

**LETTER OF AUTHORIZATION APPLICATION**

**BOEM CONTROL NUMBER:**

**REQUESTED PERIOD OF EFFECTIVENESS:**

**START DATE:** July 1, 2024

**END DATE:** June 30, 2025

**A. TYPE OF SURVEY:**

Please indicate which type of survey will be used in the proposed activity

**Deep Penetration Seismic (greater than 1,500 in<sup>3</sup> total airgun array volume)**

- 2D Seismic-towed Streamer
- 2D Seismic-Seafloor Cable or Nodes
- 3D Seismic-towed Streamer
- 3D Seismic-Seafloor Cable or Nodes
- NAZ
- WAZ
- **4D (Time Lapse) Seismic OBN**
- Vertical Cable
- Borehole Seismic (VSP)

**Shallow Penetration Seismic (less than 1,500 in<sup>3</sup> total airgun array volume)**

- Surface Vessel
- Surface Vessel and AUV/ROV
- Borehole Seismic (VSP)

**HRG Surveys (no airguns used)**

- Surface vessel
- AUV/ROV
- Both

**Other**

Describe (if Other):

**B. SURVEY AREA AND OPERATIONAL PLAN:**

<b>Question:</b>	<b>Response</b>
<b>Location:</b> (Lease Block(s), Facility or Prospect Name, Lat/Lon, etc.)	Mississippi Canyon 809 and surrounding lease blocks; Ursa Development
<b>Overall Duration of the Activity (days):</b>	~80 days (Mobilization to Demobilization)
<b>Areal extent of the survey area:</b> (in OCS lease blocks or km <sup>2</sup> ) (Attach GIS file(s) of survey lines and/or survey area perimeter)	The maximum size of the survey area includes all or portions of 143 lease blocks, ~3,328 km <sup>2</sup> .  Shape files attached separately
<b>Water Depth Range:</b>	600 - 1,800 m
<b>G&amp;G ITR/PEIS Modeling Zone(s) in which the activity will occur (1-7):</b>	Modeling Zone 5
<b>Number of days during the overall activity period on which the sound source(s) listed in Section C will operate:</b> (If the activity will occur in more than one Modeling Zone, provide the number of operating days within each modeling zone.)	63 days  Seasonal distribution of days used in Take Estimates shown in Section D (except for sperm whales for which all survey activity was assumed to occur during the summer season): Summer = 0 days Winter = 63 days

**C. SOUND SOURCES:**

List the same sound sources provided in response to question #3 in "Section D Proprietary Information Attachment" to the G&G Permit Application and indicate their Duration of Use.

The source type to be used during this survey will be conventional airgun arrays towed by a source vessel and fired in a flip flop pattern on a 50m x 50 m shot grid.

Energy Source	Manufacturer	Model	Total Array Volume & Number of Elements  (cubic inches or Liters.)	Source Level (SL) in dB re 1µPa@1m in water  (RMS)	Source Level (SL) in dB re 1µPa@1m in water  (Peak to Peak)	Operating Frequency  (Hz, kHz, range)	Pulse Duration  (seconds, milli-seconds)	Pulse Rate (or Cycle) (Pulses per second or minute)	Towing Depth of the Source  (ft or m)	Towing Depth of the Receiver(s)  (ft or m)	Duration of Use  (Number of Days or Percent of Active Sound Source Days)
Airgun Array	Teledyne	Bolt LLX	5110 in <sup>3</sup> 32 elements	~239 dB	~264 dB	0-200 Hz	0.1 s	7-12.5 s	8-10 m	OBN receivers on seabed	63
PIES (Pressure Inverted Echo Sounder)	Sonardyne	8302-3116	N/A	190-202 dB	80-120 dB	14-19 kHz	N/A	1 pulse every 30 seconds	Placed on seabed	Placed on seabed	80

#### **D. TAKE ESTIMATE:**

Since Level B takes are based on the number of individuals exposed above the 160 dB SPL<sub>rms</sub> threshold over a 24-hour period, regardless of the duration of an exposure, the area covered (in square kilometres) by a source vessel (or source vessels) within 24-hrs is directly related to the number of Level B takes that may occur. Thus, comparing the area covered over a 24-hour period by the source vessel(s) in the different Survey Types simulated in the exposure modelling (Zeddies et al. 2015) to the area expected to be covered during a planned survey provides a means to select the Survey Type most appropriate for the planned survey.

In the exposure modelling conducted by Zeddies et al. (2015; pg. D-157), the Coil survey type assumed four source vessels sailing at 4.9 knots (2.5 m/s) along a series of overlapping circles 12.5 km in diameter. This circular pattern concentrated survey activities in a smaller area relative to the patterns used to simulate 2D, 3D NAZ, and 3D WAZ Survey Types. The survey area in which the Coil survey pattern was simulated was 58 km x 58 km, or 3,364 km<sup>2</sup>. Over the course of the 7-day simulation, 30% of the area was covered (1,009 km<sup>2</sup>) or 144 km<sup>2</sup> per day.

The other Survey Types were simulated in a different sized survey area (145 km x 48 km) using 2 to 4 survey vessels sailing at 4.5 or 4.9 kts along various patterns resulting in the following estimated areas covered:

- 2D – 5,568 km<sup>2</sup> in 7 days or 795 km<sup>2</sup> per day;
- 3D NAZ – 1,392 km<sup>2</sup> in 7 days or 199 km<sup>2</sup> per day;
- 3D WAZ – 5,916 km<sup>2</sup> in 7 days or 845 km<sup>2</sup> per day.

The planned 4D OBN survey will involve a single source vessel sailing along closely spaced survey lines that are only 100 m apart and approximately 30 km in length. The "racetrack" path taken by the vessel will mean that consecutive survey lines sailed will be approximately 400 m apart. With this relatively tight line spacing and at a survey speed of 4.5 knots (8.3 km/hr), the area covered by this single source vessel will be about 110 km<sup>2</sup> per week, or 15.7 km<sup>2</sup> per day. Therefore, the Coil Survey Type was selected in the take calculator because the area covered during that simulated survey most closely matches that of the area to be covered by the single source vessel operating during the planned 3D OBN survey.

Zeddies, D., S. Denes, C. Pyc. 2017. Gulf of Mexico Acoustic Exposure Model Variable Analysis. Prepared by JASCO Applied Sciences (USA) Inc. for International Association of Geophysical Contractors and American Petroleum Institute. 171 pp.

**Take Estimate Table:**

Parameters	
Survey Type	COIL
Zone Number	5

Schedule	
Season	# days
Summer	0
Winter	63

Exposures by Metric			
	Summer	Winter	Total
<b>Level A</b>			
<b>Low-Frequency Hearing Group</b>			
Bryde's whale	< 0.01	0.63	0.63
<b>High-Frequency Hearing Group</b>			
Kogia (dwarf, pygmy sperm whale)	< 0.01	33.14	33.14
<b>Level B</b>			
<b>Low-Frequency Hearing Group</b>			
Bryde's whale	< 0.01	27.19	27.19
<b>Mid-Frequency Functional Hearing Group</b>			
Beaked whales (Cuvier/Blainville/Gervais)	< 0.01	7,313.79	7,313.79
Bottlenose dolphin	< 0.01	5,958.58	5,958.58
Short-finned pilot whale	< 0.01	672.51	672.51
Sperm whale	< 0.01	1,642.11	1,642.11
Atlantic spotted dolphin	< 0.01	2,380.09	2,380.09
Clymene dolphin	< 0.01	3,538.66	3,538.66
False killer whale	< 0.01	870.49	870.49
Fraser's dolphin	< 0.01	397.39	397.39
Killer whale	< 0.01	23.44	23.44
Melon-headed whale	< 0.01	2,324.94	2,324.94
Pantropical spotted dolphin	< 0.01	16,058.09	16,058.09
Pygmy killer whale	< 0.01	547.16	547.16
Risso's dolphin	< 0.01	1,039.69	1,039.69
Rough-toothed dolphin	< 0.01	1,257.54	1,257.54
Spinner dolphin	< 0.01	4,302.82	4,302.82
Striped dolphin	< 0.01	1,382.11	1,382.11
<b>High-Frequency Hearing Group</b>			
Kogia (dwarf, pygmy sperm whale)	< 0.01	593.17	593.17

Level A Color Legend:	
	Level A SEL
	Level A Peak

\*If no color highlight, both level A peak and SEL are <0.01

Total take, including Level B Scaling (where appropriate)		
Summer	Winter	Total
< 0.01	5.763772	5.76
< 0.01	738.69	738.69
< 0.01	1710.11	1710.11
< 0.01	198.39	198.39
< 0.01	694.61	694.61
< 0.01	683.09	683.09
< 0.01	1015.60	1015.60
< 0.01	256.80	256.80
< 0.01	114.05	114.05
< 0.01	6.91	6.91
< 0.01	685.86	685.86
< 0.01	4608.67	4608.67
< 0.01	161.41	161.41
< 0.01	306.71	306.71
< 0.01	360.91	360.91
< 0.01	1234.91	1234.91
< 0.01	396.67	396.67
< 0.01	223.54	223.54

\*Note that the requested take for sperm whales is 701 in the event that all survey activities (63 days) occur during the summer season.

**E. MITIGATION AND MONITORING EFFORTS:**

<b>Question:</b>	<b>Response:</b>
Please indicate which set of monitoring and mitigation measures from the ITR apply to the planned activity:	All monitoring and mitigation measures in the ITRs applicable to Airgun Surveys with a total volume >1,500 in <sup>3</sup> (Deep Penetration) will be followed.
Confirm that you will apply this set of monitoring and mitigation measures during the activity:	Yes

**F. MAP OF SURVEY AREA AND TRANSIT ROUTE:**

