IN REPLY REFER TO:

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1011 E. Tudor Road
Anchorage, Alaska 99503-6199

JUN 28 2013

AFES/MMM

Mr. Troy Nelson
TGS
2500 CityWest Boulevard, Suite 200
Houston, Texas 77042

Dear Mr. Nelson:

We have received your request dated April 18, 2013, for a Letter of Authorization (LOA) for the incidental take of polar bears and Pacific walruses during activities associated with the TGS 2013 Two-Dimensional Seismic Acquisition, Chukchi Sea, Alaska Program.

In response, enclosed is LOA 13-CS-03 granting TGS authority to take small numbers of polar bears and Pacific walruses incidental to the activities identified in your request.

TGS proposes to conduct approximately 9,600 kilometer (km) (5,965.1 miles [mi]) of 2D marine seismic surveys along pre-determined lines in U.S. Federal waters and international waters of the Chukchi Sea during the 2013 open water season. The purpose of the proposed seismic program is to gather geophysical data using a 53,792 cubic centimeters (cm^3) (3,280 cubic inch [in^3]) seismic source array and an 8,100-meter (m) (26,575 feet) long hydrophone solid streamer towed by the seismic vessel. Results of the 2D seismic program will be used to identify and map potential hydrocarbon-bearing formations and the geologic structures that surround them. Throughout the duration of the program, a second vessel will act as a dedicated monitoring (i.e., scout) vessel.

A detailed description of the proposed activities is found in TGS's *2013 2D Seismic Program Request for Letter of Authorization, Chukchi Sea, Alaska (April 2013)* including the *Polar Bear and Walrus Awareness and Interaction Plan* (Section 4.0), *Detailed Plan of Operations (Appendix A), Plan Of Cooperation (Appendix C)*, as well as the *TGS 2013 2D Seismic Program Marine Mammal Monitoring and Mitigation Plan Chukchi Sea, Alaska (April 2013)*. All provisions contained within these plans are incorporated by reference into this LOA. This authorization is issued in accordance with the Incidental Take Regulations published in the *Federal Register* (78 FR 35364), dated June 12, 2013.

TGS must provide monitoring data of polar bears and Pacific walruses throughout the project and a complete report of all observations at the conclusion of the project in accordance with 50 CFR §18.118. This final report must be provided to the U.S. Fish and Wildlife Service

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(Service), Marine Mammals Management Office (MMM) within 90 days after completion of the project.

If questions or concerns arise during the project period, Service, MMM biologists are available for consultation at the phone numbers listed below and noted in your Interaction Plan. If any changes develop in your project, such as activities or location, the MMM must be notified prior to the planned operation. This will allow us to evaluate the activity and, if appropriate, amend the LOA.

The Service has completed intra-Service consultation and conference under the Endangered Species Act of 1973, as amended (ESA), on the issuance of these LOAs and has determined that issuance is not likely to jeopardize the continuing existence of polar bears and Pacific walruses. Therefore, no additional authorization under the ESA is required.

If you have any further questions, please contact Mr. Craig Perham or Mr. Christopher Putnam of our Marine Mammals Management Office, at (907) 786-3810 or (907) 786-3844, respectively.

Sincerely,

Acting Chief, Marine Mammals Management

Enclosure

cc: Ms. Elizabeth Benson, ASRC Energy Services
Mr. Richard Shideler, Alaska Department of Fish and Game (email)
U.S. Fish and Wildlife Service, Fairbanks Fish and Wildlife Field Office
U.S. Fish and Wildlife Service, Office of Law Enforcement
North Slope Borough, Department of Law

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1011 E. Tudor Road
Anchorage, Alaska 99503-6199

IN REPLY REFER TO:
AFES/MMM

U.S. Fish and Wildlife

LETTER OF AUTHORIZATION
(13-CS-03)

ISSUED: June 28, 2013
EXPIRES: October 31, 2013

TGS is hereby authorized to take small numbers of polar bears and Pacific walruses incidental to activities occurring during the 2013 Two-Dimensional Seismic Acquisition, Chukchi Sea, Alaska Program. This authorization is issued in accordance with the Incidental Take Regulations published in the *Federal Register* (78 FR 35364), dated June 12, 2013.

TGS proposes to conduct approximately 9,600 kilometer (km) (5,965.1 miles [mi]) of 2D marine seismic surveys along pre-determined lines in U.S. Federal waters and international waters of the Chukchi Sea during the 2013 open water season. The purpose of the proposed seismic program is to gather geophysical data using a 3,280 cubic inch seismic source array and an 8,100-meter (m) (26,575 feet [ft]) long hydrophone solid streamer towed by the seismic vessel. Results of the 2D seismic program will be used to identify and map potential hydrocarbon-bearing formations and the geologic structures that surround them. Throughout the duration of the program, a second vessel will act as a dedicated monitoring (i.e., scout) vessel.

A detailed description of the proposed activities is found in TGS's *2013 2D Seismic Program Request for Letter of Authorization, Chukchi Sea, Alaska (April 2013)* including the *Polar Bear and Walrus Awareness and Interaction Plan* (Section 4.0), *Detailed Plan of Operations (Appendix A)*, and *Plan Of Cooperation (Appendix C)*, as well as the *TGS 2013 2D Seismic Program Marine Mammal Monitoring and Mitigation Plan Chukchi Sea, Alaska (April 2013)*.

This Letter of Authorization (LOA) and the required conditions below include contractors of TGS performing TGS-approved work under the scope of operations to be conducted. The LOA is subject to the following conditions:

1. Intentional take is prohibited under this LOA.

2. TGS Operations Managers, or designates, must be fully aware, understand, and capable of implementing the conditions of this authorization.

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3. The species authorized for takings, by Level B Harassment only, are: Pacific walrus (*Odobenus rosmarus divergens*), and polar bear (*Ursus maritimus*). The taking of any walrus or polar bear in a manner prohibited under this authorization must be reported within 24 hours of the taking to the U.S. Fish and Wildlife Service (Service), Marine Mammals Management Office (MMM), Incidental Take Coordinator in Anchorage, Alaska at (907) 786-3800, or their designee.

4. This authorization is valid only for those activities identified in the request for a Letter of Authorization, *2013 2D Seismic Program Request for Letter of Authorization, Chukchi Sea, Alaska* dated April 18, 2013.

5. The TGS *2013 2D Seismic Program, Request for Letter of Authorization, Chukchi Sea, Alaska (April 2013)* including the *Polar Bear and Walrus Awareness and Interaction Plan* (Section 4.0), *Detailed Plan of Operations (Appendix A), Plan Of Cooperation (Appendix C)*, as well as the *TGS 2013 2D Seismic Program Marine Mammal Monitoring and Mitigation Plan Chukchi Sea, Alaska (April 2013)* are approved. All provisions contained within these plans are incorporated by reference into this LOA. All provisions must be complied with unless specifically noted otherwise in this LOA. A copy of these plans must be available on site for all personnel. A copy of this LOA and these plans must be in the possession of the operators of all vessels and aircraft engaged in any activity operating under the authority of this LOA.

6. TGS is required to cooperate with the Service and any other Federal, State or local agency monitoring the impacts of the activity on Pacific walruses and polar bears.

7. At the discretion of the Service, MMM the operator will allow the Service, MMM to place an observer on site (vessels and aircraft) to monitor the impacts of the activity on Pacific walruses and polar bears.

8. If any changes develop in your project during the 2013 Two-Dimensional Seismic Acquisition, Chukchi Sea, Alaska Program, such as activities or location; notify the Service, MMM prior to the planned operation.

9. TGS must comply with mitigation, monitoring and reporting requirements in accordance with 50 CFR §18.118. Mitigation, monitoring and reporting requirements include, but may not be limited to:

   A. Mitigation Requirements.

      i. At all times, vessels must maintain the maximum distance possible from concentrations of walruses or polar bears. Under no circumstances, other than an emergency, should any vessel approach within an 805-m (0.5-mi) radius of walruses or polar bears observed on ice. Under no circumstances, other than an emergency, should any vessel approach within 1,610 m (1 mi) of groups of walruses observed on land or within an 805-m (0.5-mi) radius of polar bears observed on land.

ii. Vessel operators must take every precaution to avoid harassment of concentrations of feeding walruses when a vessel is operating near these animals. Vessels should reduce speed and maintain a minimum 805-m (0.5-mi) operational exclusion zone around groups of 12 or more walruses encountered in the water. Vessels may not be operated in such a way as to separate members of a group of walruses from other members of the group. When weather conditions require, such as when visibility drops, vessels should adjust speed accordingly to avoid the likelihood of injury to walruses.

iii. Operators of support aircraft should, at all times, conduct their activities at the maximum distance possible from concentrations of walruses or polar bears.

iv. Under no circumstances, other than an emergency, should fixed wing aircraft operate at an altitude lower than 457 m (1,500 ft) within 805 m (0.5 mi) of walrus groups observed on ice, or within 1,610 m (1 mi) of walrus groups observed on land. Under no circumstances, other than an emergency, should rotary winged aircraft (helicopters) operate at an altitude lower than 914 m (3,000 ft) within 1,610 m (1 mi) of walrus groups observed on land. Under no circumstances, other than an emergency, should aircraft operate at an altitude lower than 457 m (1,500 ft) within 805 m (0.5 mi) of polar bears observed on ice or land. Helicopters may not hover or circle above such areas or within 805 m (0.5 mi) of such areas. When weather conditions do not allow a 457-m (1,500-ft) flying altitude, such as during severe storms or when cloud cover is low, aircraft may be operated below the required altitudes stipulated above. However, when aircraft are operated at altitudes below 457 m (1,500 ft) because of weather conditions, the operator must avoid areas of known walrus and polar bear concentrations and should take precautions to avoid flying directly over or within 805 m (0.5 mi) of these areas.

v. All vessels must avoid areas of active or anticipated subsistence hunting for walrus or polar bear as determined through community consultations. Plan all aircraft routes to minimize any potential conflict with active or anticipated walrus or polar bear hunting activity as determined through community consultations.

B. Additional mitigation measures for offshore exploration activities.

i. Offshore exploration activities will be authorized only during the open-water season, defined as the period July 1 to November 30.

ii. Operators must maintain a minimum spacing of 24 kilometers (15 mi) between other seismic source vessels during exploration activities to avoid significant synergistic or cumulative effects from multiple oil and gas exploration activities on foraging or migrating walruses. This does not include support vessels for these operations.

iii. TGS may not transit through or conduct seismic operations in areas of the Hanna Shoal Walrus Use Area (HSWUA) between July 1 and September 30 unless the area

is outside of the monthly 50% utilization distribution contours[1] (UDs) for Pacific Walruses during the month of transit or seismic operations.

C. Additional mitigation measures for offshore seismic surveys. Any offshore exploration activity expected to include the production of pulsed underwater sounds with sound source levels ≥160 dB re 1 μPa will be required to establish and monitor acoustic exclusion and disturbance zones and implement adaptive mitigation measures as follows:

i. Monitor zones. Establish and monitor with trained marine mammal observers an acoustically verified exclusion zone for walruses surrounding seismic airgun arrays where the received level will be ≥ 180 dB re 1 μPa; an acoustically verified exclusion zone for polar bear surrounding seismic airgun arrays where the received level will be ≥ 190 dB re 1 μPa; and an acoustically verified walrus disturbance zone ahead of and perpendicular to the seismic vessel track where the received level will be ≥ 160 dB re 1 μPa.

ii. Ramp-up procedures. For all seismic surveys, including airgun testing, use the following ramp-up procedures to allow marine mammals to depart the exclusion zone before seismic surveying begins:

a. Visually monitor the exclusion zone and adjacent waters for the absence of polar bears and walruses for at least 30 minutes before initiating ramp-up procedures. If no polar bears or walruses are detected, you may initiate ramp-up procedures. Do not initiate ramp-up procedures at night or when you cannot visually monitor the exclusion zone for marine mammals;
b. Initiate ramp-up procedures by firing a single airgun. The preferred airgun to begin with should be the smallest airgun, in terms of energy output (dB) and volume (in^3);
c. Continue ramp-up by gradually activating additional airguns over a period of at least 20 minutes, but no longer than 40 minutes, until the desired operating level of the airgun array is obtained.

iii. Power down/Shutdown. Immediately power down or shutdown the seismic airgun array and/or other acoustic sources whenever any walruses are sighted approaching close to or within the area delineated by the 180 dB re 1 μPa walrus exclusion zone, or polar bears are sighted approaching close to or within the area delineated by the 190 dB re 1 μPa polar bear exclusion zone. If the power down operation cannot reduce the received sound pressure level to 180 dB re 1 μPa (walrus) or 190 dB re 1 μPa (polar bear), the operator must immediately shutdown the seismic airgun array and/or other acoustic sources.

iv. Emergency shutdown. If observations are made or credible reports are received that

[1] The 50 % UDs is described in 78 FR 35364 (June 12, 2013) and based on, Jay, C.V., A.S. Fischbach, and A.A. Kochnev. 2012. Walrus areas of use in the Chukchi Sea during sparse sea ice cover. Marine Ecology Progress Series Vol. 468: 1–13, 2012) (GIS files available at, https://www.erma.unh.edu/arctic/erma.htm).

one or more walruses and/or polar bears are within the area of the seismic survey and are in an injured or mortal state, or are indicating acute distress due to seismic noise, the seismic airgun array will be immediately shutdown and the Service contacted. The airgun array will not be restarted until review and approval has been given by the Service. The ramp-up procedures must be followed when restarting.

v. Adaptive response for walrus aggregations. Whenever an aggregation of 12 or more walruses are detected within an acoustically verified 160 dB re 1 μPa disturbance zone ahead of or perpendicular to the seismic vessel track, the holder of this LOA must:

a. Immediately power down or shutdown the seismic airgun array and/or other acoustic sources to ensure sound pressure levels at the shortest distance to the aggregation do not exceed 160–dB re 1 μPa;
b. Not proceed with powering up the seismic airgun array until it can be established that there are no walrus aggregations within the 160 dB zone based upon ship course, direction, and distance from last sighting. If shutdown was required, the ramp-up procedures must be followed when restarting.

D. Monitoring Requirements. Depending on the siting, timing, and nature of Industry activities, holders of Letters of Authorization will be required to:

i. Maintain trained, Service-approved, on-site observers to carry out monitoring programs for polar bears and walruses necessary for initiating adaptive mitigation responses.

ii. Marine Mammal Observers (MMOs) will be required on board all operational and support vessels to alert crew of the presence of walruses and polar bears, initiate adaptive mitigation responses, and carry out specified monitoring activities identified in the marine mammal monitoring and mitigation plan necessary to evaluate the impact of authorized activities on walruses, polar bears, and the subsistence use of these subsistence resources. The MMOs must have completed a marine mammal observer training course approved by the Service.

E. Reporting requirements.

i. In-season monitoring reports. Activity progress reports. Operators must keep the Service informed on the progress of authorized activities by:

a. Notifying the Service at least 48 hours prior to the onset of activities;
b. Providing weekly progress reports of authorized activities noting any significant changes in operating state and or location;
c. Notifying the Service within 48 hours of ending activity.

ii. Walrus observation reports. The operator must report, on a weekly basis, all observations of walruses during any Industry operation. Information within the observation report will include, but is not limited to:
   a. Date, time, and location of each walrus sighting;
   b. Number, sex, and age of walruses (if determinable);
   c. Observer name, company name, vessel name or aircraft number, LOA number, and contact information;
   d. Weather, visibility, and ice conditions at the time of observation;
   e. Estimated distance from the animal or group when initially sighted, at closest approach, and end of the encounter;
   f. Industry activity at time of sighting and throughout the encounter. If a seismic survey, record the estimated radius of the zone of ensonification;
   g. Behavior of animals at initial sighting, any change in behavior during the observation period, and distance from the observers associated with those behavioral changes;
   h. Detailed description of the encounter;
   i. Duration of the encounter;
   j. Duration of any behavioral response (e.g., time and distance of a flight response)
   k. Actions taken.

iii. Polar bear observation reports. The operator must report, within 24 hours, all observations of polar bears during any Industry operation. Information within the observation report will include, but is not limited to:

   a. Date, time, and location of observation;
   b. Number, sex, and age of bears (if determinable);
   c. Observer name, company name, vessel name, LOA number, and contact information;
   d. Weather, visibility, and ice conditions at the time of observation;
   e. Estimated closest point of approach for bears from personnel and/or vessel/facilities;
   f. Industry activity at time of sighting, and possible attractants present;
   g. Behavior of animals at initial sighting and after contact;
   h. Description of the encounter;
   i. Duration of the encounter;
   j. Actions taken.

iv. Notification of incident report. Reports should include all information specified under the species observation report, as well as a full written description of the encounter and actions taken by the operator. The operator must report to the Service within 24 hours:

   a. Any incidental lethal take or injury of a polar bear or walrus;
   b. Observations of walruses or polar bears within prescribed mitigation monitoring zones.

vi. After-action monitoring reports. The results of monitoring efforts identified in the marine mammal monitoring and mitigation plan must be submitted to the Service for review within 90 days of completing the year's activities. Results must include, but are not limited to, the following information:

a. A summary of monitoring effort including: Total hours, total distances, and distribution through study period of each vessel and aircraft;
b. Analysis of factors affecting the visibility and detectability of walruses and polar bears by specified monitoring;
c. Analysis of the distribution, abundance, and behavior of walrus and polar bear sightings in relation to date, location, ice conditions, and operational state;
d. Estimates of take based on the number of animals encountered/kilometer of vessel and aircraft operations by behavioral response (no response, moved away, dove, etc.), and animals encountered per day by behavioral response for stationary drilling operations;
e. Raw data in electronic format (i.e., Excel spreadsheet) as specified by the Service in consultation with Industry representatives.

F. A report on the Plan of Cooperation, including the notification of the affected communities, measures taken to ensure that exploratory activities did not interfere with subsistence activities, and follow-up notification after the season, shall be submitted to the Service no later than 90 days after the end of the 2013 Two-Dimensional Seismic Acquisition, Chukchi Sea, Alaska Program. A copy of the report shall be sent to affected local subsistence communities, the Alaska Nanuuq Commission, the Eskimo Walrus Commission and the North Slope Borough Wildlife Department as well as to the Service.

Activities related to the monitoring described in this authorization do not require a separate scientific research permit issued under Section 104 of the Marine Mammal Protection Act.

This Letter of Authorization is valid for the period indicated above, unless extended or terminated in writing by the U.S. Fish and Wildlife Service.

Acting Chief, Marine Mammals Management

JUN 28 2013
Date