

**DENIED**

**E14-005**

**CGG Services (US), Inc.**



# United States Department of the Interior

**BUREAU OF OCEAN ENERGY MANAGEMENT**  
Gulf of Mexico OCS Region  
1201 Elmwood Park Boulevard  
New Orleans, LA 70123-2394

In Reply Refer To: GM333C

**CERTIFIED MAIL – RETURN RECEIPT REQUESTED**

**JAN 06 2017**

CGG Services (US), Inc.  
Attn: Mr. Whitehead  
10300 Town Park  
Houston, TX 77072

RE: Bureau of Ocean Energy Management Permit Application: E14-005

Dear Mr. Whitehead:

Pursuant to the authority granted to the Bureau of Ocean Energy Management (the “Bureau”) under section 11 of the Outer Continental Shelf Lands Act (OCSLA), and the accompanying regulations, the Bureau hereby denies your permit application number E14-005.

As outlined in the attached memorandum from the Director, the Bureau recognizes that new seismic data has benefits to both industry and the federal government in considering any oil and gas activity in the region. However, the Bureau has determined that even allowing the *possibility* of impacts to the environment and existing uses in the Atlantic from airgun seismic surveys – even with the most stringent mitigations being implemented – is unnecessary at this time because:

- i.* The Secretary decided to remove the Atlantic planning areas from any leasing in the 2017-2022 Five Year Program and there is no immediate need for new geophysical and geophysical (G&G) data from seismic airgun surveys to inform pending decisions;
- ii.* The G&G data to be acquired could become outdated if the Atlantic is offered for oil and gas leasing activities too far into the future, as is the case now with the G&G data currently available;
- iii.* Developments in technology might allow for the use of lower impact airguns or other seismic instruments that do not have the potential for the level of impacts on the environment from currently proposed airgun surveys; and
- iv.* Although the mitigation measures included in the Atlantic G&G Programmatic Environmental Impact Statement may be adequate for purposes of minimizing the level of impacts that airguns could cause on the environment (e.g., North Atlantic Right Whale and other species), there is no certainty that in all cases those mitigation measures will avoid all potential impacts. Allowing the *possibility* of high intensity impacts from

airguns, even if only possible in a nominal number of instances, is unnecessary given the lack of immediate need for acquiring oil and gas G&G data at this time.

In light of the reasons for the denial, there are no changes that the applicant could make to change the Bureau's determination and obtain approval. Pursuant 30 C.F.R. 551.10(c), any appeal of this decision shall be made in accordance with 30 C.F.R. part 590.

Sincerely,



Michael A. Celata  
Regional Director  
Gulf of Mexico Region

Enclosure



# United States Department of the Interior

BUREAU OF OCEAN ENERGY MANAGEMENT  
WASHINGTON, DC 20240-0001

JAN - 5 2017

## Memorandum

To: Michael Celata  
Regional Director, Gulf of Mexico Region

From: Abigail Ross Hopper  
Director

Subject: Airgun Seismic Survey Permit Applications

### I. Summary

This memorandum directs you to deny the pending applications to conduct airgun seismic surveys in the Mid- and South Atlantic Planning Areas using the authority granted under section 11 of the Outer Continental Shelf Lands Act (OCSLA). My decision, derived after thoughtful consideration of multiple factors outlined below, is based on the diminished immediate need for seismic survey information in light of the Secretary's decision to remove the Atlantic Program Area from the 2017-2022 Five Year Oil and Gas Program and the promise of emerging noise-quieting technologies. Additionally, given the risks identified in BOEM's Atlantic Outer Continental Shelf (OCS) Proposed Geological and Geophysical (G&G) Activities Mid-Atlantic and South Atlantic Planning Areas Final Programmatic Environmental Impact Statement ("PEIS"), issued in February 2014, and the accompanying Record of Decision (ROD), signed in July 2014, the value of obtaining the information from the surveys does not outweigh the risks of obtaining said information, in light of the removal of the Atlantic from consideration for leasing during the next five years.

### A. Authority

Section 11(a) of the OCSLA provides that "any person *authorized by the Secretary* may conduct geological and geophysical explorations in the OCS, which do not interfere with or endanger actual operations under any lease maintained or granted pursuant to this subchapter, and which are not unduly harmful to aquatic life in such area." 43 U.S.C. §1340(a). Consistent with the foregoing, Section 11(g) of OCSLA specifies what determinations must be made by the Secretary before authorizing G&G permits under OCSLA.

Any permit for geological explorations authorized by this section shall be issued *only if the Secretary determines*, in accordance with regulations issued by the Secretary, that

- (1) the applicant for such permit is qualified;
- (2) the exploration will not interfere with or endanger operations under any lease issued or maintained pursuant to this subchapter; and

(3) such exploration will not be unduly harmful to aquatic life in the area, result in pollution, create hazardous or unsafe conditions, unreasonably interfere with other uses of the area, or disturb any site, structure, or object of historical or archeological significance.

43 U.S.C. § 1340(g)(emphasis added). Sections 11(a) and 11(g) of OCSLA do not provide an unrestricted right to the exploration of the OCS and leave to the Secretary the discretion to approve or deny G&G activities governed by Section 11.<sup>1</sup> The Secretary may not authorize G&G activities that are not consistent with the criteria listed in Section 11(g), but otherwise has discretion regarding the G&G permits issued. *Id.*

BOEM G&G regulations implementing Section 11, and which govern permitting OCS G&G activities on unleased lands or on lands under lease to a third party, are found at 30 C.F.R. Part 551. The regulatory provisions for the issuance of G&G permits provide for approval or disapproval of a permit application. 30 C.F.R. 551.5(b). The regulations are not extensive, but provide, "BOEM authorizes you to conduct exploration or scientific research activities under this part in accordance with the Act, the regulations in this part, orders of the Director/Regional Director, and other applicable statutes, regulations, and amendments." 30 C.F.R. 551.3. Concerning the denial of G&G permit applications, the regulations provide that "[i]f BOEM disapproves your application for a permit, the Regional Director will state the reasons for the denial and will advise you of the changes needed to obtain approval." 30 C.F.R. 551.5(b).

The regulations in Part 551 further provide that approved G&G activities must not

- (1) Interfere with or endanger operations under any lease, right-of-way, easement, right-of-use, Notice, or permit issued or maintained under the Act;
- (2) Cause harm or damage to life (including fish and other aquatic life), property, or to the marine, coastal, or human environment;
- (3) Cause harm or damage to any mineral resource (in areas leased or not leased);

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<sup>1</sup> The language in Sections 11(a) and 11(g) of OCSLA contrasts sharply with that in Section 11(c) of OCSLA, which provides, in part, that exploration plans "shall be approved by the Secretary if [s]he finds that such plan is consistent with the provisions of this subchapter, regulations prescribed under this subchapter, including regulations prescribed by the Secretary pursuant to paragraph (8) of section 1334(a) of this title, and the provisions of such lease." 43 U.S.C. § 1340(c)(emphasis added). Section 11(c) contains a high standard for the disapproval of exploration plans:

The Secretary shall approve such plan, as submitted or modified, within thirty days of its submission, except that the Secretary shall disapprove such plan if he determines that (A) any proposed activity under such plan would result in any condition described in section 1334(a)(2)(A)(i) of this title [where the activity "would probably cause serious harm or damage"], and (B) such proposed activity cannot be modified to avoid such condition.

43 U.S.C. § 1340(c). In contrast, the relevant subsections of section 11 do not set forth any circumstances under which applications for seismic permits "shall be approved" nor spell out any findings that must be made in order to decline to issue such permits. Thus the Secretary has greater discretion to deny G&G permit applications than she does to deny exploration plans as those plans must be approved absent unavoidable, probable, serious harm or damage.

- (4) Cause pollution;
- (5) Disturb archaeological resources;
- (6) Create hazardous or unsafe conditions; or
- (7) Unreasonably interfere with or cause harm to other uses of the area.

30 C.F.R. 551.6(a).<sup>2</sup>

#### B. Seismic Surveys

G&G activities survey the marine environment to acquire information that could be used to determine the resource potential of oil and gas, aid in siting renewable energy structures, and locate potential non-energy minerals such as sand and gravel. They can also assist in developing energy and other resources safely, efficiently, and without harm to natural or cultural heritage.

G&G activities for oil and gas exploration generally include deep penetration seismic airgun surveys, electromagnetic surveys, deep stratigraphic and shallow test drilling, and various remote-sensing methods. Deep penetration seismic surveys are conducted by vessels towing an array of airguns that emit acoustic energy pulses into the seafloor over long durations and over large areas. Many whale species hear and vocalize at low frequencies which overlap with the low frequencies produced by deep penetration seismic surveys. Seismic airguns penetrate several thousand meters beneath the seafloor. These surveys are controversial because of public concerns over potential impacts of the sound produced by these surveys to marine life.

G&G activities for all three program areas (oil and gas, renewable energy, and marine minerals) include high-resolution geophysical surveys (HRG) and other non-airgun surveys to detect geohazards, archaeological resources, and certain types of benthic communities. Techniques also include bottom sampling and analysis (often referred to as geotechnical surveying) to assess seafloor suitability for supporting structures such as platforms, pipelines, cables, and wind turbines, or to evaluate the quantity and quality of sand for beach nourishment and coastal restoration projects. HRG surveys have far less potential to impact marine life than deep penetration seismic using airguns because HRG surveys use less energy, are at a higher frequency that is less in the range of many marine mammals, and are predominately used over a smaller geographic area for a shorter duration.

The existing seismic survey information for the Atlantic Outer Continental Shelf (OCS) was collected more than 30 years ago, and no additional seismic surveys for oil and gas activity have taken place since then. While the older seismic data can be reprocessed, advances in 2D and 3D seismic survey technology now enable collection of much better information.

In 1990, as part of the U.S. Department of the Interior's annual appropriations act, Congress began a moratorium prohibiting Federal spending on oil and gas development on the Atlantic OCS. On June 12, 1998, President Clinton issued a memorandum to the Secretary of the

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<sup>2</sup> Similar requirements are found in the G&G permit application form (Form BOEM-0327).

Interior, which continued leasing restrictions in the Atlantic. Both Congressional and Presidential moratoria were allowed to expire or were lifted, respectively, in 2008. In 2010, Congress mandated that a programmatic environmental impact statement (PEIS) be prepared to comprehensively review potential environmental impacts of G&G activities off the Atlantic coast. BOEM completed the PEIS in February 2014, and a record of decision (ROD) for the PEIS was signed in July 2014.

BOEM has received a number of applications for G&G surveys in the Atlantic. Since issuance of the ROD, two permits that did not propose the use of airguns have been issued. However, six airgun seismic survey permit applications remain pending BOEM's decision. In making its determination, BOEM must consider the impact of the proposed activities on marine life and other factors. Additionally, each of the pending permits is also required to obtain an Incidental Harassment Authorization (IHA), under the Marine Mammal Protection Act, from the National Marine Fisheries Service (NMFS). No IHAs have yet been issued.

### C. Five Year Program and Need for Seismic Data

Section 18 of OCSLA requires the Secretary of the Interior to prepare a nationwide offshore oil and gas leasing program, setting forth a five-year schedule of lease sales designed to best meet the Nation's energy needs. On January 29, 2015, BOEM published the 2017-2022 Draft Proposed Program (DPP), which included lease sales in the Gulf of Mexico, Alaska and the Mid- and South Atlantic Program Area. In March 2016, the Secretary released the 2017-2022 Proposed Program, the second of three proposals required to develop the 2017-2022 Five Year Program. After an extensive public input process, the sale that was proposed in the DPP for leases in the Mid- and South Atlantic area was removed from the program. Many factors were considered in the decision to remove this sale, including potential conflicts with other ocean uses by the Department of Defense and commercial interests; potential harm to competing interests; current market dynamics; limited infrastructure; and opposition from many coastal communities. The range, number, and nature of conflicts in the Atlantic are unique to the region and require extensive work to address these conflicts prior to including a lease sale in the program.

In light of the Secretary's decision to remove the Atlantic planning areas from any leasing in the 2017-2022 Five Year Program, the immediate need for new G&G information in that area is greatly reduced. While BOEM has acknowledged that updated seismic information could be helpful for future decisions concerning oil and gas activities in the Atlantic, there are currently no pending decisions which would depend upon the updated information. Further, if the Atlantic is included in a future 5 Year Program, industry would likely apply to conduct additional G&G surveys closer in time to an actual lease sale if significant time has elapsed since prior surveys were conducted. Therefore, in light of other considerations discussed below and the fact that the immediate need for updated seismic information has greatly decreased since the ROD was issued in June 2014, I have determined that it is not appropriate to issue these permits at this time.

#### D. Emerging Technologies

An effort to develop “quieting” technology has paralleled improvements in seismic survey capability. BOEM has worked with industry to examine technologies with the potential to reduce noise generated during seismic surveys using airguns. In 2014, BOEM organized a workshop with more than 100 representatives from government, industry, non-governmental environmental organizations, and academia to work together and gain a better understanding of these emerging technologies. The most promising alternative to airguns appears to be marine vibroseis technology. While a number of different types of marine vibroseis technologies are under development, some are being evaluated for commercial use, typically for surveys near sensitive habitat or other biological resources. The economic feasibility of this technology remains to be proven and the potential environmental impacts tested. Industry has hesitated at using marine vibroseis or other quieting technologies until they are better understood. There is no silver bullet. However, by engaging industry and the regulators, I expect technologies will be developed that can produce data that is commensurate to that being produced by currently available airgun seismic survey techniques but with much less environmental impact. In fact, an industry-led study on vibroseis technologies is underway; and industry is regularly updating BOEM on its progress. I believe that BOEM should do what it can to encourage development of these technologies.

#### D. Marine Mammals

As human presence in the offshore environment has grown, so too has anthropogenic sound. BOEM, and its predecessor MMS, has been a pioneer in sponsoring research on ocean sound, beginning in the 1980s with research on how industrial sounds affect large whales species. The bureau has moved forward since then with studies on an array of topics, including methods to detect, classify and locate marine life near sound sources; improvements in mitigation; quieting technologies; and effects of sound on prey species. BOEM has also begun to examine the even more complex issue of cumulative effects from chronic exposure to anthropogenic sounds.

Deep penetration seismic airgun surveys come with an environmental burden. The high energy sound they produce may damage the hearing or disrupt the behavior of sea animals, particularly marine mammals, if they are too close to the source. For HRG surveys, while injury is possible, it is unlikely given that an animal would need to be within feet of an HRG source for a period of time at enough intensity for the potential to lead to hearing injury. This concern has prompted a wealth of research, guidance, and measures to mitigate potential harm. The PEIS and the accompanying ROD identified various mitigation measures whose application would reduce the potential for hearing damage or disrupted behavior, including, for example, placement of observers on survey vessels, ramp up requirements, exclusion zones around survey vessels, shut down requirements, and closure of areas to surveys at certain places and times when exposure of marine mammals to survey sounds are a particular concern.

I believe the mitigation measures in the ROD contribute substantially to preventing hearing damage and biologically significant disruption of sea animal behavior. However, there is no certainty that in all cases those mitigation measures will avoid all potential impacts.<sup>3</sup> I am particularly persuaded by the continually emerging science regarding the North Atlantic right whale (NARW). BOEM's PEIS estimates that between zero and two individual NARWs would potentially experience Level A take (hearing damage) annually and that between zero and 224 individual NARWs would potentially experience Level B take (behavioral disruption) annually if seismic surveys proceed within the parameters established by the PEIS. The assumptions made in these estimates are "conservative," tending to err in overestimating takes. Furthermore, mitigation measures outlined in BOEM's PEIS and included in its ROD should contribute substantially to preventing hearing damage and biologically significant disruption of NARW behavior. However, some NARWs would doubtless be disturbed by seismic activity in the Atlantic. Given that next Five Year Program excludes the Atlantic from leasing from 2017-2022, and the potential for less intrusive seismic technologies in the near future, the potential disadvantage to this small, critically endangered, and declining population is not worth the risk.

## II. Directive

As outlined above, new seismic data has benefits to both industry and the federal government in considering any oil and gas activity in the region. However, I have determined that even allowing the *possibility* of impacts to the environment and existing uses in the Atlantic from airgun seismic surveys – even with the most stringent mitigations being implemented – is unnecessary at this time because:

- i. The Secretary decided to remove the Atlantic planning areas from any leasing in the 2017-2022 Five Year Program and there is no immediate need for new G&G data from seismic airgun surveys to inform pending decisions;
- ii. The G&G data to be acquired could become outdated if the Atlantic is offered for oil and gas leasing activities too far into the future, as is the case now with the G&G data currently available;
- iii. Developments in technology might allow for the use of lower impact airguns or other seismic instruments that do not have the potential for the level of impacts on the environment from currently proposed airgun surveys; and

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<sup>3</sup> The PEIS notes that "the effects of mitigation measures, and other caveats described below, cannot be quantified with precision, and mitigation measures may not be fully implemented. For example, visual and PAM are not 100 percent effective due to factors such as physical conditions (e.g., inclement weather), presence of animals at the surface, difficulty in species identification, lack of vocalizing animals, and limitations in equipment used for monitoring. Further, larger acoustic exclusion zones are more difficult to monitor than smaller zones." PEIS xi-xii

- iv. Although the mitigation measures included in the Atlantic G&G PEIS may be adequate for purposes of minimizing the level of impacts that airguns could cause on the environment (e.g., NARW and other species), there is no certainty that in all cases those mitigation measures will avoid all potential impacts. Allowing the *possibility* of high intensity impacts from airguns, even if only possible in a nominal number of instances, is unnecessary given the lack of immediate need for acquiring O&G G&G data at this time.

Therefore, please deny forthwith all pending applications to conduct airgun seismic surveys in the Mid- and South Atlantic Planning Areas.



**BUREAU OF OCEAN ENERGY MANAGEMENT  
DOCUMENT TRACKING CONTROL SLIP**

Date: 01/05/2017

DCN: OEM0001230		ES No:
Orig Office: DIR-ODM	Input Date: 01/05/2017	Addressee:  Mike Celata
Due Date:	Signature Level: D	
Subject: Ailgun Seismic Survey Permit Applications		

Comments:

Task Codes:

- |                         |                                |                           |
|-------------------------|--------------------------------|---------------------------|
| 0 - Prepare Draft Reply | 6 - Revise                     | 12 - Email Draft Reply    |
| 1 - Prepare Reply       | 7 - Obtain Additional Comments | 13 - Advance Read         |
| 2 - Appropriate Action  | 8 - Other - See Comments       | 14 - File                 |
| 3 - Surname             | 9 - Mail/Distribute            | 15 - For Your Information |
| 4 - Signature           | 10 - Finalize                  | 16 - Surname through DTS  |
| 5 - Review/Comment      | 11 - Simultaneous Surnames     | 17 - Required ES Review   |

Routing:

Assigned To	Task	Assigned Date	Due Date	Completed Date
DIR-ODM	2 - Appropriate Action	01/05/2017	<i>Encl 1/5/17</i>	01/05/2017
DIR-SrA Celina Cunningham	3 - Surname		<i>Cow</i>	1-5-16
DDIR Walter Cruickshank	3 - Surname <i>Ci...</i>			1-5-17
DIR Abigail Hepper	4 - Signature <i>AW</i>			1-5-17

Public

Attachment 1

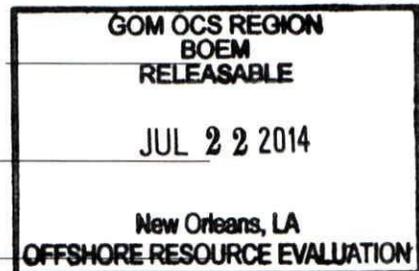
UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF OCEAN ENERGY MANAGEMENT

New Orleans  
(Insert Appropriate Regional Office)

APPLICATION FOR PERMIT TO CONDUCT GEOLOGICAL OR GEOPHYSICAL  
EXPLORATION FOR MINERAL RESOURCES OR SCIENTIFIC RESEARCH  
ON THE OUTER CONTINENTAL SHELF

(Section 11, Outer Continental Shelf Lands Act of August 7, 1953, as amended on September 18, 1978, by Public Law 95-372, 92 Statute 629, 43 U.S.C. 1340; and 30 CFR Parts 251 and 551)

CGG Services (US) Inc.  
Name of Applicant  
10300 Town Park  
Number and Street  
Houston, TX 77072  
City, State, and Zip Code



Application is made for the following activity: (check one)

- Geological exploration for mineral resources
- Geological scientific research
- Geophysical exploration for mineral resources
- Geophysical scientific research



**Submit:** Original plus three copies, totaling four copies, which include one digital copy, and one public information copy.

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To be completed by BOEM

Permit Number: E14-005

Date: 29-Apr-2014

**A. General Information**

1. The activity will be conducted by:

<u>CGG Services (US) Inc.</u> Service Company Name	For <u>CGG Services (US) Inc.</u> Purchaser(s) of the Data
<u>10300Town Park</u> Address	<u>10300Town Park</u> Address
<u>Houston, TX 77072</u> City, State, Zip	<u>Houston, TX 77072</u> City, State, Zip
<u>832-351-1603 / 832-351-8720</u> Telephone/FAX Numbers	<u>832-351-1603 / 832-351-8720</u> Telephone/FAX Numbers
<u>michael.whitehead@cgg.com</u> E-Mail Address	<u>michael.whitehead@cgg.com</u> E-Mail Address

2. The purpose of the activity is:  Mineral exploration  
 Scientific research

3. Describe your proposed survey activities (i.e., vessel use, benthic impacts, acoustic sources, etc) and describe the environmental effects of the proposed activity, including potential adverse effects on marine life Describe what steps are planned to minimize these adverse effects (mitigation measures). For example: 1) Potential Effect; Excessive sound level Mitigation; Soft Start, MMOs, mammal exclusion zone or 2) Potential Effect; Bottom disturbance; Mitigation; ROV deployment/retrieval of bottom nodes) (use continuation sheets as necessary or provide a separate attachment):  
Seismic research vessel, no adverse effects, single source array, noise propogation and mitigation in place to protect environment, NTL regulations will be followed.

4. The expected commencement date is: January 2015

The expected completion date is: January 2016

5. The name of the individual(s) in charge of the field operation is:

Jean-Francois Roudault

May be contacted at:

Telephone (Local) 832-351-8497 (Marine) 832 350 1799

Email Address: jean-francois.roudant@cgg.com Radio call sign NA

6. The vessel(s) to be used in the operation is (are): Please see Attached Document

Name (s) Registry Number(s) Registered owners)  
Single Streamer Vessel towing single source and single 10 to 12 solid km cable

*See Attached*

7. The port from which the vessel(s) will operate is: To be Determined

8. Briefly describe the navigation system (vessel navigation only):

WADGPS

### B. Complete for Geological Exploration for Mineral Resources or Geological Scientific Research

1. The type of operation(s) to be employed is: (check one)

(a) \_\_\_\_\_ Deep stratigraphic test, or

(b) \_\_\_\_\_ Shallow stratigraphic test with proposed total depth of \_\_\_\_\_, or

(c) \_\_\_\_\_ Other \_\_\_\_\_

2. Attach a page-size plat showing: 1) The generalized proposed location for each test, where appropriate, a polygon enclosing the test sites may be used, 2) BOEM protraction areas; coastline; point of reference; 3) Distance and direction from a point of reference to area of activity.

\_\_\_\_\_

### C. Complete for Geophysical Exploration for Mineral Resources or Geophysical Scientific Research

1. The type(s) of operation(s) to be employed is (are):

a) Acquisition method (OBN, OBC, Streamer): Streamer

b) Type of acquisition: (High Resolution Seismic, 2D Seismic, 3D Seismic, gravity, magnetic, CSEM, etc.)

2D Seismic, Gravity and Magnetics

2. Attach a page-size plat showing:

a) The generalized proposed location of the activity with a representative polygon,

b) BOEM protraction areas; coastline; point of reference,

c) Distance and direction from a point of reference to area of activity.

3. List all energy source types to be used in the operation(s): (Air gun, air gun array(s), sub-bottom profiler, sparker, towed dipole, side scan sonar, etc.).

Airgun array

4. Explosive charges will \_\_\_\_\_ will not X be used. If applicable, indicate the type of explosive and maximum charge size (in pounds) to be used:

Type \_\_\_\_\_ Pounds \_\_\_\_\_ Equivalent Pounds of TNT \_\_\_\_\_

**D. Proprietary Information Attachments**

Use the appropriate form on page 9 for a "geological" permit application or the form on page 11 for a "geophysical" permit application. You must submit a separate Form BOEM-0327 to apply for each geological or geophysical permit.

**E. Certification**

I hereby certify that foregoing and attached information are true and correct.

Print Name: Michael A Whitehead

SIGNED Michael A Whitehead DATE 23 April 2014

TITLE \_\_\_\_\_

COMPANY NAME: CGG Services (US) Inc.

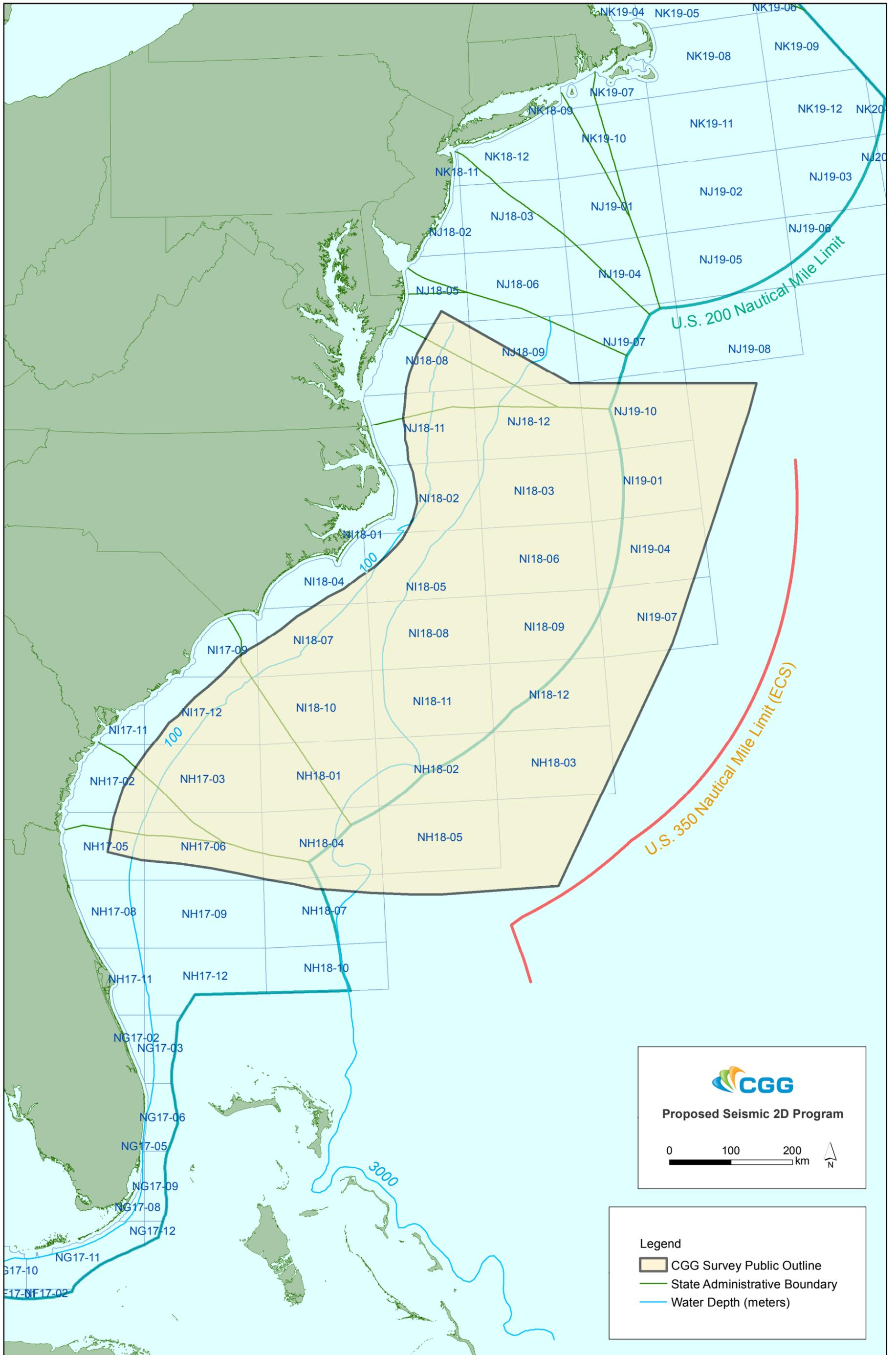
**TO BE COMPLETED BY BOEM**

Permit No. E14-005 Assigned by W. Chad Vaughan Date 2-May-2014  
of BOEM

This application is hereby:

- a.  Accepted
- b.  Returned for reasons in the attached

SIGNED [Signature] TITLE Regional Supervisor DATE 5/5/14



  
**Proposed Seismic 2D Program**

0      100      200  
 ─────────── km      N

**Legend**

- CGG Survey Public Outline
- State Administrative Boundary
- Water Depth (meters)