Letter of Authorization Application – Addendum to G&G Permit Application

Long Form – Assumes proprietary materials of BOEM G&G application are not provided to NMFS

BOEM has not provided an application number at this time. It will be forwarded as soon as issue/received.

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^3 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)
- Vertical Cable
- Borehole Seismic (VSP)

___ **Shallow Penetration Seismic (less than 1,500 in^3 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:

Question:	Response
Overall Duration of the Activity (days):	105(total) including node deployment or 65 days of sound source operation
Areal extent of the survey area: (in OCS lease blocks or km^2) (Attach GIS file(s) of survey lines and/or survey area perimeter)	200 OCS blocks Map provided as a separate attachment
G&G ITR/PEIS Modeling Zone(s) in which the activity will occur (1-7):	Zone 5 (15 days) and Zone 7 (50days): Central GoM in intermediate waters 1,000-3,200m deep.
Number of days during the overall activity period on which the sound source(s) listed in Section C will operate: (If the activity will occur in more than one Modeling Zone, provide the number of operating days within each modeling zone.)	All (65days); approx. 780,000 production shots

C. Sound Sources:

- List all survey-related instruments that emit acoustic energy into the water column, including but not limited to airgun or airgun arrays, sub-bottom profilers, bubble pulsers, sparkers, side scan sonars, multi-beam sonars, single-beam echosounders, ultra-short baseline (USBL) position systems, pressure inverted echosounder (PIES), etc.
- For airgun arrays, please attach a diagram showing the layout (geometry) of the array and list of airgun sizes.

Energy Source	**Manu-facturer**	**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)
Air Array	Bolt	G-Gun II	5040 32 elements	220	148	10 -70Hz		1 pulse approximately every 10 seconds	10m	NA	65
PIES	Sonardyne	8302-3116	NA	190-202	NA	14-19kHz		Variable; Typically 0.0116		Seafloor	85

Acquisition Plan:

The single node laying vessel and the two dual source vessels will mobilize to the survey area. The node laying vessel will come out first as it will begin deploying nodes right away to get the required offsets laid before the source vessels begin acquisition. This will take approximately 20 days to build up the required offsets before beginning source effort.

Both dual source vessels will be in service at the same time and for the full duration of acquisition. These sources will not activate simultaneously. The node vessel will continue to deploy nodes until all are placed at their required station. This will likely be before the sources have complete their acquisition.

The node vessel will begin to recover the first nodes laid once the required offsets has been reached by the source vessels. Upon completion of the source effort, the node vessel may require an additional 20 days to complete the recovery of the nodes.

After the recovery of the nodes, the node vessel and source vessel will demobilize from the survey area.

D. Take Estimate:

[*Insert the "Summary for NOAA" table here after completing all required inputs on the "Applicant Data Entry" spreadsheet in the Take Calculator Excel file or alternative tool developed with/by NMFS*]

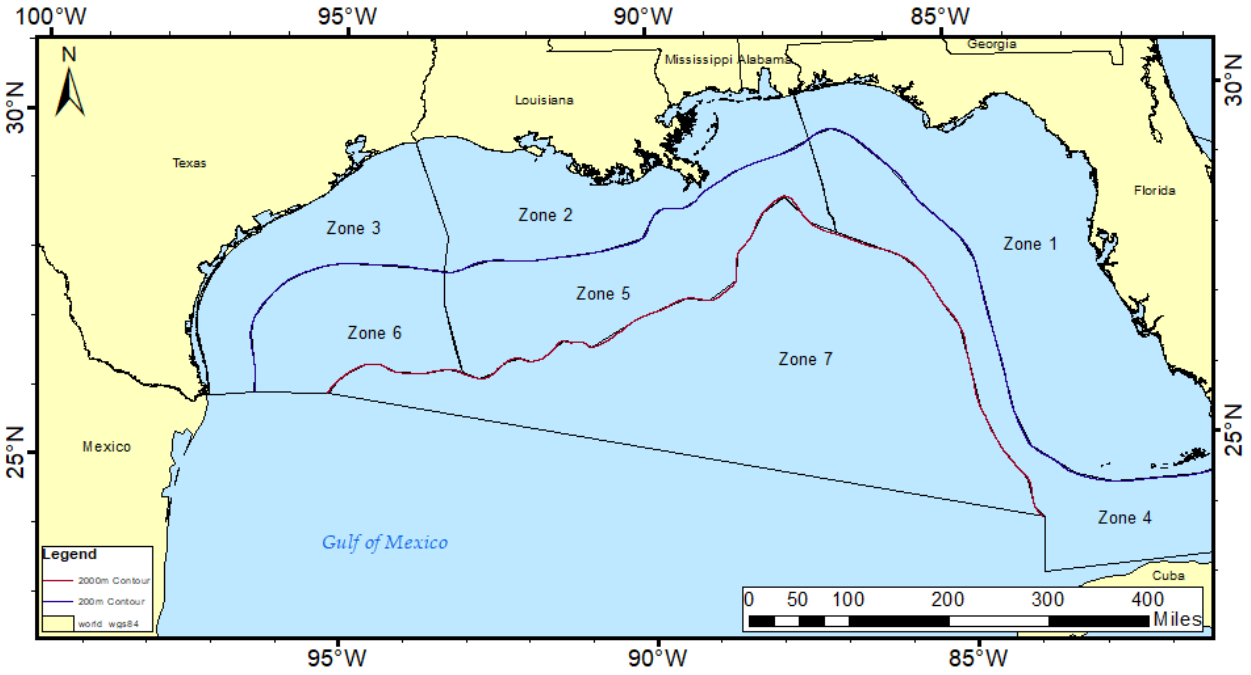
Instructions:

- Select the survey type and zone number (2-7, operations in Zone 1 are not covered by the incidental take regulations) from the drop down lists (click in the cell to see the dropdown arrow)

- Type in the number of days of acquisition per season in the "Schedule" section (Winter: December - March, Summer: April - November)

Report tables are automatically updated based on user selections.

Zone Map:



CGG is requesting approval for 1 March 2023 through 31 October 2023, 2 calculations have been generated:

1) 15 days in summer in zone 5
2) 50 days in summer in zone 7

Parameters	
Survey Type	*3D NAZ*
Zone Number	*5*

Schedule	
Season	**# days**
Summer	15
Winter	0

Level A Color Legend:	
	Level A SEL
	Level A Peak

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

Exposures by Metric				Total take, including Level B Scaling (where appropriate)		
	Summer	Winter	Total	Summer	Winter	Total
Level A						
Low-Frequency Hearing Group						
Bryde's whale	0.07	< 0.01	0.07			
High-Frequency Hearing Group						
Kogia (dwarf, pygmy sperm whale)	5.81	< 0.01	5.81			
Level B						
Low-Frequency Hearing Group						
Bryde's whale	12.07	< 0.01	12.07	12.144174	< 0.01	12.14
Mid-Frequency Functional Hearing Group						
Beaked whales (Cuvier/Blainville/Gervais)	2,919.00	< 0.01	2,919.00	2919.00	< 0.01	2919.00
Bottlenose dolphin	2,233.33	< 0.01	2,233.33	2233.33	< 0.01	2233.33
Short-finned pilot whale	251.78	< 0.01	251.78	251.78	< 0.01	251.78
Sperm whale	651.57	< 0.01	651.57	651.57	< 0.01	651.57
Atlantic spotted dolphin	874.41	< 0.01	874.41	874.41	< 0.01	874.41
Clymene dolphin	1,342.73	< 0.01	1,342.73	1342.73	< 0.01	1342.73
False killer whale	296.44	< 0.01	296.44	296.44	< 0.01	296.44
Fraser's dolphin	148.78	< 0.01	148.78	148.78	< 0.01	148.78
Killer whale	8.79	< 0.01	8.79	8.79	< 0.01	8.79
Melon-headed whale	870.44	< 0.01	870.44	870.44	< 0.01	870.44
Pantropical spotted dolphin	6,093.18	< 0.01	6,093.18	6093.18	< 0.01	6093.18
Pygmy killer whale	186.33	< 0.01	186.33	186.33	< 0.01	186.33
Risso's dolphin	400.71	< 0.01	400.71	400.71	< 0.01	400.71
Rough-toothed dolphin	428.25	< 0.01	428.25	428.25	< 0.01	428.25
Spinner dolphin	1,632.69	< 0.01	1,632.69	1632.69	< 0.01	1632.69
Striped dolphin	524.44	< 0.01	524.44	524.44	< 0.01	524.44
High-Frequency Hearing Group						
Kogia (dwarf, pygmy sperm whale)	221.58	< 0.01	221.58	227.39	< 0.01	227.39

Parameters	
Survey Type	*3D NAZ*
Zone Number	*7*

Schedule	
Season	**# days**
Summer	50
Winter	0

Level A Color Legend:	
	Level A SEL
	Level A Peak

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

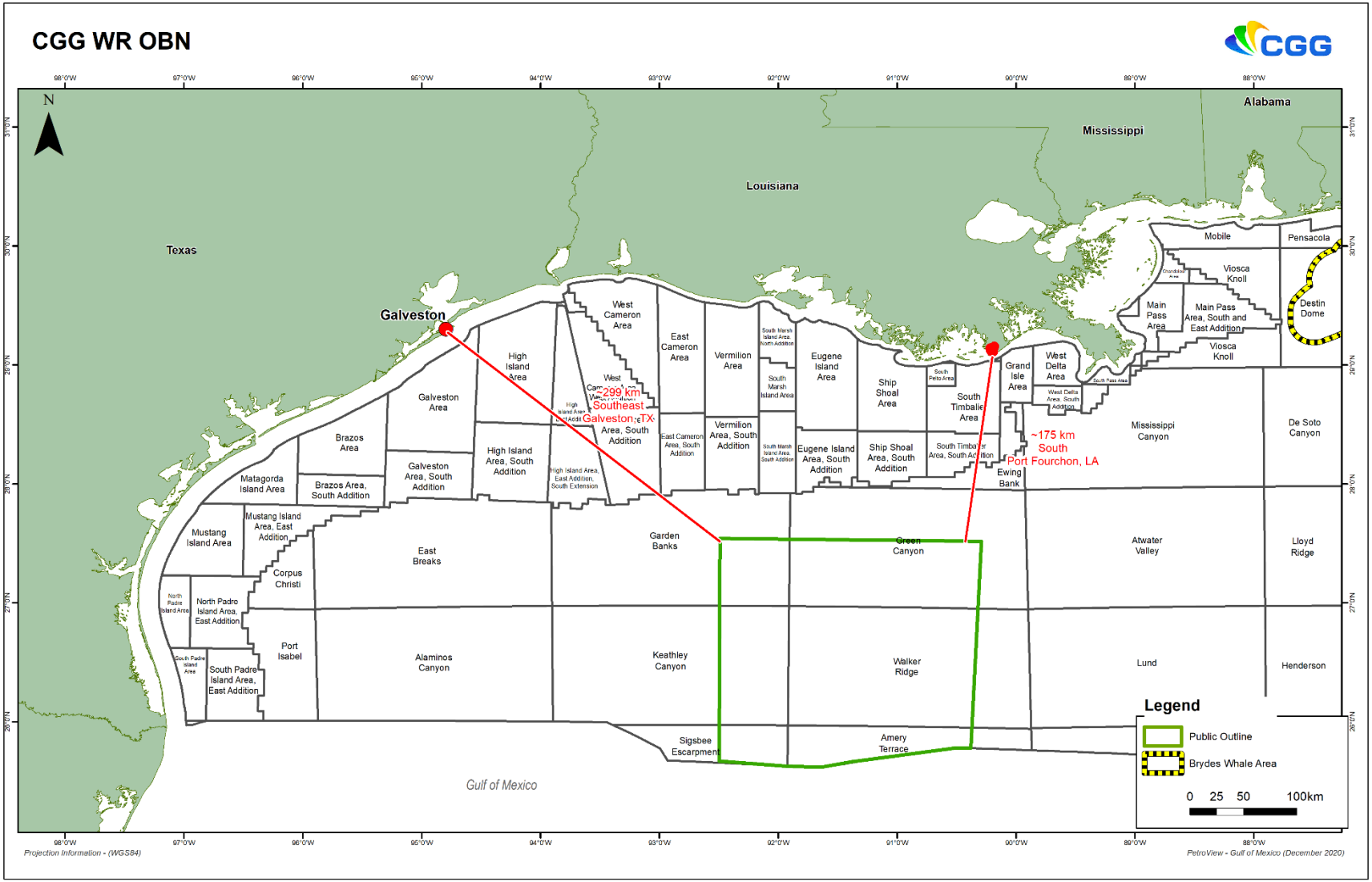
Exposures by Metric				Total take, including Level B Scaling (where appropriate)		
	Summer	Winter	Total	Summer	Winter	Total
Level A						
Low-Frequency Hearing Group						
Bryde's whale	< 0.01	< 0.01	< 0.01			
High-Frequency Hearing Group						
Kogia (dwarf, pygmy sperm whale)	8.81	< 0.01	8.81			
Level B						
Low-Frequency Hearing Group						
Bryde's whale	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Mid-Frequency Functional Hearing Group						
Beaked whales (Cuvier/Blainville/Gervais)	3,727.72	< 0.01	3,727.72	376.50	< 0.01	376.50
Bottlenose dolphin	14.98	< 0.01	14.98	4.30	< 0.01	4.30
Short-finned pilot whale	84.54	< 0.01	84.54	24.94	< 0.01	24.94
Sperm whale	365.91	< 0.01	365.91	154.78	< 0.01	154.78
Atlantic spotted dolphin	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Clymene dolphin	1,438.68	< 0.01	1,438.68	412.90	< 0.01	412.90
False killer whale	443.28	< 0.01	443.28	130.77	< 0.01	130.77
Fraser's dolphin	270.39	< 0.01	270.39	77.60	< 0.01	77.60
Killer whale	50.07	< 0.01	50.07	14.77	< 0.01	14.77
Melon-headed whale	1,066.63	< 0.01	1,066.63	314.65	< 0.01	314.65
Pantropical spotted dolphin	14,283.15	< 0.01	14,283.15	4099.26	< 0.01	4099.26
Pygmy killer whale	391.71	< 0.01	391.71	115.55	< 0.01	115.55
Risso's dolphin	235.29	< 0.01	235.29	69.41	< 0.01	69.41
Rough-toothed dolphin	473.30	< 0.01	473.30	135.84	< 0.01	135.84
Spinner dolphin	335.16	< 0.01	335.16	96.19	< 0.01	96.19
Striped dolphin	747.36	< 0.01	747.36	214.49	< 0.01	214.49
High-Frequency Hearing Group						
Kogia (dwarf, pygmy sperm whale)	210.72	< 0.01	210.72	76.45	< 0.01	76.45

E. Mitigation and Monitoring Efforts:

Question:	Response:
Please indicate which set of monitoring and mitigation measures from the ITR's apply to the planned activity:	All monitoring and mitigation measures in the ITRs applicable to Airgun Surveys with a total volume >400 cu in will be followed. See attached list for summary of applicable monitoring and mitigation measures. BOEM NTL 2016-G02 revised 6/19/2020 Appendices A, B, and C to NMFS 2020 BiOp for the GoMex Oil and Gas Program
Confirm that you will apply this set of monitoring and mitigation measures during the activity:	Yes, we will apply these measures during the 3D OBN survey.

F. Map of Survey Area and Transit Route

[*Insert map here or attach as a separate file*]



Additional Notes:
3D NAZ was chosen due to the use of minimum 2 source vessels with a minimum 2,500m separation. These sources will not fire simultaneously.
Water depths in the area range from 1,000m to over 3,200m with most of the activities taking place in waters greater than 1,500m.
The requested dates for the LOA are March 1, 2023 through October 31, 2023.