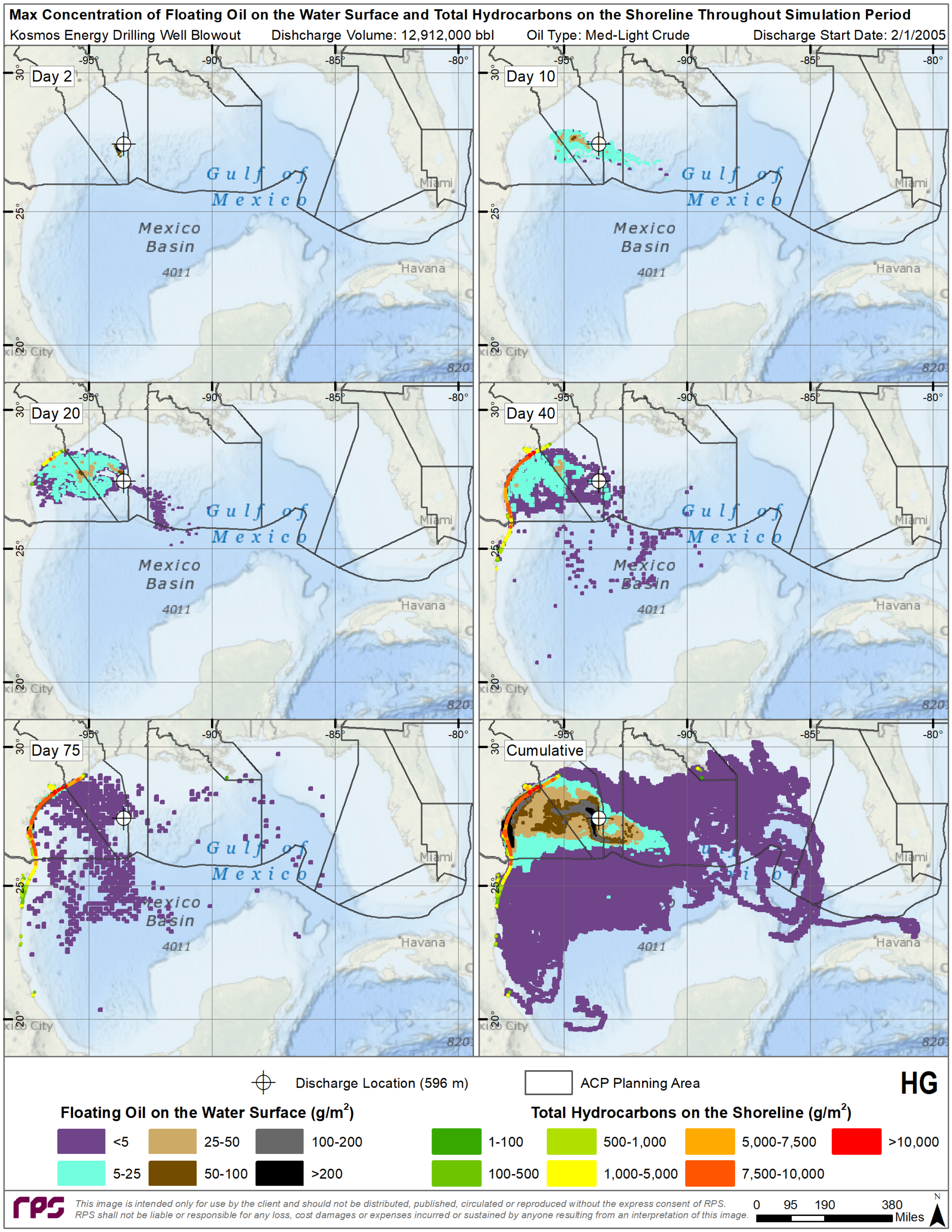

Figure 3. Deterministic modeling trajectory for maximum concentration of floating oil on the surface and total hydrocarbons on the shoreline at different points of the simulation period.

2.4.4 Maximum Water Column Oil Concentration:

The well blow out scenarios include figures showing a compilation of the single highest water column concentrations of dissolved Polycyclic Aromatic Hydrocarbons (PAHs) that were observed at any given location over the entire period of the simulation.

2.4.5 Total Oil Exposure and Mass Balance Information:

Information is provided on the total area oiled on the surface, subsurface, and shoreline at the specified ecological thresholds, and the mass balance information on the fate of the oil in various environmental compartments throughout the simulation. Note that surface area exposure provided here is the cumulative sum of areas swept by floating oil (spillets), which may include multiple exposures over the same area.

2.4.6 Minimum Surface Oil Viscosity Information*:*

As an oil spill is discharged into the environment and is exposed to wind, sunlight, and mixing energy from waves, it undergoes a weathering process. This weathering involves a number of processes, but for response purposes, two of the most important are the evaporation of the lighter components, and the formation of water in oil emulsions. Both of these processes effectively increase the viscosity of the oil. While the viscosity of spilled oil will generally increase over time, it can also be extremely sensitive to metocean changes, such as periods of increased wind and wave energy or significant temperature changes. As a result, the viscosity of an oil slick can be a very dynamic situation over time.

The oil viscosity figures in this ACP-specific WCD Scenario Appendices (2A-2F) show the minimum surface oil viscosity that occurred at any given location over the entire period of the simulation. It is important to note that the viscosities shown for the different areas of the oil slick for any single timestep may be very different than what is shown in the compilation maps. To illustrate this point, Figure 4 shows different timesteps of a slick's surface viscosity from Day 2, Day 10, Day 20, Day 40, and Day 75. At the bottom right of the figure is the compilation map that shows the minimum surface viscosity recorded for any given time during the full 75 days of the simulation across the entire impacted area.

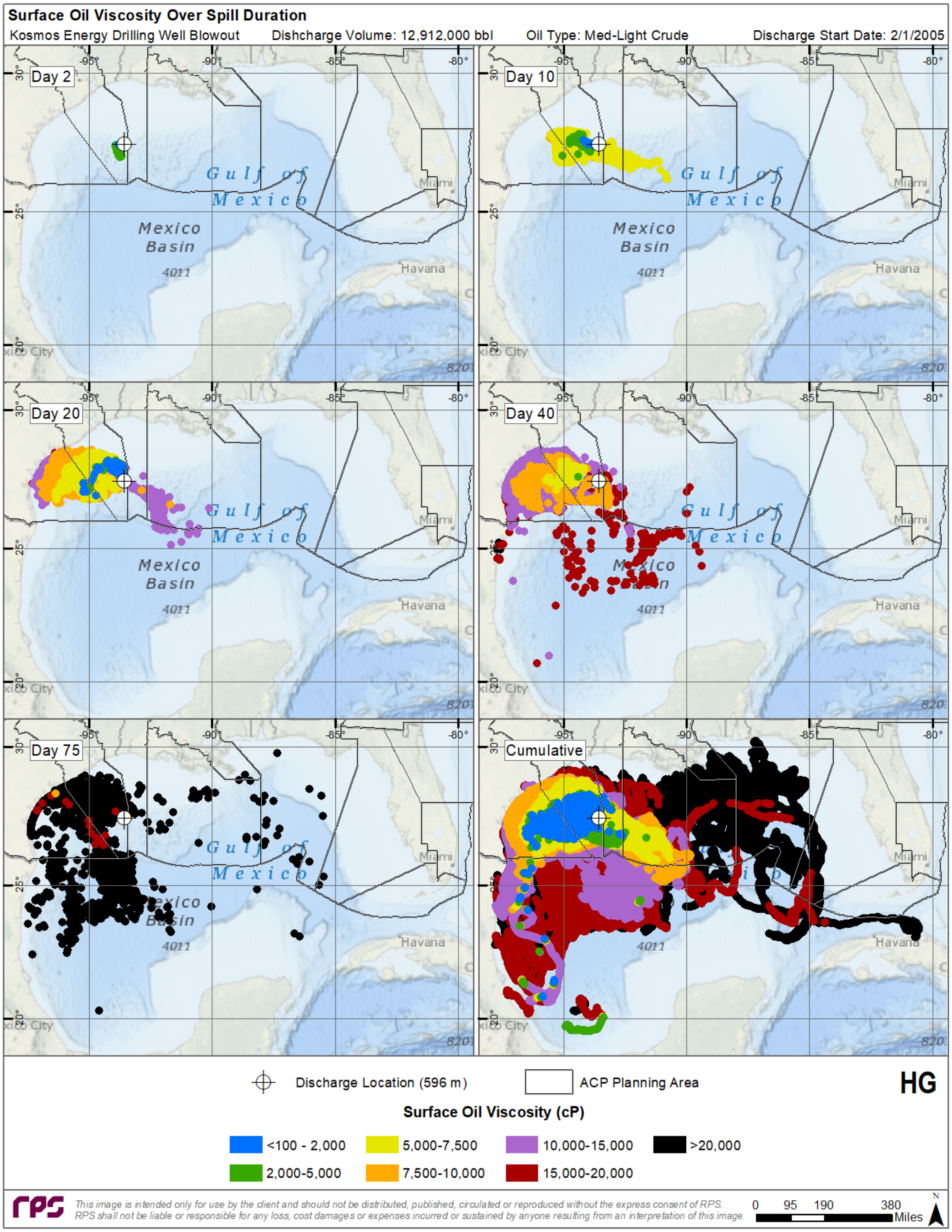

Figure 4. Deterministic modeling trajectory for minimum surface oil viscosity at different points of the simulation period.

Surface oil viscosity is an important factor for responders to consider when evaluating and selecting spill countermeasures and equipment types during an oil spill. A general rule of thumb is that the lower the oil viscosity is, the more countermeasures that may be applied. Alternatively, the higher the viscosity of the oil, the more difficult it will become for certain response equipment types or alternative technologies, such as in-situ burning or dispersants, to effectively remove the oil. For example, a fresh light or medium crude with a low viscosity may be a good candidate for mechanical recovery, dispersants, or in-situ burning. As oil weathers and emulsifies, its viscosity will increase, and the spill countermeasures that can be effectively applied may become more limited. Oil viscosity is particularly important with respect to how dispersible the oil will be. There is usually an upper viscosity limit, above which oil cannot be dispersed. Although this dispersibility limit is dependent upon the oil's specific chemical and physical properties, generally, dispersibility decreases with increasing viscosity. One general rule of thumb is that dispersants are optimally effective when viscosity is less than 2,000 cP and become increasingly ineffective when viscosity becomes greater than 10,000 cP. Table 4 provides a list of viscosities of common substances for reference.

Table 4. Viscosities of common substances for reference.

Product	Viscosity (cP)
Water at 70F	1
Corn Oil	65
Maple Syrup	150-200
Honey	2,000-3,000
Chocolate Syrup	10,000-25,000
Ketchup or Mustard	50,000-70,000
Peanut Butter	150,000-250,000
Vegetable Shortening	1,000,000-2,000,000

Viscosity of an oil also impacts the effectiveness of mechanical recovery to remove the oil. Viscosity increases significantly in oils with a tendency to form water-in-oil emulsions where the material becomes much more viscous, and the volume of oil spilled can increase by three to four times. Different skimmer types should be used to maximize their effectiveness depending on the viscosity of the oil at different temporal points along its trajectory during the response. Weir, vortex, oleophilic rope, and disc skimmers are best used with oils at lower viscosities. For oil with higher viscosities, up to 100,000 cP, skimmer designs that can physically grab and move the oil into the skimmer's recovery sump are more effective.

3 WCD Scenarios

3.1 WCD Scenario Locations

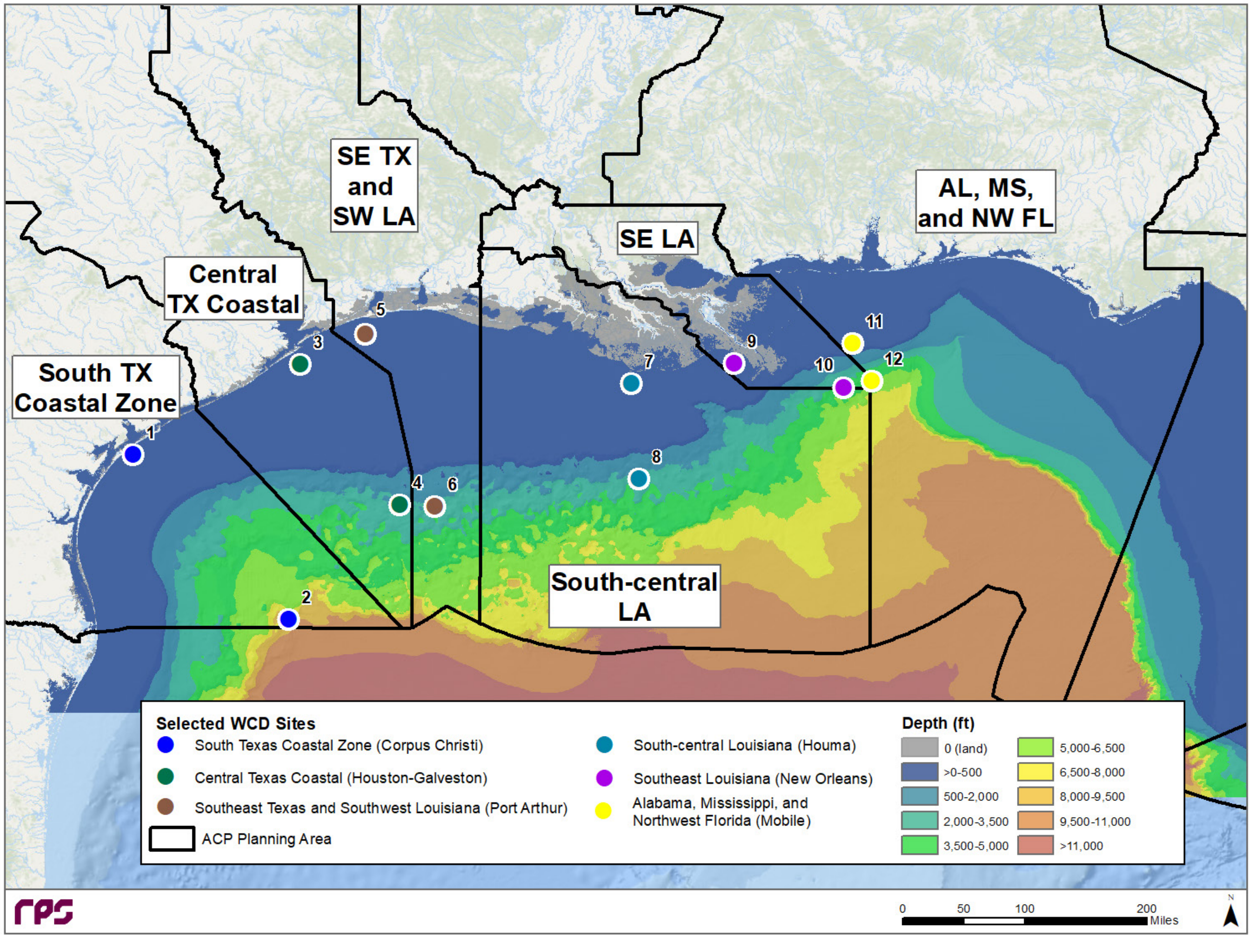

Figure 5. WCD Scenario Locations in the GOM.

Note: *Scenario numbers on the chart correspond with each of the listed WCD scenarios in the tables below.*

3.2 WCD Scenario Particulars

Table 5. WCD Scenario Particulars.

Scenario Number	ACP Planning Area	WCD Scenario Name	Area	Block	Latitude (N)	Longitude (W)	Distance from Shore (miles)	Water Depth of Discharge (m)	Oil Type	API	Flow Rate (bbls/day)	Storage (bbls)	Pipe (bbls)	Discharge Duration (days)	Simulation Duration (days)
1	South TX Coastal Zone (Corpus Christi)	White Marlin Storage Tank, Pipeline, and Well Blowout	MI	629L	28.05472	96.72138	5	Surface	Heavy Crude	24	150	15,003	0.2	30	75
2		Shell Perdido Drilling Well Blowout	AC	857	26.1054	94.882	120	2,571	Med-Light Crude	34	129,000			30	75
3	Central TX Coastal (Houston-Galveston)	American Midstream Pipeline Discharge	GA	214	29.12277	94.74416	9	17.5	Light Crude	39.9			16,873	1	45
4		Kosmos Energy Drilling Well Blowout	GB	491	27.46111	93.5686	125	596	Medium Crude	31	430,400			30	75
5	SE TX + SW LA (Port Arthur)	Genesis Crude Pipeline Discharge			29.481219	93.974894	12	Surface	Med-Light Crude	32			21,875	1	45
6		Kosmos Sioux Falls SL 1 Well Blowout	GB	544	27.44472	93.15277	130	589	Med-Light Crude	33	354,845			30	75
7	South-central LA (Houma)	Talos Drilling, No. 69 Well Blowout	SS	93	28.8922	90.833	10	Surface	Medium Crude	31.4	92,375			30	75
8		Fieldwood Drilling TA009 Well Blowout	GC	200	27.76388	90.74281	80	772	Med-Light Crude	32	466,610			30	75
9	Southeast LA (New Orleans)	Energy XXI Platform J Storage Tank, Pipeline, and Well J-5 Blowout	WD	29	29.13583	89.61055	7	Surface	Med-Light Crude	34	124,054	62	82	30	75
10		Chevron Drilling Hoffe Park Well Blowout	MC	122	28.84861	88.31305	42	1,223	Light Crude	38.2	465,709			30	75
11	AL, MS, + NW FL (Mobile)	Panther Operating Pipeline Discharge	MP	245	29.366465	88.207817	43	63	Med-Light Crude	35			3,052	1	45
12		Anadarko Drilling King North Well H Blowout	MC	84	28.92385	87.98646	57	1,552	Med-Light Crude	37	394,798			30	75

Note: While most of the scenario parameters in this table have been collated from source documents submitted by the owners or operators of offshore facilities to the US Government, RPS Group performed the WCD oil spill modeling trajectory analyses conducted for this document under a contract sponsored by the BSEE. The modeling products in each of the ACP-specific WCD Scenario Appendices (2A-2F) will be different from the trajectory analyses conducted by owners and operators in their source documents, as it is expected that different trajectory models, metocean data and modeling thresholds were used.

3.3 WCD Scenario Summary Results for Oil Exposure

Table 6. Environmental Oil Exposure Summary Results.

Oil Spill Scenario Parameters								Environmental Oil Exposure at Designated Thresholds				
ID	ACP Planning Area	Scenario Name	Total Volume Discharged (bbl)	Discharge Duration (days)	Discharge Depth (m)	Approximate Distance to Shore (nm)	Oil Type + (API Gravity)	Swept Surface Area (mi²) Exceeding 0.04 µm	Swept Surface Area (mi²) Exceeding 10 µm	Shore Length (mi) Exceeding 10 µm	Water Column Volume (m³) Exceeding 10 ppb Dissolved PAH	Time to Shore
1	South TX Coastal Zone	White Marlin Storage Tank, Pipeline, and Well Blowout	19,503	30	Surface	5	Heavy Crude (24)	794	12	240	21 million	9.5 hours
2		Shell Perdido Drilling Well Blowout	3,870,000	30	2,571	120	Med-Light Crude (34)	197,150	21,944	948	79,200 million	32.5 days
3	Central TX Coastal	American Midstream Pipeline Discharge	16,873	1	17.5	9	Light Crude (39.9)	8,515	47	193	219 million	6.9 days
4		Kosmos Energy Drilling Well Blowout	12,912,000	30	596	125	Medium Crude (31)	275,605	40,184	610	229,682 million	18.6 days
5	SE TX + SW LA	Genesis Crude Pipeline Discharge	21,875	1	Surface	12	Med-Light Crude (32)	10,011	139	246	309.million	5.9 days
6		Kosmos Sioux Falls SL 1 Well Blowout	10,645,350	30	589	130	Med-Light Crude (35)	159,874	36,390	1,546	120,900 million	12.9 days
7	South-central LA	Talos Drilling, No. 69 Well Blowout	2,771,250	30	Surface	10	Medium Crude (31.4)	90,103	7,397	1,152	26,019 million	1.4 days
8		Fieldwood Drilling TA009 Well Blowout	13,998,300	30	772	80	Med-Light Crude (32)	322,554	35,866	2,288	254,300 million	12.8 days
9	Southeast LA	Energy XXI Platform J Storage Tank, Pipeline, and Well J-5 Blowout	3,721,764	30	Surface	7	Med-Light Crude (34)	123,676	10,344	1,383	33,344 million	1.5 days
10		Chevron Drilling Hoffe Park Well Blowout	13,971,270	30	1,223	42	Light Crude (38.2)	301,496	29,079	2,189	204,320 million	14.9 days
11	AL, MS, & NW FL	Panther Operating Pipeline Discharge	3,052	1	63	43	Med-Light Crude (34)	6,776	10	222	96 million	29.3 days
12		Anadarko Drilling King North Well H Blowout	11,843,940	30	1,552	57	Med-Light Crude (33)	330,117	41,575	2,052	258,175 million	13.4 days

Note: The WCD scenario names in this document include the names of the owners or operators of the facility. It is not uncommon for ownership of offshore facilities to change over time, as companies merge, dissolve or change their portfolios of offshore infrastructure. The federal agencies sponsoring this effort will attempt to periodically update this information; however, ownership of the facilities may change before the scenario names and modeling products are updated.

Table 7. Mass Balance Information for Worst Case Shoreline Oiling Simulation for each Scenario.

Summary of Mass Balance (%) at the End of Simulation										
ID	ACP Planning Area	Scenario Name	Total Volume Discharged (bbl)	Surface (%)	Atmosphere (%)	Water Column (%)	Sediment (%)	Ashore (%)	Degradation (%)
1	South TX Coastal Zone	White Marlin Storage Tank, Pipeline, and Well Blowout	19,503	<0.1	23.8	2.5	<0.1	40.9	32.7
2		Shell Perdido Drilling Well Blowout	3,870,000	3.8	29.9	10.7	0.8	9.5	45.1
3	Central TX Coastal	American Midstream Pipeline Discharge	16,873	<0.1	41.9	12.9	0.6	15.4	29.2
4		Kosmos Energy Drilling Well Blowout	12,912,000	17.4	37.0	7.7	0.1	3.3	34.5
5	SE TX + SW LA	Genesis Crude Pipeline Discharge	21,875	<0.1	38.2	12.9	1.2	18.0	29.6
6		Kosmos Sioux Falls SL 1 Well Blowout	10,645,350	0.4	47.4	7.5	5.3	12.2	27.0
7	South-central LA	Talos Drilling, No. 69 Well Blowout	2,771,250	0.5	34.5	9.9	2.1	21.4	31.6
8		Fieldwood Drilling TA009 Well Blowout	13,998,300	4.0	28.2	9.8	1.3	10.5	45.0
9	Southeast LA	Energy XXI Platform J Storage Tank, Pipeline, and Well J-5 Blowout	3,721,764	0.1	39.1	8.6	3.2	18.2	30.9
10		Chevron Drilling Hoffe Park Well Blowout	13,971,270	1.4	31.1	10.4	2.2	9.0	44.8
11	AL, MS, & NW FL	Panther Operating Pipeline Discharge	3,052	1.5	43.9	10.7	0.1	17.3	26.5
12		Anadarko Drilling King North Well H Blowout	11,843,940	2.8	42.5	11.0	1.8	8.0	33.9

Table 8. Stochastic Information Regarding Shoreline Oiling for each Scenario.

Summary of Stochastic Results								
ID	ACP Planning Area	Scenario Name	Total Volume Discharged (bbl)	Percent of Simulation Reaching Shore (%)	Percent Volume of Discharged Oil Reaching Shore (%)		Time to Reach Shore (days)	
					Maximum	Average	Minimum	Average
1	South TX Coastal Zone	White Marlin Storage Tank, Pipeline, and Well Blowout	19,503	100	66	62	0.2	0.9
2		Shell Perdido Drilling Well Blowout	3,870,000	100	16	7	9.5	22
3	Central TX Coastal	American Midstream Pipeline Discharge	16,873	100	53	31	0.5	2.2
4		Kosmos Energy Drilling Well Blowout	12,912,000	100	15	6	8.9	21.8
5	SE TX + SW LA	Genesis Crude Pipeline Discharge	21,875	100	52	32	0.7	2.1
6		Kosmos Sioux Falls SL 1 Well Blowout	10,645,350	100	17	6	11.1	23.2
7	South-central LA	Talos Drilling, No. 69 Well Blowout	2,771,250	100	34	20	0.5	4.2
8		Fieldwood Drilling TA009 Well Blowout	13,998,300	100	19	7	8	22.5
9	Southeast LA	Energy XXI Platform J Storage Tank, Pipeline, and Well J-5 Blowout	3,721,764	100	30	17	0.5	2.0
10		Chevron Drilling Hoffe Park Well Blowout	13,971,270	100	15	5	4.4	14.1
11	AL, MS, & NW FL	Panther Operating Pipeline Discharge	3,052	97.2	40	16	2	9.6
12		Anadarko Drilling King North Well H Blowout	11,843,940	99.3	22	8	5.6	16.1