

ANADARKO PETROLEUM CORPORATION 1201 LAKE ROBBINS DRIVE • THE WOODLANDS, TEXAS 77380
P.O. BOX 1330 • HOUSTON, TEXAS 77251-1330



May 25, 2022

Jolie Harrison, Division Chief
Permits and Conservation Division, Office of Protected Resources,
1315 East-West Highway, F/PR1 Room 13805
Silver Spring, MD 20910

RE: Letter of Authorization (LOA) Application, 3D OBN Seismic Survey
Green Canyon, area around OCS block GC 517
BOEM G&G Permit Application L22-013

Dear Ms. Harrison:

Anadarko Petroleum Corporation (Anadarko) has attached for your review and approval a Letter of Authorization (LOA) application request for an incidental take authorization under section 101(a)(5) of the Marine Mammal Protection Act of 1972 (MMPA), as amended, for the potential take of marine mammals incidental to conducting a 3D Ocean Bottom Node (OBN) Seismic Survey referred as "K2 OBN" in the vicinity of the Marco Polo Tension Leg Platform (TLP), in the Green Canyon (GC) area, around block GC 517.


The K2 area has been covered in the past by Wide Azimuth (WAZ) multiclient streamer surveys. Those surveys provide near and mid seismic offsets, however, they lack the long offsets necessary to fully enable modern seismic processing, in particular techniques such as Full Waveform Inversion (FWI), Reverse Time Migration (RTM) and Least Square Reverse Time Migrations (LS-RTM). Those legacy survey also have inadequate low frequency content. Modern OBN surveys, like the proposed K2 OBN, on the contrary, provide long offsets, low frequencies, low noise, and full azimuths coverage, allowing the best seismic imaging available today, when combined with the existing WAZ. Therefore, in 2023 Anadarko plans to conduct a new OBN at K2. The new proposed survey would provide enhanced subsalt imaging, better estimate compartmentalization and faults, detect drilling hazards and optimize future well locations; the duration of the proposed source activity will be 40 days.

Anadarko's upcoming 3D OBN survey is subject to the provisions of the MMPA and the Regulations Governing Taking Marine Mammals Incidental to Geophysical Survey Activities in the Gulf of Mexico (50 CFR § 217, Subpart S); therefore, we are requesting issuance of a Letter of Authorization for the proposed activities.

Anadarko is requesting the LOA be issued with an effective period from April 1, 2023, to March 31, 2024. The expected commencement date of the survey is May 1, 2023.

If you have any questions or need additional information, please contact me at 713-557-9453 or by e-mail at Debbie_malbrough@oxy.com

Kind regards,

DocuSigned by:

F4013CDF08CA45C...

Deborah Malbrough
Consultant Regulatory, GOM Regulatory

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

Short Form – Assumes proprietary materials of BOEM G&G application are provided to NMFS

A. Type of Survey:

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

Deep Penetration Seismic (greater than 1,500 in³ total airgun array volume)

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

Shallow Penetration Seismic (less than 1,500 in³ 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):	38-42 days
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)	Survey centered around Green Canyon block GC-517. Source area, including sparse sources: 3,117 square km. Node area, including sparse nodes: 1,072 square km. See map inserted in Section F.
G&G ITR/PEIS Modeling Zone(s) in which the activity will occur (1-7):	Zone 5 (Central GoM in slope water 4000 to 4400ft)
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.)	40 days

C. Sound Sources:

List each energy source to be used (e.g., airgun, airgun array(s), sparker, towed dipole, side scan sonar, sub bottom profiler, etc.). Indicate the source’s manufacturer, model, Source Level (SL) in dB re 1µPa @1m in water (RMS) and if applicable, Source Level (SL) in dB re 1µPa @1m in water (Peak to Peak) and ping rate. If the manufacturer does not provide a peak to peak level (many side scan sonars, etc.), please enter N/A. Additionally, provide the operational frequency ranges.

Energy Source	Manufacturer	Model	Array or Airgun Size (cu. in.)	Source Level (SL) in dB re 1µPa@1m in water (RMS)	Source Level (SL) in dB re 1µPa@1m in water (Peak to Peak)	Frequency (Hz, kHz range)	Ping Duration/ Cycle	Ping Rate
Airgun	Bolt	LLXT	5110 cu in.	10.93 (1.093 MPa, 241 dB re 1µPa. at 1m.)	224.8 +/- 2.0 (22.48 +/- 0.2 MPa, 267 dB re 1µPa. at 1m.)	0-1024 Maximu model bandwidth	N/A	N/A
PIES	Sonardyne	8302-3116	NA	190-202-dB-1 PA per meter	268-285 bB-1 PA per meter	14-19 kHz	10 ms	-Varies between 5-15 minutes

For air guns/air gun arrays (excludes multibeam bathymetry, high frequency subbottom profilers, and side scan sonar systems), provide the maximum distance from the sound source to the 190, 180, and 160 dB in RMS dB levels: (Required for Alaska region, GOM region only requires this information for surveys in the GOM that will use simsource during acquisition; Not required for Atlantic permits).

dB level	Maximum Distance from Source
190 dB	
180 dB	
160 dB	

D. Take Estimate:

Summary of Exposures in support of LOA application:

Parameters			
Survey Type	3D WAZ		
Zone Number	5		

Schedule	
Season	# days
Summer	0
Winter	40

Exposures by Metric			
	Summer	Winter	Total
Level A			
Low-Frequency Hearing Group			
Bryde's whale	< 0.01	0.03	0.03
High-Frequency Hearing Group			
Kogia (dwarf, pygmy sperm whale)	< 0.01	41.04	41.04
Level B			
Low-Frequency Hearing Group			
Bryde's whale	< 0.01	35.14	35.14
Mid-Frequency Functional Hearing Group			
Beaked whales (Cuvier/Blainville/Gervais)	< 0.01	8,021.37	8,021.37
Bottlenose dolphin	< 0.01	6,246.56	6,246.56
Short-finned pilot whale	< 0.01	670.14	670.14
Sperm whale	< 0.01	1,605.47	1,605.47
Atlantic spotted dolphin	< 0.01	2,411.37	2,411.37
Clymene dolphin	< 0.01	3,700.88	3,700.88
False killer whale	< 0.01	719.29	719.29
Fraser's dolphin	< 0.01	395.99	395.99
Killer whale	< 0.01	25.57	25.57
Melon-headed whale	< 0.01	2,316.77	2,316.77
Pantropical spotted dolphin	< 0.01	16,794.24	16,794.24
Pygmy killer whale	< 0.01	452.11	452.11
Risso's dolphin	< 0.01	1,136.25	1,136.25
Rough-toothed dolphin	< 0.01	1,039.10	1,039.10
Spinner dolphin	< 0.01	4,500.07	4,500.07
Striped dolphin	< 0.01	1,445.47	1,445.47
High-Frequency Hearing Group			
Kogia (dwarf, pygmy sperm whale)	< 0.01	590.03	590.03

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	6.67146962	6.67
< 0.01	810.16	810.16
< 0.01	1792.76	1792.76
< 0.01	197.69	197.69
< 0.01	679.12	679.12
< 0.01	692.06	692.06
< 0.01	1062.15	1062.15
< 0.01	212.19	212.19
< 0.01	113.65	113.65
< 0.01	7.54	7.54
< 0.01	683.45	683.45
< 0.01	4819.95	4819.95
< 0.01	133.37	133.37
< 0.01	335.19	335.19
< 0.01	298.22	298.22
< 0.01	1291.52	1291.52
< 0.01	414.85	414.85
< 0.01	230.44	230.44

Created for NOAA by JASCO Applied Sciences (USA) Inc.: 05/07/2021



E. Mitigation and Monitoring Efforts:

Question:	Response:
<p>Please indicate which set of monitoring and mitigation measures from the ITR apply to the planned activity:</p>	<p>All monitoring and mitigation measures in the ITRs applicable to Deep Penetration Airgun Surveys with a total volume >1,500 cu in will be followed.</p> <p>BOEM NTL 2016-G02 revised 6/19/2020</p> <p>Appendices A, B, and C to NMFS 2020 BiOp for the GoMex Oil and Gas Program</p>
<p>Confirm that you will apply this set of monitoring and mitigation measures during the activity:</p>	<p>Yes, we will apply these measures during this OBN survey.</p>

F. Map of Survey Area and Transit Route:

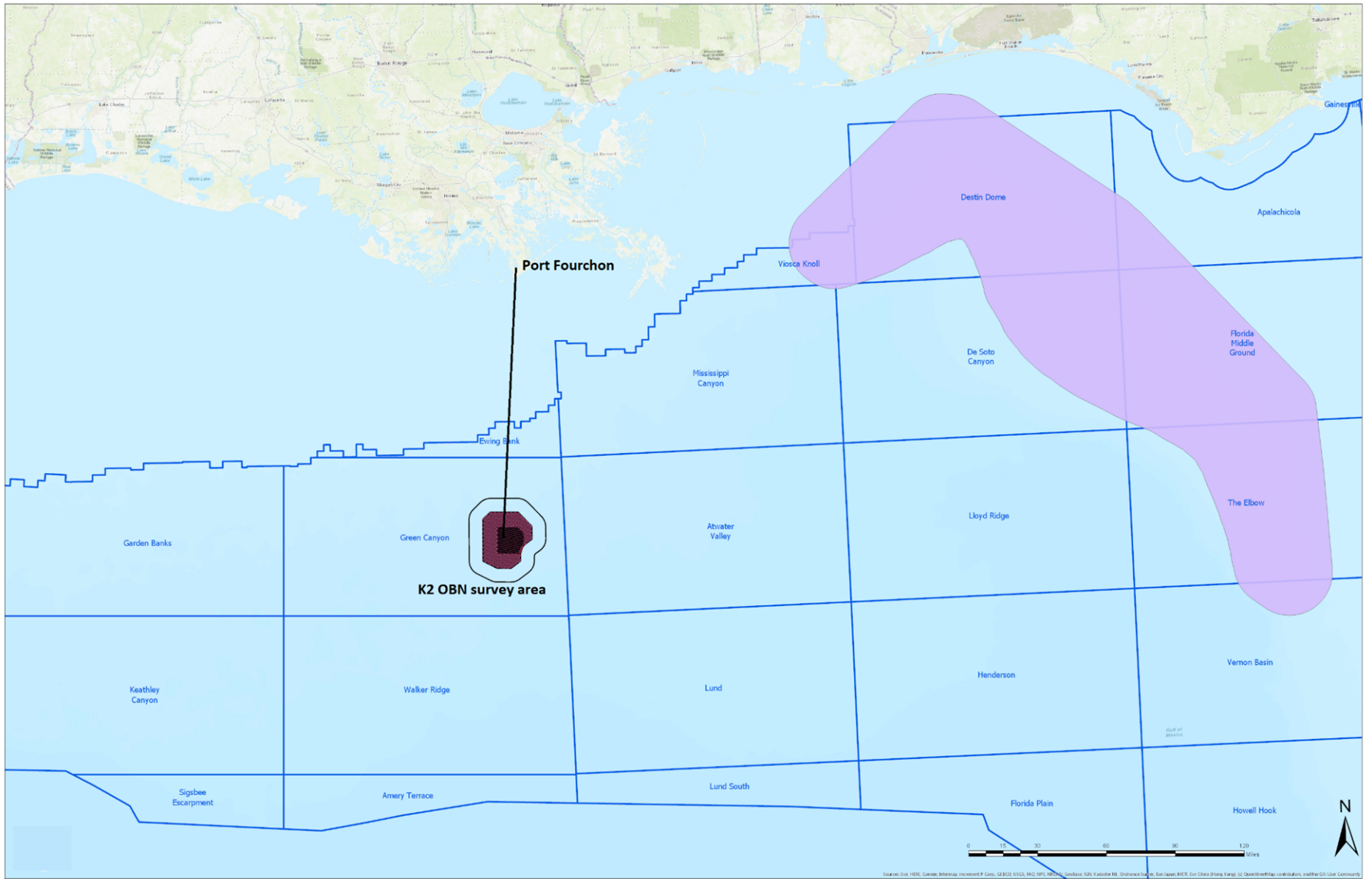


Figure 1: Rice's whale area, survey area and route to/from Port Fourchon and Houma.