Final Environmental Assessment for the Gulfstream Phase VI Project

PHSMA Docket No/s.: PHMSA-2018-0105

April 24, 2020

Final Environmental Assessment and Finding of No Significant Impact – Issued by PHMSA

Document Information

Project Name:	Gulfstream Phase VI Project
PHSMA Docket No/s:	PHMSA-2018-0105
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Acronyms

ADEM	Alabama Department of Environmental Management
Bcf	Billion cubic feet
BSEE	Bureau of Safety and Environmental Enforcement
Certificate	Certificate of Public Convenience and Necessity
CFR	Code of Federal Regulations
CWA	Clean Water Act
FEA	Final Environmental Assessment
EFH	Essential fish habitat
FEIS	Final Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
Gulfstream	Gulfstream Management & Operating Services, LLC
Gulfstream System	Gulfstream Natural Gas System, L.L.C.
Gulfstream Pipeline	Gulfstream Natural Gas Pipeline
HCA	High Consequence Area
HDD	Horizontal Direction Drill
ILI	InLine Inspection
MAOP	Maximum allowable operating pressure
MBTA	Migratory Bird Treaty Act
MFL	Magnetic Flux Leakage
Milepost	MP
MPA	Marine Protect Areas
NHD	National Hydrography Dataset
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRI	National Rivers Inventory
OCS	Outer continental shelf
OPP	Over-Pressure Protection
OTS	Operator Training System
PHMSA	Pipeline and Hazardous Materials Safety Administration
PIR	Potential impact radius
Project	Gulf Stream Phase VI Project
psig	Pounds per square inch gauge
SPS	Synergi Pipeline Simulator
USACE	United States Army Corps of Engineers
USFS	United States Forest Service
USGS	United States Geological Survey
USFWS	United States Fish and Wildlife Service
WSSTI	West Subsea Tie In

A. Project Overview and Description

A.1 Introduction

Gulfstream Natural Gas System, L.L.C. (Gulfstream System) is an interstate natural gas pipeline system jointly owned by Williams and Enbridge and operated by Gulfstream Management & Operating Services, LLC (Gulfstream), hereinafter and interchangeably referred to as Gulfstream. The Gulfstream Natural Gas Pipeline (Gulfstream Pipeline) Line 200 is a portion of the Gulfstream System and spans approximately 427 miles across the bottom of the Gulf of Mexico from southern Alabama to the Tampa Bay region and onshore in Florida (**Figure 1**). Currently, the existing Gulfstream Pipeline has the capacity to transfer approximately 1.3 billion cubic feet (BCF) of sales grade natural gas each day from natural gas supply chains to Florida customers.

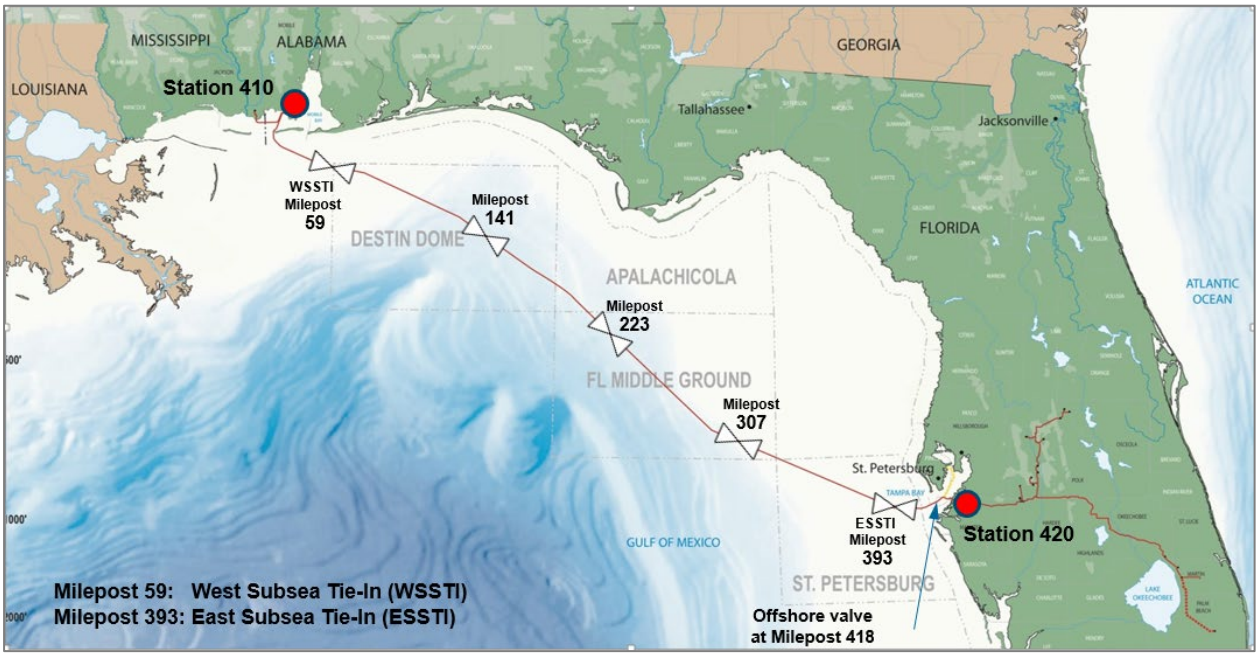

Figure 1: Map of Gulfstream System

A.2 Project Description

Gulfstream requested and PHMSA will issue a special permit to increase the pressure for approximately 55 miles of the 36-inch Gulfstream Pipeline from Milepost (MP) 3.9 to 58.7[1] from the current 2,180 pounds

[1] Gulfstream Pipeline MP 58.7 is where the 36-inch mainline valves – MLV-200-2A, MLV-200-2B, and MLV-200-2C are located. Gulfstream Pipeline MP 58.7 is in the Gulf of Mexico, Viosca Knoll, Block 82. The Gulfstream application letter of October 26, 2018, and supplemental documents used MP 59 as rounded for MP 58.7.

per square inch gauge (psig) maximum allowable operating pressure (MAOP) to 2,296 psig. A project location map is provided in Appendix A. The 2,296 psig MAOP is based on a 0.72 design factor for the pipeline. The uprate will be completed without the installation of a pressure regulator and a pressure relieving or pressure-limiting device at the MAOP specification break location at MP 58.7. However, Gulfstream is proposing to implement operational controls to temporarily reduce the 2,296 psig pressure to 2,180 psig (shutdown of Unit 5) during the following events:

- In-line inspection or pigging of ML 200;
- Compressor Station 410, Compressor Station 420, or any portion of ML 200 falls within the 3-day cone of uncertainty of a named tropical storm or hurricane;
- Disruption of flow into Compressor Station 420 with any inadvertent mainline valve closure that may cause upstream pressure increase; and
- Extended low flow demand in Florida (lasting for several days) caused by seasonal or abnormal conditions.

Figure 2 shows the process system overview. **Figure 3** shows the operating conditions. **Figure 4** shows the operating pressure scenario.

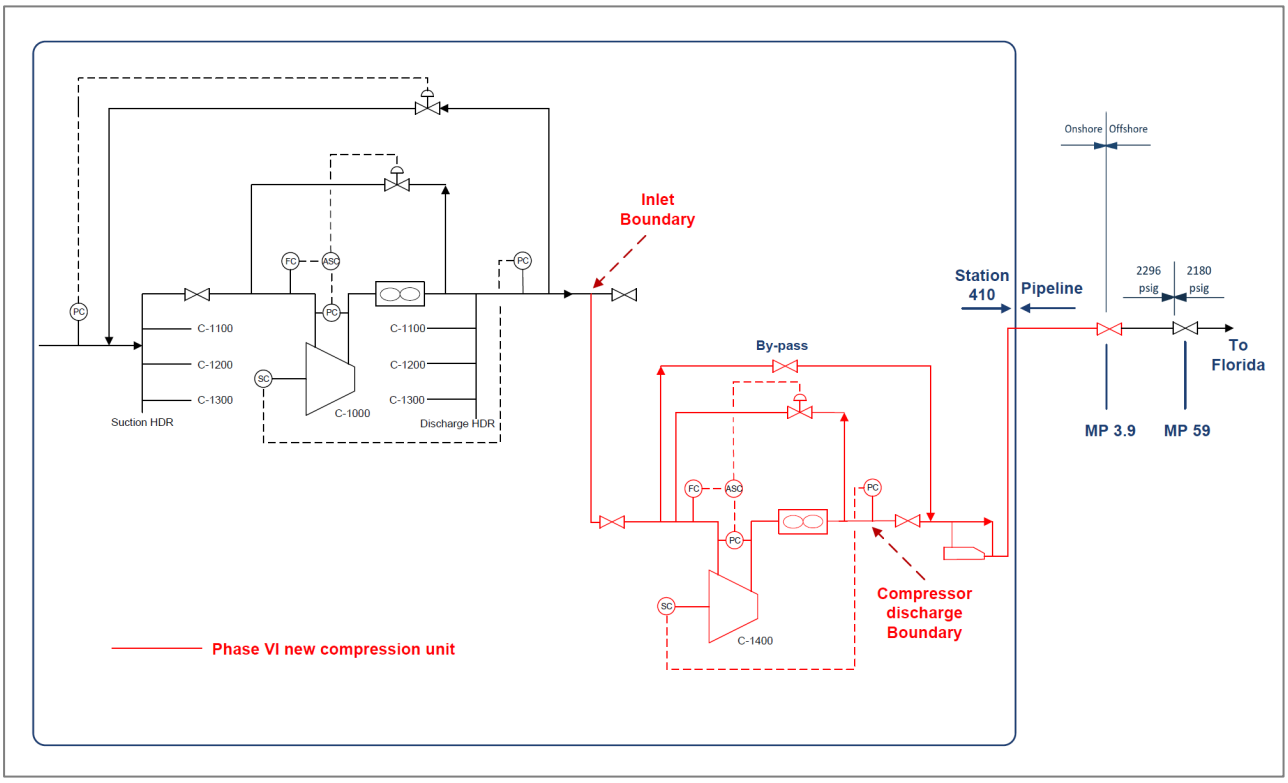

Figure 2: Gulfstream Phase VI Process System Overview

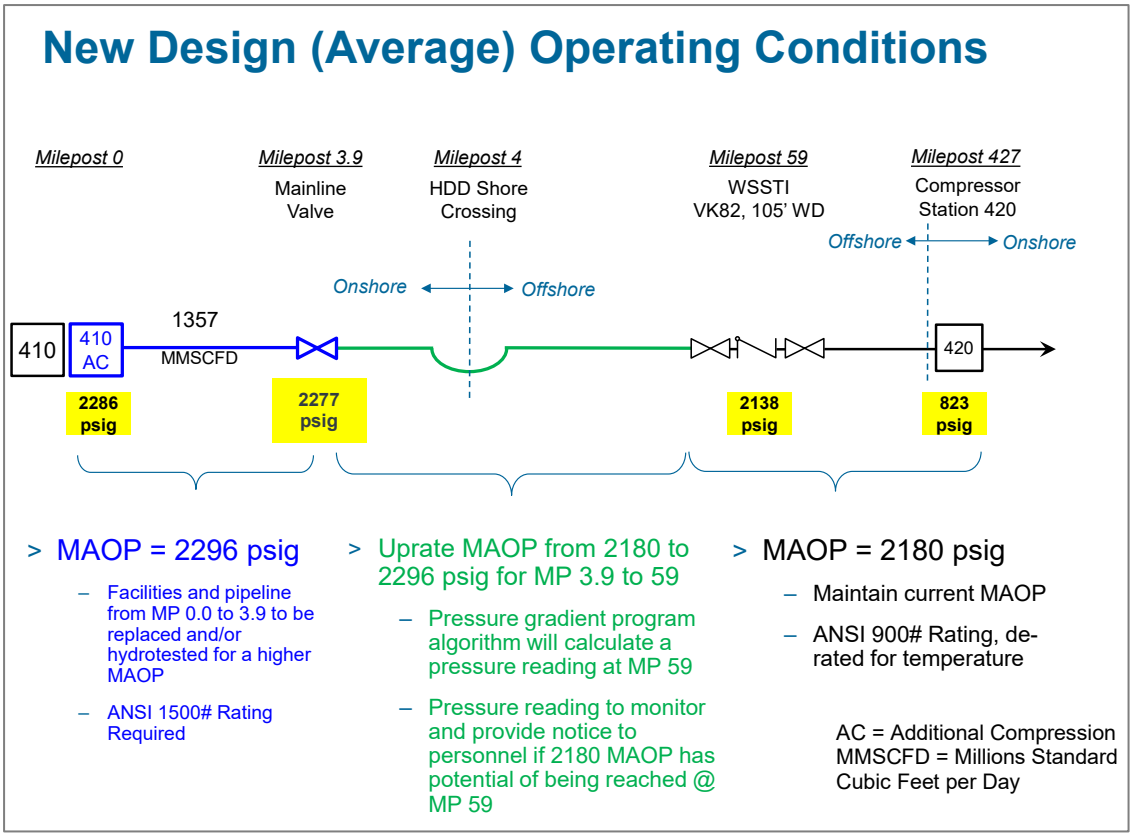

Figure 3: Gulfstream Phase VI Operating Conditions

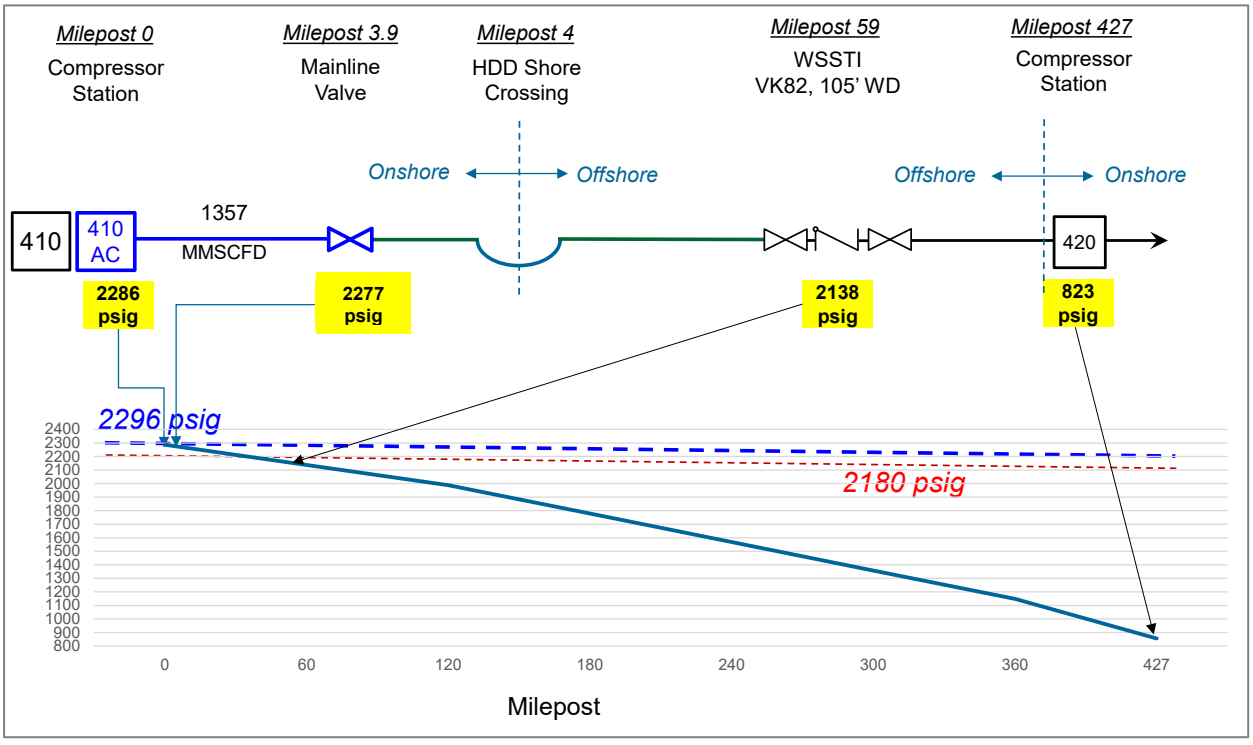

Figure 4: Gulfstream Phase VI Operating Pressure Scenario

Note: MP 59 is rounded-up for MP 58.7.

The process of uprating consists of increasing pressure within the pipeline to transport greater quantities of gas. Typically, the term uprating includes the modification of a pipeline to accommodate the pressure increase, typically pipe replacement for heavier-walled pipe. In this case, Gulfstream is proposing to increase the pressure on the existing pipeline facility, after completing and while complying with alternative safety conditions that are not otherwise required by the Federal pipeline safety regulations in 49 CFR Part 192. The tables below represent the flow and pressure ranges of the operating system.

Gulfstream Phase VI Flow Ranges

During 24 hour Period	Flow (MMSCFD)	
	Station 410 Supply at 410	Station 420/Bartow Offtake
Max	1,383	1,813
Average	1,357	1,357
Min	1,351	337

Gulfstream Phase VI Pressure Ranges

During 24 hour Period	Pressure (psig)			
	MP 0 Compressor Station 410	MP 3.9 Mainline Valve	MP 59 WSSTI VK82	MP 427 Compressor Station 420
Max	2,286	2,277	2,142	1,121
Average	2,286	2,277	2,138	823
Min	2,286	2,277	2,134	695

The Selected Action evaluated in this Final Environmental Assessment (FEA) is defined as the approximately 55-mile section of 36-inch pipeline located primarily offshore proposed for uprate, which Gulfstream is requesting a special permit from the Pipeline and Hazardous Materials Safety Administration (PHMSA). The onshore compression addition and new pipeline replacement components of the Project are not included in the Selected Action and will be reviewed under a separate assessment by the Federal Energy Regulatory Commission (FERC).

The Environmental Report will be comprised of a series of Resource Reports that evaluate the environmental impacts of the Project and reasonable alternatives. For the Project, the anticipated Resource Reports are as follows:

- Resource Report 1 – General Project Descriptions;
- Resource Report 2 – Water Use and Quality;
- Resource Report 3 – Fish, Wildlife, and Vegetation;
- Resource Report 4 – Cultural Resources;
- Resource Report 5 – Socioeconomics;
- Resource Report 6 – Geological Resources;
- Resource Report 7 – Soils;
- Resource Report 8 – Land Use, Recreation, and Aesthetics;
- Resource Report 9 – Air and Noise Quality;
- Resource Report 10 – Alternatives;

> Resource Report 11 – Reliability and Safety; and

> Resource Report 12 – PCB Contamination.

Gulfstream will submit the Environmental Report as a part of its Certificate application in the second quarter of 2019. It is anticipated that FERC will issue an EA in the first quarter of 2020 with the Certificate to be issued in the third or fourth quarter of 2020.

A.3 Site Description

The section of the Gulfstream Pipeline associated with the Selected Action (herein referred to as the Special Permit Segment) begins in Mobile County, Alabama approximately 200 feet from the shoreline at approximate MP 3.9 (Onshore Station Number 205+47), enters the Gulf of Mexico in Alabama State waters and continues into Federal waters of the Gulf of Mexico to approximate MP 58.7 (Offshore Station Number 2892+77) immediately upstream of the West Subsea Tie In (WSSTI). The general location of the Special Permit Segment is depicted on the Special Permit Segment Overview Map provided in Appendix A.

The requested Special Permit Segment and Uprate will begin at approximately MP 3.9, Onshore Survey Station 205+47. There is an Onshore/Offshore Station equation near the Alabama shoreline. Onshore Survey Station 206+49 Back/0+09 is approximately Offshore Survey Station 0+00 as referenced on the as-built alignment sheet – Gulfstream Line 200 / Chart 1 of 50 provided in Appendix A. Referencing the as-built alignment sheet – Gulfstream Line 200 / Chart 7 of 50 provided in Appendix A, the MAOP specification break point from 2,296 psig to 2,180 psig will be at the designated weld number - LB200 MLV 2AWT-1. This MAOP specification break point will be the end of designated Special Permit Segment and Uprate at approximately MP 58.7, just upstream of the fabricated WSSTI assembly as noted on the as-built alignment sheet.

This end location is further described as the weld occurring where the base offshore line pipe of 0.820” wall thickness (WT) meets up with the fabricated WSSTI assembly consisting of 1.250” WT pipe. The physical location of this weld is 30’ 8” upstream of the WSSTI West Flange as noted on the drawing. This weld is located at approximately Offshore Station 2892+77 and will be the MAOP specification break location as discussed. Per the referenced as-built alignment sheet, the WSSTI West Flange is located at Offshore Station 2893+08. For the offshore pipeline section, the WSSTI area is located at approximate MP 54.8, as noted on the as-built alignment sheet. When added to the onshore pipeline section consisting of approximately 3.9 miles, this results in a total MP of approximately 58.7. Hence, this location of the WSSTI, and where the MAOP specification break location is to occur, is generally referred to as “MP 58.7” throughout this FEA.

Although not included in the Selected Action evaluated in this FEA, the onshore pipeline replacement between MP 0 and MP 3.9 will be designed to accommodate the increase in operating pressure from the current 2,180 pounds psig to 2,296 psig. After leaving the Compressor Station 410 piping, the gas will enter the new 36-inch pipeline at MP 0 of the Gulfstream Pipeline. The pipeline replacement will include pipe and fittings that will comply fully with 49 CFR 192.111, dependent on the class location for the 36-inch line utilizing X-70 SYMS pipe. There are currently no Class 4 areas along the Gulfstream Pipeline from MP 0 to 3.9.

Class location	Design Factor	Wall Thickness
1	0.72	0.820”
2	0.60	0.984”
3	0.50	1.181”

The fabrications between MP 0 and MP 3.9 will include a pig trap assembly and mainline valve assembly. The pipe used in these assemblies will be of a 0.5 design factor and will meet or exceed the

increased operating pressure of 2,296 psig. The small diameter flanges and valves associated with these fabrications will be rated at an ANSI 1500 pressure class. The large diameter (36-inch) valves used will be engineered to be capable of operating at a pressure of at least 2,296 psig. These components and all remaining ancillary materials for fabrications would be in Mobile County. Alabama, and would need to successfully undergo a pressure test of at least 3,444 psig (1.5x the MAOP of 2,296 psig).

Populations in the area are sparse, with the major population center located to the north in the City of Mobile, Alabama. The Special Permit Segment lies within a High Consequence Area (HCA) for approximately 103 feet near MP 3.9 (Station Number 205+47 to 206+49) based on review of the National Pipeline Mapping System's online database and Gulfstream's internal review process.

A review of structures along the Gulfstream Pipeline is completed on an annual basis by Gulfstream Operations using field verification and current structure verification maps. The information on the structure verification maps includes current aerial imagery, pipe specifications, HCAs, Class Locations, 300-foot and 660-foot class location boundary limits, and a data collection buffer indicating how far out to collect structures. The buffers are calculated and stored in a GIS system based on the pipeline centerline location. The data collection buffer is calculated by taking the greater of 660-feet for class location unit (49 CFR 192.5(a)(1)) or the potential impact radius (PIR), and then adding an additional 100-feet. Structures data is collected out to the greater of either 760 feet or the PIR plus 100 feet.

A figure provided in Appendix B depicts the section of the Special Permit Segment that lies within an HCA. This figure also depicts the class unit (660 feet), PIR (1,190 feet), and structures within the PIR along the HCA section and within one-mile upstream of the HCA section. No HCAs are located along the remainder of the Special Permit Segment or within one mile downstream of MP 58.7. Four structures are located within the PIR of the section of the Special Permit Segment that lies within an HCA near the beginning of the pipeline uprate at MP 3.9. These structures include two commercial/industrial structures and two residential structures. Additional structures are located outside of the PIR of the HCA section, but within one-mile upstream of the HCA section. The Selected Action of the special permit will not involve construction or operation activities that will directly impact these structures.

B. Purpose and Need

Gulfstream's principal purpose is to increase the amount of natural gas supplied to Florida. For this reason, Gulfstream is requesting a special permit for the Selected Action is to obtain PHMSA approval to increase pressure (or uprate) on an approximately 55-mile section of the existing Gulfstream Pipeline to increase pipeline capacity. The existing Gulfstream Pipeline has the capacity to transport approximately 1.3 Bcf of sales grade natural gas each day from natural gas receipt points in Mississippi and Alabama to power generation and distribution system customers in Florida. In 2017, Gulfstream delivered approximately 435 Bcf of gas, which accounts for 30 percent of the natural gas consumed in Florida. Florida's population growth results in increased demand for power generation. The pipeline uprate will enable Gulfstream to respond to the increased demand while also lowering Florida's carbon fuel-based emissions by supporting local power generation interest in converting existing coal power generation to natural gas power generation. By increasing the total gas supply to Florida from 30% to 32%, the Project will increase utilities ability to use more clean burning natural gas for power generation. This incremental increase in natural gas supply will provide the daily energy needs of approximately 285,000 homes in Florida.

In the event that PHMSA denies the special permit request, Gulfstream will pursue its stated purpose and need through the implementation of the no-action alternatives 2A, 2B, 2C, or 2D, as described below.

A special permit is an order that waives or modifies compliance with a regulatory requirement if the pipeline operator requesting it demonstrates the need and PHMSA determines that granting a special

permit will be consistent with pipeline safety. Under 49 CFR 192.619(a), a pressure control device, i.e. pressure regulator, will be required at the MAOP specification break location at MP 58.7 as discussed above in Sections A.2 and A.3. Under 49 CFR 192.195(a), an over-pressure protection (OPP) device, i.e. pressure relieving or limiting device, is also required with the regulator for any pressure control failure. The installation of a pressure regulator and the required OPP device is not practical at MP 58.7 due to the subsea location, without significant environmental impacts, or cost as discussed in this FEA. For Gulfstream to install a functional pressure regulator offshore at MP 58.7, the pressure regulator will need to be installed on a platform above the water surface with isolation valves and in a manner to protect the pressure regulator from the weather and Gulf of Mexico offshore waves. Therefore, Gulfstream proposes to utilize the normal pressure losses due to internal pipeline friction with the gas flow, i.e. pressure gradient, for the required pressure control, and install OPP devices at Compressor Station 410. Please review Section C – Alternative 1 below for discussions. Gulfstream is seeking to obtain approval of a PHMSA special permit to waive the following code sections under 49 CFR Part 192:

1. § 192.619(a) to allow utilizing pressure gradient for pressure control at MP 58.7.
2. § 192.195(a) for the required OPP device at MP 58.7.

Gulfstream's PHMSA special permit Application includes special permit conditions (see Section 12.0 of the PHMSA special permit application). If the special permit is granted, Gulfstream will adhere to these conditions during operation of the pipeline within the Special Permit Segment.

There are currently no existing or reasonably foreseeable requests to PHMSA, which are connected to the Selected Action. The existing Gulfstream Pipeline was evaluated in the Gulfstream Pipeline Project Final Environmental Impact Statement (FEIS), issued by the FERC on January 26, 2001 under Docket Number CP00-6-000.

Specification for the section of the existing Gulfstream Pipeline within the Special Permit Segment are provided in **Table 1**. Water depths along the Gulfstream Pipeline range from zero at the shoreline to approximately 105 feet within the Special Permit Segment up to MP 58.7. There are no valves located along the Gulfstream Pipeline within the Special Permit Segment. The nearest valves lie just outside of the Special Permit Segment:

> Valve GA 200-1 onshore at MP 3.9
> Valves GO 200-2, GO 200-3, GO 200-4 at MP 58.7 at the WSSTI.

An inline inspection assessment of the Gulfstream 36-inch ML200 (AL to FL) was completed in 2012. Rosen (a third party in-line inspection service provider) performed geometry inspection on April 5, 2012 and no deformations greater than 1% were found. A subsequent circumferential high-resolution magnetic flux leakage (MFL) inspection was completed on October 4, 2012. No external anomalies were found indicating that the external cathodic protection system is performing well. The same Rosen 2012 MFL inspection identified no internal corrosion anomalies above the 10% reporting threshold. The assessment found no features with a failure pressure ratio under 1.39.[2] There have been no cracking indications on the Gulfstream Pipeline. In 2019, Williams plans to conduct another inline inspection of the Gulfstream 36-inch ML200 (AL to FL) pipeline with geometry and MFL technology.

[2] Failure pressure ratio of 1.39 is the reciprocal of the Class 1 location 0.72 design factor, which will give a 39 percent safety factor.

Table 1: Pipe Specification for the Gulfstream Pipeline within the Special Permit Segment

MP	Location	Length	Diameter (in)	Wall Thickness (in)	Grade (psi)	Seam Type	External Coating	Internal Coating	Weight Coating	Cathodic Protection Type	Test Pressure and Duration
3.9	Onshore	103 ft	36	1.122	70,000	DSAW Longitudinal Seam	14 mils FBE	1.5 mils Liquid Epoxy	Not Applicable	Cluster of 4 Bracelet Anodes 425 lb. each	3,350 psig 8 hours
3.9 - 5.0	HDD Shore Crossing	1 mi	36	1.250	65,000	DSAW Longitudinal Seam	14 mils FBE 40 mils ARO	1.5 mils Liquid Epoxy	Not Applicable		2,879 psig 8 hours
5.0 - 6.0	Offshore	1 mi	36	0.820	70,000	DSAW Longitudinal Seam	14 mils FBE	1.5 mils Liquid Epoxy	3 in 205 lb./CF Concrete	Bracelet Anodes 454 lb. each 640 ft spacing[3]	
6.0	Offshore	35 ft	36	0.993	65,000	DSAW Longitudinal Seam	14 mils FBE	Not Applicable	Not Applicable		
6.0 - 58.7	Offshore	53 mi	36	0.820	70,000	DSAW Longitudinal Seam	14 mils FBE	1.5 mils Liquid Epoxy	3 in 205 lb./CF Concrete or 2.75" – 190 lb./CF		

MP – milepost
ft – feet
mi – mile
in – inches
psi – pounds per square inch
psig – pounds per square inch gauge
lb. – pound
lb./CF – pounds per cubic foot
ARO – abrasion resistant overcoating
FBE – fusion bonded epoxy
SAW – submerged arc welded
DASW – double submerged arc welded

[3] The design life of the 454-pound anode bracelets at a 640-foot spacing is 40 years. The remaining anode bracelet life should be approximately 24 years.

C. Alternatives

Gulfstream considered and evaluated the following alternatives for meeting the purpose and need:

- Alternative 1: Selected Alternative (Selected Action)
- Alternative 2: No Action Alternative (i.e. permit denial)
  - Alternative 2A; Looping Alternative
  - Alternative 2B: Subsea Isolation Valve Alternative
  - Alternative 2C: Platform Alternative
  - Alternative 2D: No Change in Operations

This analysis considers two main alternatives, which are the Proposed Alternative and the No Action Alternative. If PHMSA denied the special permit request, which is the same as selection of the No Action Alternative, Gulfstream will need to comply fully with Part 192. In that case, PHMSA would have no role in determining whether Gulfstream opted to undertake the Looping Alternative (2A), the Subsea Isolation Valve Alternative (2B), the Platform Alternative (2C), or No Change in Operations (2D). Each of these alternatives would need to comply fully with Part 192 unless a separate special permit was provided. Nonetheless, PHMSA must consider the potential environmental impacts of the No Action Alternative, in whichever form it might take, in comparison to the Selected Action.

All these Alternatives will be included in the Environmental Report as a part of Gulfstream's FERC Certificate application and approval.

Table 2 provides a summary of the potential impacts associated with Alternatives 1 and 2A – 2C. These alternatives are discussed in detail in Section C.1 through C.4, are depicted on figures provided in Appendix C, and are summarized in Appendix D. Like the Proposed Action, Alternatives 2A and 2B would include both onshore and offshore components. The offshore components for the Selected Action and Alternatives 2A and 2B would include minor associated shoreline segments (e.g., pipe from begin point 100 to 400 feet from the shoreline to entry into the Gulf of Mexico in Alabama State waters). To provide an equivalent impact evaluation, only potential impacts associated with the offshore components (including any associated shoreline segments) of these alternatives are evaluated in this section. FERC will be the lead agency tasked with review of alternatives to the construction and siting and routing of the onshore components of the Project (as discussed in Section A).

Table 2: Summary of Potential Offshore Impacts for the Gulfstream Phase VI Project Alternatives

Factors	Alternative 2A Looping Alternative	Alternative 2B Subsea Isolation Valve Alternative	Alternative 2C Platform Alternative	Alternative 1 Proposed Alternative[1]	Notes
Total Route Length	46 miles	55 miles	Not Applicable	55 miles	Includes only proposed offshore components of alternatives. Onshore components are not considered in this evaluation.
Co-Location Length	46 miles (Gulfstream Line 200 and Supply Lateral 060)	55 miles (Gulfstream Line 200 and Supply Lateral 060)	Not Applicable	5 miles (Gulfstream Supply Lateral 060)	Co-location includes portions of the proposed pipeline or umbilical routes that abut or are immediately adjacent to existing utility rights-of-way.

Table 2: Summary of Potential Offshore Impacts for the Gulfstream Phase VI Project Alternatives

Factors	Alternative 2A Looping Alternative	Alternative 2B Subsea Isolation Valve Alternative	Alternative 2C Platform Alternative	Alternative 1 Proposed Alternative[1]	Notes
Construction Impact	976 acres	1,334 acres	23 acres	No impact	Assumes a 200-foot construction corridor along proposed pipeline or umbilical routes. Assumes no impact along HDD crossings. Assumes a 1,000 by 1,000-foot construction area for the Subsea Isolation Valve and Platform.
Operation Impact	998 acres	1,358 acres	<1 acre	No impact	Assumes a 200-foot operation corridor along pipeline or umbilical routes. Assumes a 100 by 100-foot operation area for the Subsea Isolation Valve and Platform.
Anchor / Cable Sweep Impact	9 acres	9 acres	No impact	No impact	Estimated impacts to benthic resources from anchoring/cable sweeps in water depths less than 10 feet. Assumes 2.9 acres/mile and use of eight anchors/barge for three passes of barge traffic during construction. Assumes no impact along HDD crossings.
Marine Protected Areas Impact	599 acres	955 acres	23 acres	No impact	Estimated impacts associated with construction activities. Marine protected areas include Reef Fish Stressed Area, Reef Fish Longline and Buoy Gear Restricted Area, and Desoto Canyon Closed Area.
Essential Fish Habitat Impact	976 acres	1,334 acres	23 acres	No impact	Estimated impacts associated with construction activities. Essential fish habitat for Coastal Migratory Pelagic Resources, Red Drum, Shrimp, and Reef Fish.
Critical Habitat Impact	264 acres	264 acres	No impact	No impact	Estimated impacts associated with construction activities. Critical habitat for Atlantic sturgeon (*Acipenser oxyrinchus desotoi*).
Major Waterbodies Crossed	3	3	1	3	Number crossed by pipeline or umbilical routes or within area occupied by the Subsea Isolation Valve and Platform.
Offshore Pipelines Crossed	9	11	1	11	Number crossed by pipeline or umbilical routes or within area occupied by the Subsea Isolation Valve and Platform.
Offshore Platform Crossed	0	0	0	0	No offshore platforms crossed by pipeline or umbilical routes or within area occupied by the Subsea Isolation Valve and Platform.

Table 2: Summary of Potential Offshore Impacts for the Gulfstream Phase VI Project Alternatives

Factors	Alternative 2A Looping Alternative	Alternative 2B Subsea Isolation Valve Alternative	Alternative 2C Platform Alternative	Alternative 1 Proposed Alternative[1]	Notes
Waterway/ Shipping and Navigation Channels Crossed	4	5	0	5	Number crossed by pipeline or umbilical routes or within area occupied by the Subsea Isolation Valve and Platform.
Reported Shipwrecks Crossed	1	1	0	1	Number crossed by pipeline or umbilical routes or within area occupied by the Subsea Isolation Valve and Platform.
Submerged Obstructions Crossed	4	4	0	4	Number crossed by pipeline or umbilical routes or within area occupied by the Subsea Isolation Valve and Platform.

[1] Route lengths and resource crossings reported for the Preferred Alternative are provided for comparison only and do not constitute potential impacts. The Preferred Alternative will involve only the uprating of the approximately 55 miles of pipeline in the Special Permit Segment, which will not impact resources reported in this table.

Source: NOAA 2018a, 2018b, 2018c, and 2018 and BOEM 2018a, 2018b, and 2018c.

C.1 Alternative 1: Selected Alternative (Selected Action)

As described in Section A, under the Selected Action, PHMSA proposes to allow Gulfstream to increase pressure for approximately 55 miles of pipeline located primarily offshore from the current 2,180 psig MAOP to 2,296 psig. Because the Selected Action involves an increase in the MAOP of the pipeline from 2,180 psig to 2,296 psig, both a Right-of-Way Modification Permit from the U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement (BSEE) and a special permit from PHMSA are required to implement the Selected Action.

If PHMSA denies the special permit request, then strict adherence to the code section § 192.619(a) and § 192.195(a) requirements would be required. Alternatives 2A, 2B, or 2C would then be required to meet and comply with these requirements. Gulfstream would select the Alternative and fully comply with all Part 192 requirements and no special permit would be required for the project.

The preferred selection is Alternative 1. The special permit conditions for the safe operation of the existing Gulfstream Pipeline at the uprated MAOP is listed below for the ***special permit segment*** and ***special permit inspection area***:

Special Permit Segment and Special Permit Inspection Area:

This special permit applies to the ***special permit segment*** and defined as follows using the Gulfstream Pipeline survey station (SS) references:

- ***Special permit segment*** — Onshore SS 205+47 (MP 3.9) to Offshore SS 2892+77 (MP 58.7).

  The Gulfstream Pipeline ***special permit segment*** begins in Mobile County, Alabama approximately 200 feet from the shoreline at approximate MP 3.9 (Onshore SS 205+47), enters the Gulf of Mexico in Alabama State waters and continues into Federal waters of the Gulf of Mexico to approximate MP 58.7 (Offshore SS 2892+77) immediately upstream of the West Subsea Tie In (WSSTI) (“MP 58.7” or “MP 58.7 WSSTI”).

- ***Special Permit Inspection Area:***

> ***Special permit inspection area*** is defined to mean the area that extends 220 yards on each side of the centerline along approximately 427.8 miles of the 36-inch diameter Gulfstream ML 200 Pipeline from MP 0.0 to MP 427.8. The ***special permit inspection area*** includes all of the following:

- ***Special permit inspection area A*** is from MP 0.0 through MP 3.9 Mainline Valve 200-1 (MLV 200-1);
- ***Special permit segment*** is from MP 3.9 to MP 58.7 WSSTI and
- ***Special permit inspection area B*** is from the upstream side of MP 58.7 WSSTI to MP 427.8.
- Note: The ***special permit inspection area*** was divided into the ***special permit inspection area A, special permit segment***, and ***special permit inspection area B*** for MAOP and/or pressure gradient change points as described in Condition 2 below.

- **Summary of the Special Permit Conditions:**

PHMSA grants this special permit for the Gulfstream Pipeline subject to Gulfstream implementing the following summarized conditions[4]:

1. **Operating Procedures and Maximum Allowable Operating Pressure:** All procedures, records, and documentation for implementing these special permit conditions must be included in the Gulfstream Operations and Maintenance (O&M) Procedures to meet 49 CFR 192.605 and 49 CFR 192.603(a) for the life of the special permit.

2. Maximum Allowable Operating Pressure:

a. The pipe, fittings, flanges, fabrications, and other components upstream of and including Mainline Valve 200-1 (MLV 200-1) in the ***special permit inspection area A*** must be designed, constructed, pressure tested, and operated at a MAOP of 2,296 psig to meet 49 CFR Part 192.

b. The ***special permit segment*** must be operated at or below an MAOP of 2,296 psig, using a pressure gradient to 2,180 psig or below at MP 58.7.

c. The ***special permit inspection area B*** must be operated at or below its MAOP of 2,180 psig. The subsea mainline valves at MP 58.7 are ANSI 900 rated valves (2,180 psig) and are the pressure rating change-over location for the MAOP.

3. Integrity Management Program:

a. The ***special permit inspection area*** must be included in the Gulfstream written integrity management program (IMP) as a "covered segment" in a high consequence are (HCA) in accordance with 49 CFR 192.903, except for the reporting requirements contained in 49 CFR 192.945.

b. Gulfstream must require in the O&M Procedures the usage of inline inspection (ILI) tools for the inspection and reassessments to meet 49 CFR 192.917 for threats and 49 CFR 192.939 for reassessment intervals for the ***special permit inspection area***. ILI tools must be high resolution and capable of detecting features for the identified threats.

[4] The special permit with conditions can be reviewed at www.regulations.gov on Docket No. PHMSA-2018-0105.

4. Flow Model Validation:

a. The “Active” flow model validation must be completed and both the “Active” and “Operational” flow models must be installed and operating prior to uprating the MAOP of the Gulfstream Pipeline. Attachment E (“Gulfstream Pipeline Hydraulic Flow Modeling and Operator Training”) describes the “Active” and “Operational” models used for the pipeline system operation.

b. The “Active” model must be revalidated within six (6) months of the initial validation and then on an annual basis not to exceed 15 months based upon real-time pressure and flow readings upstream and downstream of Station 410 and upstream of Station 420. If the “Active” model results are over +/- 1% of actual operating pressures, the operating pressure must be lowered to 2,180 psig or below at MP 0. Before operating pressures are raised, the “Active” model must be retuned and revalidated to show that the MAOP of 2180 psig is not exceeded at MP 58.7. Gulfstream must maintain documentation of the validation for the life of the special permit.

c. A monthly maximum operating pressure over the 2,180 psig MAOP (based upon the “Active” model calculations) at MP 58.7 or misalignment of the pressures (model versus actual pressures at MP 0.0 and MP 427.8) at MP 0.0, MP 58.7, or MP 427.8 for varying flow rates where the maximum operating pressure at MP 58.7 can be exceeded are events that Gulfstream must report to Director, PHMSA Southern Region and may require Gulfstream to retune and revalidate the “Active” model, if requested by the Director, PHMSA Southern Region. [5]

5. **Operator Training:** Operator training for this special permit must be completed prior to uprating the Gulfstream Pipeline. Operator training must include training on normal operating conditions and upset conditions. All training must be in accordance with 49 CFR 192.631(h).

6. Pipeline Pressure Control:

a. Gulfstream must install an active logic algorithm system for pressure control and a station control panel to monitor pressures at Compressor Station 410 and Compressor Station 420 with real time modeling to ensure the pressure remains at or below 2,180 psig at MP 58.7 WSSTI. Compressor Station 410 must be pressure controlled and monitored to not exceed the uprated 2,196 psig MAOP in ***special permit inspection area A*** and the ***special permit segment***. Attachment E (“Gulfstream Pipeline Hydraulic Flow Modeling and Operator Training”) has the requirements that must be followed for the active logic algorithm.

b. The "Active" model must utilize real-time Gulfstream Pipeline pressures, temperatures, flow rates, and gas composition to provide a detailed picture of current operations. The "Active" model must continuously compute a pressure for MP 58.7 by reading real-time flow rates and pressures at Compressor Station 410 and Compressor Station 420.

c. If the "Active" model is not online, the discharge pressure at Compressor Station 410 must be maintained at or below 2,180 psig. Gulfstream must maintain documentation of this changed condition.

d. The Gulfstream Pipeline must have an operational supervisory control and data acquisition (SCADA) system, 24-hours per day and 7-days per week, for the ***special permit inspection area*** to be operated over a 2,180 psig MAOP. The SCADA system must be operated in accordance with 49 CFR 192.631 and must receive pressure data from Compressor Station 410, Compressor Station 420, incoming gas receipt pipelines, and outgoing gas delivery

[5] Upon notice by the Director, PHMSA Southern Region to Gulfstream, PHMSA may have the Gulfstream Pipeline assigned to another PHMSA Region.

pipelines. Should the Gulfstream Pipeline SCADA system become non-operational, Gulfstream must notify the Director, PHMSA Southern Region within 48 hours of the event or the next working day, and must have 24-hour per day operational coverage or communications with Compressor Station 410, Compressor Station 420, gas receipt points, and gas delivery points for pipeline operating pressures.

e. The Gas Control Center for the Gulfstream Pipeline must control pressures entering and leaving the ***special permit inspection area***, so that the 2,180 psig MAOP at MP 58.7 and throughout the ***special permit inspection area B*** will not be exceeded.

f. Should any of the pressure reduction requirements in **Condition 6** need to be modified for up to a seven (7) day interval due to the model or SCADA being out of service, Gulfstream must send a notice letter stating the proposed modification to the Director, PHMSA Southern Region and must receive a letter of "no objection" from the Director, PHMSA Southern Region prior to it being implemented by Gulfstream.

7. Overpressure Protection:

a. A minimum of two (2) OPP devices must be installed at Compressor Station 410 for any compressor or pipeline flowing into the Gulfstream Pipeline.

b. The Station or Pipeline Control Panels for compressors or pipelines flowing into the Gulfstream Pipeline must be set at 2,321 psig or less to trigger the emergency shutdown device (ESD) and a hard-wired ESD switch must be set at 2,341 psig or less. [6] These ESDs must ensure the Gulfstream Pipeline overpressure must remain below the allowable over-pressure limit of 2,267 psig at MP 58.7. [7]

c. Gulfstream must conduct annual flow model validation that ensures the OPP setting at Compressor Station 410 maintains an OPP limit of 2,267 psig or less at MP 58.7. Gulfstream must maintain documentation of the validation for the life of the special permit.

d. Within six (6) months after installation of the Gulfstream Project to expand flow volumes, Gulfstream must conduct 30 days of pressure monitoring at MP 58.7 WSSTI to confirm the "Active" flow model for modeling pressure gradients for the Gulfstream Pipeline. If less than 30 days of pressure monitoring is conducted by Gulfstream at MP 58.7 WSSTI, Gulfstream must obtain a "no objection letter" from PHMSA's Southern Region Director. Results must be documented and submitted to the Director, PHMSA Southern Region within 60 days of completion of the pressure monitoring.

e. Gulfstream must record the maximum operating pressures at MP 0.0 (Compressor Station 410 discharge) and MP 427.8 (Compressor Station 420 suction) for each month during the year. The "Active" model pressure must be used to trend the maximum pressures at MP 58.7 and either at MP 0.0 (Compressor Station 410 discharge) and MP 427.8 (Compressor Station 420 suction) based upon the actual maximum operating pressures.at the other Compressor Station.

Note: A monthly maximum operating pressure over the 2,180 psig MAOP (based upon the "Active" model calculations) at MP 58.7 is an event that Gulfstream must report to the Director, PHMSA Southern Region and may require Gulfstream to retune and revalidate the "Active" model, if requested by the Director, PHMSA Southern Region, see **Condition 4(b)**.

[6] OPP at Compressor Station 410 or pipelines flowing into the Gulfstream Pipeline must be set at 2,341 psig or less (2,296 psig times 1.02). Gulfstream must have flow models to show that a 2,341 psig OPP at Compressor Station 410 will not overpressure MP 58.7 valves beyond 2,267 psig.

[7] OPP at MP 58.7 must not exceed 2,180 psig times 1.04 (MAOP times 1.04), which is 2,267 psig.

f. In the future, if Gulfstream expands pipeline facilities over the present FERC certificated facilities in the Gulfstream Project, Gulfstream must contact the Director, PHMSA Southern Region to determine if pressure monitoring at MP 58.7 WSSTI is required to revalidate the model described in Attachment E ("Gulfstream Hydraulic Flow Modeling and Operator Training").

8. **Pipeline Operational Controls:** During any possible upset operational conditions, Gulfstream Pipeline operational controls must be put in place to temporarily reduce the 2,296 psig Compressor Station 410 discharge pressure to 2,180 psig, by shutting down the new Unit 5 Booster Compressor, during any possible upset operational conditions defined as follows:

   a. In-line inspection or other pigging of the Gulfstream Pipeline;

   b. Compressor Station 410, Compressor Station 420, or any portion of the Gulfstream Pipeline lies between or falls within the 3-day “cone of uncertainty” for a track projection of a named tropical storm or hurricane by the National Hurricane Center. The “cone of uncertainty” represents the range of possibilities for the storm's center and extends up to five days into the future;

   c. Disruption of flow into or out of Compressor Station 420 with any inadvertent or intentional mainline valve closure[8] that may cause upstream pressure increases; or

   d. Extended low flow demand of 337 million cubic feet per day or less in Florida, lasting for 72-hours or more, caused by seasonal or abnormal conditions.

   e. Should any of the pressure reduction requirements in **Condition 8** need to be modified for up to a seven (7) day interval, Gulfstream must send a notice letter stating the proposed modification to the Director, PHMSA Southern Region and must receive a letter of “no objection” from the Director, PHMSA Southern Region prior to it being implemented by Gulfstream.

9. **Pipeline Patrols and Surveys:** Gulfstream must perform aerial patrols from the Gulfstream Pipeline MP 0 to MP 58.7 in Alabama and from MP 406 (Egmont Key - Offshore SS 21438 +16) to MP 427.8 on a quarterly basis not to exceed 75 days in accordance with the 49 CFR 192.705.

10. **Annual Offshore Leakage Survey:** Gulfstream must perform an offshore leakage survey by aircraft from Gulfstream Pipeline MP 3.9 to MP 427.8 on an annual basis not to exceed 15 months in accordance with 49 CFR 192.706.

11. **Shallow Water Surveys:** Gulfstream must develop procedures for performing shallow water depth of cover surveys and remediation based upon survey findings for the Gulfstream Pipeline. The procedures must require shallow water depth of cover surveys a minimum of every five (5) years not to exceed 66 months in accordance with 49 CFR 192.612.

12. **Annual Report to PHMSA:** Annually,[9] after issuance of this special permit, Gulfstream must submit an annual pipeline integrity report[10] to the Director, PHMSA Southern Region with a copy to the

[8] Examples of inadvertent or intentional mainline valve closures that would disrupt flow and cause mainline pressures to increase would be the closure of the 36-inch mainline valves, where the Gulfstream Pipeline reaches the Florida coast and would include the 36-inch diameter mainline valve MLV-200-10 located near the Florida Sunshine Skyway Bridge, the 36-inch diameter mainline valve MLV-200-11 located where the pipeline comes onshore in Florida, and 36-inch diameter mainline valve GF-200-S1 located at the inlet of Compressor Station 420 near the incoming pig receiver.

[9] Annual reports must be received by PHMSA by the last day of the month in which the special permit is dated. For example, the annual report for a special permit dated July 2020, must be received by PHMSA no later than July 31, each year beginning in 2021.

[10] Gulfstream must place a copy of each Gulfstream Pipeline annual report on the PHMSA docket, PHMSA-2018-0105, at www.regulations.gov.

Director, PHMSA Engineering and Research Division summarizing the following and any other significant integrity threats or pressure modeling issues:

a. Any new integrity threats identified during the previous year and the results of any ILI or direct assessments performed (including any un-remediated anomalies over 30% wall loss, cracking found in the pipe body, weld seam or girth welds, and dents with metal loss, cracking or stress riser) during the previous year in the ***special permit inspection area*** including the respective survey station and MP, failure pressure ratio, anomaly depth and length, and class location.

b. The maximum operating pressure reached at MP 0.0 (Compressor Station 410 discharge) and MP 427.8 (Compressor Station 420 suction) for each month during the year with the corresponding "Active" flow model pressure at MP 58.7 based upon these maximum operating pressures at MP 0.0 and MP 427.8.

c. Any reportable incident, any leak normally indicated on the DOT Annual Report, and all repairs on the pipeline that occurred during the previous year in the ***special permit inspection area***.

d. Any on-going damage prevention initiatives affecting the ***special permit inspection area*** and a discussion of the success of the initiatives including findings and any remediation actions.

e. Any mergers, acquisitions, transfer of assets, or other events affecting the regulatory responsibility of the company operating the pipeline.

13. **Certification:** A Gulfstream senior executive officer, vice president or higher, must certify in writing the following:

    a. The ***special permit inspection area*** meet the conditions described in this special permit.

    b. The written manual of O&M Procedures required by 49 CFR 192.605 for the Gulfstream Pipeline has been updated to include all requirements of this special permit; and

    c. Gulfstream has implemented all special permit conditions required, prior to uprating the ***special permit inspection area***, by this special permit for the Gulfstream Pipeline and any future special permit condition requirements are in the Gulfstream Pipeline O&M Procedures for future work.

    Within 60 days after installation of the Gulfstream Project, Gulfstream must send the certifications required in **Condition 13(a) through (c)** with special permit condition status and procedure completion date, compliance documentation summary, and the required senior executive signature and date of the signature to the PHMSA Associate Administrator with copies to the Director, PHMSA Southern Region; the Director, PHMSA Engineering and Research Division; and to the docket for PHMSA-2018-0105 at www.Regulations.gov.

14. Limitations: This special permit is subject to the limitations set forth in 49 CFR 190.341 as well as the following limitations:

    a. PHMSA has the sole authority to make all determinations on whether Gulfstream has complied with the specified conditions of this special permit. Failure to comply with any condition of this special permit may result in revocation of the permit.

    b. Any work plans and associated schedules for the Gulfstream Pipeline ***special permit segment*** and ***special permit inspection area*** are automatically incorporated into this special permit and are enforceable in the same manner.

    c. Failure by Gulfstream to submit the certifications required by **Condition 13 (Certification)** within the time frames specified may result in revocation of this special permit.

d. As provided in 49 CFR 190.341, PHMSA may issue an enforcement action for failure to comply with this special permit. The terms and conditions of any corrective action order, compliance order or other order applicable to a pipeline facility covered by this special permit will take precedence over the terms of this special permit.

e. If Gulfstream sells, merges, transfers, or otherwise disposes all or part of the assets known as the Gulfstream Pipeline, Gulfstream must provide PHMSA with written notice of the change within 30 days of the consummation date. In the event of such transfer, PHMSA reserves the right to revoke, suspend, or modify the special permit if the transfer constitutes a material change in conditions or circumstances underlying the permit.

f. PHMSA grants this special permit to limit it to a term of no more than ten (10) years from the date of issuance. If Gulfstream elects to seek renewal of this special permit, Gulfstream must submit its renewal request at least 180 days prior to expiration of the ten (10) year period to the PHMSA Associate Administrator for Pipeline Safety with copies to the PHMSA Southern Region Director; and Director, PHMSA Engineering and Research Division. All requests for a renewal must include a summary report in accordance with the requirements in **Condition 12 (Annual Report to PHMSA)** above and must demonstrate that the special permit is still consistent with pipeline safety. PHMSA may seek additional information from Gulfstream prior to granting any request for special permit renewal.

Under the Selected Alternative there will be two (2) independent models protecting the piping and components at or downstream of MP 58.7 from an overpressure event. The “Transient” model provides the set points for the primary layer of protection, which is the Compressor Station 410 safety and control system, and the “Active” model provides the secondary layer of protection from an overpressure event.

The “Transient” model is a proven hydraulic model (model) used for planning system operating pressures. It will be used to set-up the “Active” model to calculate the pressure at MP 58.7 where the downstream specification break occurs from 2,296 psig to 2,180 psig MAOP. Based on these model calculations, using the most conservative expected operating conditions, the MAOP at MP 58.7 must not exceed 2,180 psig during operating flow conditions. The Gulfstream Pipeline controlling pressure set points established at Compressor Station 410 discharge must provide pressure protection of the 2,296 psig MAOP for the **special permit segment** and must prevent any pressure excursion above 2,180 psig at or downstream of MP 58.7 (***special permit inspection area***).

The “Active” model software is the industry-leading solution for real-time pipeline monitoring for liquids and gas pipelines. It offers multiple leak detection technologies to find anything from small leaks to ruptures. The “Active” model utilizes real-time pressure, temperature, flow rates and fluid composition to provide a detailed picture of current operations. Additional information for both models is provided in Appendix E.

Under the Selected Alternative operational safeguards will be implemented to control the pressure. These safeguards include:

> Validation of the pressure gradient, flow modeling, and controls has been completed and verified with actual subsea pressure recorder data. The results of both the design flow model and the active model are summarized in Appendix E and demonstrate that discharging at 2,296 psig will not exceed the MAOP of 2,180 psig past MP 58.7 – is safe, prudent, and technically feasible.

> Development of a control algorithm has been tested and verified to ensure pressure at MP 58.7 does not exceed 2,180 psig by monitoring actual and calculated pressures and flows throughout the pipeline with an active safety system. Reference Appendix E for further information.

> Operational controls to temporarily reduce the 2,296 psig pressure discharge to 2,180 psig or with shutdown of the new booster compressor during events such as pigging, a named Tropical Storm or Hurricane, or disruption of flow into Compressor Station 420.

See Appendix H for a Simplified Control Narrative which describes control set points and criteria.

In addition, Gulfstream employs a pipeline control simulator for training of controllers using the simulator on specific scenarios. The Operator Training System (OTS) is a full-scope pipeline trainer, which provides a very realistic operator experience using a copy of the same SCADA screens as in the pipeline control room. The OTS allows the training officer to define and impose specific normal or abnormal scenarios on which the pipeline control room operator is to be trained. Additional details on the operational safeguards and training to be implemented under the Preferred Alternative are provided in Appendix E.

Currently, Gulfstream performs regular operations and maintenance activities as required to remain in compliance with Federal regulations and company policies. These activities include monitoring, inspections, surveys, and remediation to ensure the integrity of the pipeline is maintained, and in turn, the MAOP is maintained. Under the Selected Alternative, Gulfstream will continue to perform these regular operations and maintenance activities. Future maintenance activities currently scheduled include:

- 2019 In Line Inspection of Gulfstream Mainline 200, occurring every 7 years.
- 2022 Depth of Cover Survey (192.612) along Gulfstream Mainline 200 and Supply Lateral 60, occurring every 5 years.

In addition, a rectifier located at Station 410 is constantly monitored remotely and is set for a bimonthly inspection schedule. Cathodic protection levels for the MP 3.9 mainline valve site and the pipeline are noted to be in operational condition in accordance with Federal regulations and company policies and are documented into a compliance database. Atmospheric inspections are completed every three years for aboveground pipe. Additional details on the current and future operations and maintenance activities to be implemented under the Preferred Alternative are provided in Appendix F.

In accordance with Williams' internal procedures, a review will be completed to document that uprating the MAOP from 2,180 psig to 2,296 psig is acceptable for the existing pipeline section up to MP 58.7. An Uprate Plan and Procedure in accordance with the special permit and 49 CFR Part 192, Subpart K will be developed to safely increase the operating pressure above 2,180 psig but not exceeding 2,296 psig.

The affected resources and environmental consequences within the special permit segment associated with Gulfstream's Preferred Alternative (Selected Action) are summarized in the following sections. Based on the evaluation of the alternatives, the Selected Action will have the least environmental impacts of the alternatives considered and will meet Gulfstream's stated purpose and need. The environmental consequences associated with the Selected Action are minimal in comparison to the other alternatives evaluated in Section C. Should the special permit be denied, construction and operation of one of the other alternatives would be necessary to meet the Project's purpose and need, which would result in sea floor disturbance and temporary and permanent impacts to environmental resources.

C.2 Alternative 2A: Looping Alternative

Under the Looping Alternative, Gulfstream would be required to construct a partial loop line to provide an incremental capacity increase while still operating the pipeline at the existing 2,180 psig MAOP. The 36-inch loop line would extend along the Gulfstream Pipeline from Gulfstream's Compressor Station 410 near Coden, Alabama to approximately MP 50 and would include approximately 4 miles of onshore pipeline and 46 miles of primarily offshore pipeline. The offshore portion of the loop line would begin in Mobile County, Alabama approximately 400-feet from the shoreline, enter the Gulf of Mexico in Alabama State waters, and continue into Federal waters of the Gulf of Mexico to approximately MP 50. The shoreline crossing of the loop line would be installed via horizontal direction drill (HDD).

C.3 Alternative 2B: Subsea Isolation Valve Alternative

Under the Subsea Isolation Valve Alternative, Gulfstream would construct a subsea isolation valve at approximate MP 58.7 at the WSSTI. An approximately 55-mile dual 3-inch umbilical line would be constructed from approximate MP 3.9 and would extend along the existing Gulfstream Pipeline to the subsea isolation valve. The umbilical line would connect the subsea isolation valve to an onshore communication building located at approximate MP 3.9 for remote operation. The umbilical line would begin in Mobile County, Alabama approximately 400-feet from the shoreline, enter the Gulf of Mexico in Alabama State waters, and continue into Federal waters of the Gulf of Mexico to approximately MP 58.7 at the WSSTI. The shoreline crossing of the umbilical line would be installed via HDD. This alternative has the potential to cause pressure losses and reduce capacity increases.

C.4 Alternative 2C: Platform Alternative

Under the Platform Alternative, Gulfstream would construct an offshore junction platform in the Federal waters of the Gulf of Mexico at approximate MP 58.7 offset from the WSSTI. This alternative would not require construction of pipeline or other linear infrastructure, but would require installation of new piping, valves, and regulators, which have the potential to cause pressure losses and reduce capacity increases. Environmental impacts associated with construction and operation of the Platform Alternative are summarized in **Table 2.** Construction of the Platform Alternative would be completed within a 1,000-foot by 1,000-foot construction area. Construction would result in disturbance of the sea floor within the construction area due to installation of the facility (platform jacket and piling installation, pipeline tie-ins, and necessary WSSTI subsea valve and pipe removals) as well as additional sea floor disturbance resulting from anchor drops and cable sweeps from construction vessels. In addition to sea floor disturbance, construction would result in temporary impacts to water quality due to sediment suspension in the water column during installation of the facility and from anchor drops and cable sweeps from construction vessels.

Installation of an offshore platform to bring the Gulfstream Pipeline specification (MAOP) change up onto a “Junction Platform” would consist of multiple construction tasks. The two major components, the jacket and deck would be fabricated onshore at a major fabrication yard with offshore barge access. The jacket, which is the structure that extends from the mudline up to roughly 15 feet above sea level would be transported offshore on an ocean-going barge using several tugs to reach the location. A heavy lift marine vessel, capable of lifting in excess of 200 tons would be positioned with a large anchor spread on location to perform the jacket installation. The jacket could be either lifted off the barge or launched off the barge and then upended by the heavy lift vessel and placed onto the seafloor adjacent to the existing pipeline near MP 58.7 at the WSSTI. The jacket would then require driven piles (typically four, one in each corner of the jacket) into the sea floor in excess of several hundred feet below the mudline depending on the substrate conditions. Once the jacket is secured to the sea floor, the pre-fabricated deck complete with all process piping and equipment, utility services, buildings and heliport would then be brought out on an offshore barge, likewise, using several tugs to reach the location. The same heavy lift vessel would then pick up the deck off the barge and install it onto the jacket. The two major components would then be welded together normally taking several days of multiple welders working around the clock. Once the deck is secured to the platform, the existing pipeline would be accessed subsea, typically with an underwater hot tap and retrievable isolation plug or other conventional means. Two new pipeline sections would be added and brought up along the face of the jacket, called “pipeline risers” as shown in the typical platform drawing provided in **Figure 5**. The two new sections would be hooked up to the prefabricated piping systems on the deck providing for a typical piping spec break control system. The existing pipeline at the WSSTI between the two new sections would then be cut and capped at both ends and removed from the sea floor.

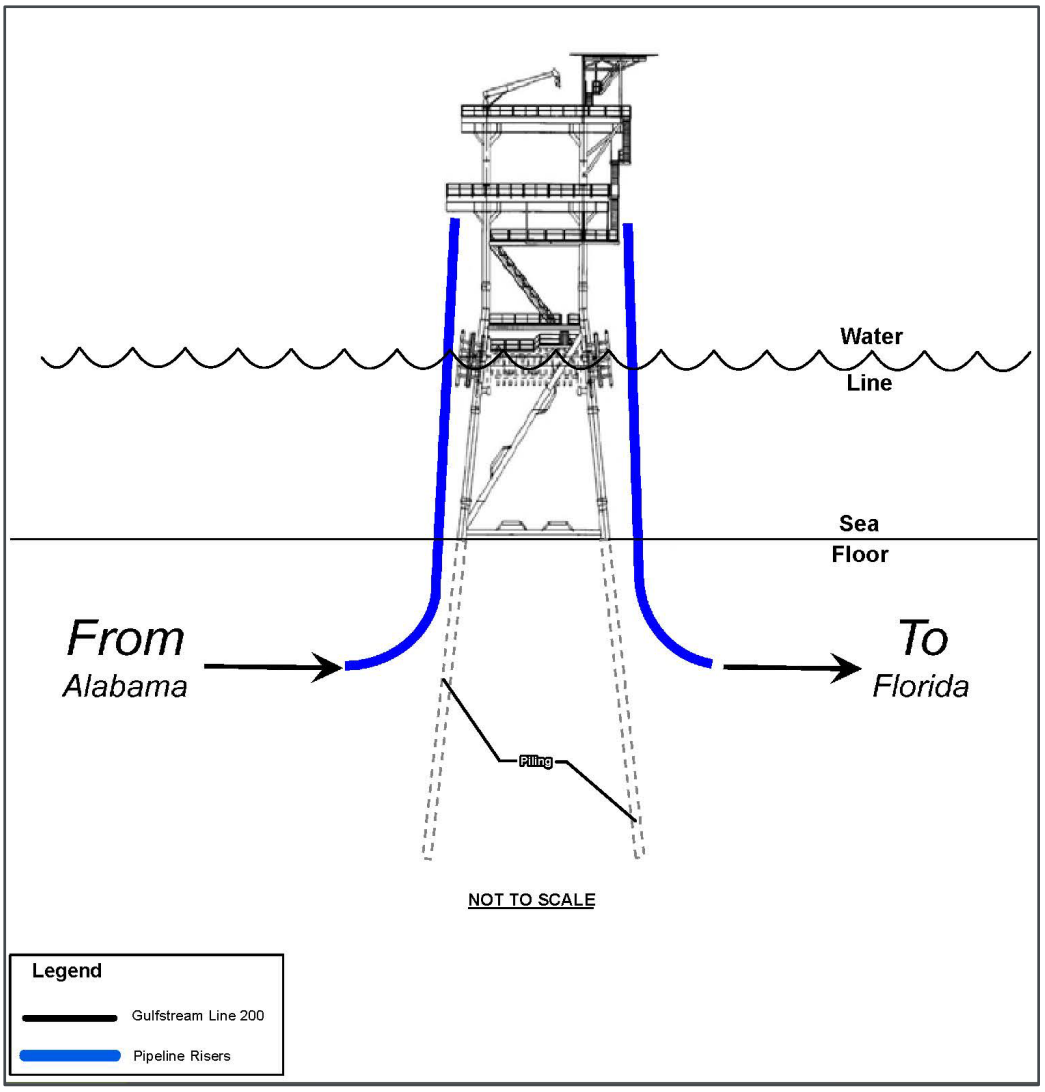

Figure 5: Typical Platform Drawing

D. Affected Resources and Environmental Consequences

This section explains and compares the impacts to the natural environmental and risks to pipeline safety under the different alternatives. Unlike the three No Action Alternatives, the Selected Action Alternative will not involve direct environmental impacts due to construction activities. The special permit conditions described in the Selected Action Alternative are designed to ensure pipeline safety by addressing risks to pipeline integrity. As stated above, in the event that PHMSA selected the No Action Alternative by denying the special permit, PHMSA has no authority to decide or impose additional conditions upon the implementation of any of the No Action Alternatives because those actions would need to comply fully with the Pipeline Safety Regulations. Nonetheless, it is important, in the scope of PHMSA's decision-making process, to understand the general safety and environmental implications of the No Action Alternatives. The No Action Alternatives would involve construction activities in the sensitive marine environment, which would cause temporary and permanent direct impacts for a large variety of marine species and indirect or cumulative impacts for other species, including shore birds and wading birds.

Looping Alternative

Environmental impacts associated with construction and operation of the offshore components of the Looping Alternative are summarized in **Table 2.** Construction of the offshore loop line would be completed within a 200-foot construction corridor adjacent to the existing Gulfstream Pipeline, beginning at the HDD exit and extending to approximate MP 50. Construction would result in disturbance of the sea floor due to trenching, installation, and burial of the pipeline as well as additional sea floor disturbance resulting from dredging required at the HDD exit location and from anchor drops and cable sweeps from lay vessels. In addition to sea floor disturbance, construction would result in temporary impacts to water quality due to sediment suspension in the water column during trenching and burial of the pipeline and from anchor drops and cable sweeps from lay vessels.

Impacts to sensitive benthic resources, submerged aquatic vegetation, oysters, and live bottom habitat would result from anchor drops and cable sweeps from lay vessels during construction in water depths less than 10 feet. Although anchor drops and cable sweeps would occur in water depths greater than 10 feet, submerged aquatic vegetation, oysters, and live bottom habitat are not present at these water depths over 10 feet. Sedimentation resulting from anchor drops and cable sweeps from lay vessels would occur in both shallow and deep waters.

Due to the sea floor disturbance and water quality impacts, construction of the Looping Alternative route would have the potential to cause direct and indirect impacts to state and federally threatened and endangered species and designated critical habitat for the federally threatened Atlantic sturgeon (*Acipenser oxyrinchus desotoi*). Critical habitat for the federally threatened Piping Plover (*Charadrius melodus*) is in close proximity, but not directly crossed by the Looping Alternative route. The Looping Alternative route traverses' areas that are identified by the National Oceanic and Atmospheric Administration (NOAA) Fisheries as supporting essential fish habitat (EFH), as defined under the Magnuson-Stevens Fishery Conservation and Management Act (Public Law 94-265 as amended through January 12, 2007). The route crosses identified EFH for Coastal Migratory Pelagic Resources, Red Drum, Shrimp, and Reef Fish. The Looping Alternative route is partially located within areas that are identified on the NOAA Marine Protect Areas (MPA) Inventory. The Looping Alternative route crosses three identified MPAs: Reef Fish Stressed Area, Reef Fish Longline and Buoy Gear Restricted Area, and Desoto Canyon Closed Area. Construction of the Looping Alternative would have the potential to cause direct and indirect impacts to EFH and MPAs.

The Looping Alternative route intersects the Bayou Coden Channel, Intracoastal Waterway, Horn Pass to Mobile Ship Channel Safety Fairway, and Mississippi River-Gulf Outlet Channel to Mobile Ship Channel Safety Fairway. Construction of the pipeline loop at these crossings could potentially impact maritime transportation due to an increase in vessel traffic, increase in the probability of vessel collisions, blockage of portions of navigation channels, reduction in sediment stability in shipping channels and the installation of a gas pipeline that could be damaged by ships or anchors. Consultation would be necessary to determine special construction safety considerations required at these crossings to minimize adverse impacts to maritime transportation.

Similar to the Special Permit Segment, a small portion of the offshore component of the Looping Alternative route lies within an HCA near MP 3.9; however, because this alternative would provide an incremental capacity increase while still operating the pipeline at the existing 2,180 psig MAOP, there would be no change in the current PIR of the existing Gulfstream Pipeline.

Sea floor disturbance occurring during construction of the Looping Alternative would have minimal potential to impact cultural resources including shipwrecks and other submerged obstructions. Gulfstream conducted a cultural resource screening of the Looping Alternative route to identify previously recorded cultural resources. One submerged shipwreck and four obstructions are reported within the construction corridor. Potential impact to these cultural resources and unreported cultural resources is anticipated to be minimal as the Looping Alternative route would be located immediately adjacent to the existing Gulfstream Pipeline.

Impacts to the sea floor, water quality, air quality, maritime transportation, and potential impacts to environmental resources associated with the Looping Alternative would be limited to the construction period. Operation of the Looping Alternative is not anticipated to result in adverse impacts to environmental resources. The Looping Alternative would result in greater environmental impact than the Selected Action and would have the potential to temporarily result in direct and indirect adverse impacts to state and federally threatened and endangered species and designated critical habitat, EFH, MPAs, and cultural resources.

Subsea Isolation Valve Alternative

Environmental impacts associated with construction and operation of the offshore components of the Subsea Isolation Valve Alternative are summarized in **Table 2.** Construction of the umbilical line would be completed within a 200-foot construction corridor adjacent to the existing Gulfstream Pipeline, beginning at the HDD exit and extending to approximate MP 58.7 at the WSSTI. Construction of the subsea isolation valve would be completed within a 1,000-foot by 1,000-foot construction area. Construction would result in disturbance of the sea floor due to trenching, installation, and burial of the umbilical line as well as additional sea floor disturbance resulting from dredging required at the HDD exit location and from anchor drops and cable sweeps from lay vessels. In addition to sea floor disturbance, construction would result in temporary impacts to water quality due to sediment suspension in the water column during trenching and burial of the umbilical line, installation of the facility, and from anchor drops and cable sweeps from lay vessels and other construction vessels.

Impacts to sensitive benthic resources such as submerged aquatic vegetation, oysters, and live bottom habitat would result from anchor drops and cable sweeps from lay vessels during construction in water depths less than 10 feet. Although anchor drops and cable sweeps would occur in water depths greater than 10 feet, submerged aquatic vegetation, oysters, and live bottom habitat are typically not present at these water depths. Sedimentation resulting from anchor drops and cable sweeps from lay vessels and other construction would occur in both shallow and deep waters.

Due to the sea floor disturbance and water quality impacts, construction of the Subsea Isolation Valve Alternative would have the potential to cause direct and indirect impacts to state and federally threatened and endangered species and designated critical habitat for the federally threatened Atlantic sturgeon (*Acipenser oxyrinchus desotoi*). Critical habitat for the federally threatened Piping Plover (*Charadrius*

melodus) is in close proximity, but not directly crossed by the umbilical line route. The umbilical line route and the and subsea isolation valve site are both located in areas that are identified by the NOAA Fisheries as supporting EFH, as defined under the Magnuson-Stevens Fishery Conservation and Management Act (Public Law 94-265 as amended through January 12, 2007). The umbilical line route and valve site are in areas identified as EFH for Coastal Migratory Pelagic Resources, Red Drum, Shrimp, and Reef Fish. The umbilical line route is partially located within areas, which are identified on the NOAA MPA Inventory, and the subsea isolation valve is entirely within areas that are identified on the NOAA MPA Inventory. The umbilical line and subsea isolation valve site are both located in three identified MPAs: Reef Fish Stressed Area, Reef Fish Longline and Buoy Gear Restricted Area, and Desoto Canyon Closed Area. Construction of the Subsea Isolation Valve Alternative would have the potential to cause direct and indirect impacts to EFH and MPAs.

The umbilical line route intersects the Bayou Coden Channel, Intracoastal Waterway, Horn Pass to Mobile Ship Channel Safety Fairway, Mississippi River-Gulf Outlet Channel to Mobile Ship Channel Safety Fairway, and Mobile Ship Channel to Sea Safety Fairway. Construction of the umbilical line at these crossings could potentially impact maritime transportation due to increase in vessel traffic, increase in the probability of vessel collisions, blockage of portions of navigation channels, reduction in sediment stability in shipping channels and the installation of a utility (umbilical line) that could be damaged by ships or anchors. Consultation would be necessary to determine special construction safety considerations required at these crossings to minimize adverse impacts to maritime transportation.

Similar to the Special Permit Segment, a small portion of the umbilical line route lies within an HCA near MP 3.9. Because this alternative would provide a pressure increase, it would have similar impacts to the PIR as the Preferred Alternative.

Sea floor disturbance occurring during construction of the Subsea Isolation Valve Alternative would have minimal potential to impact cultural resources including shipwrecks and other submerged obstructions. Gulfstream conducted a cultural resource screening of the umbilical line and subsea isolation valve site to identify previously recorded cultural resources. One submerged shipwreck and four obstructions are reported within the construction corridor of the umbilical line. No shipwrecks or obstructions are reported within the construction area of the for the subsea isolation valve. Potential impact to these cultural resources and unreported cultural resources is anticipated to be minimal as the umbilical line route would be located immediately adjacent to the existing Gulfstream Pipeline.

Impacts to the sea floor, water quality, air quality, maritime transportation, and potential impacts to environmental resources associated with the Subsea Isolation Valve Alternative would generally be limited to the construction period. If the Subsea Isolation Valve Alternative were selected, further environmental evaluation would be necessary to determine the long-term environmental impacts.

This Subsea Isolation Valve Alternative would result in greater environmental impact than the Selected Action and would have the potential to temporarily result in direct and indirect impacts to state and federally threatened and endangered species and designated critical habitat, EFH, MPAs, and cultural resources. In addition, the Subsea Isolation Valve Alternative may result in potential permanent adverse impacts to species habitats, EFA and MPAs.

Impacts to sensitive benthic resources such as submerged aquatic vegetation, oysters, and live bottom habitat are not anticipated to result from anchor drops and cable sweeps from construction vessels as construction would occur in water depths greater than 10 feet where submerged aquatic vegetation, oysters, and live bottom habitat are typically not present. Sedimentation resulting from anchor drops and cable sweeps from construction vessels would occur during construction.

Platform Alternative

Due to the sea floor disturbance and water quality impacts, construction of the Platform Alternative would have the potential to cause direct and indirect impacts to state and federally threatened and endangered

species. The Platform Alternative is in an area that is identified by the NOAA Fisheries as supporting EFH, as defined under the Magnuson-Stevens Fishery Conservation and Management Act (Public Law 94-265 as amended through January 12, 2007). The site is also located in areas identified as EFH for Coastal Migratory Pelagic Resources, Red Drum, Shrimp, and Reef Fish. The Platform Alternative site is located within areas that are identified on the NOAA Marine MPA Inventory. The site is in three identified MPAs, Reef Fish Stressed Area, Reef Fish Longline and Buoy Gear Restricted Area, and Desoto Canyon Closed Area. Construction of the Platform Alternative would have the potential to cause direct and indirect impacts to EFH and MPAs.

The Platform Alternative would not be located within an HCA; however, because this alternative would provide a pressure increase, it would have similar impacts to the PIR as the Preferred Alternative.

Sea floor disturbance occurring during construction of the Platform Alternative would have the minimal potential to impact cultural resources including shipwrecks and other submerged obstructions. Gulfstream conducted a cultural resource screening of the platform site to identify previously recorded cultural resources. The potential for impacts to unreported cultural resources is anticipated to be minimal as the platform would be located immediately adjacent to the existing Gulfstream Pipeline.

Impacts to the sea floor, water quality, air quality and potential impacts to environmental resources associated with the Platform Alternative would generally be limited to the construction period. However, operation of the Platform Alternative would result in air emissions from equipment and may result in some long-term alteration of species habitats, EFH, and MPAs. Over time, the platform structure may provide habitat for marine organisms such as mussels and barnacles that attach themselves to structures, forming habitats that supports a vast array of fish and other marine species. If the Platform Alternative were selected, further environmental evaluation would be necessary to determine the long-term negative and positive environmental impacts.

The Platform Alternative would result in greater environmental impact than the Selected Action and would have the potential to temporarily result in direct and indirect impacts to state and federally threatened and endangered species, EFH, MPAs, and cultural resources. In addition, the Platform Alternative may result in potential permanent adverse impacts to species habitats, EFA and MPAs.

D.1 Aesthetics

The Special Permit Segment is located primarily within the Gulf of Mexico. The Selected Action will not change the visual character/aesthetics of the surrounding area as the pipeline to be uprated is existing and will not require construction of new pipeline infrastructure or aboveground facilities. There will be no impact to aesthetics or visual resources in the view shed of the Special Permit Segment. Should the special permit be denied, construction and operation of one of the other alternatives may be needed to provide a comparable capacity increase, which could negatively affect the aesthetics in the area of the selected alternative. Underwater pipeline construction may damage coral reefs, marine vegetation, geologic formations that serve as habitat, and the benthic organisms that serve as the base of the marine ecosystem. Because some impacts would occur subsurface, some aesthetic impacts would be limited, with the possible exceptions of scuba divers. Construction of a platform would have aesthetic impacts for boaters. As for No Action Alternatives that involve onshore construction, those impacts would likely involve temporary aesthetic impacts during the period of construction due to equipment and disturbed soil and vegetation. Permanent aesthetic impacts would be minor, resulting from in an increase in existing pipeline right-of-way width, but would be consistent with existing conditions.

D.2 Agricultural Resources

The Special Permit Segment is located primarily within the Gulf of Mexico. There are currently no aquaculture or agricultural operations in the vicinity of the Special Permit Segment based on GIS analysis. Should the special permit be denied, construction and operation of one of the No Action

Alternatives that involve on-shore construction may be needed, which may result in impacts to agricultural resources within the on-shore area of the selected alternative. Agricultural resources crossed by or near the on-shore areas of the No Action Alternatives consist primarily of hay and pasture areas dominated by grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops.

D.3 Air Quality

The Selected Action will have no offshore impact on short-term/long-term air quality. The Selected Action will not involve construction or operation activities that result in air emissions within the Special Permit Segment. Should the special permit be denied, construction and operation of one of the other alternatives may be needed, which would result in temporary impacts to air quality due to construction activities within the area of the alternative and potential long-term impacts due to platform facility emissions.

D.4 Biological Resources

The Selected Action will not involve construction activities with the potential to impact biological resources within the Special Permit Segment. Biological resources potentially present in the Special Permit Segment are discussed below. Should the special permit be denied, construction and operation of one of the other alternatives may be needed, which would potentially affect biological resources in the area of the selected alternative, including marine and nearshore environments, as described above.

Threatened and Endangered Species

Data maintained by the United States Fish and Wildlife Service (USFWS) and Alabama Natural Heritage Program were reviewed to identify state and federally threatened and endangered species either known to occur or that have the potential to occur within the Special Permit Segment. Based on the review, several protected species are potentially present within the Special Permit Segment. In addition, designated critical habitat for the federally threatened Atlantic sturgeon (*Acipenser oxyrinchus desotoi*) is crossed by a portion of the Special Permit Segment. Critical habitat for the federally threatened Piping Plover (*Charadrius melodus*) is in close proximity, but not directly crossed by the Special Permit Segment. A figure provided in Appendix G depicts critical habitat crossed and within the vicinity of the Special Permit Segment. **Table 3** provides the listing status and habitat requirements for protected species with the potential to occur in the Special Permit Segment. This summary of potential occurrences was prepared using publicly available data, and therefore is considered public information but should not be used as a singular tool for determining the presence or absence of a protected species. Protected species known to inhabit coastal waters are summarized below, however, because in water construction activities are not anticipated, impacts to these species and their associated habitats are not anticipated.

The Selected Action will not involve construction activities with the potential to impact state and federally threatened and endangered species potentially present within the Special Permit Segment or designated critical habitat crossed by the Special Permit Segment. Should the special permit be denied, construction and operation of one of the other alternatives may be needed, which would have the potential to impact state and federally threatened and endangered species and designated critical habitat in the area of the selected alternative. If PHMSA denied the special permit, Gulfstream would be required to act in full compliance with the Pipeline Safety Regulations, and PHMSA would have no decision-making authority over which, if any, alternative Gulfstream enacts to fulfill the Purpose and Need.

Table 3: Threatened and Endangered Species and Natural Communities Potentially Occurring in the Special Permit Segment

Scientific Name	Common Name	Federal Status	State Status	Likelihood of Occurrence and Habitat Requirements
Birds				
Calidris canutus rufa	Red knot	Threatened	N/A	Breeds in dry, sparsely vegetated hillsides; outside breeding season found in intertidal, marine habitats near bays and estuaries. Potential to occur.
Charadrius melodus	Piping plover	Threatened	Protected	Nests and forages on open sandy beaches and rocky shores. Critical habitat has been designated for this species within a portion of the Special Permit Segment. Potential to occur.
Haliaeetus leucocephalus	Bald eagle	Recovery	N/A	Nests in tall trees adjacent to any wetland habitat along seacoasts, rivers, lakes and marshes. Potential to occur.
Mycteria americana	Wood stork	Endangered	Protected	Breeds in fresh and brackish forested wetlands, and forage in wetlands, swamps, ponds and marshes with open canopy. Potential to occur.
Fish				
Acipenser oxyrinchs desotoi	Gulf sturgeon	Threatened	Protected	Spawning occurs upriver in coastal rivers during the spring, while foraging occurs in the brackish water of the Gulf of Mexico. Critical habitat has been designated for this species within a portion of the Special Permit Segment. Potential to occur.
Fundulus jenkinsi	Saltmarsh topminnow	Threatened	N/A	Gulf species of fish that inhabits vegetated estuarine salt marshes. Potential to occur.
Scaphirhynchus suttkusi	Alabama sturgeon	Endangered	N/A	Historically known to inhabit all major rivers of the Mobile basin of Alabama and Mississippi, but now known only to exist within a portion of the lower Alabama River. Not likely to occur.
Mammals				
Trichechus manatus	West Indian manatee	Threatened	Protected	Shallow slow-moving rivers, estuaries, bays, and coastal waters. Occurs in coastal waters.
Reptiles				
Caretta	Loggerhead sea turtle	Threatened	Protected	Nest on ocean beaches, generally preferring high energy, relatively narrow, steeply sloped, coarse-grained beaches. Post hatchlings will inhabit nearshore waters, floating among sargassum and other similar materials. Adults forage and travel in open water. Potential to occur
Chelonia mydas	Green sea turtle	Endangered	Protected	
Dermochelys coriacea	Leatherback sea turtle	Endangered	Protected	
Eretmochelys coriacea	Hawksbill sea turtle	Endangered	N/A	
Lepidochelys kempii	Kemp's Ridley sea turtle	Endangered	Protected	
Source: USFWS 2018b, NatureServe 2018, Alabama Natural Heritage Program 2018.				

Essential Fish Habitat

The entirety of the Special Permit Segment is located within areas that are identified by the NOAA Fisheries as supporting EFH, as defined under the Magnuson-Stevens Fishery Conservation and Management Act (Public Law 94-265 as amended through January 12, 2007). The Special Permit Segment crosses identified EFH for Coastal Migratory Pelagic Resources, Red Drum, Shrimp, and Reef Fish. A figure depicting EFH in the vicinity of the Special Permit Segment is provided in Appendix G. The activities associated with the Selected Action will not require construction of new pipeline infrastructure or aboveground facilities, and therefore will have no impact on EFH crossed by the Special Permit Segment. As described above, the No Action Alternatives would each result in some level of temporary and permanent impacts to fish habitat.

Marine Protected Areas

Portions of the Special Permit Segment are located within areas identified on the NOAA MPA Inventory. The Special Permit Segment crosses three identified MPAs: Reef Fish Stressed Area, Reef Fish Longline and Buoy Gear Restricted Area, and Desoto Canyon Closed Area. A figure depicting MPAs in the vicinity of the Special Permit Segment is provided in Appendix G. The activities associated with the Selected Action will not require construction of new pipeline infrastructure or aboveground facilities, and therefore will have no impact on MPAs crossed by the Special Permit Segment. As described above, the No Action Alternatives would each result in some level of temporary and permanent impacts to marine protected areas.

Migratory Birds

The Migratory Bird Treaty Act (MBTA), as enforced by the USFWS, protects migratory birds by prohibiting the taking of any migratory bird, or a part, nest, or eggs of any such bird, except under terms of a valid permit issued pursuant to Federal regulations. All migratory birds in the vicinity of the Special Permit Segment are protected under the MBTA. The activities associated with the Selected Action will not require construction of new pipeline infrastructure or aboveground facilities, and therefore will have no impact on any migratory birds in the vicinity of the Special Permit Segment. Enactment of any of the No Action Alternatives could impact migratory birds due to construction activities. Also, offshore platforms can cause bird mortality due to strikes with structures and confusion from lighting. On the other hand, some hypothesize that platforms provide some benefit as they are utilized as “stepping stones” during migration.

D.5 Climate Change

Gulfstream intends to achieve the Purpose and Need to increase natural gas capacity in order to accommodate the increased demand regardless of whether PHMSA approves or denies the special permit. An increase in natural gas transmission facilitates the end use of natural gas, which results in the release of greenhouse gases (GHGs). As stated above, if PHMSA denies the special permit request or if Gulfstream withdraws its request, PHMSA has no jurisdiction or authority over which No Action Alternative Gulfstream might select. Nonetheless, the construction activities and expanded infrastructure that could take place under the No Action Alternatives would result in increased release of GHGs.

The Selected Action will not result in offshore construction and operation of new pipeline infrastructure or aboveground facilities within the Special Permit Segment and will more efficiently transfer additional quantities of clean burning natural gas to expanding markets in Florida. Given that no new offshore construction is related to the special permit, there will be no new emissions from construction, or operation of new or existing facilities within the Special Permit Segment. As a result of the Selected Action, no new offshore greenhouse gas emissions associated with contribution to global climate change are anticipated.

D.6 Cultural Resources

The Selected Action will not involve construction activities with the potential to impact cultural resources. Gulfstream conducted a cultural resource screening of the Special Permit Segment to identify previously recorded cultural resources within the Special Permit Segment. Records indicate one submerged shipwreck and four obstructions are located within a 200-foot corridor centered on the Special Permit Segment. The potential for undocumented cultural resources within the Special Permit Segment is minimal because it is along the existing Gulfstream Pipeline. Because the Selected Action will not involve construction activities resulting in sea floor disturbance, impacts to cultural resources are not anticipated. Should the special permit be denied, construction and operation of one of the other alternatives may be needed, which would have the potential to impact cultural resources within the area of the selected alternative.

D.7 Environmental Justice

Environmental justice considers fair treatment and meaningful participation of all persons, including certain identified socioeconomic groups such as low-income and minority populations. A standard for evaluation is whether an identified group would bear a disproportionate share of negative effects, particularly environmental and health effects. The Selected Action will involve uprating an existing pipeline and will not involve construction or operation of new pipeline infrastructure or facilities within the Special Permit Segment. Due to the nature of the Selected Action, socioeconomic impacts in the vicinity of the Special Permit Segment are not anticipated. The Selected Action is not anticipated to impact low-income, minority or non-English language populations, and will not involve activities that would impact minorities or immigrant populations. Should the special permit be denied, construction and operation of one of the other alternatives may be needed, which would potentially result in impacts (negative or positive) in the area of the selected alternative.

D.8 Geology, Soils, and Mineral Resources

The Special Permit Segment crosses the Mississippi Sound and the Mississippi/Alabama inner shelf region inside the outer continental shelf (OCS) boundary and into Federal waters on the OCS. The nearshore substrate consists of primarily sand from riverine deposition on the northern gulf coast. Water depths along the Gulfstream Pipeline range from zero at the shoreline to approximately 105 feet within the Special Permit Segment up to MP 58.7. The substrate changes to sandy bottom with areas of hard-bottom (remains of ancient reef or shoreline structures shelf) beyond the 50-foot depth.

Mineral resources consist of oil and gas deposits deep below the seafloor and sand deposits in nearshore areas (Schroeder, et. al, 1988; Parker, 1992). The Selected Action will not involve construction of new facilities that would impact or disturb geology, soils, or mineral resources in the Special Permit Segment. There is no likelihood of landslides or seismic hazards from the Selected Action as seafloor disturbance will not occur in connection with this special permit. If PHMSA denied the special permit, construction and operation of one of the other alternatives would have been needed, which would have the potential to impact geology, soils, and mineral resources within the area of the selected alternative.

D.9 Indian Trust Issues

The Special Permit Segment is not within any Indian Trust Assets based on review of the United States Forest Service (USFS), Federal and Indian Lands and Land Cessions database (USFS 2018). Gulfstream verified that the Special Permit Segment is not within and would have no effect on Tribal Reservations. Additionally, the Selected Action will have no impact on Indian Trust Assets because the pipeline uprate involves an existing facility that is located primarily within Alabama State waters and Federal waters of the Gulf of Mexico. Should the special permit be denied, construction and operation of one of the other

alternatives may be needed, which may require consultations with Indian Tribes within the area of the selected alternative.

D.10 Land Use

The Special Permit Segment occurs primarily within Alabama State waters and Federal waters of the Gulf of Mexico. The Special Permit Segment crosses several offshore lease areas and shipping and navigation channels in State and Federal waters. Additionally, the Special Permit Segment crosses specific military use areas in the Gulf of Mexico. The Selected Action will involve uprating an existing pipeline and will not involve construction or operation activities that will impact existing land use in the Special Permit Segment. Should the special permit be denied, construction and operation of one of the other alternatives may be needed, which would result in impacts to current land use within the area of the selected alternative.

D.11 Noise

The Selected Action will have no impact on noise levels in the Special Permit Segment. The Selected Action will involve uprating an existing pipeline and will not involve construction or operation activities that result in increased noise in the Special Permit Segment. Should the special permit be denied, construction and operation of one of the other alternatives may be needed, which would result in increased noise impacts within the area of the selected alternative during the time that construction is underway.

D.12 Recreation

The Selected Action is not anticipated to impact recreational areas or resources in the Special Permit Segment. Some areas of recreational fishing and boating are present within the Special Permit Segment; however, no construction or operation activities that will adversely impact these areas will occur as a result of the Selected Action. Should the special permit be denied, construction and operation of one of the other alternatives may be needed, which would potentially result in impacts to recreational areas within the area of the selected alternative.

D.13 Safety

Gulfstream is requesting a special permit (waiver) with conditions, when implemented, will protect against the risks of overpressure, which can result in pipe failure. Section 192.619(a) describes the MAOP for steel pipelines and needed pressure control to avoid exceeding the MAOP. Section 192.195(a) requires the use of pressure limiting or pressuring relieving devices to avoid overpressure incidents due to pressure control failure. PHMSA is proposing to allow Gulfstream to utilize pressure gradient for pressure control at MP 58.7 and to allow overpressure protection to be installed at Compressor Station 410 instead of at MP 58.7. Pressure control can safely be achieved by pressure gradient because of the much longer pipeline length (approximately 55 miles) to the first subsea valve located near MP 58.7 and located in an offshore area with no population. Although MP 58.7 is in an offshore area, a gas pipeline failure could cause hazards to commercial navigation and recreational boaters.

The hydraulic modeling indicates operating pressures will not exceed 2,180 psig at MP 58.7 for any normal operating conditions. Gulfstream has additional pressure control measures to shut down the compressor unit for abnormal or other flow conditions as described in the special permit. The OPP devices installed at Compressor Station 410 will ensure any unanticipated pressure build-up will remain within the allowable pressure limits for the lower MAOP of 2,180 psig.

The Selected Action is anticipated to have minimal effect on safety and will result in no change in the risk of failure related to the integrity of the Gulfstream Pipeline. The pipeline segment within the Special Permit Segment will continue to operate under the mandated operational and maintenance activities, and

internal inspections will be conducted in accordance with frequencies specified in 49 CFR Part 192, Subpart O. The existing Gulfstream Pipeline was installed, and pressure tested to accommodate the increased pressure to safely move greater quantities of gas. While the uprate will increase the volume of gas transported through the Gulfstream Pipeline, it will result in only a nominal increase in the event of an unanticipated gas release. In addition, the uprate will have minimal effect on the PIR of the pipeline and will result in a 30-foot increase in the PIR as depicted below.

36-inch Pipeline PIR, r = 0.69 * 36" * square root of 2,180 psig = 1,160 feet

36-inch Pipeline PIR, r = 0.69 * 36" * square root of 2,296 psig = 1,190 feet

The Selected Action will have no foreseeable effect on the lifespan or reliability of the pipeline and will not result in anticipated maintenance issues. Should the special permit be denied, construction and operation of one of the other alternatives may be needed. Each alternative would be operated in compliance with operational and maintenance requirements in 49 CFR Part 192 and would have similar risks of release, gas release volumes, and PIRs as the Selected Action.

D.14 Topography

The Special Permit Segment is located primarily within the Gulf of Mexico. Sea floor topography in the nearshore portion of the Special Permit Segment is characterized by isolated rolling undulations on a mostly sandy bottom. Water depths along the Gulfstream Pipeline range from zero at the shoreline to approximately 105 feet within the Special Permit Segment up to MP 58.7. No impacts to the topography of the Special Permit Segment are anticipated as the Selected Action will involve uprating an existing pipeline and will not involve construction or operation of new pipeline infrastructure or facilities. Should the special permit be denied, construction and operation of one of the other alternatives may be needed, which would potentially result in impacts to existing topography within the area of the selected alternative.

D.15 Transportation

The Special Permit Segment intersects the Bayou Coden Channel, Intracoastal Waterway, Horn Pass to Mobile Ship Channel Safety Fairway, Mississippi River-Gulf Outlet Channel to Mobile Ship Channel Safety Fairway, and Mobile Ship Channel to Sea Safety Fairway. A figure depicting the location of the waterways and shipping and navigation channels crossed by the Special Permit Segment can be found in Appendix A. The Selected Action will involve increasing the pressure an existing pipeline to increase throughput and will not involve construction or operation activities that result in impacts to maritime transportation activities in the Special Permit Segment. Should the special permit be denied, construction and operation of one of the other alternatives may be needed, which would potentially result in impacts to existing transportation routes within the area of the selected alternative.

D.16 Water Resources

A summary of water resources within the Special Permit Segment is provided below. The Selected Action will have no impacts to water resources in the Special Permit Segment as the Selected Action will involve uprating an existing pipeline and will not involve construction or operation of new pipeline infrastructure or facilities. Should the special permit be denied, construction and operation of one of the other alternatives may be needed, which would potentially result in impacts to water resources within the area of the selected alternative.

Waterbodies

A review of publicly available data including aerial imagery and United States Geological Survey (USGS) National Hydrography Dataset (NHD) data was used to identify waterbodies crossed by the Special Permit Segment. The Special Permit Segment is located within Alabama State and Federal waters within

the Gulf of Mexico and crosses three coastal bays. Waterbodies crossed by the Special Permit Segment are summarized in **Table 4**.

The U.S. Army Corps of Engineers (USACE) regulates jurisdictional waters of the U.S. under Section 10 of the River and Harbors Act [33 CFR Part 329] and Section 404 of the Clean Waters Act. Navigable waters of the U.S. are defined as "those waters that are subject to the ebb and flow of the tide or are presently used, or have been used in the past, or may be susceptible for use to interstate transport of foreign commerce, and are classified as jurisdictional waters under Section 10. Navigable waters do not include all "waters of the U.S." that are jurisdictional under Section 404 of the Clean Water Act (CWA)".

Table 4: Waterbodies Crossed by the Special Permit Segment

Waterbody Name	Flow Type	303(d) Listing Status
Portersville Bay	Coastal water	Impaired
Grand Bay	Coastal water	Impaired
Gulf of Mexico	Coastal water	Impaired

Impaired Waterbodies

Section 303(d) of the CWA establishes that states are to list waters for which technology-based limits alone do not ensure attainment of applicable water quality standards. These waters are considered "impaired waterbodies" and are listed on the 303(d) list for each state. Based on a review of the Alabama Department of Environmental Management (ADEM) 2016 Final 303(d) list for Alabama (ADEM 2016), the Special Permit Segment crosses three coastal bays that are listed as impaired waterbodies. The Selected Action will have no effect on the impaired waterbodies as the Selected Action will involve uprating an existing pipeline and will not involve construction or operation of new pipeline infrastructure or facilities.

Protected Waterbodies

The National Park Service (NPS), in accordance with Section 5-(d) of the National Wild and Scenic Rivers Act (16 U.S.C 1271-1287), has compiled and maintains the National Rivers Inventory (NRI), a register of river segments that potentially qualify as nation wild, scenic or recreational river areas. Based on a review of the NRI, no waterbodies listed on the NRI or listed as Wild and Scenic Rivers are crossed by the Special Permit Segment (NPS 2018a and 2018b).

E. FONSI and Public Comment

PHMSA published the special permit request in the Federal Register for a 30-day public comment period on July 29, 2019, through August 28, 2019. The special permit application from Gulfstream, environmental assessment, and special permit conditions were available in Docket No. PHMSA-2018-0105 at: www.regulations.gov. PHMSA received no comments from the public through April 13, 2020.

In consideration of the safety conditions explained above, PHMSA finds that no significant negative safety or environmental impact will result from the issuance and full implementation of the above-described special permit to waive the requirements of 49 CFR 192.195(a) and 192.619(a) for the ***special permit segment*** and ***special permit inspection area***, which consists of 427.8 miles of the 36-inch diameter Gulfstream Pipeline. The Gulfstream Pipeline is located near Coden, Mobile County, Alabama, across the Gulf of Mexico, to near Palmetto, Manatee County, Florida. This permit will require Gulfstream to implement additional conditions in the operation and maintenance of the Gulfstream Pipeline.

F. Consultation and Coordination

F.1 Gulfstream Contacts

This EA was prepared by PHMSA and the following Gulfstream and Gulfstream contractor team members:

Table 5: Environmental Assessment Contributors

Name	Company	Title	Project Role
Martin Coleman	Williams Gas Pipeline, LLC	Project Manager	Project Management
Chad Burrows	Williams Gas Pipeline, LLC	Senior Environmental Specialist	Environmental Permitting
Michael Kologinczak	Williams Gas Pipeline, LLC	Offshore Project Developer	Project Development
Stephanie Ross	Williams Gas Pipeline, LLC	Engineer III	Pipeline Safety Engineer
Scott Brumbaugh	Williams Gas Pipeline, LLC	Offshore Project Manager, Staff	Engineering Manager
Eric Cooper	Williams Gas Pipeline, LLC	Offshore Project Developer	Project Development
Tim Huggins	Williams Gas Pipeline, LLC	Principal Engineer	Pipeline Safety
Cathy Thornton	Williams Gas Pipeline, LLC	Offshore Regulatory Compliance Specialist, Sr.	BSEE Permitting
Rick Kivela	Enbridge	Manager, Operational Compliance	PHMSA Special Permit
Freddy Sanchez	Enbridge	Principal Project Manager	Enbridge Project Manager
Dan Ransbottom	Enbridge	Manager, Environmental Projects U.S.	Enbridge Environmental Permitting Review
Rachel Bell	Cardno, Inc.	Senior Project Manager	Environmental Permitting Contractor
Woody Speed	Cardno, Inc.	Senior Project Scientist	Environmental Permitting Contractor

F.2 Stakeholder Engagement

On March 22, 2018, representatives from Williams and Enbridge met with the U.S. Department of the Interior, BSEE to discuss technical and safety issues surrounding operation of the pipeline at the higher MAOP. Minutes from this meeting are available upon request. Meeting attendees are provided below:

- Angie Gobert, BSEE Pipeline Section Chief
- Bimal Shrestha, BSEE Pipeline Section
- Dane Geyer, BSEE Technical Assessment Section
- Eric Cooper, Williams
- Cathy Thornton, Williams
- Lance Labiche, J. Connor Consulting (Contractor)

> Rick Kivela, Enbridge

> Tom Preli, Enbridge

On May 25, 2018, representatives from Williams met with BSEE to review and discuss the proposed contents for what will be included in the BSEE application. Minutes from this meeting are available upon request. Meeting attendees are provided below:

> Cathy Thornton, Williams

> Lance Labiche, J. Connor Consulting (Contractor)

> Angie Gobert, BSEE Pipeline Section Chief

On July 2, 2018, representatives from Williams and Enbridge met with PHMSA to provide an introduction to the Project. Minutes from this meeting are available upon request. Meeting attendees are provided below:

> Rick Kivela – Enbridge

> Nathan Atanu – Enbridge

> Freddy Sanches – Enbridge

> Eric Cooper – Williams

> Larry Legendre – Williams

> Stephanie Ross – Williams

> Steve Nanney - PHMSA

Phone:

> Cathy Thornton – Williams

> Kay McIver – PHMSA

> Amelia Samaras – PHMSA

> John Gale – PHMSA

> Alicia Covert - PHMSA

On September 19, 2018 representatives from Williams met with BSEE to hand deliver the Gulfstream BSEE application and to review the application with BSEE and answer any questions or concerns they had. Minutes from this meeting are available upon request. Meeting attendees are provided below:

> Bimal Shrestha, BSEE Pipeline Section

> Will Fernandez. Staff Engineer in pipeline section

> Stephen Dessauer. BSEE Deputy Regional Supervisor

> Stephen Pelous. Staff Engineer in pipeline section

> Cathy Thornton, Williams

> Lance Labiche, J. Connor Consulting (Contractor)

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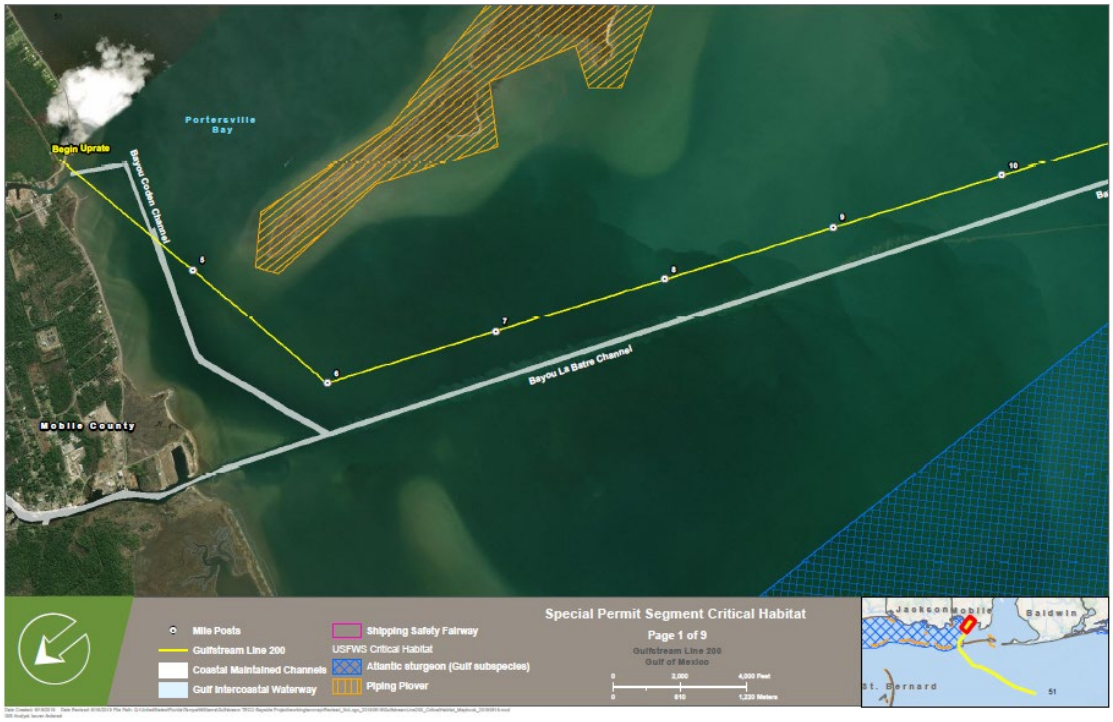
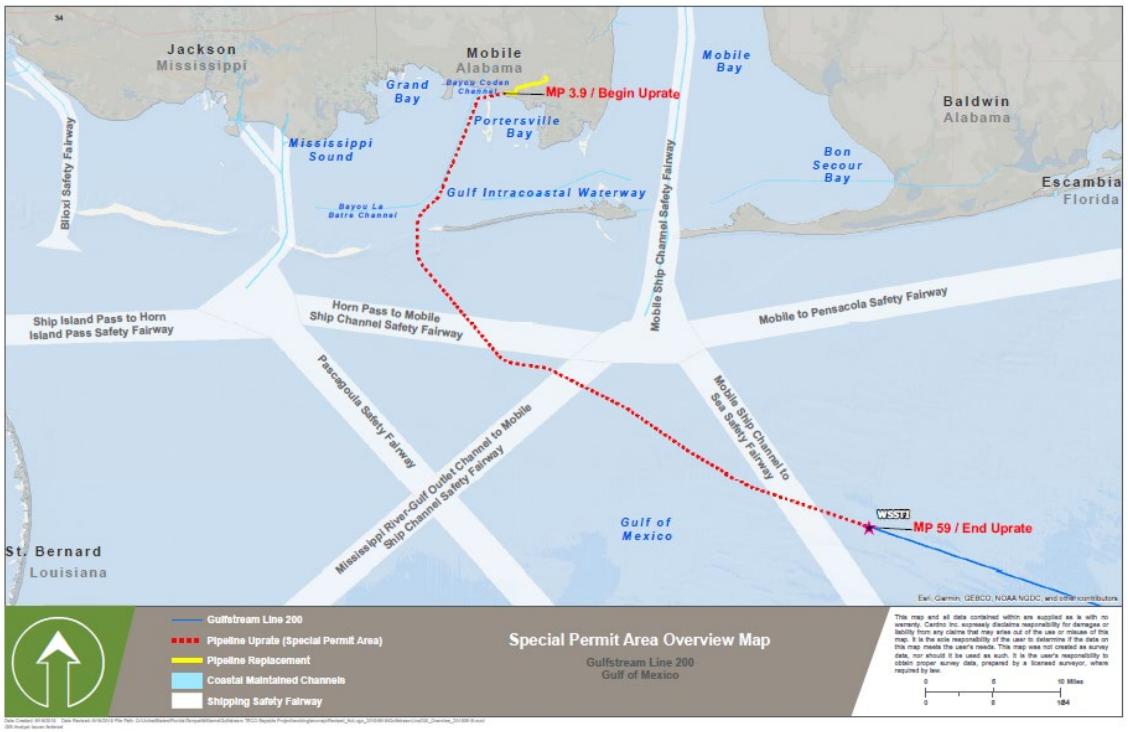
Completed by PHMSA in Washington, DC on: Month, Day, Year

Appendix A
Project and Special Permit Segment Maps

Project and Special Permit Segment Maps

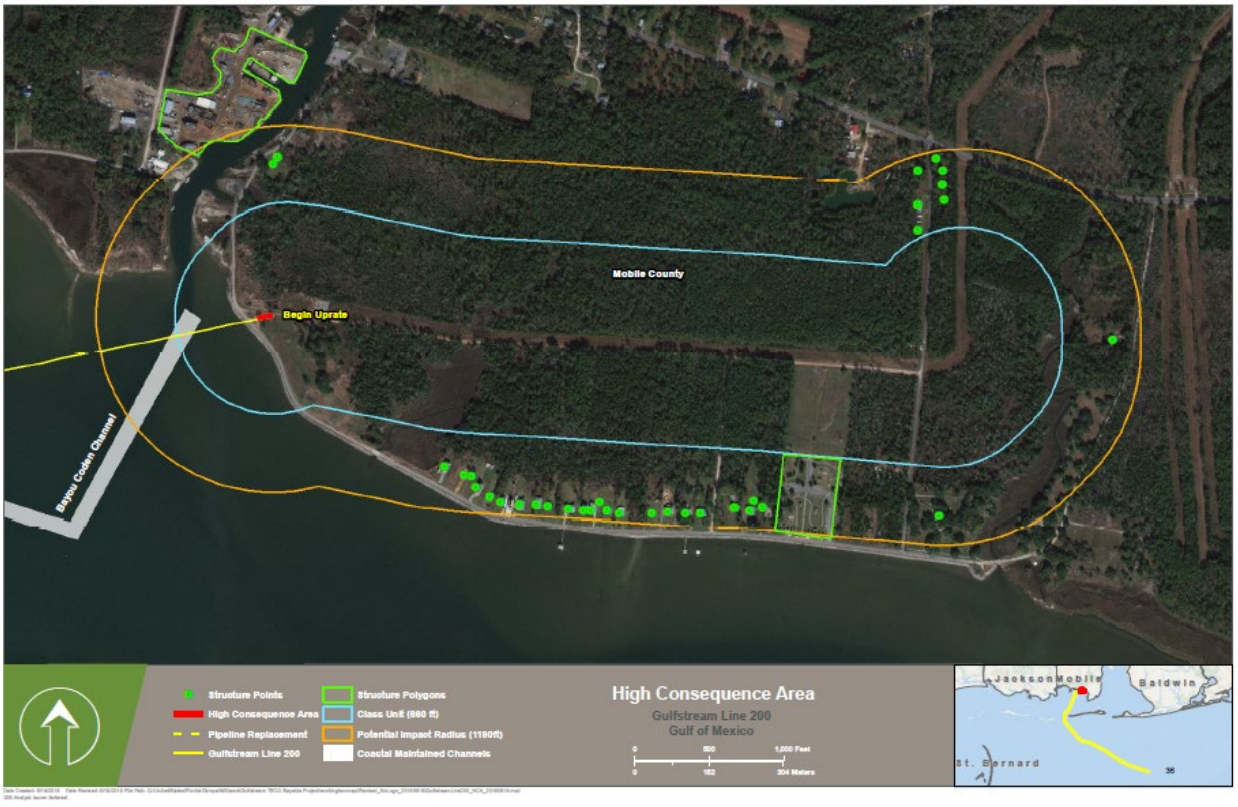




NOTE: MP 59 is rounded-up for MP 58.7.

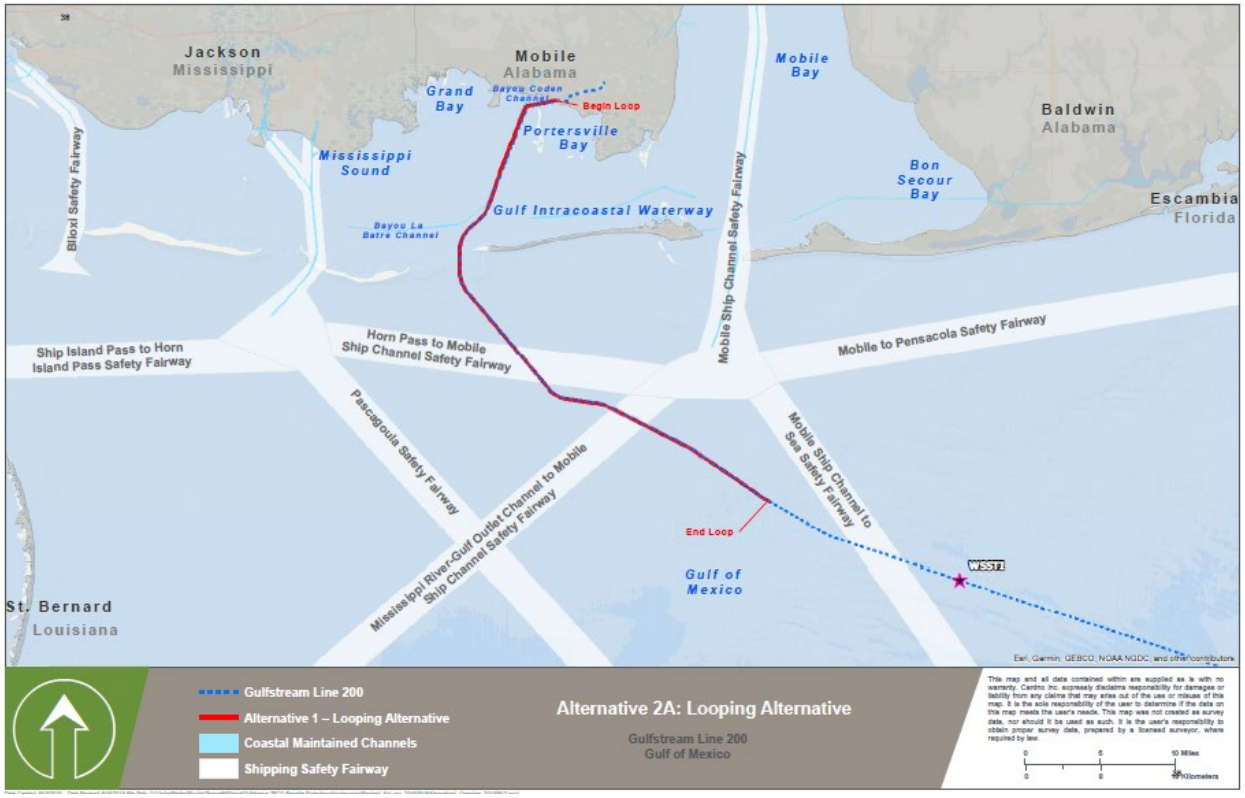
Appendix B
Potential Impact Radius Map

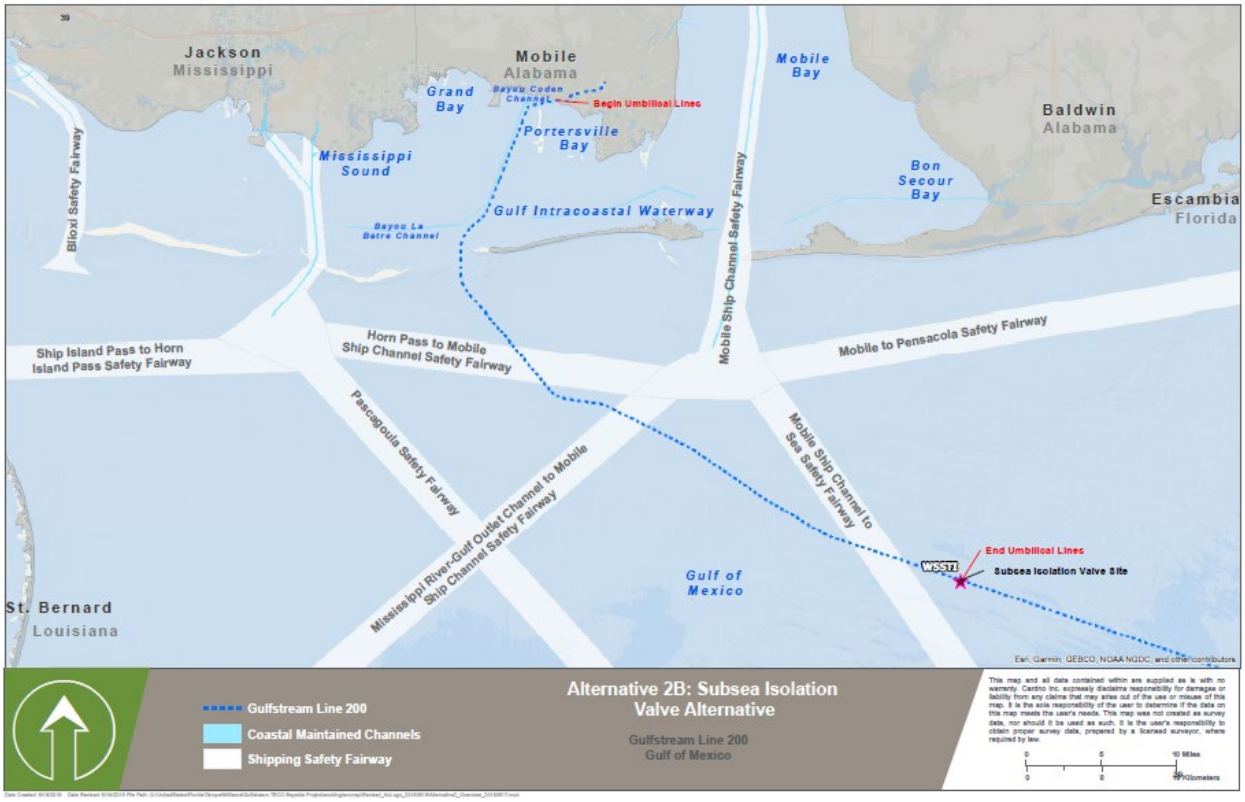
Potential Impact Radius Map



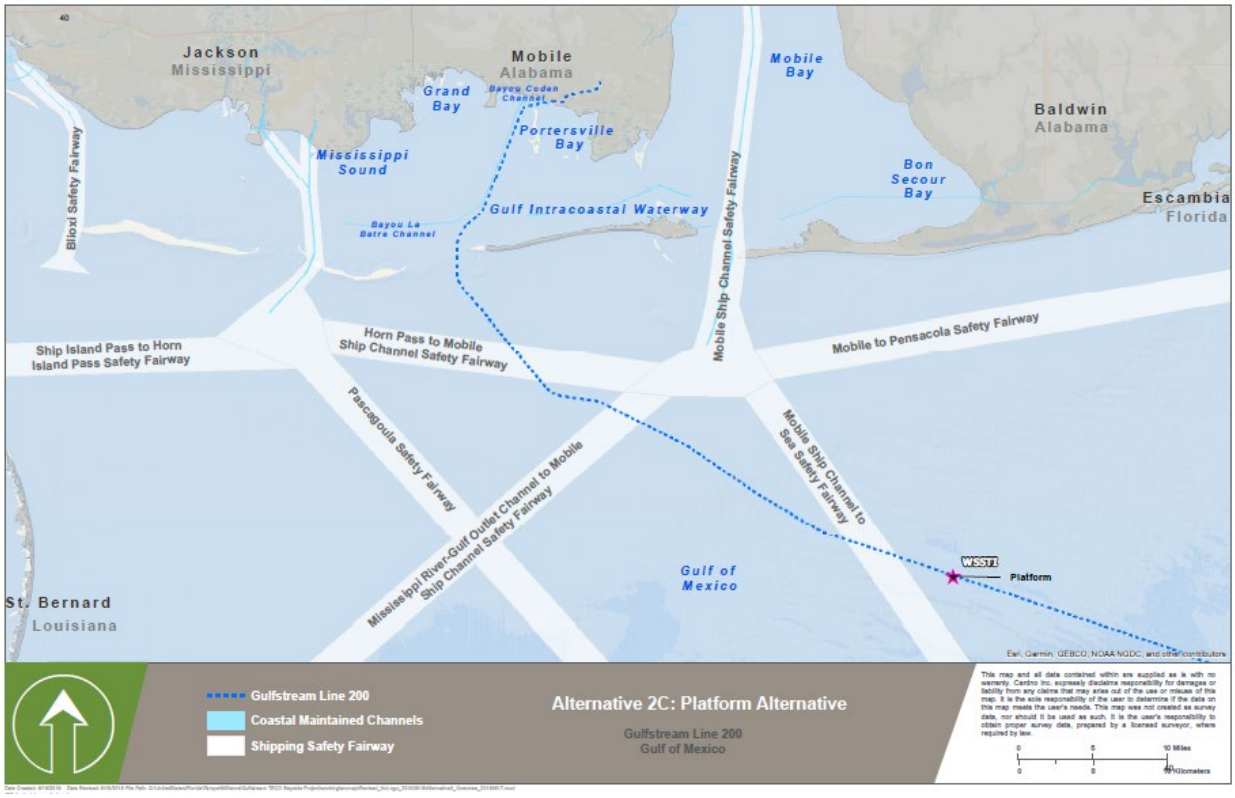
Appendix C
Alternatives Maps

Alternatives Maps





Alternatives Maps



Appendix D
Summary of Alternatives

Alternatives Considered

Gulfstream considered the following alternatives to design the project:

Alternative 1 – Uprate Pressure and Control with Real Time Transient Modeling:

- Pressure gradient to be used to control operating pressure below 2180 psig MAOP at MP 58.7 (WSSTI).
    - No automated valves at MP 58.7
- Flow modeling based on onshore pressure and flow monitoring will be used to calculate pressure at MP 58.7. Pressure monitoring will be used to manage onshore facilities to prevent overpressure at MP 58.7.
- During adverse operating conditions, limit discharge pressure at Compressor Station 410 to mitigate the potential for exceeding 2180 psig at MP 58.7.
- The pressure control and real time transient model will address a wide range of operating scenarios and upset conditions (holistic review of the system)
- Gulfstream will use a pipeline control simulator and training of controllers using simulator on specific scenarios
- Issues
    - Requires Special Permit and uprating plan

Alternative 2A – Looping of Existing Line:

- Install a partial loop line to operate at the existing 2180 psig MAOP.
- Requires incremental land acquisition, environmental permitting and disturbance of land and sea bottom.
- The approximately 50-mile 36” loop would extend from Compressor Station 410 and include approximately 4 miles of onshore and 46 miles of offshore pipeline
- Has the potential to contribute to adverse impacts to environmental resources.

Alternative 2B -Addition of Subsea Equipment:

- Subsea isolation valves at the MP 58.7 location
    - Umbilical for remote operation
    - ~20 installations globally, predominantly for North Sea upstream flowline applications
    - New technology application in the Gulf of Mexico (GOM)
    - Difficult to maintain subsea equipment
    - Involves very complex engineering for this application
    - Pressure loss through new piping, valves, and regulators reduces capacity increase
    - Has the potential to contribute to adverse impacts to environmental resources.

Alternative 2C – Installation of a Platform:

- Platform-based isolation valves at MP 58.7
    - Junction platform, common in GOM
    - Straightforward permitting process
    - Pressure loss through new piping, valves, and regulators reduces capacity increase
    - Has the potential to contribute to adverse impacts to environmental resources.

Selected Alternative:

Gulfstream will pursue Alternative 1, dependent of PHMSA’s issuance of a special permit. This alternative is in the public interest and mitigates environmental risks. This will require addition and replacement of some pipeline facilities, an up-rate of operating pressure of some of the pipeline facilities, the implementation of an operating strategy, and the approval of a PHMSA special permit.

Control of the pipeline pressure will be based on algorithms which use actual pressures and flows from Compressor Stations 410 and 420, Bartow Meter Station, and temporary pressure readings at the valves

at MP 3.9 and MP 58.7. This provides the establishment of a pressure profile and demonstrates conservative controller response time.

- Pressures at MP 3.9 and MP 58.7 valves, Compressor Stations 410 and 420, and Bartow Meter Station were recorded every 2 minutes for 30 days during the summer of 2018.
- Pressures from the recorders will be correlated with pressures and flows measured and used within SCADA to validate the hydraulic model that is used to determine pipeline operating model.
- Pressure and flows will be monitored during operation with Real Time Transient Model (RTTM) drawing up experience from liquid pipelines.
- An off-line simulator that is a virtual image of SCADA will be used to train controllers; including defined scenarios and abnormal operations.

Based on the evaluation of the alternatives, Alternative 1 will have the least environmental impacts of those considered and will meet Gulfstream's stated purpose and need. The environmental consequences associated with Alternative 1 are minimal in comparison to the other alternatives evaluated in the Environmental Assessment. This alternative will not involve construction or operation activities that result in change in the visual character/aesthetics of the surrounding area, biological resources and habitat of several protected species present, and in air emissions within the special permit area as other potential scenarios. Geology, soils, mineral resources, and cultural resources (such as a documented shipwreck) will not be disturbed. Should the special permit be denied, construction and operation of one of the other alternatives would be necessary to meet the project's purpose and need, which would result in sea floor disturbance and temporary and permanent impacts to environmental resources. It is anticipated to have minimal effect on safety and would result in no change in the risk of failure related to the integrity of the pipeline system as it would continue to operate under the mandated operational and maintenance activities and internal inspections in accordance as specified in 49 CFR Part 192.

Appendix E
Hydraulic Modeling and Operator Training

Gulfstream Transient Model

A proven hydraulic model, used for planning system operating pressures, will be used to calculate the pressure at MP 58.7 where the downstream specification break occurs from 2,296 psig to 2,180 psig MAOP. Based on these planning model calculations, using the most conservative expected operating conditions, the MAOP at MP 58.7 is never exceeded during normal flow conditions. Therefore, the controlling pressure set points established at Compressor Station 410 discharge provide protection of the planned 2296 psig pipeline segment and will prevent any pressure excursion above 2,180 psig at or downstream of MP 58.7.

The “Transient” model is an industry-leading software used for single phase transient modeling. It offers the user the ability to match real world hydraulics by utilizing pipeline characteristics along with written code to mimic virtually any single-phase fluid system. On behalf of Gulfstream, Williams has successfully modeled every liquid pipeline system that Williams owns and/or operates and have tuned these systems to a high degree of accuracy. Although there are multiple software products used for gas pipeline modeling, based on Williams’ experience with the “Offline” model, it is capable of modeling gas systems with the same efficacy as liquid systems.

The “Transient” model typically contains more detail than the “Active” model. This is due to the need of the “Transient” model to provide control and ESD set points for the system to prevent over pressuring any segment. Compressor details, ESD valve set points, and control valve logic are all coded to ensure the model behaves the same as reality.

Normal and abnormal operations are simulated, and set points are provided, to estimate system capacity and mitigate conservative surge scenario situations, respectively. Conservative surge scenarios are blockages that occur faster than one second (considered instantaneous in most cases) at locations where ESD valves or control valves exist. For special areas of interest, these blockages can be placed a mile or so downstream of MP 58.7 to simulate a stuck pig that blocks 100% of the flow rate. Conservative scenarios also consider inadvertent compressor station shutdowns.

Gulfstream Active Model

The “Active” model software utilizes the PipelineManager™ program as developed by Energy-Solutions, Inc. under Emerson Automation Solutions. PipelineManager™ is the industry-leading solution for real-time pipeline monitoring for liquids and gas pipelines. It offers multiple leak detection technologies to find anything from leaks to ruptures. The “Active” model utilizes real-time pressure, temperature, flow rates and fluid composition to provide a detailed picture of current operations.

The PipelineManager™ website link is provided below for further information:

http://www.energy-solutions.com/products/esi-operational-management-solutions/pipelinemanager/

An algorithm based on the “Active” model will be running in Pipeline Control and communicating with the SCADA system. The algorithm will continuously calculate the pressure at MP 58.7. The SCADA system will send the calculated value of this pressure to the Station PLC, which can be viewed as a continuously updated reference value. This value will also be used for alarm purposes back to Pipeline Control. Pipeline Control will monitor the pressure calculated by the model algorithm and the SCADA system will trigger an alarm if the calculated pressure at MP 58.7 approaches 2180 psig, allowing the operator to take appropriate actions to reduce the current set point of the booster compressor accordingly to avoid an overpressure scenario.

The “Active” model has been tuned using 2 weeks of archived SCADA data for all available metering and field transmitters. The software will run and verify model-calculated pressures with actual pipeline pressures via SCADA and pressure recorder values. The model will be fine-tuned by conducting a statistical analysis of the difference between model calculated pressures and actual pressures.

Combining the use of “Transient” and “Active” models provides more protection over and above the existing regulatory requirements.

Operational Model

The System Planning Operations group was tasked with tuning of the operational model for Gulfstream. For this purpose, the model was curtailed to the offshore portion between Compressor Station 410 and Compressor Station 420.

First the offshore pipeline model alignment with GIS data for pipe lengths, pipe diameter, pipe wall thickness, elevations and valve locations were verified for accuracy. Then the offshore pipe ambient temperature profiles were set up using the following third-party technical reports and papers:

- Analyses of near bottom temperatures near the Gulfstream Pipeline by Robert H. Weisberg, Professor of Physical Oceanography, University of South Florida and Lianyuan Zheng, Ph.D., Senior Associate in Research.
- PSIG 1212 - Tuning of Subsea Pipeline Models to Optimize Simulation Accuracy.

Next, the hourly average data was gathered from SCADA using the process history database and from measurement using the Flow Cal database for the 2017 calendar year. From SCADA, Pressure and Temperature data was pulled at the discharge side of Compressor Station 410, and suction side of Compressor Station 420 and at the Bartow Meter Station. Line pack data was gathered for all Pipes in Florida downstream of Compressor Station 420. From measurement, the inlet and outlet flows were gathered at all Meter Stations in Florida downstream of Compressor Station 420 and at the Bartow Meter Station.

The model was developed using the Compressor Station 410 delivery pressure and temperature, the delivery flow at Bartow and the netted flow through Compressor Station 420. The model was run for the entire year, but the focus was kept on the summer months when Gulfstream experiences higher flowrates.

After each run the model calculated pressure and temperature at Compressor Station 420 and Bartow were compared with the respective SCADA data using standard deviations. The pipeline roughness and thermal conductivity was adjusted, and the model was run again. This iterative process was repeated until the pipe roughness and heat transfer were adjusted to align the model calculated pressure and temperature with SCADA pressure and temperature accordingly.

The Pipeline Roughness was adjusted from 350 to 175 micro inches while the Heat Transfer Coefficient was adjusted from 0.50 to 1.25 btu/hr-ft^2-deg.F. By completing this process, the model was fine-tuned to improve accuracy.

Operator Training System

The OTS is a full-scope pipeline trainer which provides a very realistic operator experience using a copy of the same SCADA screens as in the pipeline control room. The OTS can be used for any type of pipeline for simulating hydraulic behavior and the ability to model accurately the control logic associated with field devices and SCADA sequencing.

The OTS contains the following components:

- Virtual Pipeline Model to accurately replicate thermo-hydraulic pipeline transient behavior and to provide field data to the SCADA
- Virtual Control System to simulate the major control loops, system interlocks, and other logical control behavior
- Scenario Composer allows instructor to create normal or abnormal scenarios
- Scenario Navigator helps instructor in organizing, creating, scoring, and executing training scenarios
- Qualification Information System is a database for managing the historical records related to operator training

- Copy of production SCADA system including same type of screens as operator will use on production SCADA

Williams' operators will be trained using the OTS. The OTS allows the training officer to define and impose specific normal or abnormal scenarios on which the pipeline control room operator is to be trained.

Currently, Williams utilizes a full-scope OTS on 9 liquid pipelines and 1 gas pipeline each with four scenarios: 1. Pipeline Startup; 2. Pipeline Shutdown; 3. Inadvertent valve closure/pipeline blockage; 4. Pipeline leak. The scenarios are programmed to observe the trainee and monitor their actions against standard procedures for that pipeline system. Scoring and pass/fail criteria are predetermined by Pipeline Control Management.

As a part of the controllers' on-the-job training, Houston Pipeline Control schedules controllers to run through (and pass) each scenario for each pipeline system controllers in their area of responsibility. New controllers are required to run and pass each scenario before the OQ exam. The OTS is also used as an environment for the OQ exam; it provides a way for the evaluator to observe the covered tasks performed by the controller.

Lastly, the OTS has been used to test and train controllers on major changes to operational conditions of a pipeline or SCADA system. These changes range from increased pipeline flow to a new safety critical alarm feature in SCADA.

Appendix F
Existing and Future Operational Activities

Existing and Future Operational Activities

Operations and Maintenance activities are performed as required to remain in compliance with Federal regulations and company policies such as:

- Monthly Aerial Patrol to the 3 Mile line from AL Shore and to Egmont Key from FL Shore
- Class 1&2 Offshore Leakage Survey, performed via fixed wing aircraft from FL to AL, annually

A summary of additional operations and maintenance activities to date are as follows:

- 2007 Depth of Cover Survey (192.612), ML 200 & SL 60 AL/MS
  Lowest depth of cover measurement obtained was 2.69 feet for ML200.
- Tampa Fairway Rock Cover Survey including soil anchor inspections
  Completed per the approved MMS "Monitoring and Maintenance Plan"
  2012 inline inspection
- 2012 Depth of Cover Survey (192.612), ML 200 & SL 60 AL/MS
- Egmont Key Pipe Exposure Cover Survey completed 2012
- Egmont Key FDEP inspection, Aug 2013
- Dauphin Island Pipe Exposure cover remediation discovered during 2012 Depth of Cover Survey, completed March 2013
- Mobile Bay Pipe Exposure and Spanning remediation (MO820, MO910, VK36), completed Jan 2014 – Aug 2014
- 2017 Depth of Cover Survey (192.612), ML 200 & SL 60 AL/MS
- Egmont Key FDEP inspection, May 2017
- Egmont Key Pipe Exposure cover remediation completed Aug 2018
  Installed concrete mats on an exposed section of ML200 near Egmont Key – Tampa Bay, FL Area.

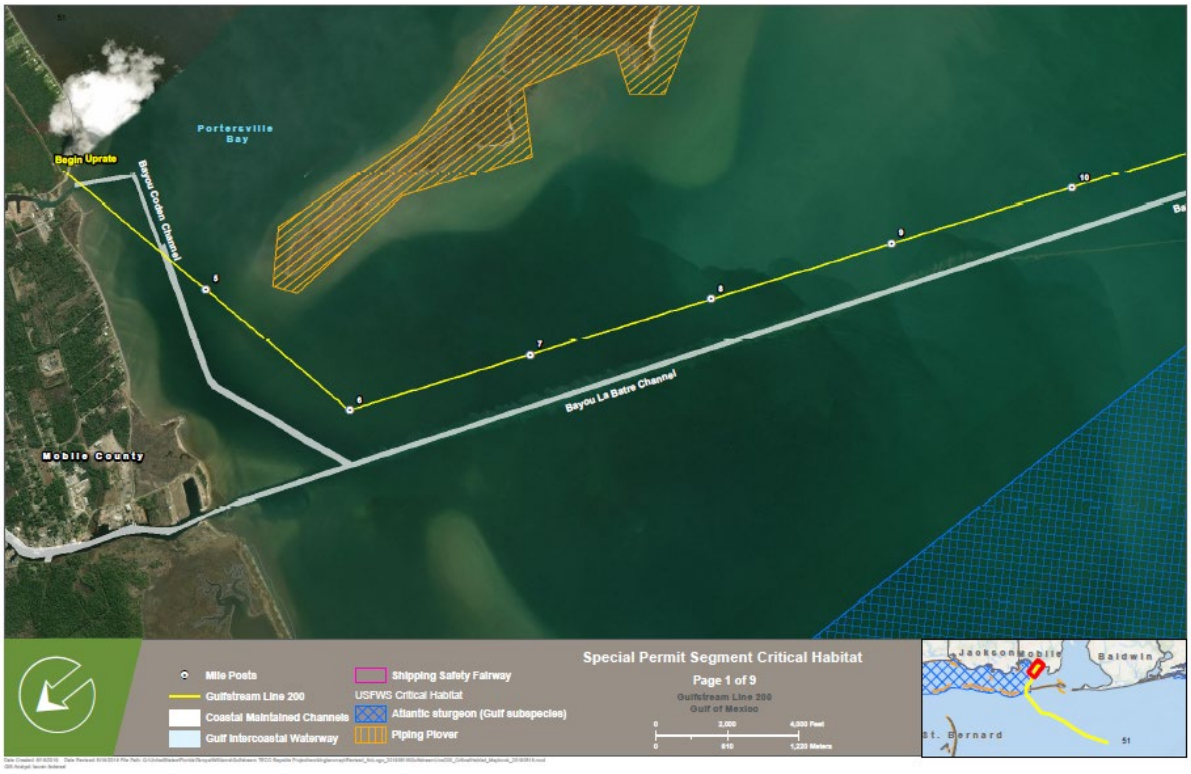
Future maintenance activities scheduled include:

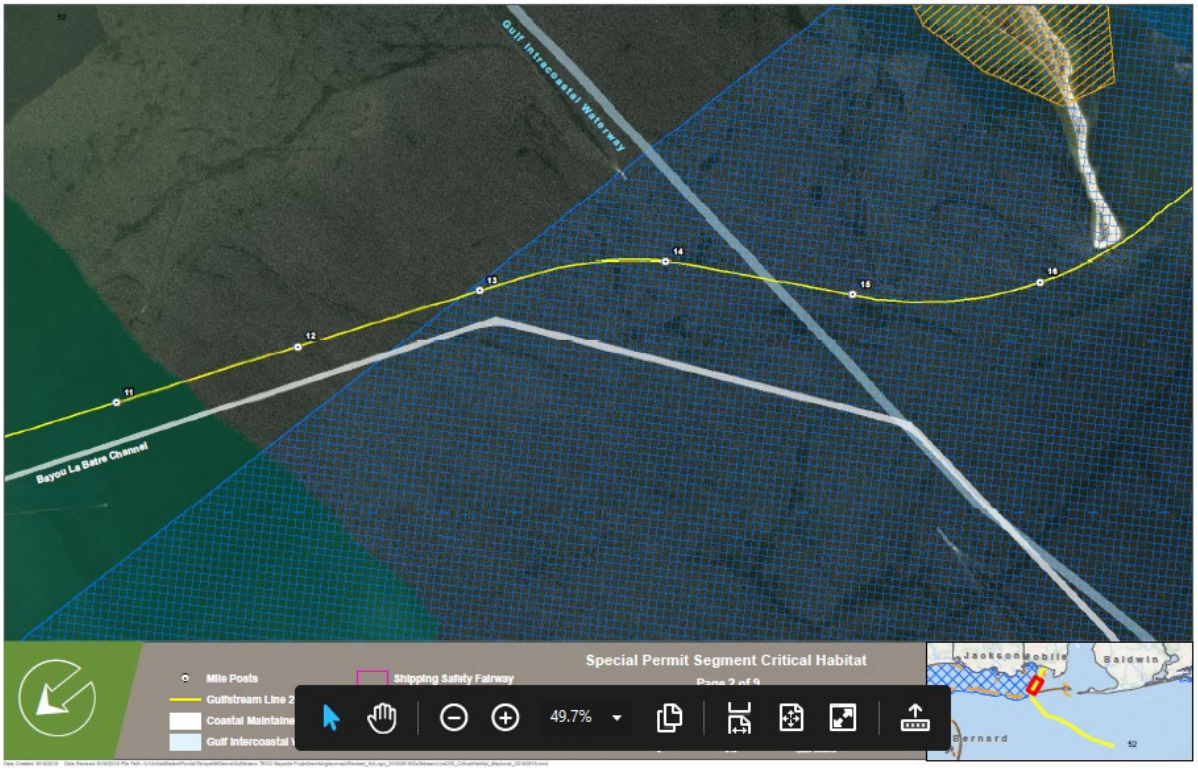
- 2019 ILI ML200, occurring every 7 years
  - Magnetic Flux Leakage (MFL)
  - Geo Combo Tool
- 2022 Depth of Cover Survey (192.612), ML 200 & SL 60 AL/MS, occurring every 5 years
  - Conduct underwater inspections of Gulfstream pipeline segments that lie in 15 ft of water or less in the Gulf of Mexico.
  - Survey in accordance with Title 49 CFR 192.612.

In addition, a rectifier located at Station 410 is constantly monitored remotely and is set for a bimonthly inspection schedule. Cathodic protection levels for the MP 3.9 mainline valve site and the pipeline are noted to be in good condition and is documented into a compliance database. Atmospheric inspections are completed every 3 years for aboveground pipe.

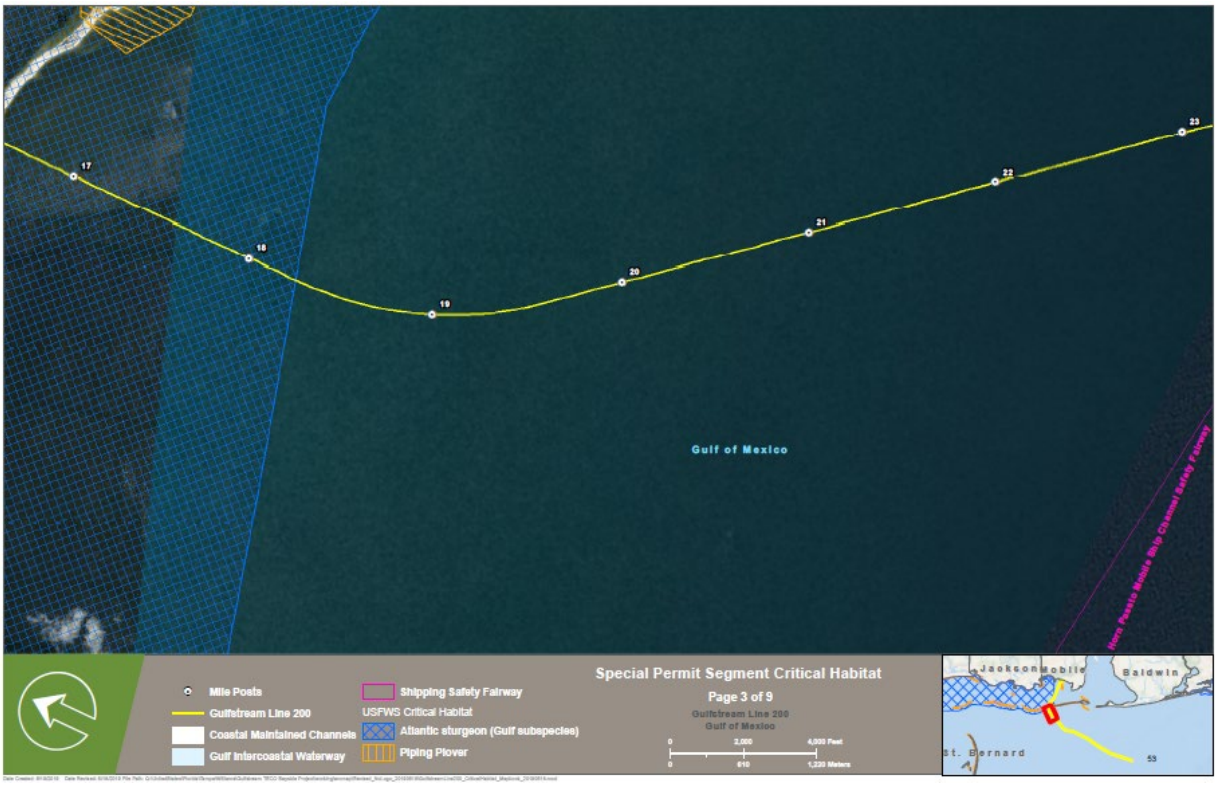
Appendix G
Offshore Marine Resources Maps

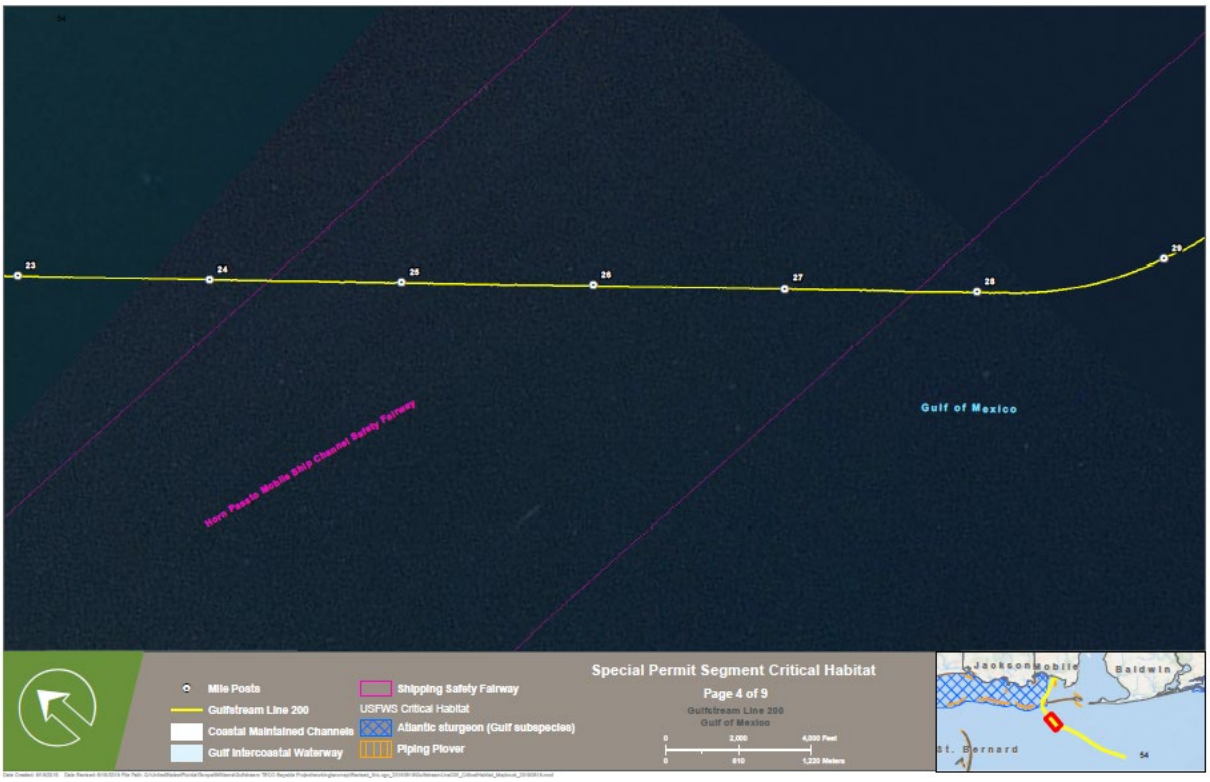
Offshore Marine Resource Maps



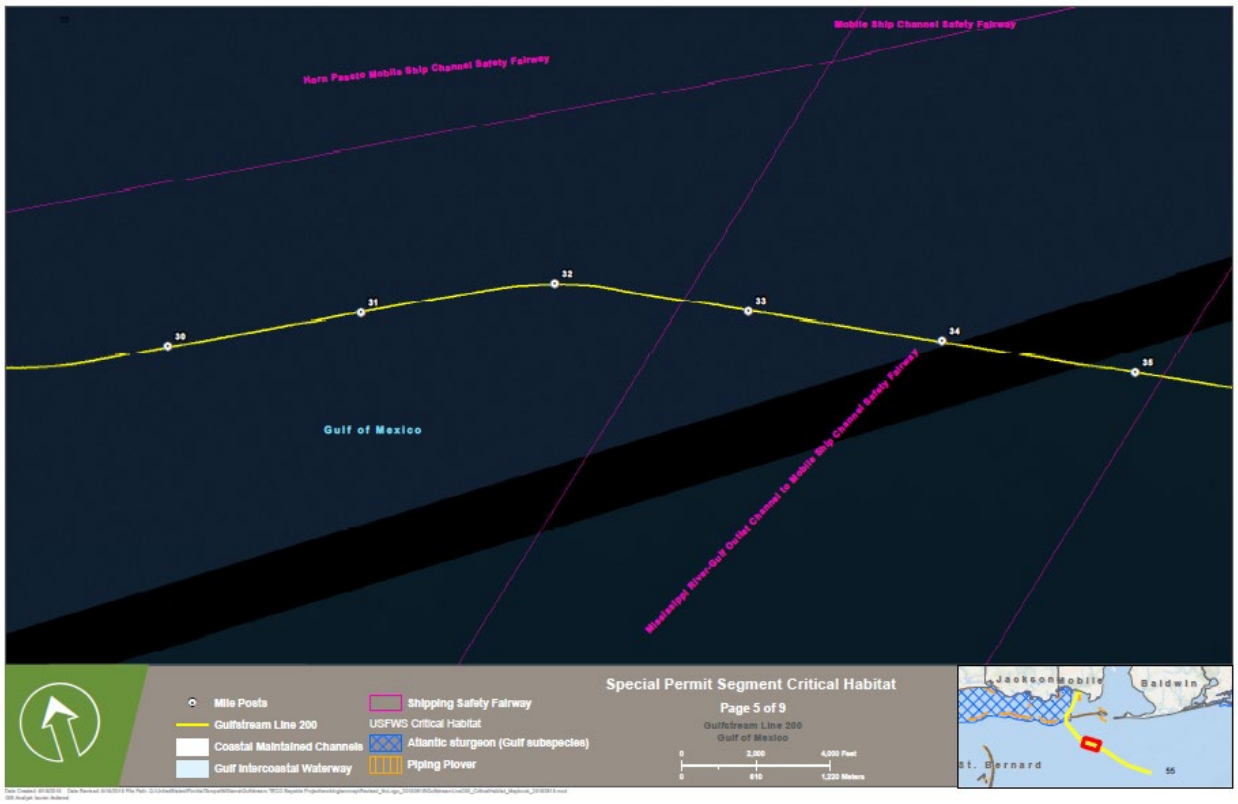


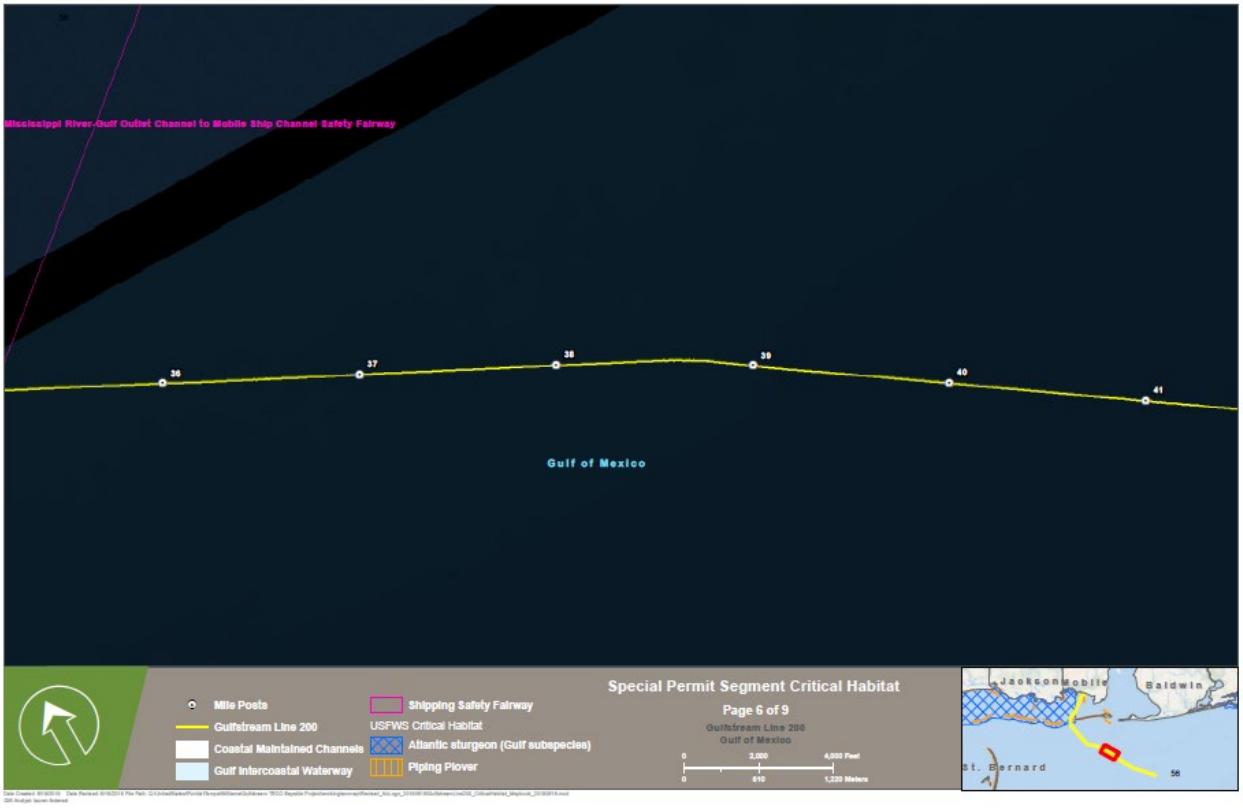
Offshore Marine Resource Maps





Offshore Marine Resource Maps





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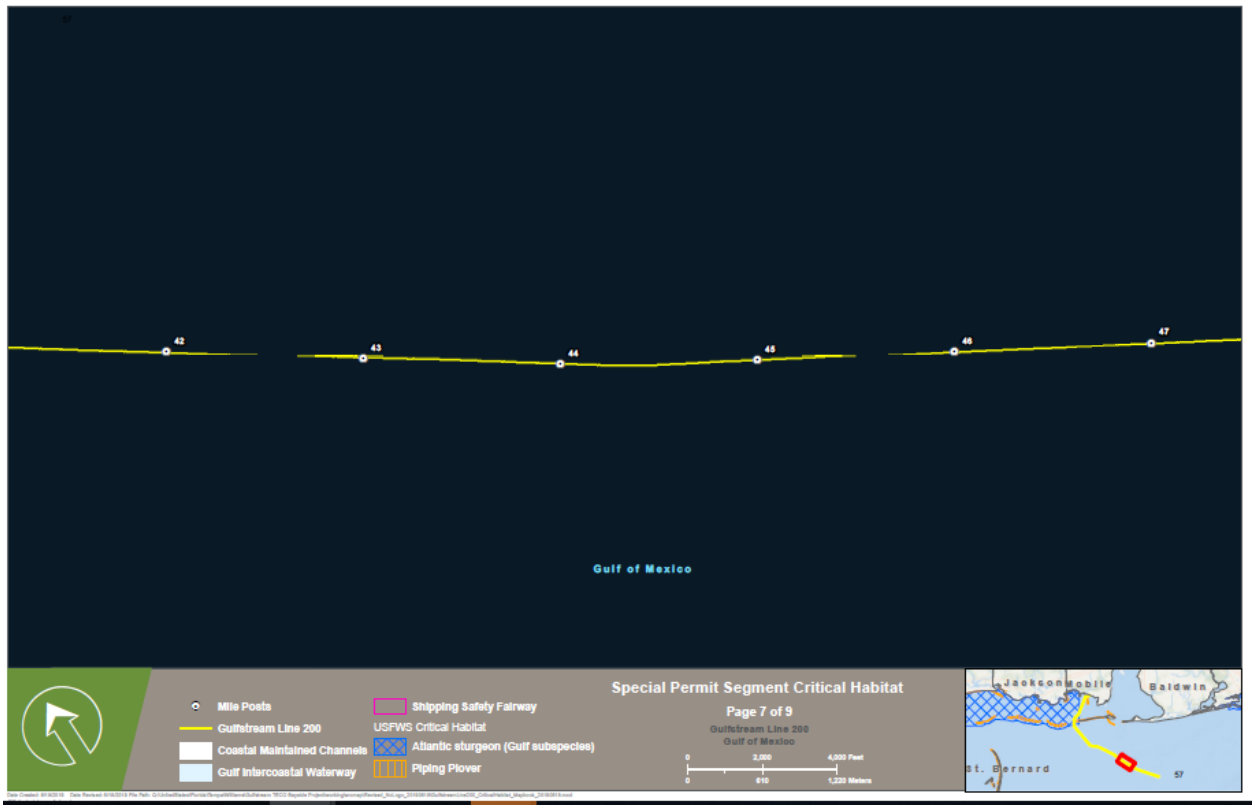

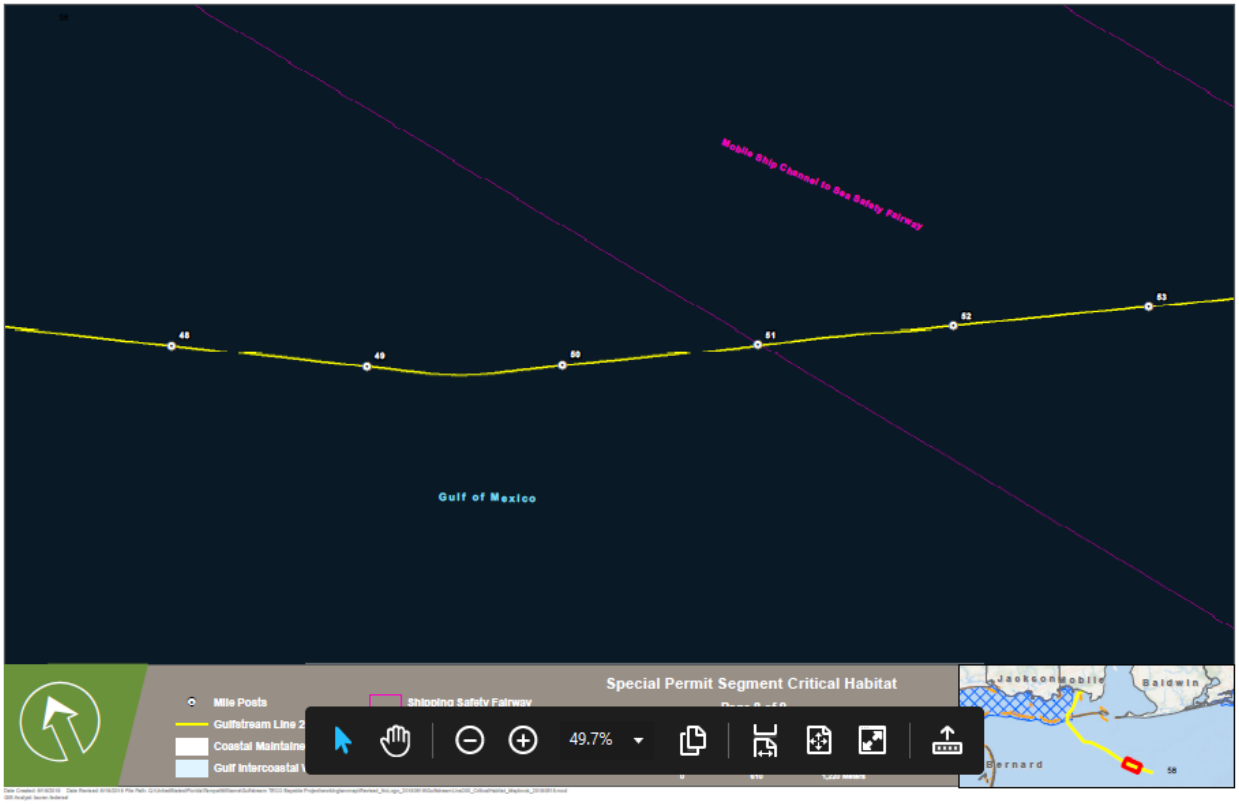

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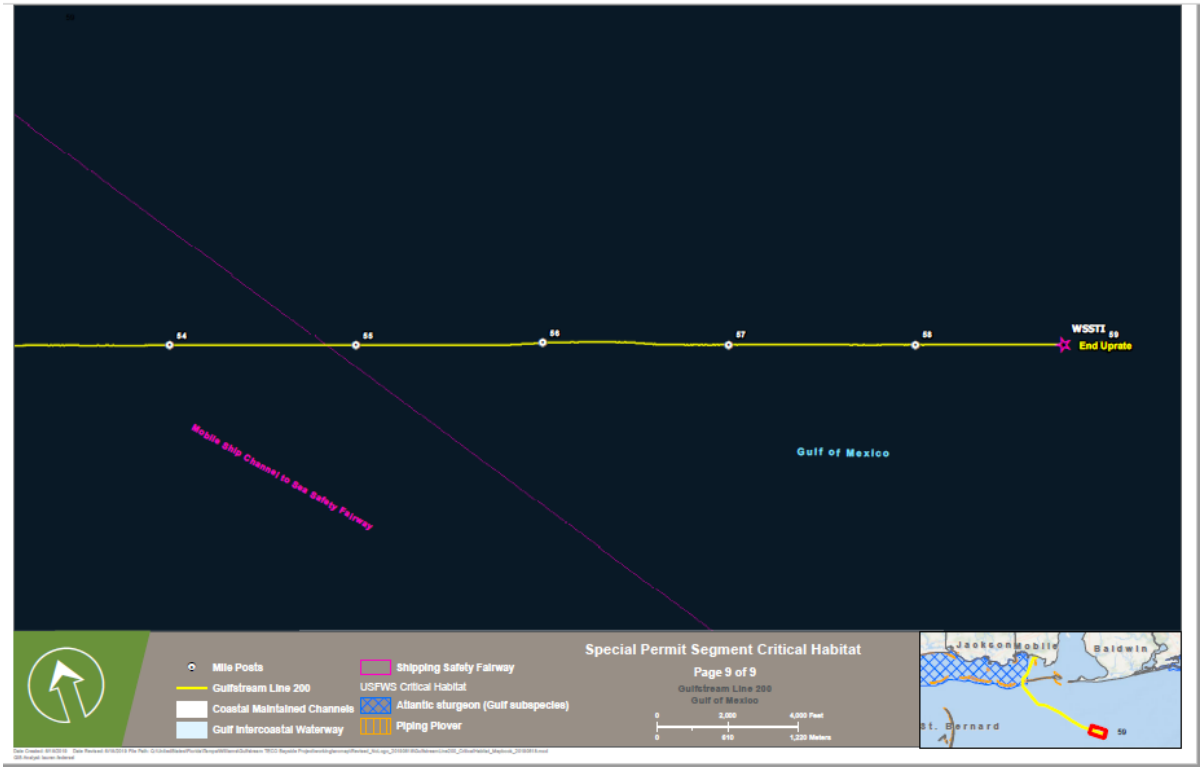

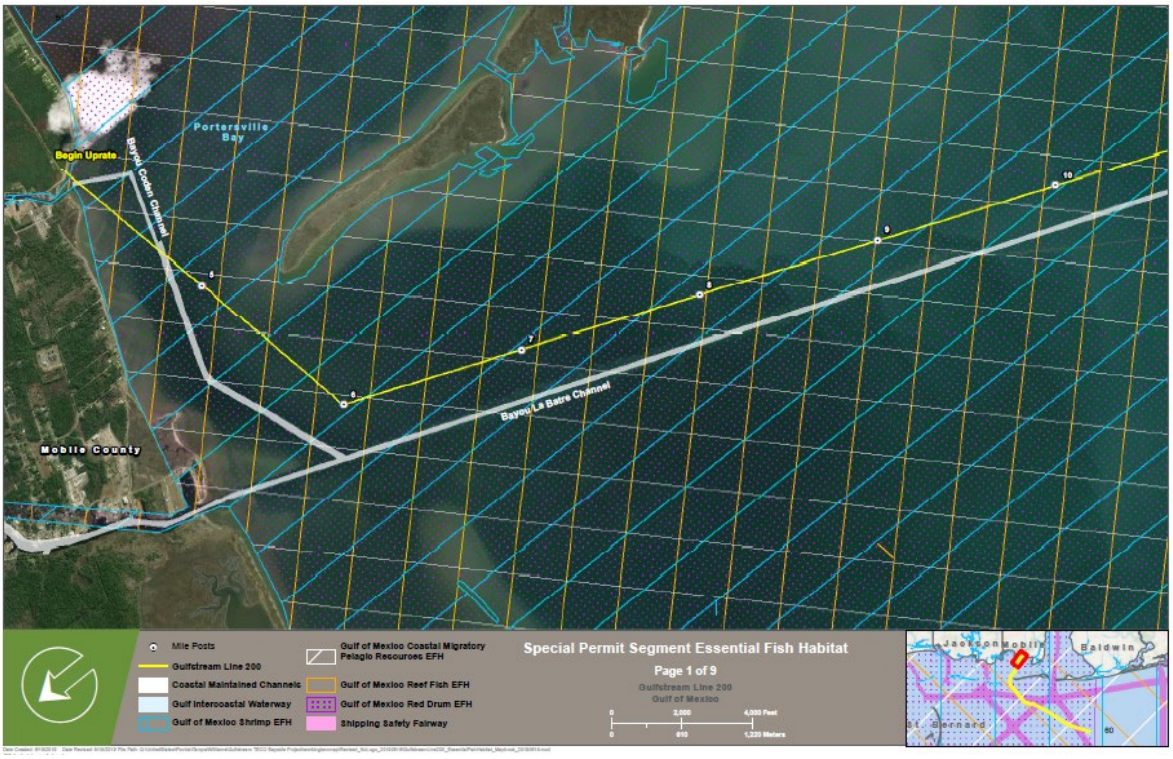

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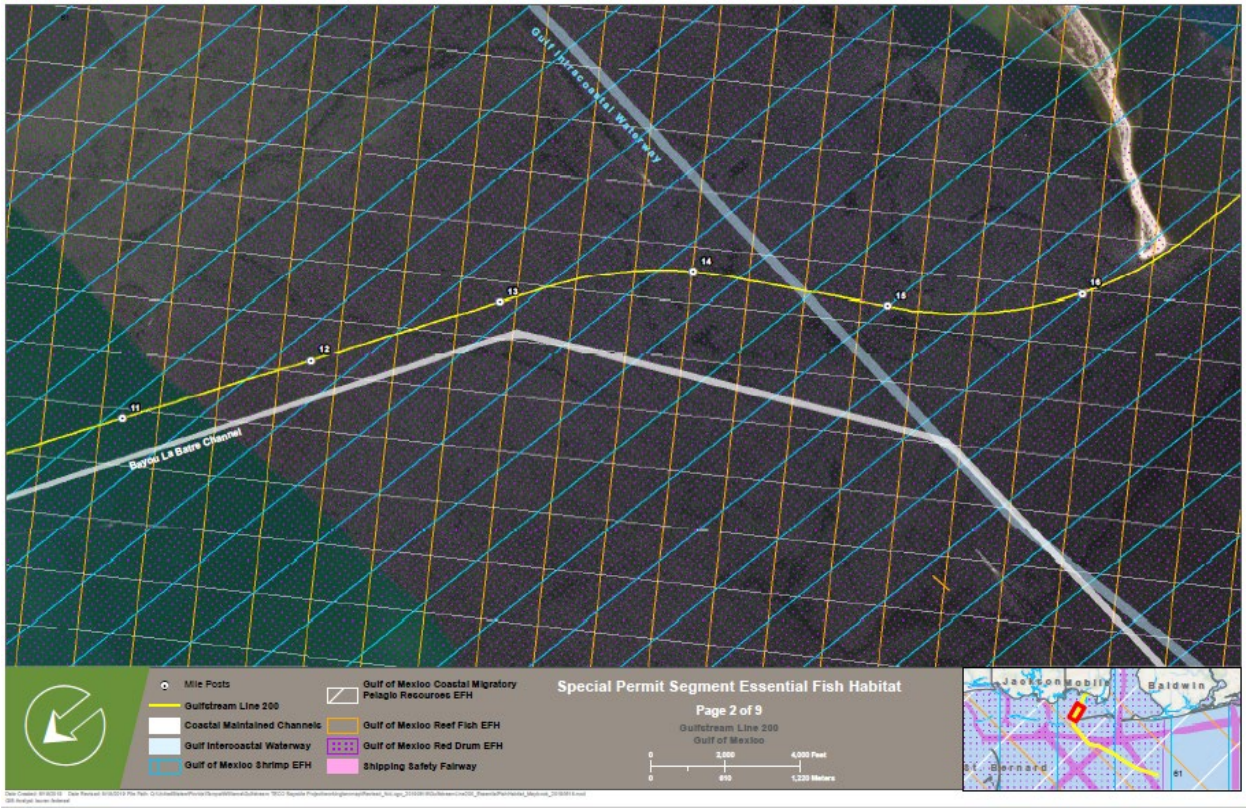

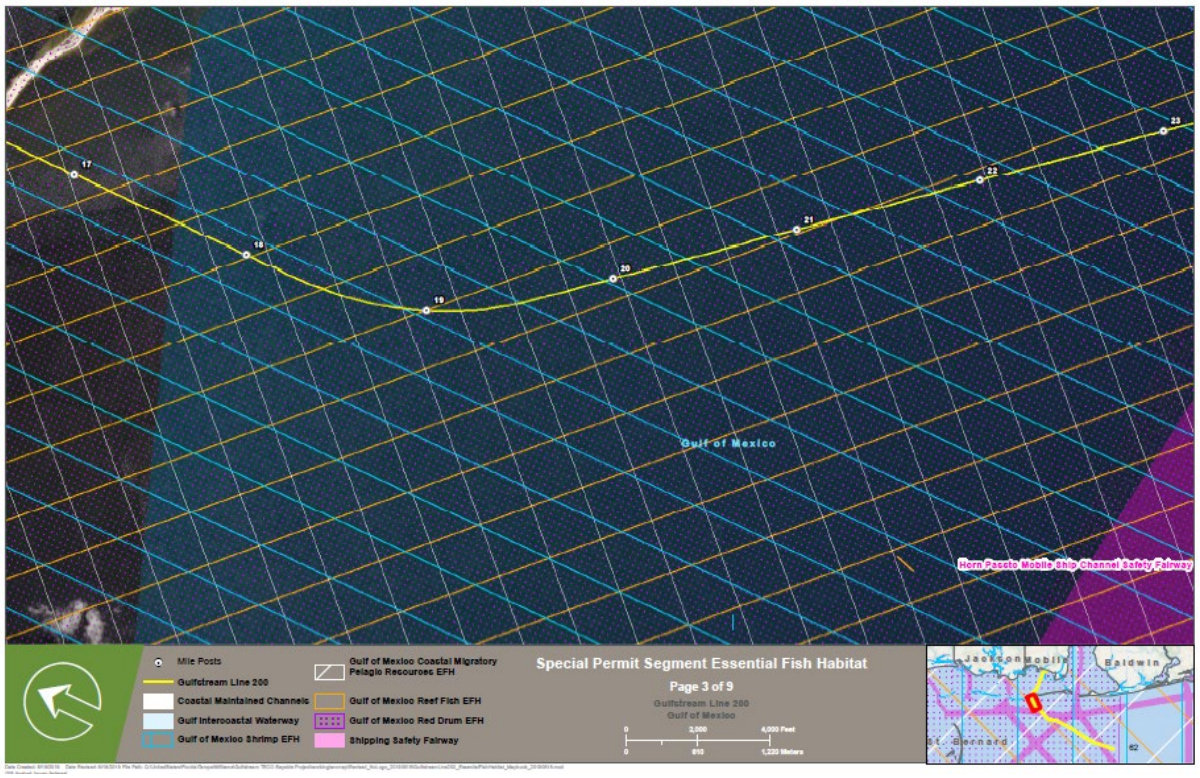

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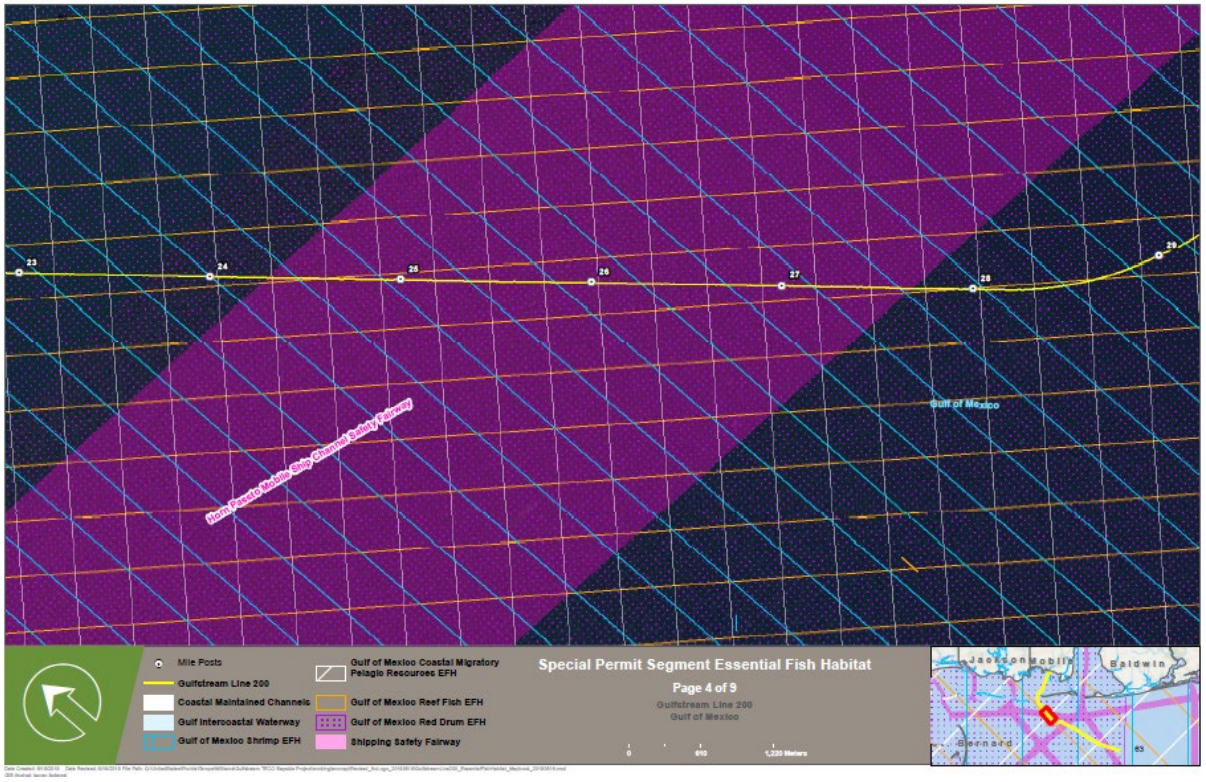

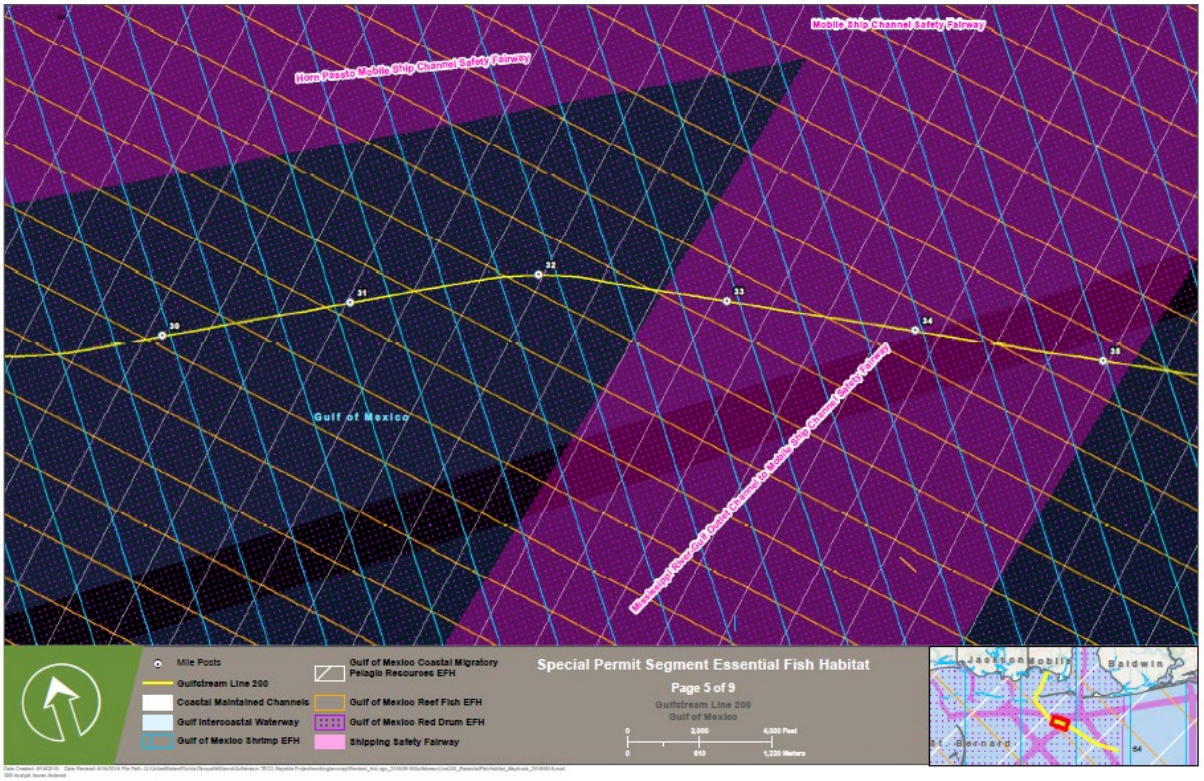

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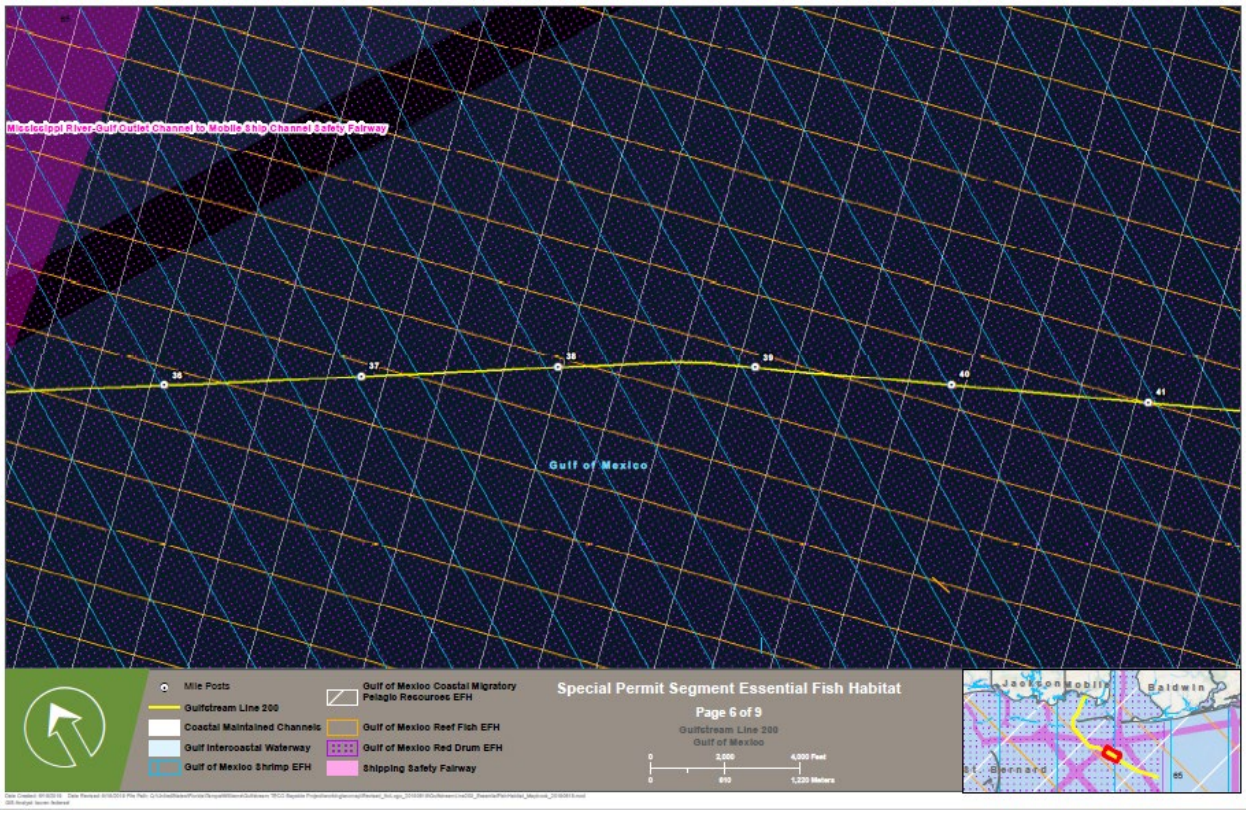

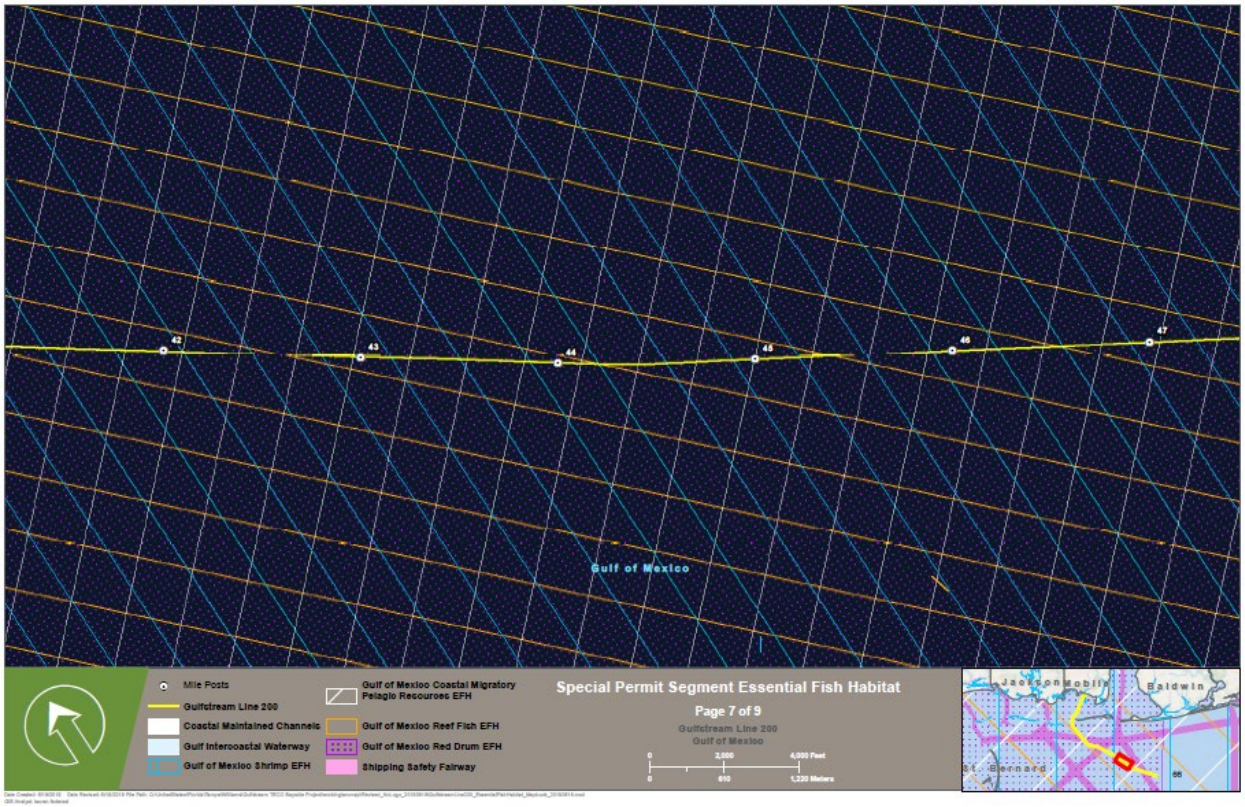

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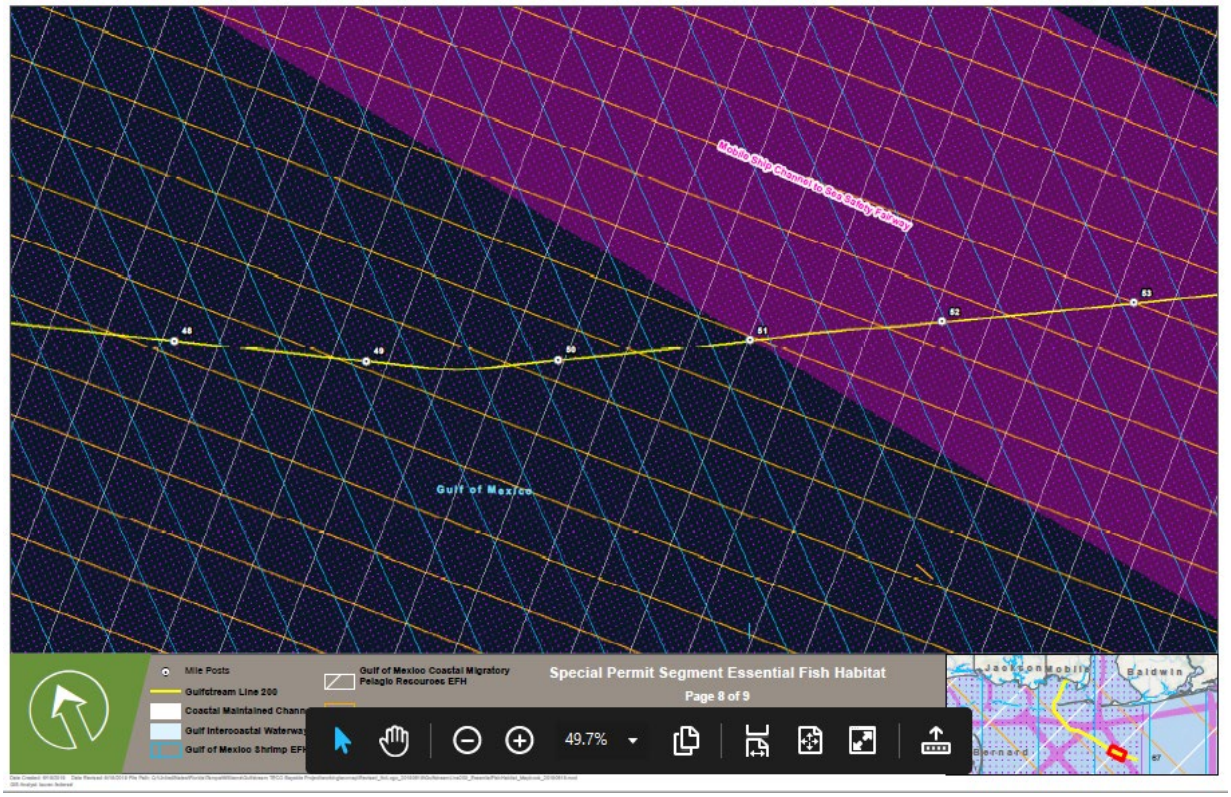

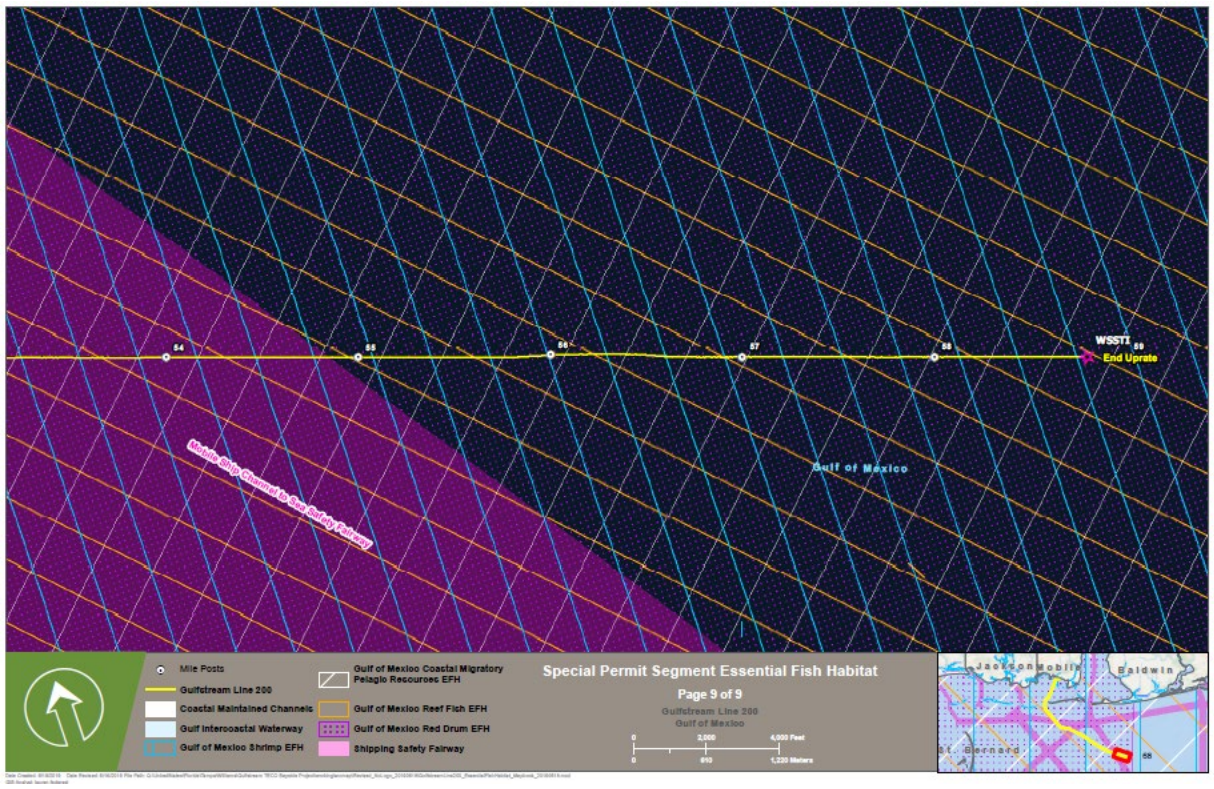

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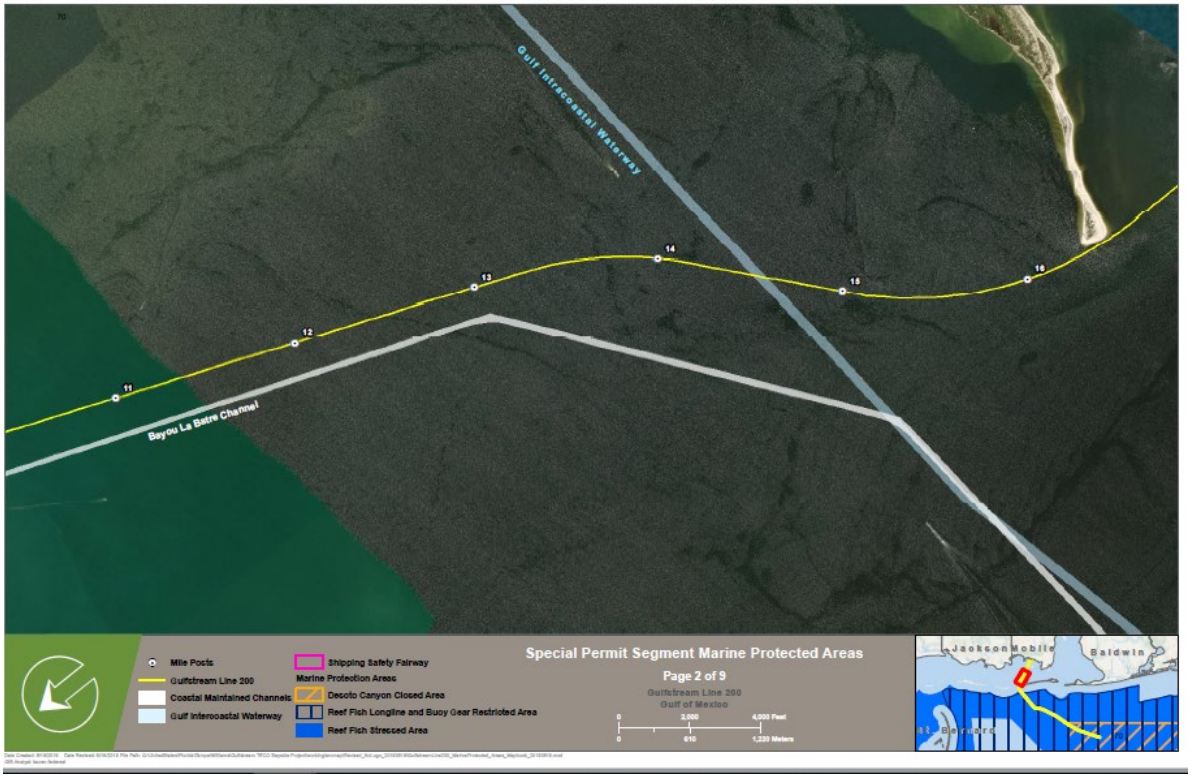

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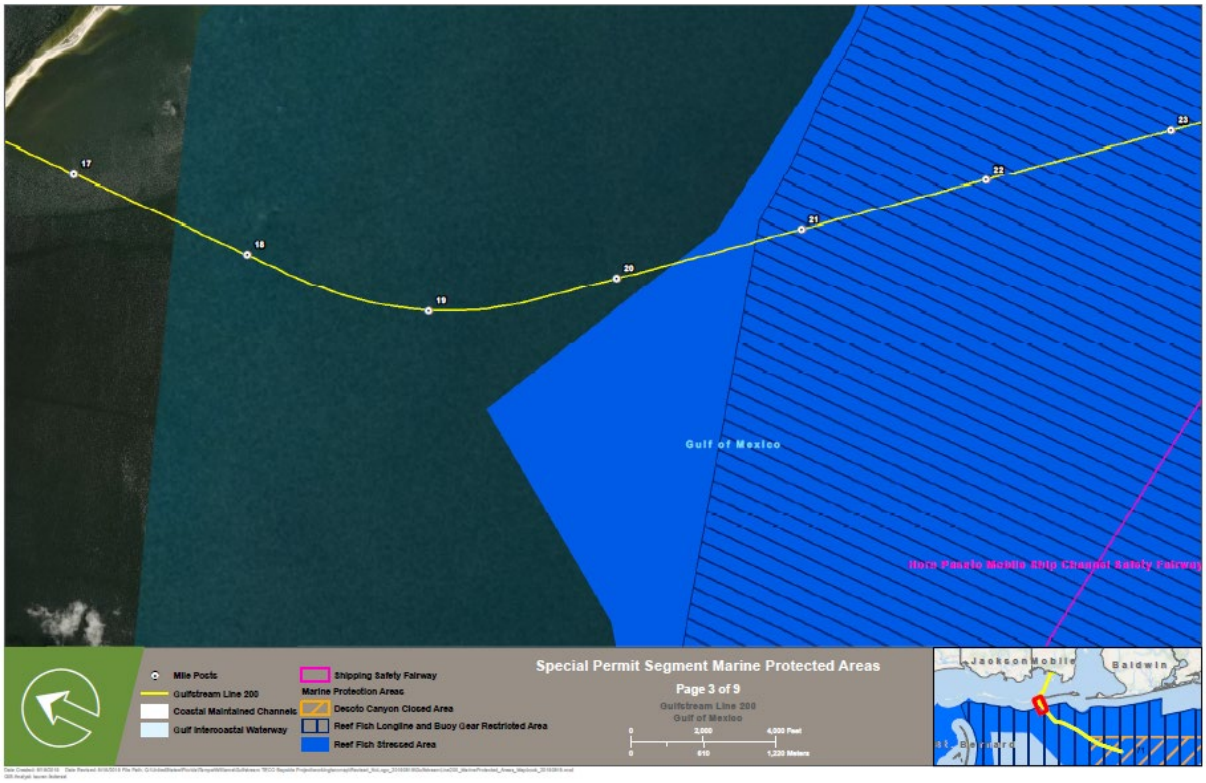

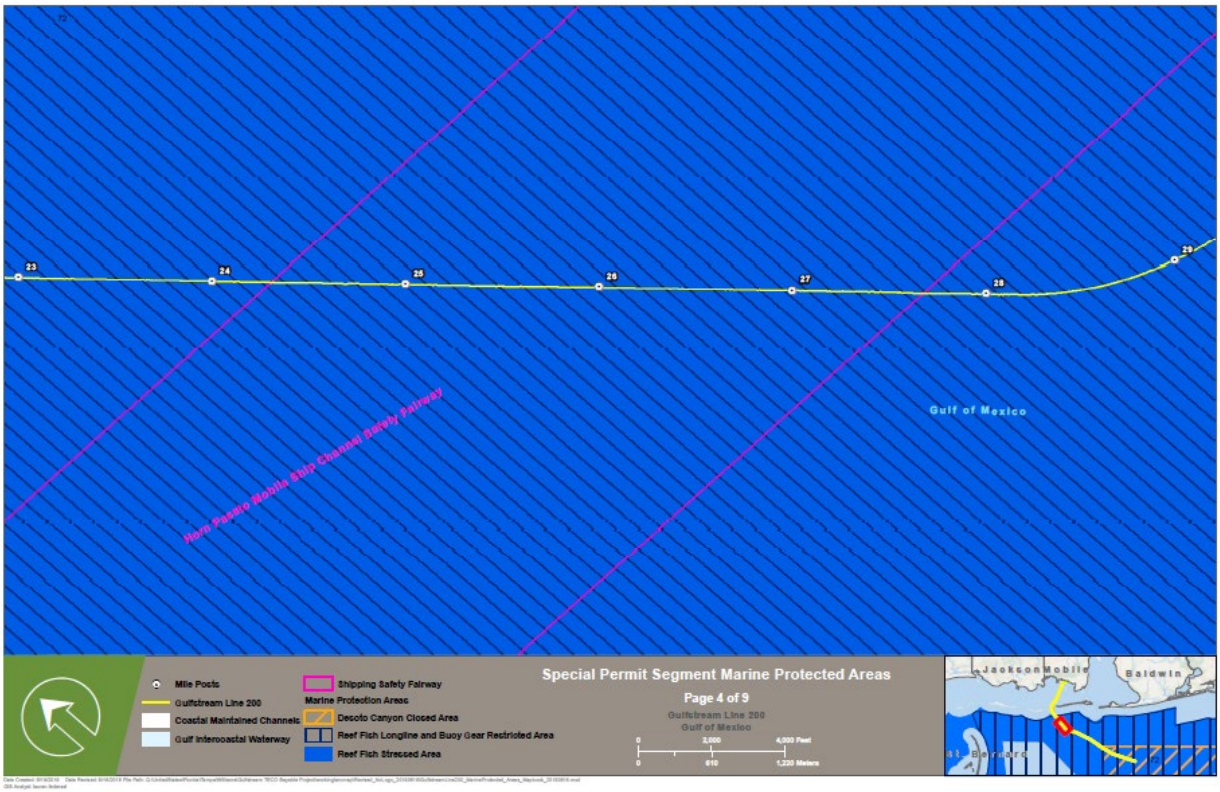

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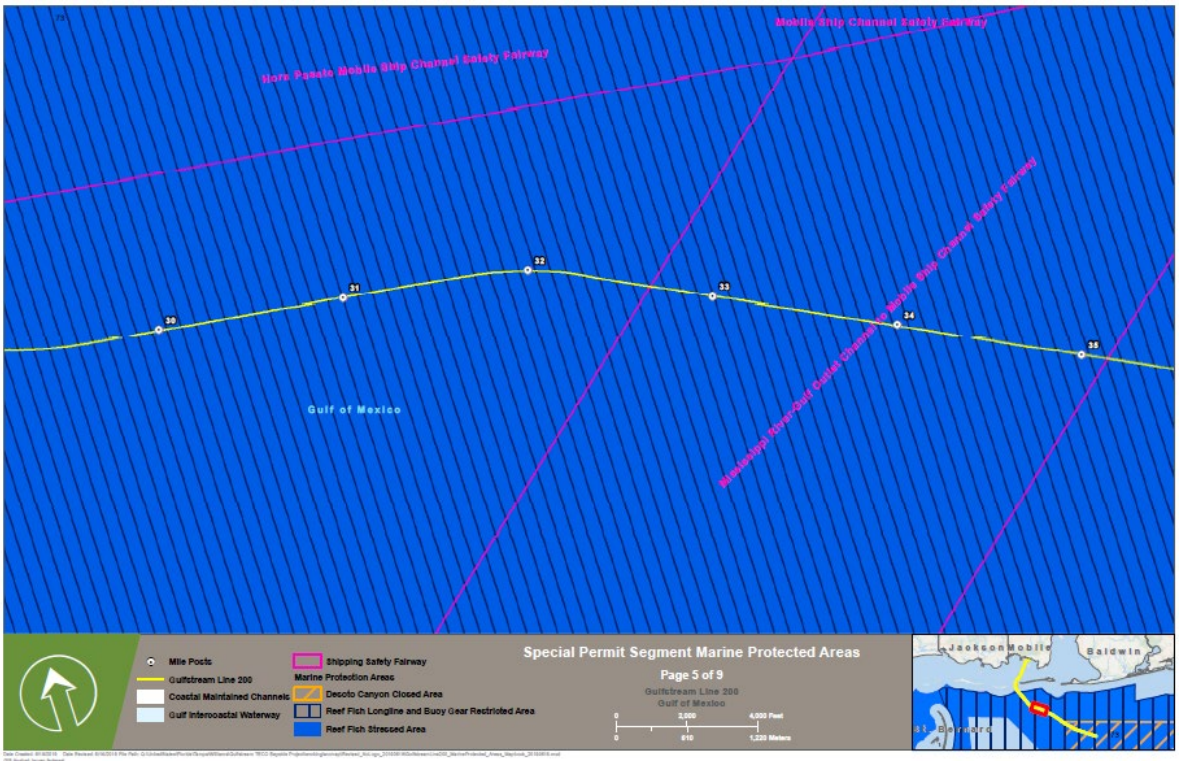

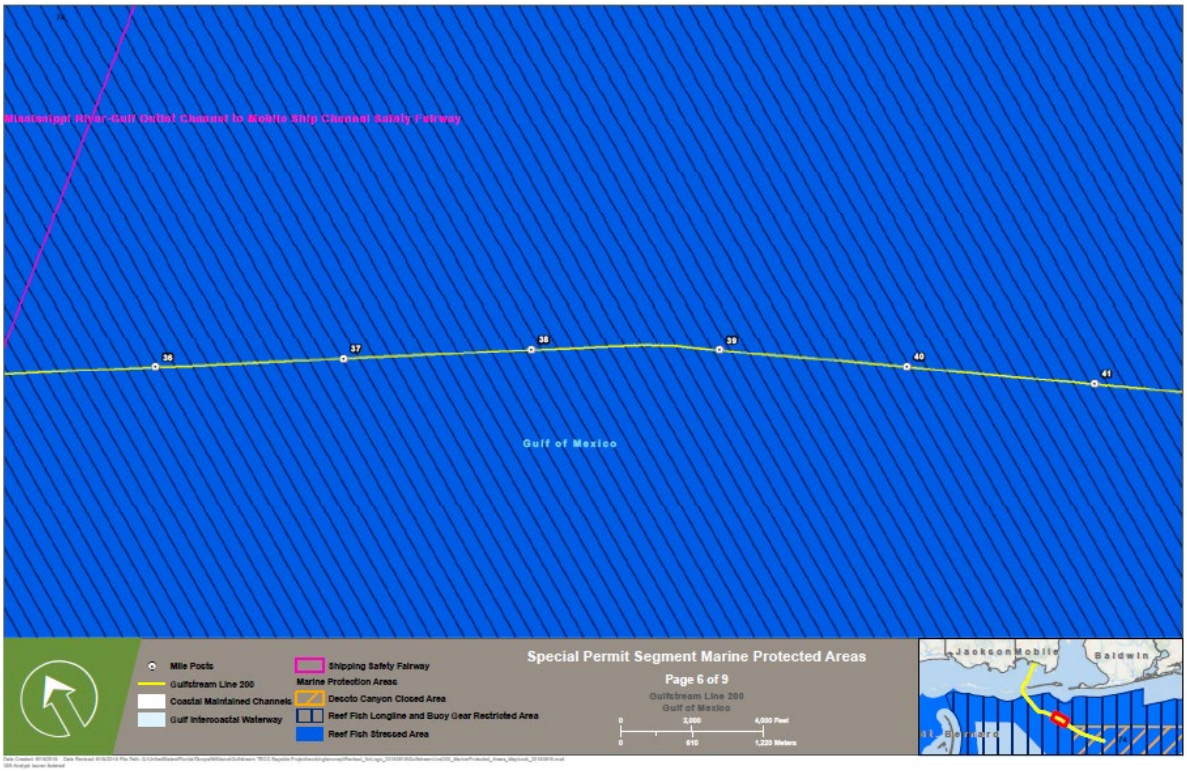

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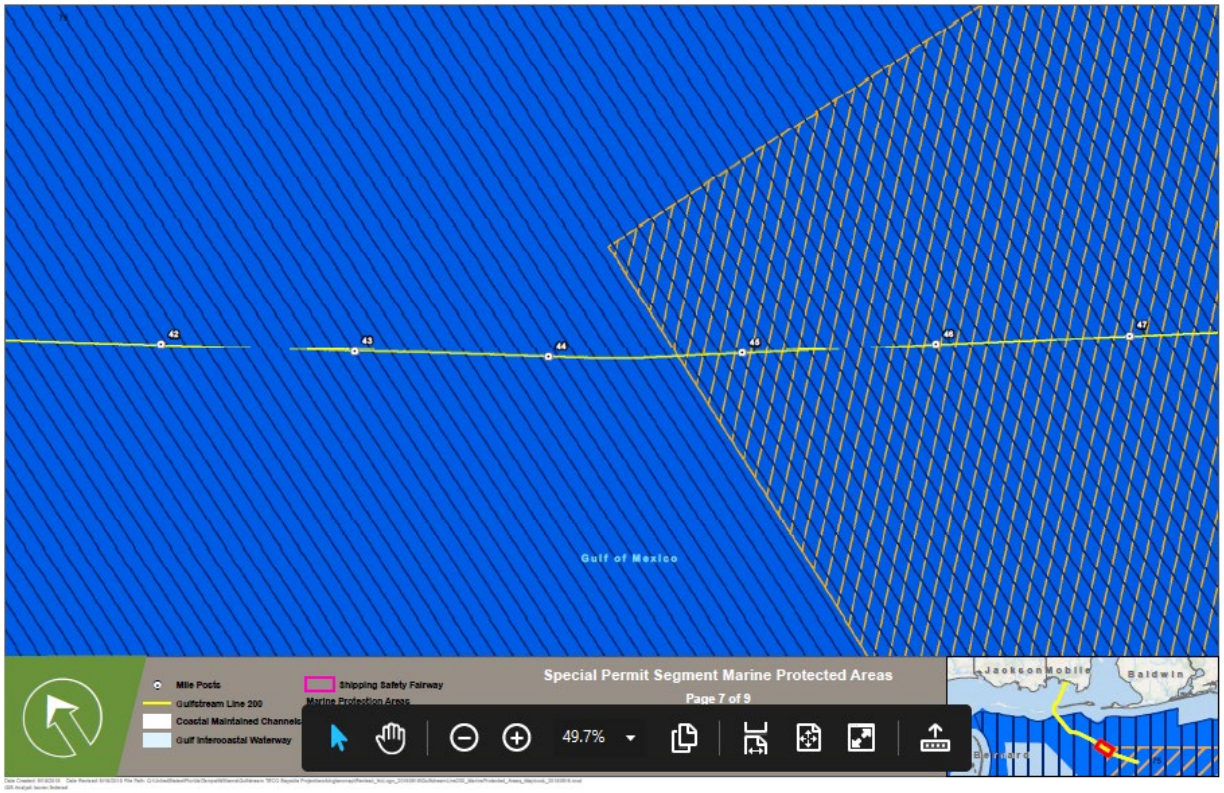

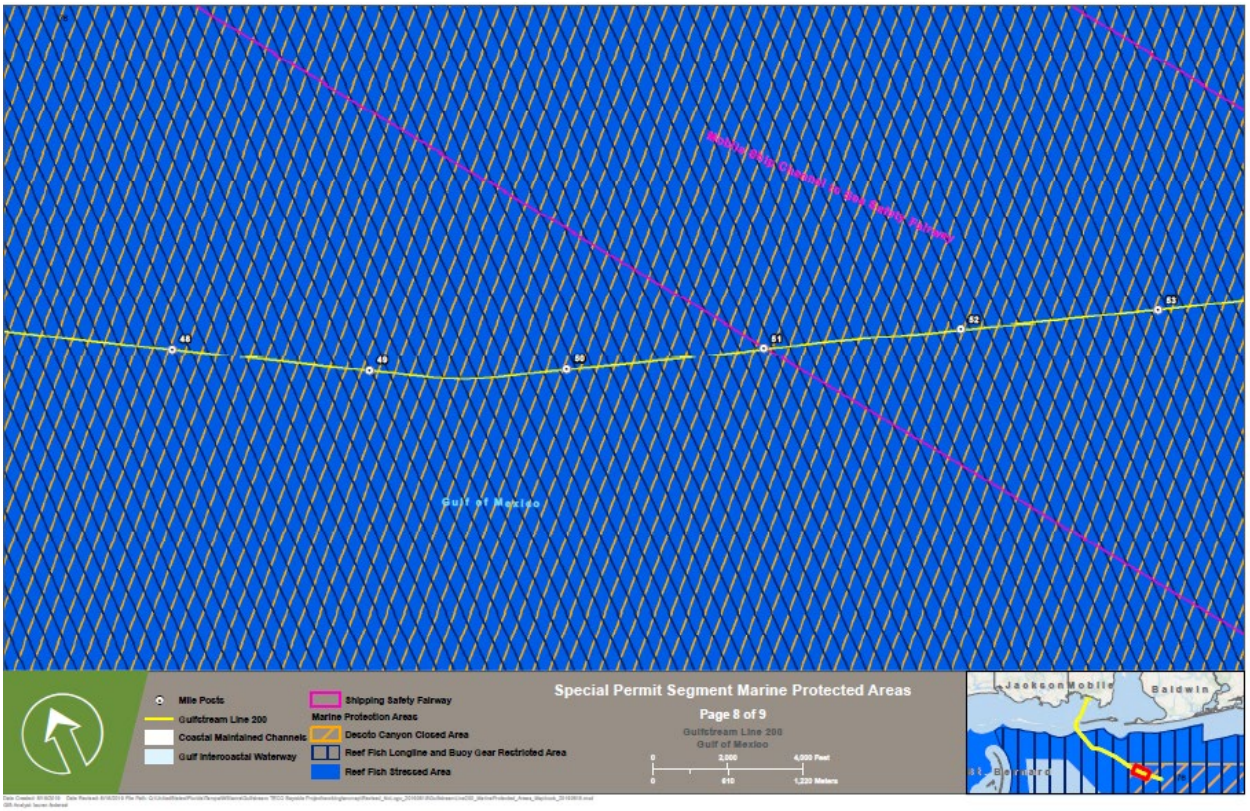

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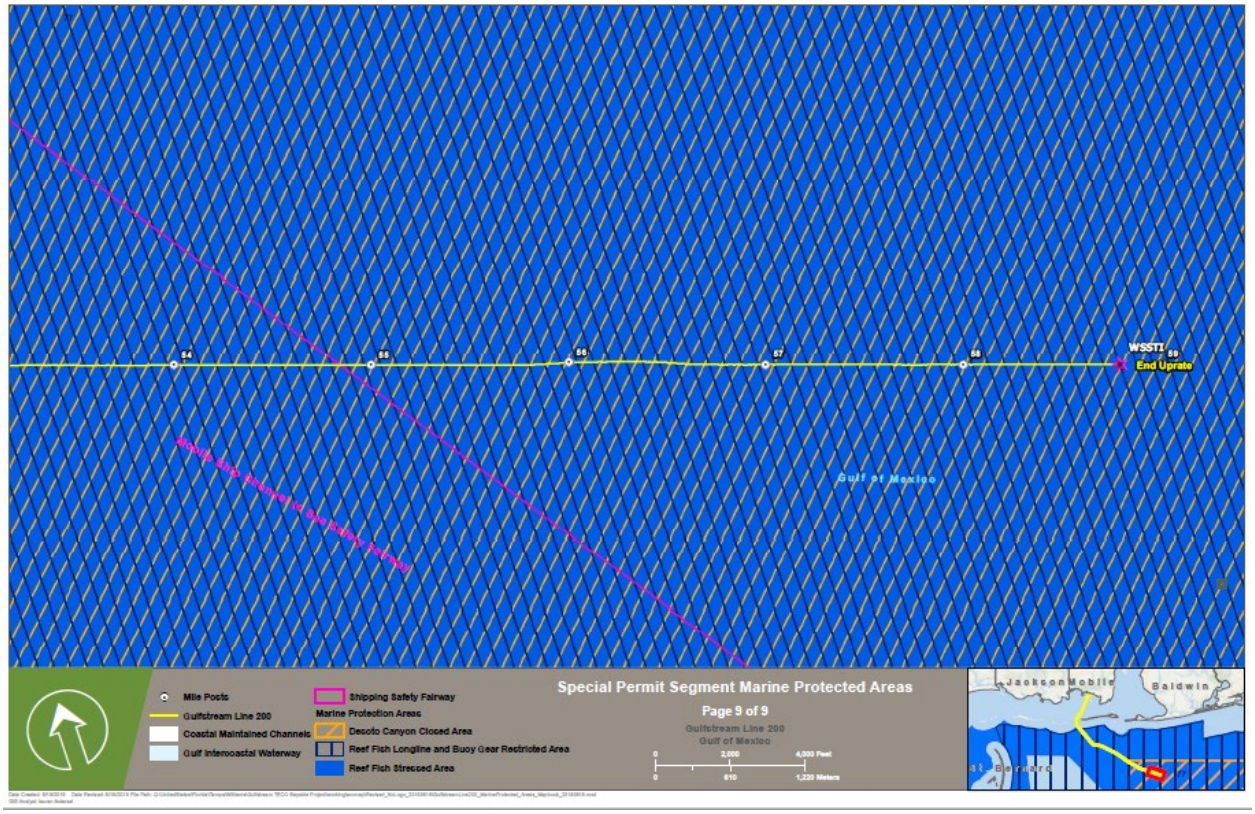

Appendix H
Simplified Control Narrative

Gulfstream Phase VI

Gulfstream Simplified Control Narrative

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Asset ID		Area		Discipline		Document Type		Sequence No.		
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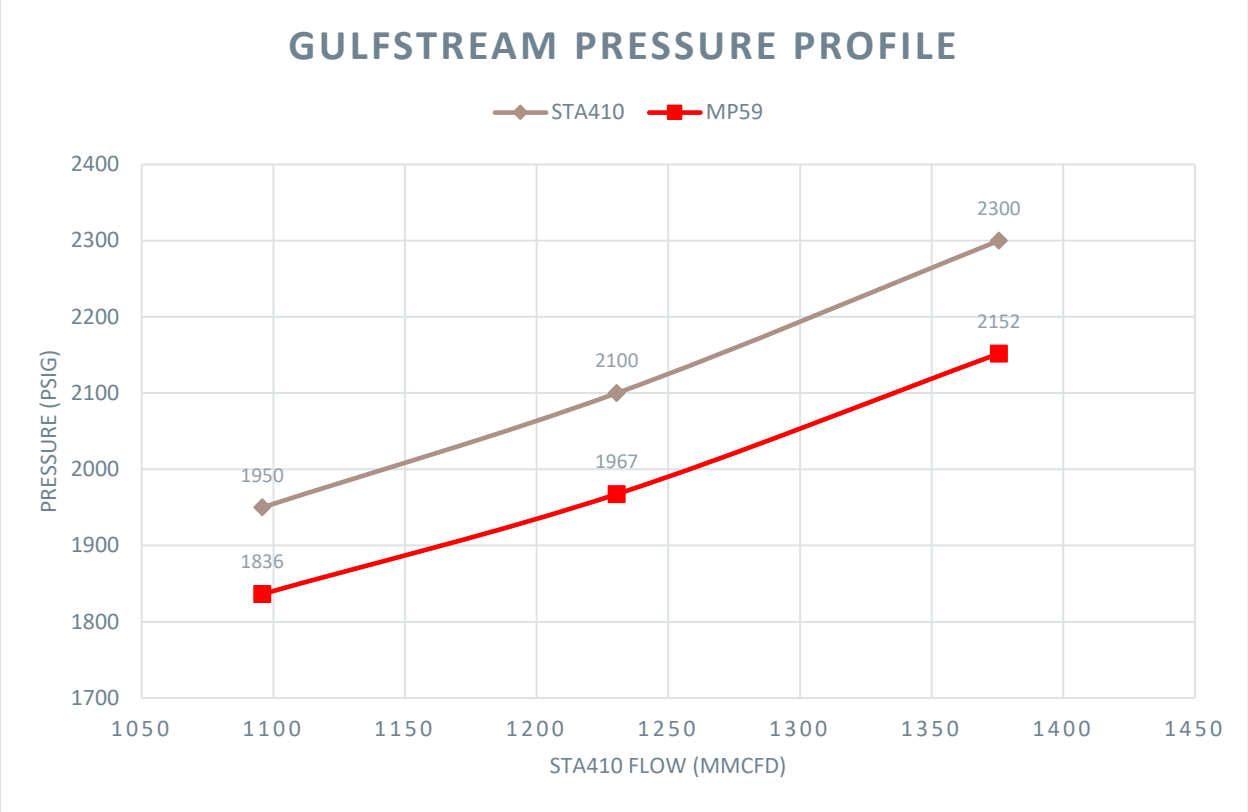
D	18-June-2019	Re-Issued for Environmental Assessment	S Brumbaugh	J. Montalvo	M. Coleman
C	21-May-2019	Re-Issued for Permit	S Brumbaugh	J. Montalvo	M. Coleman
B	29-April-2019	Issued for Permit	S Brumbaugh	J. Montalvo	M. Coleman
A	16-April-2019	Issued for review.	S Brumbaugh	J Fatema	M Coleman
Rev	**Date of Issue**	**Reason for Issue**	**Prepared By**	**Checked By**	**Approved By**

Gulfstream Simplified Control Narrative

The chart below depicts the pressure profile of Compressor Station 410 and MP 58.7 at various load conditions. The three points selected on the chart are at 80%, 90% of rated flow capacity, and an increase of 9 Mdt/d on total design load. The MAOP of the pipe segment from Compressor Station 410 to MP 58.7 is 2,296 psig. After MP 58.7 it is 2,180 psig. The pipeline system between Compressor Station 410 and MP 58.7 will normally operate as shown in the operating curves above. When the booster compressor (Unit 5) is in operation, it will have a normal discharge set point of 2,286 psig.

Gulfstream Pressure Profile:

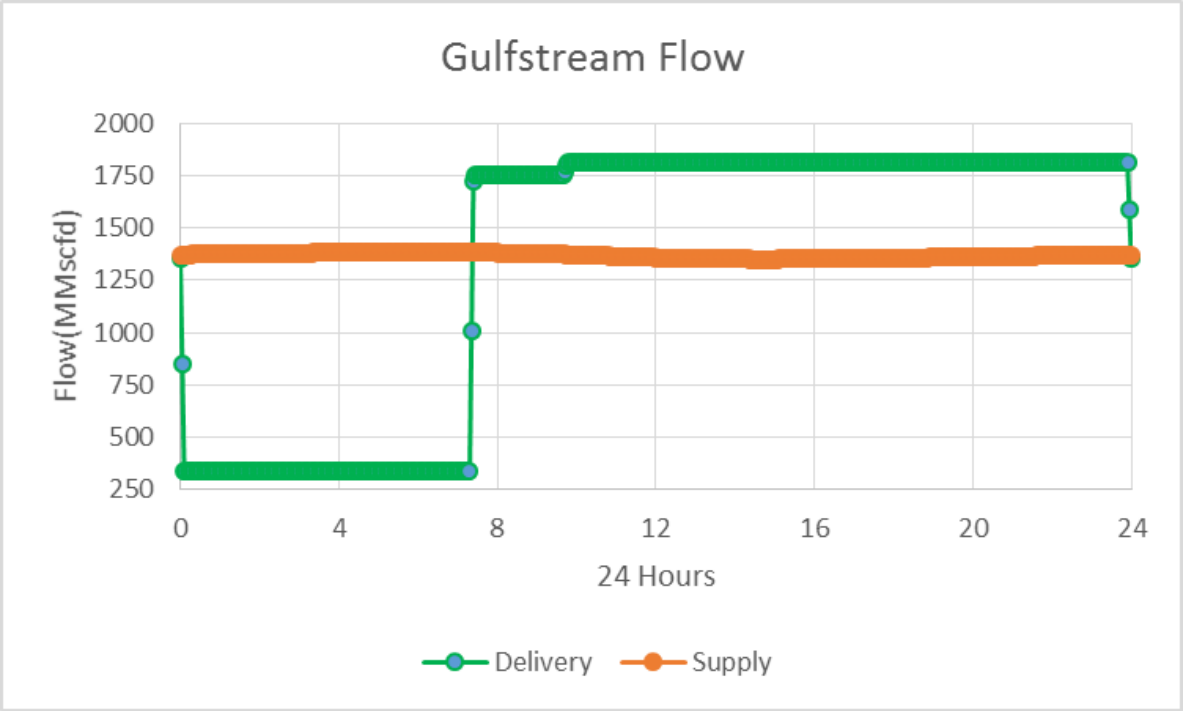


The Compressor Station 410 control system will initiate speed reduction on Unit 5 when Station 410 discharge pressure reaches 2,296 psig. This keeps the operating envelop of the system between the two curves above. Additional safeguards provide more protection to keep the Gulfstream Pipeline within the operating envelope as follows:

- At Station 410 discharge of 2,297 psig – Unit 5 goes to minimum speed
- At Station 410 discharge of 2,310 psig – Cool down stop command issued to Unit 5
- At Station 410 discharge of 2,323 psig – Fast stop command issued to Unit 5
- At Station 410 discharge of 2,341 psig – Station 410 ESD (1st set point)
- At Station 410 discharge of 2,361 psig – Station 410 ESD (2nd set point)

As can be seen in the charts above, MP 58.7 never reaches the 2,180 psig MAOP, with the various commands and shut downs indicated above. In fact, it has at least a 28 psig margin of safety (2,180-2,158) even under the most extreme operating conditions.

The Plot below shows the expected supply and offtake pattern over a 24-hour period, after implementation of Gulfstream Phase VI. Supply flow is steady due to fixed discharge pressure at Compressor Station 410, set at 2,286 psig. When the offtake is low the system starts packing. When offtake is high, then the system is being drawn down. This packing and drawdown cycle repeat daily as indicated below.



In the event reduced offtake continues well beyond the expected 8-hour period of the day, the suction pressure at Compressor Station 420 in Florida will continue to increase. Normal expected daily high pressure at Station 420 is expected to reach 1,121 psig. The higher suction pressure at Compressor Station 420 will start to peak long before the increased pressure occurs at MP 58.7. For the extreme case of a sudden valve closure at Compressor Station 420, the pressure climbs to 1,800 psig in about 2 ½ hours. It takes another 3 hours after that before the pressure at MP 58.7 reaches 2,180 psig. To indicate a potential gas over-packing event that might be occurring, should the pressure ever reach 1,600 psig at Compressor Station 420 Suction, the SCADA system will trigger an alarm in Pipeline Control (located in Houston, TX), for the operators to take action in advance and either resolve the reduced offtake issue in Florida or to reduce the discharge set point of Unit 5 or other units to avoid overpressure. In the event this alarm condition is not addressed, additional Compressor Station 420 High and High-High alarms will be set at 1,650 and 1,700 psig, respectively, to automatically slow down Unit 5 to minimum speed and then decrease Compressor Station 410 discharge to a maximum of 2,180 psig.

As another safeguard, an active hydraulic model which is embedded in the control logic, will always predict the MP 58.7 pseudo pressure based on Compressor Station 410 and 420 pressures and flows. If the active model ever predicts a pseudo pressure of 2,170 psig, the SCADA system will also trigger an alarm in Pipeline Control as an added precaution. Additionally, the pseudo pressure High and High-High

alarms will be set at 2,180 and 2,182 psig, respectively, to automatically slow down Unit 5 to minimum speed and then decrease Compressor Station 410 discharge to a maximum of 2,180 psig. When the accuracy, stability and predictability of the active hydraulic model is established, these various alarm and High, High-High set points may be adjusted to maximize system performance.

In addition, to further keep Gulfstream Pipeline in its normal operating range and to prevent any possible overpressure of the 2,180 MAOP psig pipeline segment downstream of MP 58.7 due to any unusual or upset conditions, Compressor Station 410 will be taken out of Booster Mode (taking Unit 5 off-line) and will revert back to Normal Mode during the following events:

- In-line inspection or pigging of the Gulfstream Mainline 200
- Compressor Station 410, Compressor Station 420, or the Gulfstream Mainline 200 pipeline between these two compressor stations falls within the three-day cone of uncertainty of a named tropical storm
- Abnormal or seasonal low flow demand in Florida lasting for an extended period (several days).
- Disruption of flow into Compressor Station 420 due to inadvertent or intentional closure of any mainline valve as follows:
    - MLV-200-10, located in the bay, approx. 1,600 ft upstream of the Sunshine Skyway Bridge
    - MLV-200-11, located where the pipeline comes onshore near the Port Manatee beach / bulkhead
    - GF-200-S1, located at the inlet of Compressor Station 420 near the incoming pig receiver

Note: Changing Compressor Station 410 from Booster Mode to Normal Mode will be accomplished either manually or automatically depending on the above event. Manual commands to the mode select setting will be done either locally at Compressor Station 410 or remotely through Pipeline Control, as conditions dictate.