

**ALASKA WILDERNESS LEAGUE, BRAIDED RIVER, CANADIAN PARKS AND
WILDERNESS SOCIETY-YUKON CHAPTER, CENTER FOR BIOLOGICAL
DIVERSITY, DEFENDERS OF WILDLIFE, EARTHJUSTICE, ENVIRONMENT
AMERICA, EYAK PRESERVATION COUNCIL, FAIRBANKS CLIMATE ACTION
COALITION, FRIENDS OF ALASKA NATIONAL WILDLIFE REFUGES,
GWICH'IN STEERING COMMITTEE, NATIONAL AUDUBON SOCIETY,
NATIONAL WILDLIFE REFUGE ASSOCIATION, NATIVE MOVEMENT, NATURAL
RESOURCES DEFENSE COUNCIL, NORTHERN ALASKA ENVIRONMENTAL
CENTER, RESISTING ENVIRONMENTAL DESTRUCTION ON INDIGENOUS
LANDS, SIERRA CLUB, THE WILDERNESS SOCIETY, TRUSTEES FOR ALASKA,
WILDERNESS WATCH ALASKA CHAPTER**

August 17, 2018

Shelly Jones
Acting District Manager
Arctic Field Office
Bureau of Land Management
222 University Ave.
Fairbanks, AK 99709
blm_ak_coastal_plain_seismic_ea@blm.gov

Submitted via e-mail

Dear Ms. Jones:

On behalf of our millions of members and supporters nationwide and in Alaska and Canada, the above listed organizations write to register our deep concerns with the Bureau of Land Management's (BLM) planning process for authorizing seismic exploration for oil and gas resources on the Coastal Plain of the Arctic National Wildlife Refuge. BLM is moving forward with its review of SAExploration, Inc.'s (SAE) proposal to conduct 3-Dimensional (3D) winter seismic surveys across the entire 1.6 million acre Coastal Plain without any apparent legal authority to do so, without providing adequate opportunities for public involvement, and without preparing the full Environmental Impact Statement (EIS) required by the National Environmental Policy Act (NEPA).

The Arctic National Wildlife Refuge is the crown jewel of the National Wildlife Refuge System. It is the largest and wildest of our nation's wildlife refuges. The Coastal Plain is the biological heart of the Refuge, providing essential habitat for a variety of wildlife, including imperiled polar bears, the Porcupine caribou herd, and numerous species of migratory birds from all 50 states and six continents. It is an area sacred to the Gwich'in nation, who depend on the Refuge for their way of life. These unparalleled public lands, and the wildlife that depend on them, are an international treasure that must be conserved for future generations.

PROCESS ISSUES

We submit these initial scoping comments focused primarily on BLM's NEPA obligations, if the agency continues to evaluate SAE's seismic proposal. We say "if" because, to date, BLM has not publicly identified any source of authority for permitting pre-leasing seismic exploration anywhere in the Coastal Plain, nor is any such authority apparent. BLM should not pursue authorization for SAE to explore for oil and gas on the Coastal Plain unless and until it can identify such authority, and it should do so publicly, to justify the time and resources that BLM, other agencies, and the public would invest in a permitting process. Regardless, we oppose authorizing SAE to conduct seismic surveys even if BLM claims to have that authority, and strongly oppose any oil and gas activities on the Coastal Plain, including seismic exploration.

We also oppose the process that BLM has undertaken thus far to evaluate SAE's proposal. It undercuts the public's ability to meaningfully participate in planning and decision making and will not enable BLM, sister agencies, decision makers, or the public to adequately analyze and account for the environmental impacts of exploration on public resources as required by law. BLM's lack of clarity and conflicting statements regarding public review of the seismic proposal have already created significant confusion and curtailed public participation in the process. BLM originally posted only a summary document of SAE's proposal to its website on July 18, 2018.¹ It did so without making any formal announcement to the public that it was initiating its review and providing a scoping comment period. The summary document, titled "Seismic Exploration on the Coastal Plain," was posted with no notification to our organizations, our membership, or, as far as we can determine, any other interested stakeholders or the public at large. BLM did not post a copy of SAE's plan of operations on its website until August 6, 2018.² Again, it did so without making any formal announcement to the public that it was initiating a scoping comment period or that the document was available. Incredibly, BLM previously deemed this same document, titled "Marsh Creek Plan of Operations Submitted May 2018," insufficient for the agency itself to evaluate the project.³ By the same token, it does not provide the public with sufficient information for purposes of providing informed comments on the proposal.

BLM has also issued conflicting statements regarding opportunities for public input. After posting the Seismic Proposed Action, the agency made statements to both the public and the media that the public would be given a 30-day opportunity to review and comment on the

¹ See U.S. Dep't of the Interior, Bureau of Land Mgmt., NEPA Register, DOI-BLM-AK-R000-2018-0040-EA (SAExploration, Inc. Seismic Application), *available at* <https://eplanning.blm.gov/epl-front-office/eplanning/projectSummary.do?methodName=renderDefaultProjectSummary&projectId=111085> [hereinafter BLM NEPA Register].

² *Id.*

³ BLM deemed SAE's submission incomplete and returned it to SAE. Steven Mufson & Juliet Eilperin, *Companies Take First Steps to Drill for Oil in Arctic National Wildlife Refuge*, THE WASHINGTON POST, June 1, 2018.

agency's environmental assessment (EA) of the proposal, once drafted.⁴ However, on August 1, 2018, BLM-Alaska leadership could not confirm in a meeting with multiple representatives from conservation organizations whether the draft EA would be made available for a 30-day public comment period. Then on August 10—one week before the purported deadline—BLM posted to its NEPA Register that “scoping” comments on the proposal were due August 17.⁵ This was the first time that BLM indicated that there was a deadline for comments, or the nature of the comments sought (i.e., scoping comments). And again, BLM did not make any formal announcement to the public that it was undertaking a “scoping period” or imposing a deadline. When asked about the process, BLM leadership was again unable to confirm as of Monday, August 13, whether BLM would make the draft EA available for public comment as previously stated.

These flip-flops and the resulting compressed timeframe have severely hindered engagement in a NEPA process of intense public interest. As BLM is aware, given the submission of over 700,000 comments in response to its scoping notice for a proposed oil and gas leasing program for the Coastal Plain, the public is deeply committed to understanding and commenting on proposals for activities that could impact these vital public lands.⁶ The purposes of NEPA include ensuring “that environmental information is available to public officials and citizens before decisions are made and before actions are taken,” and that information relied upon is “of high quality.”⁷ To meet its legal obligations, BLM must provide the public with the information, analysis, and time necessary for informed, meaningful engagement.

BLM has a legal obligation to comply with NEPA's mandate to prepare a detailed EIS for any major federal action that may significantly affect the quality of the human environment. BLM's public statements to date about preparing an EA appear to indicate that the agency believes that the impacts of seismic exploration will not be significant and hence that it can dispense with an EIS. In fact, both the extraordinary and pristine natural values of the Refuge and the high potential for significant impacts mandate development of an EIS. Nothing shows that more vividly than the photo appended to these comments, revealing how completely seismic exploration bordering on the Refuge has changed the character of that landscape. If seismic exploration is ever contemplated in the Refuge, the direct, indirect and cumulative effects must be thoroughly analyzed and disclosed in a comprehensive EIS before any final decision is made to allow such activities on what many consider America's premier wildland.⁸

⁴ See, e.g., Liz Ruskin, *BLM Projects 'Insignificant' Impact from Seismic Work in ANWR*, ALASKA PUBLIC MEDIA, July 27, 2018; Henry Fountain, *See the Scars That Oil Exploration Cut Across Alaska's Wilderness*, N.Y. TIMES, Aug. 3, 2018.

⁵ BLM NEPA Register, *supra*.

⁶ Additionally, over 700,000 comments were submitted on the Fish and Wildlife Service's scoping and draft Comprehensive Conservation Plan during its recent revision and numerous comments were submitted on the EIS for that agency's exploration program in the 1980s.

⁷ 40 C.F.R. § 1500.1(b).

⁸ Notably, the Coastal Plain seismic program in the 1980s was preceded by a rulemaking, an EIS, and significant public involvement, including public hearings.

Importantly, such an EIS would need, among other things, to examine how the potential impacts of seismic exploration would combine with those of all other ensuing, reasonably foreseeable oil and gas related authorizations in the region—including leasing, exploration, development, production, and transportation—in a single EIS to ensure that BLM will protect the resources of the Arctic Refuge. BLM must not unlawfully segment its NEPA review and potentially allow destructive activities like SAE’s proposal without first preparing an EIS that examines the full range of potential impacts from all phases of oil and gas activities. In other instances, such as in the National Petroleum Reserve–Alaska, BLM has studied seismic impacts together with leasing impacts in an EIS. Fortunately, Congress provided ample time for completion of a full EIS prior to any decision on whether and how to permit any oil and gas activities.⁹

Finally, we emphasize that, even if BLM could convincingly show that it has the authority to authorize pre-leasing seismic activities on the Coastal Plain, it would also have to comply with numerous other legal mandates and policy obligations, including those related to the mission of the U.S. Fish and Wildlife Service (FWS), which manages the entire Arctic Refuge and whose role as primary manager was not altered by the Tax Act. These include, but are not limited to, the Endangered Species Act (ESA), the Marine Mammal Protection Act, the National Wildlife Refuge Administration Act (including protecting the conservation purposes of the Arctic Refuge), the Wilderness Act, the Alaska National Interest Lands Conservation Act, and others that guide and mandate the protection of the Coastal Plain, its natural resources, and the fish and wildlife that depend on it. An EIS would need to document how BLM is ensuring compliance with all applicable laws and policies.

MAJOR SCOPING ISSUES

Although we object to the manner in which BLM is proceeding with this planning process, we identify the following major issues that BLM must address in any environmental analysis. These comments are necessarily preliminary, not only because of the truncated process BLM has adopted, but also in keeping with the role of scoping comments. As the courts have found, scoping “describes when an agency begins initial consideration of a project, and identifies the significant issues related to the contemplated action.”¹⁰ Our focus in these comments is, therefore, simply on issue identification. More detailed input on the agency’s analysis and evaluation of these issues in its NEPA documentation must necessarily await public circulation of the environmental analysis.

SAE is proposing to conduct 3D seismic surveys across the entire Coastal Plain for the winter seasons of 2018/2019 and 2019/2020.¹¹ The summary document refers to the entire Coastal Plain and does not identify the specific areas where SAE will engage in activities. The seismic program will involve two camps of 160 people, 12–15 tracked vibrators, 20,000 to 25,000 nodes, and 6,000–7,000 gallons of fuel usage per day, for each camp. There would be approximately 50

⁹ See Pub. L. 115-97, sec. 20001(c)(1)(B)(ii).

¹⁰ *Lands Council v. Powell*, 395 F.3d 1019, 1025 (9th Cir. 2005).

¹¹ If activities are planned for the private corporation lands, the agency must address how these activities will be evaluated and the impacts as well.

trailers and support trailers that make up each camp, with generators, lighting, temporary airstrips, incinerators and waste discharges, and other industrial equipment and activities. SAE would move the camps with heavy vehicles every two to three days, eventually covering the entire Coastal Plain. Given the extent of the proposed program, there would be approximately forty to fifty different camp locations for each of the two crews throughout the Coastal Plain. Operations would continue 24 hours a day, 7 days a week. The impacts from these extremely extensive activities proposed by SAE will necessarily be significant, far more so than those associated with the two-dimensional seismic survey conducted in the 1980s, the scars of which remain detectable on the Refuge to this day. Moreover, the Coastal Plain and its wildlife are significantly more sensitive than during prior seismic activities due to the deleterious effects of climate change, which is impacting the Arctic at twice the rate as the rest of the country.

More specifically, SAE's seismic proposal indicates numerous activities the company will engage in that raise a host of potential significant impacts. Consistent with this, BLM must, among other things, fully analyze the following:

- The impacts of water withdrawals and snow usage with regard to specific locations and usage volumes, including the impacts to fish and wildlife that may rely on those freshwater resources;
- The potential for spills from up to 7,000 gallons of fuel that SAE's summary estimates it may use each day, and the ability to clean up any spills;
- The potential air, water quality, and other impacts from all of the proposed activities, the food waste that the summary says will be continually incinerated to avoid attracting wildlife, the discharge of gray water amounting to 1,000 to 2,500 gallons per crew per day, and the generators SAE says will operate 24 hours a day, 7 days a week, exposing, among others, the crews working in close proximity to hazardous air pollutants;
- The impacts from large numbers of personnel accessing the Coastal Plain with heavy equipment, traversing over state lands or across sea ice, as well as on unidentified snow trails within the Refuge, and with an unspecified number of river and other waterbody crossings, during the course of the project as camps are moved across the tundra every few days and dragged with heavy equipment;
- The effects on the unique terrain, ecology and conditions of the Coastal Plain, where there is limited snow cover in the winter compared to other areas on the North Slope;
- The impacts of the proposed activities on threatened polar bears and designated critical habitat for this imperiled species, including the potential effectiveness of the aerial FLIR survey and the manner in which it is being used, and the uncertainties associated with its implementation in practice, as well as impacts to other federally protected species that use the Refuge;
- The impacts of the proposed activities on all fish and wildlife and their habitats, including migratory, resident, and overwintering species, which may be present on or in the vicinity of the Coastal Plain during the timeframe of the proposed activities, including impacts that may result from damage to the Coastal Plain's vegetation and hydrological systems;
- The impacts to subsistence resources and users, human health, environmental justice, and sociocultural systems;
- The impacts to wilderness characteristics, including the globally significant natural values of the area;

- The impacts to tundra, soils, and permafrost, and the potential changes to hydrology from seismic activities, including as assessment of the damage that may be expected to occur from operations at different snow depths; and
- The impacts on and potential contributions of a potential oil and gas program in the Refuge to climate change.

To comply with NEPA, BLM should also consider alternatives or limitations to the proposed action. While we oppose any exploration activities, under NEPA, BLM must analyze a range of alternatives beyond the proposed action and no action alternatives in its environmental analysis. For example, BLM must consider alternatives that would limit the spatial extent of the survey to reduce or avoid impacts to the most sensitive and vulnerable resources of the Refuge. Although it is plain that significant impacts to the Refuge would result from any action alternative, BLM is bound by NEPA to consider alternatives including but not limited to: limiting the survey to areas outside of suitable polar bear denning habitat and limiting the survey to only a portion of the Refuge within a given denning season; excluding areas where the hydrology could be impacted by seismic tracks; and eliminating or vastly reducing the proposed mobile camps.

In sum, the cursory summary of SAE's seismic proposal and the deeply flawed plan of operations raise serious concerns about the proposed activities and the potential impacts to the Coastal Plain. These woefully inadequate documents make it impossible for the public to understand or comment on the full array of impacts from multi-year seismic exploration across the entire Coastal Plain. Based on the limited information provided to the public to date, the impacts are likely to be significant and long lasting. BLM must ensure that it has comprehensive baseline data of both current and historic conditions to evaluate this proposal. Additionally, the issues identified above are not the only issues that BLM must analyze; there are likely numerous other issues that the agency will need to consider. We urge BLM to provide opportunities for the public to review and weigh in on BLM's NEPA analysis of the proposed activities. The issues discussed above are simply those that are readily identifiable from the company's plan of operations and BLM's brief summary of its proposed activities. BLM must thoroughly and comprehensively analyze the impacts to all Coastal Plain resources and ensure that it is meeting all legal obligations. The analysis required should be completed in an EIS with significant and robust public involvement that evaluates all phases of oil and gas activities.

Thank you for your consideration of these comments.

Sincerely,

Adam Kolton, Executive Director
Alaska Wilderness League

Helen Cherullo, Executive Director
Braided River

Chris Rider, Executive Director
Canadian Parks and Wilderness Society-Yukon Chapter

Kristen Monsell, Oceans Legal Director & Senior Attorney
Center for Biological Diversity

Mark Salvo, Vice President, Landscape Conservation
Defenders of Wildlife

Erik Grafe, Attorney
Earthjustice

Eric DuMont, Public Lands Advocate
Environment America

Carol Hoover, Executive Director
Eyak Preservation Council

Jessica Girard, FCAC Coordinator
Fairbanks Climate Action Coalition

David Raskin, President
Friends of Alaska National Wildlife Refuges

Bernadette Demientieff, Executive Director
Gwich'in Steering Committee

Sarah Greenberger, Senior Vice President, Conservation Policy
National Audubon Society

Geoffrey Haskett, President
National Wildlife Refuge Association

Adrienne Blachford, Community Organizer
Native Movement

Garett Rose, Staff Attorney
Natural Resources Defense Council

Lisa Baraff, Program Director
Northern Alaska Environmental Center

Faith Gemmill, Executive Director
Resisting Environmental Destruction on Indigenous Lands

Karimah Schoenhut, Staff Attorney
Sierra Club

Nicole Whittington-Evans, Alaska Director
The Wilderness Society

Victoria Clark, Executive Director
Trustees for Alaska

Fran Mauer, Representative
Wilderness Watch Alaska Chapter



Photo Credit: Matt Nolan, <https://fairbanksfodar.com/detecting-tire-tracks-in-the-1002-area-with-fodar>

**DOCUMENTS CITED IN ALASKA WILDERNESS LEAGUE ET AL.'S AUGUST 17,
2018 COMMENTS REGARDING SAEXPLORATION, INC.'S SEISMIC APPLICATION
(FF097424, JULY 18, 2018)**

Attachment 1	U.S. Dep't of the Interior, Bureau of Land Mgmt., NEPA Register, DOI-BLM-AK-R000-2018-0040-EA, Aug. 8, 2018
Attachment 2	U.S. Dep't of the Interior, Bureau of Land Mgmt., NEPA Register, DOI-BLM-AK-R000-2018-0040-EA, Aug. 15, 2018
Attachment 3	Seismic Exploration on the Coastal Plain
Attachment 4	Marsh Creek 3D Plain of Operations: Winter Seismic Survey
Attachment 5	Steven Mufson & Juliet Eilperin, <i>Companies Take First Steps to Drill for Oil in Arctic National Wildlife Refuge</i> , THE WASHINGTON POST, June 1, 2018
Attachment 6	Liz Ruskin, <i>BLM Projects 'Insignificant' Impact from Seismic Work in ANWR</i> , ALASKA PUBLIC MEDIA, July 27, 2018
Attachment 7	Henry Fountain, <i>See the Scars That Oil Exploration Cut Across Alaska's Wilderness</i> , NEW YORK TIMES, Aug. 3, 2018

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DOI-BLM-AK-R000-2018-0040-EA (SAExploration Inc. Seismic Application)

> NEPA Register > DOI-BLM-AK-R000-2018-0040-EA

NEPA Project Summary

NEPA #:	DOI-BLM-AK-R000-2018-0040-EA	Status:	Preparation and Planning
Project Name:	SAExploration Inc. Seismic Application	Decision Date:	
EIS OEPC #:		FONSI Date:	
Applicant:	SAExploration, Inc.		
Case File Number/ Project Number	FF097424		
Start Date:	07/18/2018		
End Date:			

Project Description:

Please submit any comments about the proposed action to: blm_ak_coastal_plain_seismic_ea@blm.gov

Project Location:

Coastal Plain Arctic National Wildlife Refuge

Project Lead:**Phone Number:****Email Address:** blm_ak_coastal_plain_seismic_ea@blm.gov**Office(s):** Arctic DO**Lead Office:** Arctic DO**Counties:** North Slope**Program(s):** Fluid Minerals (Oil & Gas, Tar Sands, Oil Shale)**Subprogram(s):** Oil & Gas**Cooperating Agencies:**

Documents:

<u>Document Name</u>	<u>Release Date</u>	<u>Available Formats</u>	<u>Public Comment Period</u>
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Seismic Proposed Action.pdf	07/18/2018	 (46 KB)	
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<u>Document Name</u>	<u>Release Date</u>	<u>Available Formats</u>	<u>Public Comment Period</u>
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Marsh Creek Plan of Operations Submitted May2018.pdf	08/06/2018	 (1634 KB)	
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**DOI-BLM-AK-R000-2018-0040-EA (SAExploration Inc.
Seismic Application)**> [NEPA Register](#) > [DOI-BLM-AK-R000-2018-0040-EA](#)**NEPA Project Summary**

NEPA #:	DOI-BLM-AK-R000-2018-0040-EA	Status:	Preparation and Planning
Project Name:	SAExploration Inc. Seismic Application	Decision Date:	
EIS OEPC #:		FONSI Date:	
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Start Date:	07/18/2018		
End Date:			

Project Description:

Scoping period will end August 17, 2018. Please submit any comments about the proposed action to:
blm_ak_coastal_plain_seismic_ea@blm.gov

Project Location:

Coastal Plain Arctic National Wildlife Refuge

Project Lead:**Phone Number:**

Email Address: blm_ak_coastal_plain_seismic_ea@blm.gov

Office(s): Arctic DO

Lead Office: Arctic DO

Counties: North Slope


Program(s): Fluid Minerals (Oil & Gas, Tar Sands, Oil Shale)

Subprogram(s): Oil & Gas

Cooperating Agencies:

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Seismic Proposed Action.pdf	07/18/2018	 (46 KB)	

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SEISMIC EXPLORATION ON THE COASTAL PLAIN

Purpose and Need

SA Exploration has requested to conduct 3 Dimensional (3D) Winter Seismic Exploration Surveys on the Coastal Plain of the USFWS Arctic National Wildlife Refuge in Alaska. The proposed seismic exploration would begin in winter 2018/2019 and, if not finished in one year, would continue through winter 2019/2020. Seismic exploration generates acoustic waves that are picked up by sensors as the waves bounce off subsurface formations. From this information, images can be created that show subsurface topography and formations including those areas of potential hydrocarbons.

The purpose of the proposed seismic activity is to acquire quality, high resolution seismic data, using vibroseis techniques to identify potential oil and gas reserves. Approval of the proposed action would authorize SAE to conduct 3D seismic surveys beginning when frost and snow cover are at sufficient depths to protect tundra and would continue through the winter seasons until tundra travel has been closed.

Analysis of this project will include access to the program area from Deadhorse, storage of fuel, and the use of up to two mobile camps, each capable of housing up to 160 people. The total proposed project area would encompass the entire Coastal Plain, approximately 2,600 sq. miles (1,664,000 acres) (program area).

Access

Equipment would be staged at existing facilities in Deadhorse, Alaska. The camp trailers and seismic equipment would be trucked via existing gravel road from Deadhorse to a point of access where the camp trailers and equipment could be moved over tundra or sea ice to the program area. Access to the program area would entail crossing state land after the Alaska Department of Natural Resources has opened tundra travel. The state would allow tundra travel when they determine there is adequate snow cover and frozen ground. The Coastal Areas criteria are six inches of snow and 23 degrees Fahrenheit soil temperature at approximately one foot snow depth and the Foothills Areas are nine inches of snow and 23 degrees Fahrenheit soil temperature at approximately one foot depth. SAE has obtained a permit from the State. No ice roads would be constructed for this project.

Before camp trailers and seismic equipment enter the program area, an advance survey team in either Tucker Sno Cat (Tucker) or steigers would scout environmental conditions, such as ice thickness and low snow areas and would map a trail for the rest of the crew and camp to follow. To determine ice conditions, tucker vehicles and, potentially, snow machines equipped with ground penetrating radar systems (GPR) would be used to test ice thickness. In addition, ice conditions would be checked with battery operated ice augers to verify the calibration of the GPR, measure ice depths on sea ice, or verify depths where the GPR units cannot reach. Freeboard testing (ice stabilization) would also be conducted along potential routes on floating ice to ensure ice is strong enough to safely hold equipment. Preliminary trails would be established along sea ice routes, lakes or rivers that vibrators would travel to prevent the potential for equipment breaking through ice.

Prior to the beginning of operations, cultural sites, polar bear dens and native allotments would be identified on a map for the advanced survey crew. They would verify, identify, stake and map avoidance areas such as environmental hazards, important habitat features including (but not limited to) polar bear den sites, sensitive willow areas, cultural sites, native allotments, and low snow areas. All cultural or historic sites within the project area would be avoided with a 500-foot buffer around the sites and Native Allotments would also be avoided. All mobile equipment would have a navigation system installed for logistics and for mapping/locating avoidance areas.

At stream crossings, the advance crew would identify steep streambanks and, depending on the crossing, would either avoid the crossing and identify a different route or recommend a snow ramp over the stream. Survey crews would identify the lowest grade areas to safely cross rivers or drainages and avoid steep slopes, wherever possible, or find other routes of travel that would be more practical and safe for equipment movement.

Rivers that could be crossed during implementation of seismic activities include: Canning River, Sadlerochit River, Hulahula River, and Okpilak River Jago River, Amavariak River, Katakuvuk River, Okerokovik River, Akutoktak River, Niguanak River, Kimikpaurauk River, Siksik River, Sikrelurak River, Angun River, and the Kogotpak River.

Where there is unstable ice, unusual ice surface fracturing or drillings (with augers) shows substandard ice, the standard seismic survey grid would be modified to insure a safe path for camp moves or equipment travel. Although vibroseis vehicles could travel over ungrounded (but suitable) ice, they would only be allowed to operate on grounded ice, with the exception of lagoon areas that are 10 feet in depth or less.

Tracked tundra vehicles (such as steigers) would be used to transport sled camps along the tundra. The camp would remain close to seismic survey activities and could move every 2-3 days depending on survey progress and snow cover. The camp would move to the next predetermined camp site over pre-packed snow trails with adequate snow cover and on flat ground. Prepacking would be conducted using tuckers and/or steigers pulling a groomer. Crew and camp travel routes, as well as resupply routes, would be along snow packed trails throughout the project area. At some stream crossings, it could be necessary to build snow ramps or protect stream banks with additional snow cover by moving snow from drifts to the stream banks with a front end tracked loader. The location of snow trails would depend on snow cover and terrain conditions. During travel on State lands, SAE would attempt to coordinate with companies to use existing or planned trails.

Predetermined snow routes have not been identified at this time because routes within the project area would be located based on camp locations, results of cultural and wildlife surveys, local knowledge, community consultation, and environmental terrain and conditions.

If low snow conditions are encountered, the advanced crew would use a procedure based on State of Alaska guidance to continuously sample snow depths along the routes. Low snow areas would be avoided and these locations would be loaded into all vehicle navigational systems.

After completion of seismic activity, the camps and all equipment would return to Deadhorse on grounded sea or tundra depending on camp logistics. In this case, the return route would be over identified snow routes.

Camp Facilities

The support camps would be immediately adjacent to seismic exploration activities and would move every 2-3 days as seismic exploration activities move across the program area. It is expected that there would be a total of 360 miles of snow trails associated with moving up to two camps across the entire program area.

Camps would be located in areas of adequate snow cover and away from hazards and sensitive areas. Camps would not be located on lakes or rivers, and would be a minimum 500 feet from waterbodies.

Each camp would be able to accommodate up to 160 people and would consist of sled-mounted units including; a kitchen and diner, sleeping areas, washrooms, laundry, offices, shops, medical clinic, storage, generator rooms, and storage compartments. There would be approximately 50 trailers including support trailers that make up a camp. Due to the size of the project, there could be 40-50 different camp locations (for 2 crews/camps) throughout the project area. The camp would be moved along pre-packed snow trails and could be moved up to 2 miles every few days depending on weather, snow cover and the advancement of the seismic survey.

Equipment lighting would consist of tail lights, headlights and reflectors. A sled camp would use flood lights (typically 250 watts) on trailers in and around the camp areas for crew safety. Seismic line work would use vehicle lights for travel and during lay down and pick up of survey nodes. Airstrip lighting would only be used during landing and takeoff, approximately 3 times per week and only during low light environments.

The remote camp would be independent of any land based power, therefore generators would be in use 24 hours a day, 7 days a week. The generators would be contained within trailers and the decibel (dB) level would be within Occupational Safety and Health Administration (OSHA) standards which is less than 85 dB outside the trailers.

Approximately 6,000 – 7,000 gallons of fuel would be delivered every day by ground vehicle to the camps and resupply of food and other supplies would occur twice or more a week. Crew changes would be twice a week and could occur by aircraft or ground vehicle. The existing airstrip at Kaktovik would be used whenever feasible.

SAE plans to construct temporary airstrips on tundra and lakes as necessary to support the program. A flat area or lake suitable for an airstrip with adequate snow cover would be groomed using a tucker or a steiger pulling a groomer. It is possible that airstrips could be used within 5 miles of each camp location. The advance surveyors would identify appropriate locations that could be used for airstrips. Landing strips would only be in areas that have adequate space for safely landing aircraft. Aircraft using these landing strips would be equipped with both wheels and skis.

Fuel Supply and Storage

A rolligon or steiger would be used to tow fuel tanks on skis/tracks for refueling operations. All fuel would be ultra-low sulfur for vehicles and equipment. In the event the supply is disrupted by weather or other unforeseen events, fuel would be delivered by aircraft on temporary airstrips.

Fuel storage and fueling would be located at least 100 feet from any water body and all equipment fuel locations would be tracked and recorded. All fuel tanks would be double-wall tank construction and capable of holding 110% of the fuel volume in case of a spill. Fuel dye is added to all fuel as part of spill detection. There could be up to 20,000 gallons of fuel in camp at any given time. Fueling procedures include spill management practices such as drip pan placement under any vehicle parked and placement of vinyl liners with foam dikes under all valves or connections to diesel fuel tanks.

All spills, no matter the size, would be tracked and cleaned up by SAE. SAE currently has a Spill Prevention Countermeasure Control (SPCC) plan for fueling and fuel storage operations associated with seismic operations as well as a site specific seismic SPCC plan. All reportable spills would be communicated through the proper agencies and according to reporting requirements.

A total of 6,000-7,000 gallons of fuel would be the average daily consumption per crew. If the project is a 100-day season, it is estimated that the total amount of fuel needed would be about 650,000 gallons per crew.

Field Operations

Seismic operations would be conducted utilizing 12-15 rubber tracked vibrators (vibrators are switched to wheels for sea ice operations) and 20,000 to 25,000 wireless autonomous recording devices (nodes/geophones) for each of the two crews. Receiver points (20,000-25,000) occupied with wireless nodes and a single geophone (recorder) would be laid out along a line that is perpendicular to source lines (routes driven by the vibrators). There could be up to 48 receiver lines placed on the ground at a time with approximately 32 lines being active at any given time. Although there may only be 32 lines required to be recorded for any given source point, all wireless nodes on the ground would record 24 hours per day. Vibroseis vehicles would be positioned between 41.25 and 200 feet from an adjacent receiver point on a given line. In a typical square mile there would be 4 linear miles of receivers and 8 linear miles of source. Receivers would be transported to and from each location with a low ground pressure Tucker that could carry up to 220 receiver points and manned by three personnel.

In order to maintain data quality, lines should not be moved more than 30% of the cross line distance; however, in areas that require avoidance due to wildlife, cultural features or terrain, some points would be dropped. Any movement of source or receiver or exclusion of source/receiver would result in a reduction or loss of data or quality of data.

The energy source for the seismic wave is Vibroseis which would exert 64,000 pounds of peak force on the ground. Each source point is occupied by a single vibrator which generate frequencies during a "sweep" of approximately 1.5 to 96 Hz and designed to travel down. The duration of each sweep is anticipated to be 16 to 24 seconds per source point. Multiple vibrators spaced at least 1,320 feet apart, would collect data at the same time. This methodology means that

only a single vibrator is required to travel down any source line, reducing risk of compaction or damage to the tundra. Vibrators would only operate on snow covered tundra or grounded ice, with exception of lagoon areas that are less than 10 feet of water depth. The duration and decibel level of the source varies depending on such factors as terrain and weather conditions; however, the levels are so low that hearing protection is not required for seismic crew members.

Recording operations would run 24 hours per day with two 12 hour shifts. Communications with the crews, while out in the field, would be via VHF radio systems and wireless data transfer radios. The camp would also have a satellite communication system for phone and internet access.

Prior to seismic activities, SAE would work with the North Slope Borough, State of Alaska, and other federal agencies to identify archeological, historic, and traditional sites and would avoid these sites with a 500-foot buffer.

Water Use

Potable water would be produced at camp with a skid-mounted snow melter. Water would be produced by melting snow or, if it is a low snow year, supplemental water could be collected by withdrawing water from lakes or other areas with fresh water or hauled in. SAE does not anticipate large quantities of water needing to be withdrawn from lakes or that ice aggregate would need to be utilized. If water would need to be withdrawn from lakes or other fresh water sources, SAE would be required to obtain permission from the BLM and the State of Alaska. Any water withdrawn would be processed through a Department of Environmental Conservation (DEC) approved water system, which consists of filtration and chlorination that is regulated by the DEC.

If there is not an adequate source of snow or water from lakes to generate water for the camps, water would be transported over snow trails by ground vehicle to each camp to ensure crews have approximately up to 3,500 gallons of water per day.

Where floating ice is encountered that would not safely support the weight of equipment, SAE could request a permit with the State of Alaska Department of Fish & Game, to apply water to increase the thickness of the ice and establish temporary river crossings.

Waste Management

Food waste generated during field operations would be stored in vehicles until the end of the shift. All garbage would be consolidated at camp in wildlife resistance containers until further disposal. A skid-mounted incinerator would be used for daily garbage waste.

Any waste generated by seismic operations would be properly stored and disposed of in accordance with applicable permit stipulations and SAE controls. Food waste would be continually incinerated to avoid attracting wildlife. Gray water generated from the mobile camp (approximately 1,000 -2,500 gallons per crew day) would be discharged according general permit AKG332000 and 18 AAC 83.210 and Alaska Pollution Discharge Elimination System (APDES) discharge limits. Toilets would be "PACTO" type to eliminate "black water". Ash

from the incinerator would be back-hauled to the North Slope Borough disposal facility in Deadhorse.

Wildlife Encounters

All Polar Bear sightings would be reported to the USFWS. Any type of bear dens, suspected or confirmed would be reported to the USFWS or ADF&G agency personnel. SAE has submitted a petition to get an approved Incidental take authorization for working around polar bears. If a seal lair is identified, a 500 foot buffer would be implemented and the location recorded. Personnel would remain at least a one-half mile distance from brown bear dens and 1-mile from polar bear dens. SAE would adhere to a 1-mile operational exclusion zone around all known polar bear dens during the denning season (November-April, or until the female and cubs leave the areas). Should previously unknown occupied dens be discovered within 1-mile of activities, work would cease and the USFWS contacted for guidance.

SAE would perform an aerial FLIR survey¹ with the approval of USFWS, as required by USFWS Incidental Take Regulations. Den detection surveys are generally conducted during the first half of December. The area covered by the FLIR survey would depend on the USFWS requirement.

Community Relations

SAE is coordinating with the Native Village of Kaktovik and Kaktovik Iñupiat Corporation to ensure communication with the community as well as to reduce winter surveys occurring during peak subsistence activity. SAE has proposed providing a daily map of activity to be displayed in the community for subsistence users and would employ subsistence representatives. This is the same map that SAE would provide to all stakeholders.

SAE would establish an oversight panel for subsistence and the native communities to address subsistence issues and report back to the communities near the project area and the agencies overseeing the project. If a permit is authorized, the Kaktovik oversight panel would be formed in the fall of 2018 in advance of the winter survey season. The Subsistence Oversight Panel would be designed to fit the community's needs and tailored to the unique subsistence activities of Kaktovik hunters. The panel would be comprised of subsistence users identified during community meetings and through guidance from KIC and the Native Village of Kaktovik and would include:

- One subsistence user from Kaktovik
- One subsistence representative from crew operations
- One KIC representative
- One SAE representative
- One ASRC representative

The proposed oversight panel would: 1) Meet with the community of Kaktovik prior to the season start to discuss the concerns; 2) Document past subsistence activities in the area; 3) Work

¹ Thermal imaging survey

with a biologist hired by SAE on any wildlife or environmental issues, if necessary 4) Conduct advanced crew scouting with a subsistence representative; 5) Staff a subsistence observer on each crew-each shift to scout with the survey crew teams and consult on any unknown subsistence or cultural sites; and 6) Address any key issues with communities.

Marsh Creek 3D

PLAN OF OPERATIONS WINTER SEISMIC SURVEY

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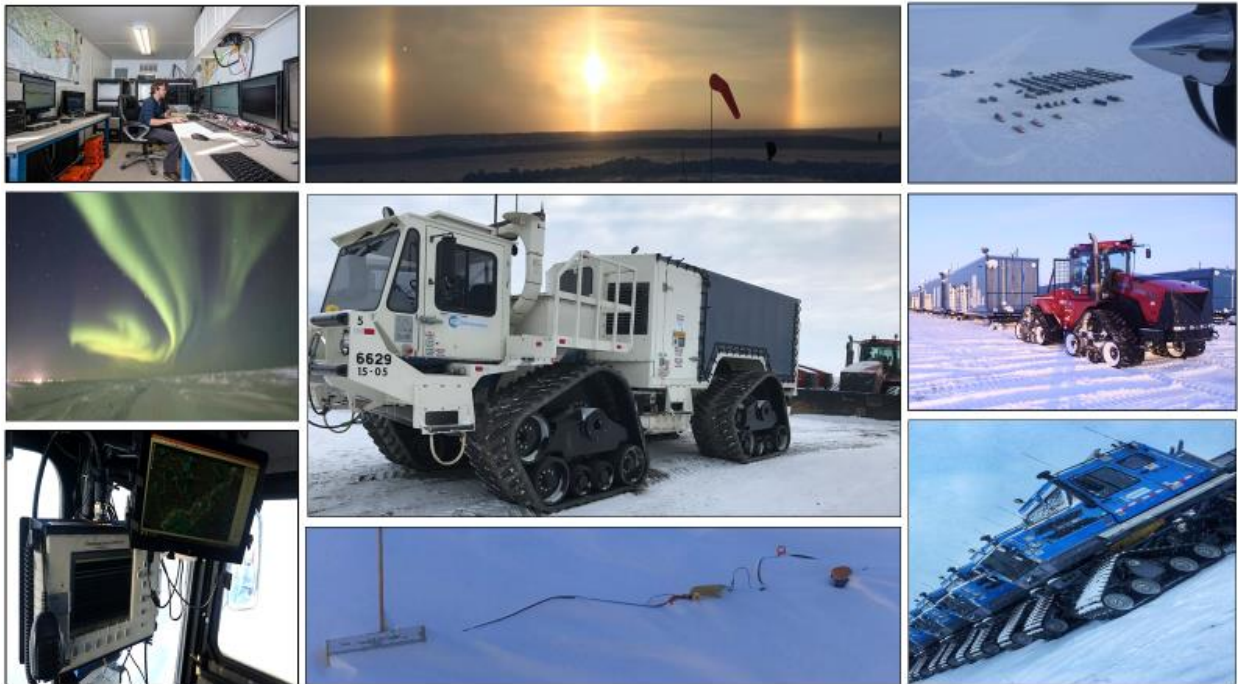


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Marsh Creek Plan of Operations

Winter Plan of Operations 2018 Project Description

1.0 Introduction

SAExploration, Inc (SAE), along with our partners, Arctic Slope Regional Corporation (ASRC) and Kaktovik Iñupiat Corporation (KIC), is pleased to submit their plan of operations for the Marsh Creek 3D Program. Together ASRC, KIC, and SAE, through its joint venture with the Kuukpik Corporation (Kuukpik-SAE), are in the process of forming a joint venture, Iñupiat Geophysical Partnership, LLC. SAE is requesting permits on behalf of its partners to conduct a seismic survey within the 1002 Area of the Arctic National Wildlife Refuge (ANWR) beginning during the winter season of 2018-2019 initially. SAE will be the operator conducting seismic operations during open tundra travel winter season within this boundary with an estimated start date of December 10th, 2018 with ice checking and continuing until the close of tundra or the sea ice deteriorates. Land ownership within this boundary area is primarily federal lands that fall within the Arctic National Wildlife Refuge 1002 area, Native Corporation land owned by ASRC and KIC, and private lands all within the North Slope Borough.

2.0 Scope

SAE is proposing to acquire seismic data from within ANWR with the opening of the coastal plain area (1002) for oil exploration. SAE would like to be the entity that initiates the exploration phase of the 1002 Area, this area represents the interests of the people of the local communities. SAE will use the best available technology, to acquire better quality and higher resolution seismic data, using new recording methodology to image potential targets for future lease sales. SAE would support two (2) crews each winter season for two (2) winter seasons to complete the acquisition of the seismic program. This plan of operations will cover the winter seasons of 2018-2019 and 2019-2020, starting approximately December 1st each winter season and ending on May 31st, or tundra closure.

3.0 Location

The survey permit area encompasses approximately 2602 sq. miles. The project area will include parts, or all the following townships:

All of:

U003N034E, U003N035E, U003N036E, U004N031E, U004N032E, U004N033E
 U004N034E, U004N035E, U004N036E, U004N037E, U005N024E, U005N025E
 U005N026E, U005N027E, U005N028E, U005N029E, U005N030E, U005N031E
 U005N032E, U005N033E, U005N034E, U005N035E, U005N036E, U005N037E
 U006N024E, U006N025E, U006N026E, U006N027E, U006N028E, U006N029E
 U006N030E, U006N031E, U006N032E, U006N033E, U006N034E, U006N035E

U006N036E, U006N037E, U006N038E, U007N024E, U007N025E, U007N026E
U007N027E, U007N031E, U007N032E, U007N033E, U007N034E, U007N035E
U007N036E, U007N037E, U008N025E, U008N026E, U008N033E, U008N034E
U008N035E, U008N036E,

Part of:

U009N024E, U009N025E, U009N026E, U009N032E, U009N033E, U009N034E
U009N035E, U009N036E, U008N024E, U008N027E, U008N028E, U008N030E
U008N031E, U008N032E, U008N037E, U008N038E, U007N023E, U007N028E
U007N029E, U007N030E, U007N038E, U007N039E, U006N023E, U006N039E
U006N040E, U005N023E, U005N038E, U005N039E, U005N040E, U004N038E
U004N039E, U003N037E, U003N038E

The program areas are defined by the enclosed boundary map in Appendix A.

4.0 Environmental Management

This partnership is dedicated to minimizing the effect of our operations on the environment. We are unified in a commitment to environmental excellence and continuous improvement. We will constantly assess our impact on the environment, and will apply what we have learned over the past several years to each new project.

“Environmental management is not just the job of a few specialists - it is a crucial and integral part of our day-to-day business and an environmental culture for our seismic projects.” Our experience on the tundra and sea ice has enabled us to manage and develop equipment and procedure to minimize environmental impact caused by seismic operations. This type of health, safety and environment (HSE) management has enable us to successfully implement many environmental improvements a few are listed below:

- Reduce the number of equipment on the tundra, through new technology, thereby has reduced the total environmental impact of the crew.
- The use of articulating, rubber tracked, low ground pressure vehicles has minimized the compaction of the tundra and risk of damage when vehicles are turning.
- Reduced vehicle size
- Many modifications of seismic equipment have minimized the risk of hydrocarbon spills to the tundra.
 - Containments systems
 - High resolution rear mounted vehicle monitoring cameras, aids in spill detection.
 - Daily and weekly maintenance of equipment.
 - Daily equipment inspections.
 - Hourly equipment walk-arounds.
 - The use of biodegradable, environmentally sensitive products is number one priority when operating in delicate regions such as the NPRA and ANWR. This includes lubricants, hydraulic fluids, greases and glycol that

have readily biodegradable based oils that are virtually non-toxic, still delivering maximum protection to our equipment aiding in preventing breakdowns.

5.0 Cultural Interface

SAE will coordinate its seismic activities with the local communities and villages to mitigate and to prevent potential conflicts when operating in close proximity of subsistence users. Prior to the commencement of the 2018-2019 and 2019-20 winter seasons, representatives will hold a meeting with the village of Kaktovik to discuss the planned activities. These discussions will include text and visual documentation of the crew's activities, as well as the project boundaries. It is anticipated that as a result of these meetings various protocols and procedures can be developed and implemented which will allow both subsistence and exploration activities to co-exist with respect to this project. Any subsistence hunting and fishing that will be in the area of operations can be documented at this time with the help of community members. All meetings will be documented and kept on file as a resource during and after activities. We are dedicated to enhance, sustain and develop locally based economic and employment opportunities for Borough businesses and residents.

6.0 Oversight Panel

An oversight panel for subsistence and the native community of Kaktovik will be developed to address subsistence issues and will report back to the communities near the project area and the agencies overseeing the project. This oversight panel will have the charter for the following:

- Meet with the Kaktovik Native Community prior to the season start to discuss the concerns.
- Document past subsistence activities in the area.
- Work with a biologist hired by SAE on any wildlife or environmental issues.
- Conduct scouting with a local subsistence representative from the community.
- Staff a subsistence observer on each crew-each shift to scout with the survey team and consult on any unknown subsistence or cultural sites.
- Address any key issues with communities.
 - "An issue is a significant opportunity, problem, factor or trend or a challenge to our mission, direction, way of doing business, or culture".

7.0 Crew Integrity

SAE's commitment at all levels to continue "Raising the Bar" for HSE awareness is paying off. Our health and safety goal is to achieve a zero-accident rating consistently. Over the past six seasons and more than 4,769,424 man hours we have not recorded a lost time accident. We attribute a portion of this success to the following critique:

7.1 Our Hiring Process:

- We work to attract and hire the best in the industry to operate the crew.
- A comprehensive pre-employment screening for new hires.
- Prospective employees are administered a drug and alcohol screening test.
- Prospective employees must complete a Physical exam and Functional Capacity Exam.
- Prospective employees complete an eight-hour Health, Safety and Environmental orientation and task specific training as well as a competency assessment while on the crew.

7.2 Our Training Process:

- The operations are controlled with high quality, experienced arctic personnel.
- Provide unique employment opportunities for its employees.
- Engages its employees in operations outside the seismic sector.
- Holds an Annual HSE Seminar for the full crew.
- Comprehensive online SAE training and testing.
- Hold daily orientation and safety briefings (for each shift) accounting for: hazards which could be encountered, other conflicting operations, daily conditions, and review of the day before and the day ahead.
- Tailgate meetings are held to review procedures in areas of known hazard or where operational requirements have changed from those expected.
- Annual training for employees, including:
 - Remote medicine training
 - Arctic survival training
 - first aid/CPR
 - Hazard recognition, rating and mitigation seminars
 - NSTC refreshers
 - Hazwoper training
 - Hazcom awareness training
 - Behavior based safety awareness training
 - Wildlife interaction training
 - Permit stipulation reviews

8.0 Permit Requirements

Provided below is a list of permits, approvals, authorizations and supporting documents required for the operations described in this Plan. Land ownership for this program includes Federal, Native Corporation (ASRC and Kaktovik Iñupiat Corporation) and private holdings all within the North Slope Borough.

Agency	Authorization
Federal Government	
Bureau of Land Management	Geophysical Exploration Permit
US Fish and Wildlife Service	Incidental Harassment Authorization (IHA), Polar Bear
North Slope Borough	
Planning Department	Land Management Development Permit for seismic: Landing Strips: Mobilization Route
IHLC Department	Form 600
TLUI Department	Administrative Approval form 400
ICAS Department	Coordination
State of Alaska	
Alaska Department of Natural Resources, State Historic Preservation Office	Letter of Concurrence
Department of Natural Resources, Division of Mining Land and Water	Temporary Water Use Permit (if necessary) Tundra Travel Permit
Alaska Department of Environmental Conservation	Kitchen Potable Water Permits Discharge Permits
State of Alaska Fish and Game	Fish Habitat Permit Water Withdrawal Permit (if necessary)
Other Approvals	
Lease Holders	Letter of Non-Objection
Kaktovik Inupiat Corporation	Letter of Non-Objection
Arctic Slope Regional Corporation (ASRC)	Letter of Non-Objection
Native Allotments	"No go buffers" placed around lands.

9.0 Mobilization and Access

SAE will stage equipment from existing facilities in Deadhorse. Camp and equipment will be trucked via road infrastructure to a point of access to the tundra or sea ice (See Appendix C). The crews will mobilize to existing gravel pads which will allow access to the tundra and provide a resupply area for the crews. All mobile equipment will have a navigation system installed for logistics and hazard Identification. Tracked and wheeled tundra vehicles will be used to transport the sled camp along the tundra. The camp will remain close to the survey activities and will move every 2-5 days depending on the survey progress and snow cover. When the survey is completed each season, the camp

and equipment will travel along the tundra or sea ice to gravel pad for offloading and then trucked back to our Deadhorse pad location. Snow packed trails will be made throughout the project area, these trails will be used for the purpose of less environmental impact and crew travel /re-supply. The location of these trails will depend on snow coverage and terrain conditions. SAE will attempt to coordinate with companies to use any existing or planned trails.

10.0 Survey and Ice check

Surveyors will establish survey controls by setting up a base station; controls will be set with a satellite navigation system transported by tracked vehicles. One of the highest risk potentials for arctic operations is properly verifying the integrity of the ice. This will be done by “ice checking units” consisting of a Tucker vehicle capable of supporting 24 hour operations. Snow machines may also be used for survey and ice check operations. The survey units will be equipped with ground penetrating radar systems (GPR), which are extremely accurate on fresh water. In addition, each ice check unit is equipped with battery operated ice auger which is used to verify the calibration of the GPR, measure ice depths on sea ice, or verify if depths where the GPR units cannot reach. Freeboard testing (ice stabilization) is also be conducted when working on floating ice to insure the ice has the strength to safely hold the equipment. Preliminary trails or snail trails will be established for every foot that the vibrators must travel on the sea ice, lakes or rivers, which will minimize the potential for breaking through the ice. Survey will also map each hazard that is discovered and placed into Tiger-Nav which is a navigation system that allows each vehicle to display the program area, hazards and avoidance areas.

In low snow years, snow surveys will be conducted to substantiate depths and will be recorded for equipment movement efforts

11.0 River Crossings

There may be areas where we encounter floating ice which may not safely support the weight of some equipment. In these cases, SAE will permit this activity with State of Alaska Department of Fish & Game, to apply water to increase the thickness of the ice to establish temporary river crossings. There also may be areas on rivers, streams and lakes that need to be protected with snow for traversing from tundra to ice for crossing. SAE will make snow ramps in these areas and establish that the ice is grounded or the ice is of sufficient ice depth to cross. This will eliminate any impact to river banks and or tundra.

12.0 Willow Protocol

SAE is committed to operate in a manner that all its operations or activities do not damage or affect the social, cultural or community in the areas where we work. If it is determined that willows are in the area, SAE has developed a willow protocol that ensures willow areas are mapped and defined by size. Willow areas will first be identified via aerial photos and possibly snow machines, the areas will then be placed

on maps. It is the responsibility of the survey manager to ensure that willow areas are recorded on the hazard maps and appropriate markings are in place. During the ground truthing of willows, Subsistence Representatives will be responsible for assisting in identifying sensitive willow areas and defining size. Survey will mark trials to be follow by the crews if it is determined that the area is accessible.

13.0 Recording Operations

The method of acquisition is Random Source Driven Acquisition (RSD) combined with a Compressive Sensing design. Seismic operations will be conducted utilizing rubber tracked/buggy vibrators and wireless, autonomous recording channels (nodes). Vibrators will typically operate within a distinct area proximal to each other. Vibrator source points will be located along source lines every 41.25 feet. Geophone receiver lines will run perpendicular to source lines, and both source and receiver lines are spaced approximately 660 feet apart. Geophones will be located along source lines every 165 feet. Up to 20 receiver lines could be placed on the ground at one time. Wireless nodes and geophones will be laid out by crews on foot and through the use of rubber tracked tundra travel approved vehicles. Each station will be placed individually and will be surveyed by GPS upon deployment. Upon retrieval, all GPS data is then entered into a database.

Using the RSD methodology, multiple vibrators can collect data at the same time. This methodology means that only a single vibrator is required to travel down any source line, thereby reducing risk compaction or damage to the tundra. Vibrators will only operate on snow covered tundra or grounded sea ice.

Recording Operations continue for 24 hours per work day and are based on two 12 hour shifts. Communications with the crews while out in the field will be via VHF radio systems and wireless data transfer radios.

14.0 Camp Facilities

Each camp can accommodate up to 150 - 160 persons. Equipment included at camp stations will include long haul fuel tractors, remote fuelers, water maker, incinerator, resupply and survival sleigh, tractors, loaders and tuckers.

Sanitary conditions in the kitchen and diner and washrooms will be maintained in full compliance with governmental regulations.

Grey water will be filtered to meet the discharge requirements of the Alaska Department of Environmental Conservation (ADEC) Alaska Pollutant Discharge Elimination System (APDES) permit prior to discharge. SAE holds a current APDES discharge permit for this purpose.

Due to the size of the project, SAE may use 2 camps and 2 crews at different locations within the project area for logistical purposes. The mobilization of the camp or camps will be from the existing gravel roads, starting off a gravel pad. A pre-determined route will be used to move equipment to the project location. Camp trails during project will be scouted out in advance by project manager to avoid hazards and measure snow depth. To mitigate any tundra damage the sleigh camp could be moved up to 2 miles every few days, this will depend on the weather, snow covering and the advancement of the project.

The SAE HSE advisor and the local hire subsistence representative will revisit every camp site, after camp has moved on, to review the area and sign-off that no damage occurred.

During the active work season, crews will travel to the camp area by personnel carrier tundra travel. If existing airstrips are within the project area those area may be utilized to allow personnel, food and fuel to be delivered to the work area.

15.0 Water Withdrawal

Potable water will be produced at camp with a skid-mounted snow melter. Water is produced by melting snow or if it is a low snow year this can be supplemented by withdrawing water from lakes, it is then processed through our ADEC approved water system. SAE will identify lakes and will be permitted if used. If lakes are used, SAE has fish and game approved water withdrawal pumps that will be utilized during this process. If there is not an adequate source of snow, water may need to be transported to each camp from an approved source.

16.0 Temporary Snow Airstrips

The project will need airstrips to transport crews on crew change days. Having temporary airstrips will save several hours of tundra travel. SAE will create a flat area on predetermined grounded, frozen lakes, or tundra to serve as landing strip to receive the aircraft for crew changes. An advance scouting trip will be identifying grounded lakes and or tundra locations that can be used for this purpose. The landing strip will only be on areas that have adequate space for safely landing aircraft. On lakes, a rubber tracked Steiger with a blade will clear the snow down to ice approximately 75 feet wide and 2300 to 3500 feet long for the aircraft to land. Black bags filled with snow will be placed along the side of the berm to delineate the edge of landing strip along with lighting.

After crew has mobilized and initial scouting has been done lakes which may support this operation will be documented for possible airstrip locations. The GPS location of the landing strip will be documented.

The strips will be used for landing and will not be maintained unless the same location is needed again. After use of the strip is no longer necessary, the crews will inspect the location and record that area that was used by GPS location to be included in the final reporting. An example of airstrip is listed in Appendix E.

17.0 Fuel Supply and Storage

SAE will be using long haul sleigh tanks for fueling. All fuel will be ultra-low sulfur for vehicles and equipment. Fuel will be delivered using over land Rolligon or rubber tracked carriers. In the event the supply is disrupted by weather or other unforeseen events fuel may have to be delivered by aircraft, SAE will use temporary airstrips for these occasions. An advance scouting trip will assist SAE in identifying existing airstrips if any that can be used for this purpose. Off-loading fuel from aircraft will be done in accordance with SAE's fueling procedure. Fueling storages and fueling activity will be located at least 100 feet from any water body. All equipment fuel locations will be tracked and recorded. SAE fueling procedures include spill management practices such as drip pan placement under any vehicle parked and placement of vinyl liners with foam dikes under all valves or connections to diesel fuel tanks. All fuel tanks are double-wall tank construction. Fuel dye is added to all fuel as part of spill detection. All spills, no matter what the size are tracked and cleaned up by SAE and used for spill prevention operations. We also hold a Spill Prevention Countermeasure Control (SPCC) plan for our fueling and fuel storage operations associated with seismic operations. This SPCC plan is site specific and will be amended for each new project. All reportable spills will be communicated through the proper agencies and reporting requirements.

18.0 Waste Management

Food waste generated by the field operations will be stored in vehicles until the end of the shift. The garbage will then be consolidated at camp in wildlife resistance containers for further disposal. All food waste generated in camp will also be collected and stored in the same consolidation area. A skid-mounted incinerator will be used for daily garbage waste. This equipment falls within the regulatory requirements of 40 CFR 60. This cyclonator will use on an average 1 to 2 gallons of fuel per hour while in use. The use of electricity is for the motor to the unit that maintains the air to fuel mixture. SAE will collect data to provide the required records on a calendar basis of description and weight of camp wastes burned.

Any wastes generated by seismic operations will be properly stored and disposed of in accordance with applicable permit stipulations and SAE controls. Food waste is continually incinerated to avoid attracting wildlife. Gray water generated from the mobile camp will be discharged according general permit AKG332000 and 18 AAC 83.210 and NPDES discharge limits. Toilets are "PACTO" type to eliminate "black water". Ash from the incinerator will be back-hauled to the North Slope Borough

disposal facility in Deadhorse. The sleigh camp will move approximately every two to five days depending on weather conditions. An inspection by the HSE Advisor will be done after camp has left to ensure that the area is clean of all debris.

19.0 Wildlife

Wildlife that may be in the area during the winter season are owls, ravens, arctic fox, wolverine, musk ox, and, possibly, over-wintering caribou, ringed seals, and polar bears. Grizzly bears also inhabit the general area in the project, but are likely to be inactive during the winter season. Polar Bears may be seen along the coastal areas and out on the sea ice. Although encounters with Polar Bears or Grizzly bears are unlikely, SAE and its contractors will exercise caution during the project. Should a Grizzly Bear or Polar Bear be encountered, SAE would follow the procedures as outlined in our comprehensive Wildlife Interaction Plan that is approved by the ADF&G and USFWS. Food and food waste will be kept inside vehicles while out in field. All Polar Bear sightings will be reported to the USFWS as per the authorization from USFWS. Any type of bear dens, suspected or confirmed will be reported to the USFWS or ADF&G agency personnel.

SAE will work with agencies to avoid and minimize interactions with wildlife; this includes abiding by relevant regulations and obtaining required authorizations. Our Wildlife Interaction Plan is listed in Appendix F.

20.0 Historic and Cultural Resources

SAE and its partners have commissioned a Cultural Resources Study to identify the historic and cultural resources in the program area. The Cultural Resources Study will inform SAE's activities. Cultural resources known and new that fall within the mapped area will have avoidance buffers placed around them. If required, an Archeological study will be permitted through the appropriate agencies and conducted approximately August 2018. Any known existing studies will be reviewed. SAE will not be accessing any native allotments without permission of the owners. A licensed archeologist will work with the NSB, State of Alaska and the Refuge manager to review existing records. The studies will include the use of the Alaska Heritage Resource Survey (AHRs) database, maintained by the Alaska Department of Natural Resources (ADNR) and the Traditional Land Use Inventory (TLUI) database, maintained by the NSB.

Previously recorded and any new AHRs sites will not be affected by any of the proposed seismic activities. All areas will have 500-foot buffers placed around them as a non-activity zone. These buffers will be placed in our Tiger Nav system and placed on maps to ensure no vehicles enter avoidance areas.

21.0 Communication & Supervision

The following personnel at SAE can be contacted for information during the permitting survey program are:

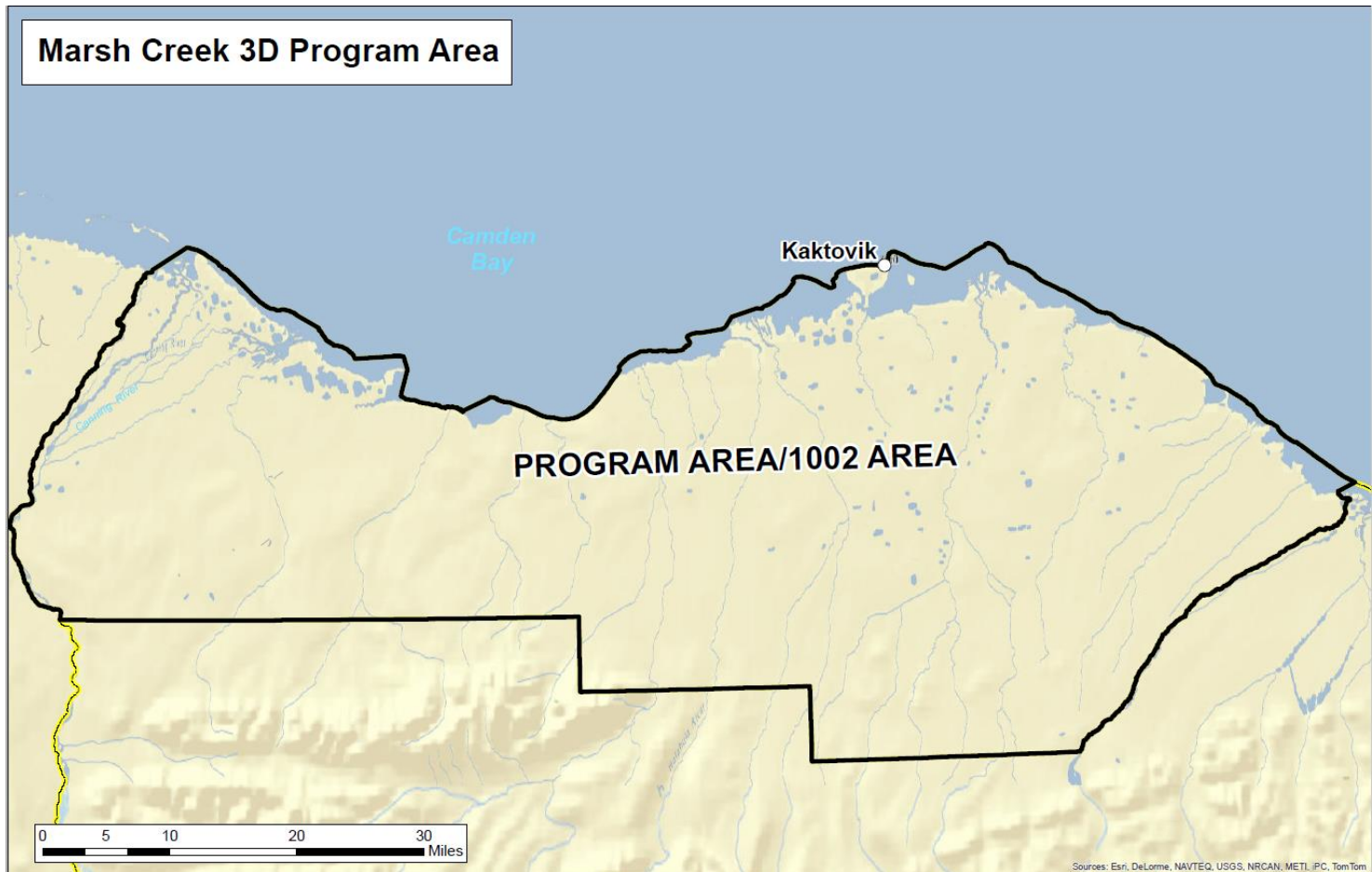
<p>Ted Smith Operations Supervisor 907-522-4499 907-301-5434 cell</p>
<p>Suzan Simonds Permits and Regulatory Manager 907-522-4499 907-331-8140 cell</p>
<p>Rick Trupp General Manager of Alaska 907-522-4499</p>
<p>Oversight Panel Suzan Simonds 907-522-4499 907-331-8140</p>

22.0 Appendices

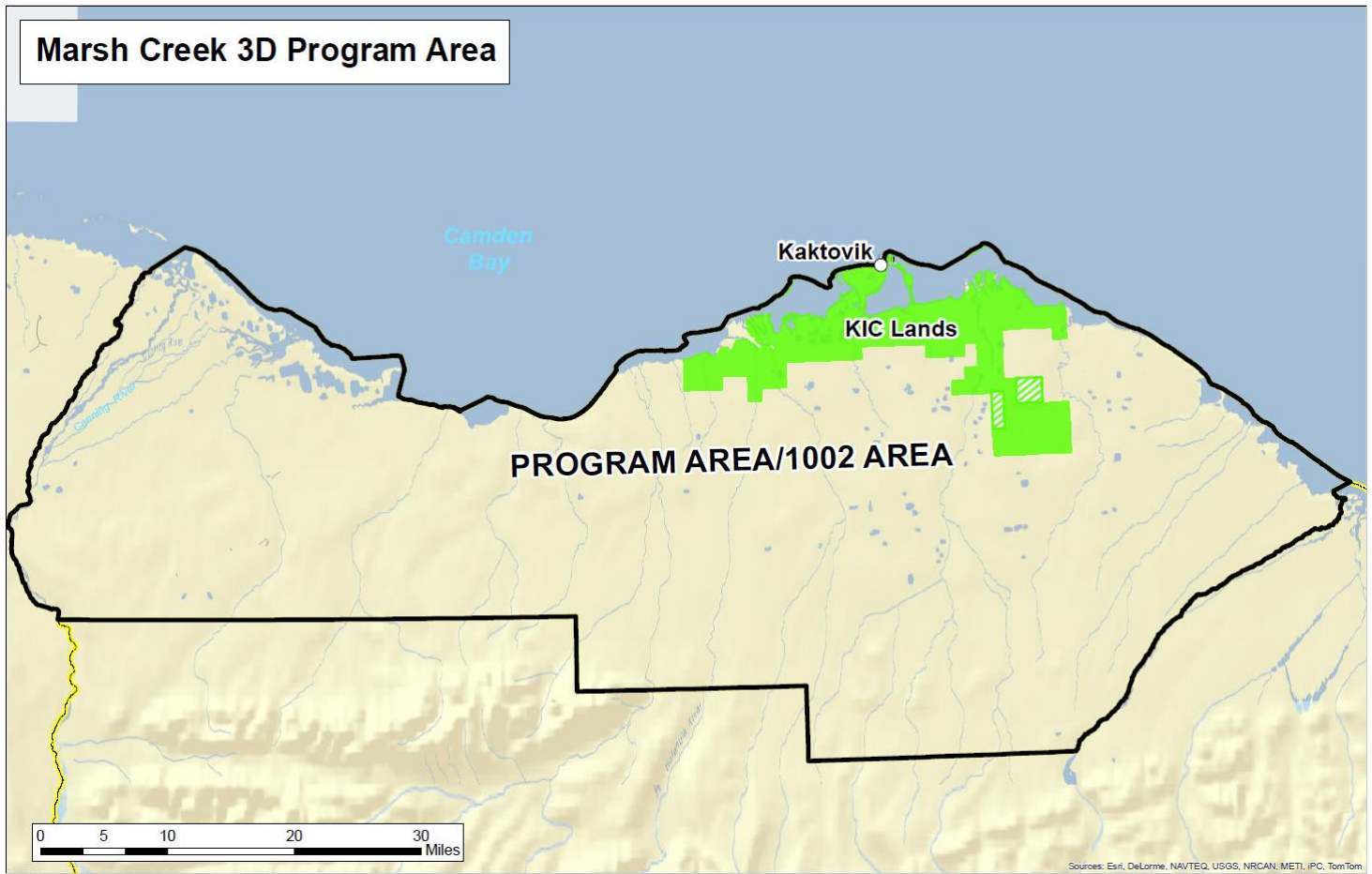
Appendix A -	Project Area Maps
Appendix B -	Equipment List
Appendix C -	Example Map of Mobilization Route
Appendix D-	Equipment Pictures
Appendix E-	Example of Temporary Airstrip
Appendix F-	Wild Life Interaction Plan

Appendix A: Project Area Maps

Project Area



Project Area with Land Status



Appendix B: Equipment List Per Crew

Equipment list per crew		
Tucker Snow Cat	12	1644
Tucker Ice Cat	8	1644
Tucker Personnel Carrier	3	1600
GPS Base Station	3	Hagglund
		Trailer
Vibe Tender	2	Tucker Trailer
Mechanic Field Shop	1	Tucker Trailer
Node Charging Shack	3	Tucker Trailer
Recorder	1	Tucker Trailer
Taco	6	Trailer
Survival Trailer	2	Tucker Trailer
GSX Nodes	TBD	GSX-1
Batteries	TBD	BX10
Sensor	TBD	Arctic Base
AHV-IV Vibrators	12	Commander (PLS-364)
Sleigh Camp	1	150 Man
Fuel Tanks/Fuel Stations	7	3,000 / 4000 Gallon
Long Haul Fueler	4	4,000 Gallon
Rolligons	1	
Case/Steiger Tractors	9	535
CAT Dozer	2	D7G
CAT loader	1	977H

Appendix C: Example of Mobilization Route



Appendix D: Equipment Pictures



NODES Cable-Free/Radio-Free Autonomous Data Recording Seismic Recorder (GSX)



Tucker



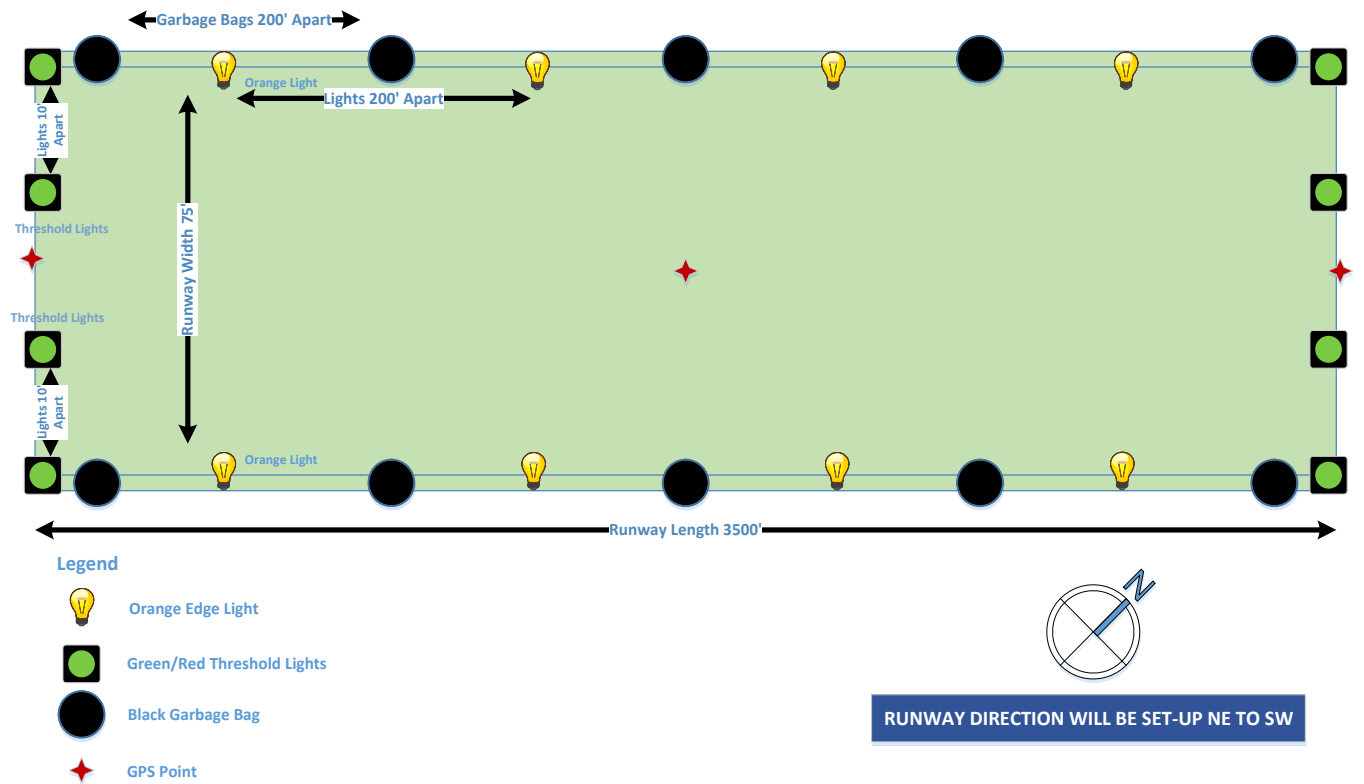
**Approximately 90,000 pounds with Tracks, 60,000 with tires
AHV4 Commander Vibrator (Source Equipment)**





Vibe rectangular baseplate

Appendix E: Example of Temporary Airstrip



Appendix F: Wildlife Interaction Plan

Wildlife Interaction Plan

Purpose: To provide guidelines for assuring the prompt reporting, investigation, and documentation of Polar Bears, sightings or incidents involving animals that are protected by the Marine Mammal Protection Act of 1972. This plan also covers reporting of Brown Bears, or any other wildlife that seismic crews may come in contact with during operations. This plan is intended to meet the requirement of a site specific Polar Bear awareness and interaction plan as required by 50 Code of Federal Regulations (CFR) 18.124(c)(3) and to meet the requirements for a Letter of Authorization (LOA) for the non-lethal, incidental and Non-intentional take of Polar Bear. Any permit stipulations that may be requested by permitting agencies will be added to this document as necessary.

Polar Bears: The United States Fish and Wildlife Service estimates that approximately 1,500 Polar Bears occur in the southern Beaufort Sea (SBS). Worldwide there are approximately 20,000 to 25,000 Polar Bears. During the summer months, Polar Bears typically remain on the southern edge of the sea ice. However, they are also known to swim long distances, haul out onto ice flows and barrier islands and can occasionally be found on the coast. It is expected that Polar Bears will be encountered on ice, in the water and on barrier islands,

Responsibility: The Project Manager have overall responsibility. They are responsible for coordination and implementation of all surveillance or monitoring personnel who deal with wildlife/human encounters, sightings and reporting on the North Slope.

Procedure:

Crews will be trained to maintain a constant level of awareness for the potential conflict with Polar Bears. In areas where high potential of conflict exists, SAE will evaluate and if required, place a dedicated watch for Polar Bears in the area of operations. This is not to say that a continuous watch is not always in effect but rather that the crew will have a dedicated person or persons for oversight in areas of known activity. A Polar Bear education program will be given to all workers at a pre-job conference or on-site prior to the start of operations or at commencement of employment on the North Slope. Polar Bear awareness refresher briefings will be held as part of regular safety briefings. A dedicated Health, Safety and Environment (HSE) Advisor will be based with the survey crew for the duration of the seismic program, and workers will be instructed to notify the Project Manager, or HSE Advisor immediately whenever a bear is detected. All personnel will be aware of the restrictions regarding "taking" of Polar Bears as described by the Marine Mammals Protection Act. When a bear is in the immediate area of the crew location, workers will stay inside vehicles or aircraft and away from the bear. Approaching a bear for taking pictures or any other reason is strictly forbidden. USFWS will be called

immediately.

Land based activities:

1. A polar bear den detection survey shall be conducted prior to activities occurring in polar bear denning habitat during the maternal denning period (November to mid-April). All personnel must use caution when operating near polar bear denning habitat during the denning period.
2. When a Polar Bear is detected near any part of the operation, any employee (permanent, temporary, or contract) or visitor shall immediately notify the Project Manager, or HSE Advisor. They shall then notify the Permits Manager.
3. The priority is the protection of human life. The second priority is to avoid any situation in which a bear will be harmed.
4. In a camp situation, the lead person with crew shall radio Project Manager/Administrative Office. The Administrative Office will sound the "air horn" with 5 short blasts and make a radio announcement on all crew channels of the sighting. At the sound of the air horn, EVERYONE is to go to the nearest vessel, helicopter, or vehicle and remain inside with doors and windows secured until the ALL CLEAR is given over the radio. The all clear signal is a long blast on the "air horn".
5. In the field, drivers of each vehicle will advise the personnel they are responsible for and have them get inside the vehicles and wait until further notice.
6. If the bear takes refuge near or in a vehicle and does not appear likely to move, crew HSE will be notified depending on the location of operation. No action will be taken unless authorized by the USFWS or their designated agents.
7. When a sighting is made by a standalone vehicle, such as the survey crew, they must not approach the bear further. The crew will notify the Project Manager, HSE Advisor radio to alert them. The crew must avoid the bear and if necessary cease operations until the bear has left the area.
8. Personnel must remain at least a one-half mile distance in all directions for brown bears and 1-mile distance in all directions from any known polar bear. The radio announcement must indicate whether this will be necessary or not. An all-clear signal will be sounded when the area is determined to be safe.
9. SAE must observe a 1.6 km (1 mi) operational exclusion zone around all known polar bear dens during the denning season (November-April, or until the female and cubs leave the areas). Should previously unknown occupied dens be discovered within 1.6 km (1 mi) of activities, work must cease and the Service contacted for guidance.
10. After any individual sighting or interaction with Polar Bears during operations

on the North Slope, a Polar Bear Sighting Report shall be completed by the HSE Advisor. The SAE Permits Manager will forward this report to the Office of Marine Mammals Management, Christopher Putnam 786-3810 by phone and or 786-3816 by fax, within 24 hours.

Aircraft:

1. Aircraft will not operate within 0.5 miles of Polar Bears.
2. Aircraft will avoid flying over ideal Polar Bear habitat including but not limited to sea ice and barrier islands.
3. When marine mammals are encountered, aircraft will not operate below 1,500ft unless the aircraft is engaged in marine mammal monitoring, approaching, landing, taking off, or as conditions allow.
4. Plan all aircraft routes to minimize any potential conflict with active or anticipated polar bear subsistence hunting activity as determined through community consultations.

Subsistence Hunting:

1. SAE will employ a subsistence advisor to reduce impacts on Polar Bear subsistence hunting.
2. Vessels and aircraft will avoid areas in which subsistence hunting is being conducted.

Reporting:

Polar Bears: When a Polar Bear is observed or crew member they shall immediately notify the HSE and Permits Manager who will be responsible for filling out the Polar Bear report form. Reports of sightings will be sent to the USFWS on a regular basis through the Permits Manager.

Reports will be sent to:

Christopher Putnam
USFWS-Marine Mammals Section
1011 East Tudor Road
Anchorage, AK 99503
Telephone: 907-786-3800
Fax: 907-786-3816

Brown Bears : (*Ursus americanus*) are the most abundant and widely distributed of the three species of North American bears.

Responsibility: The Project Manager and wilderness guides have overall responsibility. They are responsible for coordination and implementation of all surveillance who deal with wildlife/human encounters, sightings and reporting.

Procedure:

Crews will be trained to maintain a constant level of awareness for the potential conflict with bears. In areas where high potential of conflict exists, SAE will evaluate and if required, place a dedicated wilderness guides in the area of operations. This is not to say that a continuous watch is not always in effect but rather that the crew will have a dedicated wildlife guide for oversight in areas of known activity. Bear education program will be given to all workers at a pre-job conference or on-site prior to the start of operations or at commencement of employment. Bear awareness refresher briefings will be held as part of regular safety briefings. A dedicated Health, Safety and Environmental (HSE) Advisor will be based with the survey crew for the duration of the seismic program, and workers/wilderness guides will be instructed to notify the Project Manager or HSE Advisor whenever a bear is sighted by use of a hazard card. When a bear is in the immediate area of the crew location, workers will stay inside vehicles or aircraft and away from the bear. Approaching a bear for taking pictures or any other reason is strictly forbidden.

- 1 When a bear is detected near any part of the operation, any employee (permanent, temporary, or contract) or visitor shall immediately notify the Project Manager or HSE Advisor.
- 2 The first priority is the protection of human life. The second priority is to avoid any situation in which a bear will be harmed.
3. In a camp situation, the lead person with crew shall radio Project Manager/Administrative Office. The Administrative Office will sound the "air horn" with 5 short blasts and make a radio announcement on all crew channels of the sighting. At the sound of the air horn, EVERYONE is to go to the nearest vessel, helicopter, or vehicle and remain inside with doors and windows secured until the ALL CLEAR is given over the radio. The all clear signal is a long blast on the "air horn".
4. In the field, drivers of each vehicle will advise the personnel they are responsible for and have them get inside the vehicles and wait until further notice. If no vehicles are near, the wilderness guide shall lead crew away from bear.
5. If the bear takes refuge near or in a vehicle and does not appear likely to move, crew HSE will be notified depending on the location of operation. No action will be taken unless authorized by the AKFG or their designated agents.
6. The crew must avoid the bear and if necessary cease operations until the bear has left the area. The bear's safe distance from the crew will determine by the

wilderness guide. The distance should be far enough as not to affect the bears behavior. The radio announcement must indicate whether this will be necessary or not. An all-clear signal will be sounded when the area is determined to be safe.

7. Personnel must report any active bear dens. These dens will be mapped and sent to AKFG. After any individual interaction with bears during operations, the Bear Sighting Report shall be completed by the HSE Advisor or the wilderness guide. The SAE Permits Manager will forward this report to the agencies which are listed in the permit stipulations of all permits within 24 hours.

Caribou / Foxes / Wolverines or Other wildlife:

Responsibility: The Project Manager and wilderness guides have overall responsibility. They are responsible for coordination and implementation of all surveillance who deal with wildlife/human encounters, sightings and reporting.

Procedure:

- 1 Avoid any interaction with wildlife.
- 2 Do not take any actions that would cause the animals to change course or behavior unless approved by Alaska Fish and Game
- 3 After any individual interaction with Caribou or other types of wildlife during operations, the Wildlife Sighting Report shall be completed by the HSE Advisor or the wilderness guide. The SAE Permits Manager will forward this report to the agencies which are listed in the permit stipulations of all permits.
- 4 If foxes or other wildlife take up shelter within camp area, notify the permits manager.
- 5 Feeding of animals is strictly prohibited.
- 6 There is no hunting or fishing allowed on project.

U.S. Fish And Wildlife Service
Marine Mammals Management
POLAR BEAR SIGHTING REPORT

Company: _____ LOA #: _____
Date: _____ Observer Name: _____
Time: _____ am / pm / 24 Phone/Email: _____

Location: _____

Latitude: _____ Longitude: _____ Datum: _____

Weather Conditions: Fog _____ Snow _____ Rain _____ Clear _____ Temperature _____ °F / °C

Wind Speed _____ mph / kts Wind Direction (from) _____ N NE E SE S SW W NW

Visibility: Poor _____ Fair _____ Good _____ Excellent _____

Total Number of Bears: _____ (total number of bears & how many of each type)

	adult	sub-adult	2 year-old	yearling	cub of year
Male	_____	_____	_____	_____	_____
Female	_____	_____	_____	_____	_____
Unknown	_____	_____	_____	_____	_____

Closest Distance of Bear(s): from personnel _____ facility/vessel _____ m / yd / ft

Bear Behavior (Initial Contact): curious ignore aggressive walk run swim hunt feed rest other _____

Bear Behavior (After Contact): curious ignore aggressive walk run swim hunt feed rest other _____

Description of Encounter: _____

Duration of Encounter: _____ Possible Attractants Present: Y / N

Describe Attractants: _____

Deterrents Used & Distance: If Yes, submit report within 48 hours of incident

Vehicle	Y / N	_____ m / yd / ft	Spotlight/Headlight	Y / N	_____ m / yd / ft
Horn/Siren/Noise	Y / N	_____ m / yd / ft	Other (describe)	Y / N	_____ m / yd / ft
Crackershell	Y / N	_____ m / yd / ft			
Rubber Bullet	Y / N	_____ m / yd / ft			
Bean Bag	Y / N	_____ m / yd / ft			

Report Sent To: FW7_MMM_REPORTS@FWS.GOV Date: _____ Time: _____

Jack Winters
Habitat Biologist
Division of Habitat
Department of Fish and Game
1300 College Road
Fairbanks, Alaska 99701
907-459-7285

Date: _____
Time: _____

Bear Interaction Report

Location: _____

Observer name: _____

Weather conditions: Fog ____ Snow ____ Rain ____ Clear ____ Wind Speed ____
Wind Direction ____ Approx. Temp ____

Total number of bears: ____ Sow/cubs ____/____ Adult ____ Subadult ____

Estimated distance of bear from personnel/facility: ____/____

Possible attractants present: _____

Bear behavior: Curious ____ Aggressive ____ Predatory ____ Other ____

Description of encounter: _____

Injuries sustained: Personnel _____

Bear _____

Deterrents used/distance: Vehicle ____ Noise-maker ____ Firearms ____
Other ____

Duration of encounter: _____

Agency Contacts: _____ Time: _____ Date: _____

ADF&G _____ Time: _____ Date: _____

SAE _____ Time: _____ Date: _____

SAE Representative: _____ Date: _____

Jack Winters
Habitat Biologist
Division of Habitat
Department of Fish and Game
1300 College Road
Fairbanks, Alaska 99701
907-459-7285

Date: _____

Time: _____

Wildlife Sighting Report

Location: _____

Observer name: _____

Weather conditions: Fog Snow Rain Clear Wind Speed _____

Wind Direction Approx. Temp _____

Total number of animals: Type / Adult Subadult _____

Estimated distance from personnel/facility: _____ / _____

Possible attractants present: _____

Animal behavior: Curious Aggressive Predatory Other _____

Description of encounter: _____

Injuries sustained: Personnel _____

Animal _____

Deterrents used/distance: Vehicle _____ Noise-maker _____ Firearms _____

Other _____

Duration of encounter: _____

Agency Contacts: _____ Time: _____ Date: _____

ADF&G _____ Time: _____ Date: _____

SAE _____ Time: _____ Date: _____

SAE Representative: _____ Date: _____

Field Operating Procedure Polar Bear Protocol

Purpose: To provide guidelines for assuring the prompt reporting, investigation, and documentation of Polar Bear sightings or incidents involving animals that is protected by the Marine Mammal Protection Act of 1972.

Scope: This procedure applies to all sightings or interaction with Polar Bears occurring during operations on the North Slope.

Responsibility: The Project Manager and HSE Advisor have overall responsibility. They are responsible for coordination and implementation of all surveillance or monitoring personnel who deal with wildlife/human encounters or sightings on the North Slope.

Procedure:

1. A polar bear den detection survey shall be conducted prior to activities occurring in polar bear denning habitat during the maternal denning period (November to mid-April). All personnel must use caution when operating near polar bear denning habitat during the denning period.
2. When a Polar Bear is detected near any part of the operation, any employee (permanent, temporary, or contract) or visitor shall immediately notify the Project Manager or HSE Advisor.
3. The first priority is the protection of human life. The second priority is to avoid any situation in which a bear will be harmed.
4. The Administrative Office will sound the "air horn" with 5 short blasts and make a radio announcement on all crew channels of the sighting. At the sound of the "air horn, EVERYONE in camp is to go to the nearest trailer or vehicle and remain inside with doors and windows secured until the ALL CLEAR is given over the radio. The all clear signal is a long blast on the "air horn".
5. In the field, drivers of each vehicle will advise the personnel they are responsible for and have them get inside the vehicles and wait until further notice.
6. If the bear takes refuge near, in, or under a trailer or vehicle and does not appear likely to move, crew HSE security will be notified depending on the location of operation. No action will be taken unless authorized by the USFWS or their designated agents. The District Manager and North Slope Security must be contacted at this time.
7. Areas which have been identified as possible denning sites will be avoided per the permit stipulations. (Typically, prior to mobilization, Polar Bear den locations are received and entered into our hazard mapping system.) Survey crew, trained in Polar

Bear awareness, will be responsible as the lead vehicles in the field to scout for possible additional locations and bring to the crew's attention at the daily safety meetings those locations. Possible locations will be staked in the field and entered on the hazard maps for the crew per permit stipulations. If a den is encountered protocols from USFW will be followed. Operations will then be evaluated and modifications to the operation will be implemented that will allow the avoidance of the denning site and the continuation of exploration activity.

8. When a sighting is made by a stand-alone vehicle, such as the survey crew, they must not approach the bear further. The crew will notify the Project Manager or HSE Advisor via radio to alert them. The crew must avoid the bear and if necessary cease operations until the bear has left the area. The bear's distance from camp will determine whether step 3(b) is required. All personnel must remain at least a one mile distance in all directions from any known bear dens. The radio announcement must indicate whether this will be necessary or not. An all-clear signal will be sounded when the area is determined to be safe.
9. After any individual sighting or interaction with Polar Bears during operations on the North Slope, a Polar Bear Sighting Report shall be completed by the HSE Advisor. The SAE Permits Manager will forward this report to the Office of Marine Mammals Management as listed in the plan of operations.
10. A skid-mounted incinerator will be used for solid waste incineration. All garbage that contains any food will be bagged, stored inside the facilities and incinerated on site two times per day. The resulting ash will be back hauled to the North Slope Borough disposal facility during the winter season.
11. Winter crews will be trained to maintain a constant level of awareness for the potential conflict with Polar Bears. In areas where high potential of conflict exists, SAE will evaluate and if required, place a dedicated watch for Polar Bears in the area of operations. This is not to say that a continuous watch is not always in effect but rather that the crew will have a dedicated person or persons for oversight in areas of known denning or activity. A Polar Bear education program will be given to all workers on-site prior to the start of operations or at commencement of employment on the North Slope. Polar Bear awareness refresher briefings will be held as part of regular safety briefings. A dedicated Health, Safety and Environmental (HSE) Advisor will be based at the camp for the duration of the winter seismic program, and workers will be instructed to notify the Project Manager or HSE Advisor immediately whenever a bear is detected. All personnel will be aware of the restrictions regarding "taking" of Polar Bears as described by the Marine Mammals Protection Act. Approaching a bear for taking pictures or any other reason is strictly forbidden.
12. Plan all aircraft routes to minimize any potential conflict with active or anticipated polar bear subsistence hunting activity as determined through community consultations.

Permits Manager will send reports to:

Christopher Putnam
USFWS-Marine Mammals Section
1011 East Tudor Road
Anchorage, AK 99503
Telephone: 907-786-3800
Fax: 907-786-3816

Business

Companies take first steps to drill for oil in Arctic National Wildlife Refuge

By [Steven Mufson](#)

, Reporter

[Juliet Eilperin](#)

, Reporter

June 1

Two Alaska Native corporations and a small oil services firm together have applied to do extensive seismic work next winter in the Arctic National Wildlife Refuge, the first move toward development there since Congress voted late last year to open up the pristine wilderness to oil and gas drilling.

But while President Trump, congressional Republicans, the oil industry and Alaskan leaders have been [pushing hard to develop the refuge](#) that had been off-limits to petroleum exploration for more than three decades, the Interior Department's initial response to the consortium's [permit application](#) was scathing.

"This plan is not adequate," Interior's Fish and Wildlife Service said in a reply to the seismic application, adding that it showed "a lack of applicable details for proper agency review." Copies of the permit application and the Fish and Wildlife Service reply were obtained by The Washington Post.

The Alaska office of the Interior's Bureau of Land Management said in an email Wednesday that it was still reviewing the application. But the exchange over the permit highlights the difficulties of bringing to fruition a signature energy project of Trump and his fellow Republicans.

The oil services firm and project operator SAExploration said that "this partnership is dedicated to minimizing the effect of our operations on the environment." It said it would deploy sleds, smaller vehicles and biodegradable lubricants, and would construct ice roads.

But the proposal for seismic work included two 150-strong teams of workers, airstrips, giant sleds and special vehicles that create vibrations similar to those created by dynamite to search for and map underground oil or natural gas reserves.

The Fish and Wildlife Service complained that the permit application — the only one filed so far — failed to provide studies about the effects of the seismic work and equipment on wildlife, the tundra and the aquatic conditions in the refuge.

After reviewing the permit application, Peter Nelson, director of federal lands at the advocacy group Defenders of Wildlife, said: "One thing is pretty notable: how many inaccuracies and missing pieces of

information there are. It really provides more evidence that industry and the Trump administration are being pretty reckless with this process.”

Oil exploration in the Arctic National Wildlife Refuge — a vast wilderness in northeastern Alaska whose coastal plain is home to polar bears in winter and porcupine caribou and hundreds of migratory bird species in summer — has sparked a fierce debate for four decades. No drilling has been done there since it became a refuge in 1980 and no seismic work has been done since the mid-1980s.

Sen. Lisa Murkowski (R-Alaska), an ardent supporter of drilling in the refuge, managed to tack an amendment onto the budget resolution that opened up a portion of the refuge known as the 1002 Area for exploration. It directed Interior to [conduct two lease sales over the next decade](#), each covering 400,000 acres. The entire refuge covers roughly 19 million acres.

Interior officials have also stated their determination to get drilling going in the next year or so. The U.S. Geological Survey, using new interpretation techniques and 1980s seismic data, [estimated](#) in 2016 that the 1002 Area might hold 7.7 billion barrels of technically recoverable oil reserves.

“Our biggest fear is that this is going to be rubber-stamped because there is so much top-down pressure from the Trump administration to approve exploration and drilling as soon as possible,” said Lois Epstein, Arctic program director for the Wilderness Society.

The 18-page Fish and Wildlife Service response, however, showed no sign of approval. It said that the proposal to conduct operations as late as May 31 “impinges on the beginning of the calving and nesting season of wildlife using this area.” The agency said that the oil service firm SAEExploration proposed using equipment on packed snow but that it was common for large areas to have little to no snow even in winter. At one point, it laments that “there is no documentation of environmental effects, whether positive or adverse.”

Jenny Keatinge, a senior federal lands policy analyst at Defenders of Wildlife, said in an interview that conducting seismic testing when polar bears have retreated to dens could imperil the federally threatened Southern Beaufort Sea population, of which there are roughly 900 polar bears left. She noted that 77 percent of the coastal plain is designated as critical habitat for polar bears.

Given the effects of climate change, “those bears are using the coastal plain more and more,” Keatinge said.

Keatinge questioned why the firm’s proposal did not include detailed maps of areas to be excluded from testing, or how it would address the harm that could stem from the disturbance that could result from the operation. Some caribou winter on the plain, and additional caribou come in during the spring, she said, when the seismic exploration may still be underway.

“They don’t identify sensitive wetland areas or sensitive wildlife areas,” she said of the firm, adding that when it comes to the prospect of federal approval, “we are ready to fight any attempt by the administration to shortcut any protection for the coastal plain and the people and wildlife it supports.”

Before drilling, oil and gas companies want updated three-dimensional seismic studies; the 1980s studies were two-dimensional.

The seismic permit application has been filed by Kuukpik Corp., a joint venture of SAEExploration, the Arctic Slope Regional Corp. and the Kaktovik Inupiat Corp.

“Opening the coastal plain of the Arctic National Wildlife Refuge to oil and gas development will bring well-needed jobs into the community of Kaktovik as well as our other communities and the State, while at the same time helping to secure America’s energy future,” the Arctic Slope Regional Corp said in a statement. “It can be done responsibly, and ASRC looks forward to the process moving forward.”

The group hopes to start work Dec. 10 on the entire 1002 Area as well as private lands belonging to the Alaska Native groups. Lines used to generate and detect vibrations would be spaced as little as approximately 660 feet apart, the application says.

SAExploration is an oil services firm that has fallen on hard times. Its fiscal 2017 revenue was a third of the 2014 level. It has lost money four years in a row. Its stock closed Thursday at \$1.40 a share, less than one-tenth of 1 percent of the \$1,375.65-a-share level less than five years ago.

Experts say that the seismic work in the remote Alaska refuge could cost about \$250 million. The funds would probably come from the Alaska Native corporations. At the end of last year, SAEExploration, whose recent investors include hedge funds, had \$3.6 million in cash, \$121.9 million of debt and total stockholders’ equity of negative \$0.2 million, Brian Beatty, chief operating officer, said in a March 16 conference call.

Still, SAEExploration said in the permit application that it could deploy improved technologies. It said that its mobile camps would emit only gray water, the relatively clean waste water from showers and sinks, and that a skid-mounted food incinerator would reduce waste to ash that would be transported back out of the refuge to a disposal facility at Deadhorse, a town that serves the large Prudhoe Bay oil field.

Correction: A previous version of this article said seismic work in the refuge would be done with explosives. However, due to environmental concerns, most seismic work is now done with special vehicles with large pistons or other equipment to create vibrations similar to those caused by dynamite. The article also misstated the location of the Arctic National Wildlife Refuge. It is in northeastern Alaska, not in northwestern. The post has since been updated.

**Steven Mufson**

Steven Mufson covers energy and other financial matters. Since joining The Washington Post in 1989, he has covered economic policy, China, U.S. diplomacy, energy and the White House. Earlier he worked for The Wall Street Journal in New York, London and Johannesburg. [Follow](#)

**Juliet Eilperin**

Juliet Eilperin is The Washington Post's senior national affairs correspondent, covering how the new administration is transforming a range of U.S. policies and the federal government itself. She is the author of two books — one on sharks and another on Congress, not to be confused with each other — and has worked for The Post since 1998. [Follow](#)

Market Watch**Dow 25,582.65**

Today 1.67%

S&P 2,847.54

Today 1.03%

NASDAQ 7,837.78

Today 0.82%

Last Updated: 1:25 PM 08/16/2018

BLM projects 'insignificant' impact from seismic work in ANWR

By **Liz Ruskin, Alaska Public Media** - July 27, 2018



Image source Esri

The first sign of oil development in Arctic National Wildlife Refuge is likely to be a 3D seismic survey. A company has applied to do the work, and the government has deemed the application complete. Everything about the proposal to drill in ANWR is controversial. Still, officials from the Bureau of Land Management said this week they see no need to do a full environmental impact statement for the seismic work and expect to approve the request in time for work to begin this winter.

Vm

P

Seismic work used to involve dynamite. Now it's mostly done with vibrating trucks that send shock waves into the ground. Lines of sensors on the surface record the waves that bounce back to map underground formations.

A company called SAExploration wants to bring about a dozen vibrating vehicles to the refuge, each mounted on a rubber track. Several at a time would drive parallel lines across the frozen

tundra. They'd stop frequently to lower their vibration plate for about 20 seconds and then move to the next spot. The trucks would drive about eight lines across a typical square mile, according to the company's application. The plan is to shoot seismic across the entire coastal plain, or 2,600 square miles.

Lesli Ellis-Wouters of the BLM said it's the same technology that was used west of the refuge, in the National Petroleum Reserve-Alaska.

"We felt that there would be insignificant impact, so we're planning on doing an environmental assessment and when that is available we'll post that environmental assessment, with a draft finding of no significant impact," Ellis-Wouters said.

An environmental assessment is kind of the junior cousin of a full "environmental impact statement." It's less rigorous and less detailed. Wouters said if the BLM learns something unexpected in the assessment, or in the public comment period that follows, it could order a more thorough examination.

"At the end of the 30-day public comment period if we don't receive substantial input to change our finding of no significant impact, we would issue a decision record, and then the activity could be authorized," Ellis-Wouters said.

In addition to the vibration trucks, the work will require two mobile camps, each able to house 160 people, and a variety of support vehicles.

Attorney Jason Rylander at Defenders of Wildlife said the activity is far from harmless.

"Seismic has tremendous potential for serious environmental impacts," Rylander said. "In fact, you can still see the scarring from the last time that seismic was allowed, in only just a small portion of the refuge."

In the 1980s, Congress allowed a 2D seismic survey on the coastal plain of the refuge, resulting in more than a thousand miles of trails. The U.S. Fish and Wildlife Service says most of the trails recovered well in the first decade but a few miles were still visible from the air decades later. Data collection for a 3D seismic survey is more intensive, with far more sensors.

Rylander and other environmentalists say they're especially worried about the impact seismic work could have on polar bears.

"During denning season it can cause mother polar bears to leave their den," Rylander said. "It can expose polar bear cubs to disturbance. So we're very very concerned, considering there's only 900 or fewer polar bears in the southern Beaufort Sea population."

That figure, 900 polar bears, is an estimate, and like most everything in the Arctic Refuge, it's disputed.

Jason Rylander, senior staff attorney for Defenders of Wildlife, at the organization's Washington, D.C. headquarters. Photo: Liz Ruskin.

The U.S. Fish and Wildlife Service says noise disturbance and passing vehicles have prompted some mother polar bears to **abandon their dens** while others seem to adjust to industrial noise.

The Interior Department hopes to offer leases for drilling in ANWR next year. While it's responding to the application to conduct seismic work, **BLM is also** preparing a separate environmental impact statement for the lease sale itself.

Congress last year mandated the lease sale, but Rylander said environmental groups aren't giving up.

"Whether the Trump administration ultimately issues a lease or not, our aim is to ensure that this land is never drilled," Rylander said.

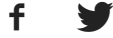
BLM expects to hold another public comment period and at least seven public meetings on the lease sale proposal this fall or winter.

Liz Ruskin, Alaska Public Media

<https://www.alaskapublic.org>

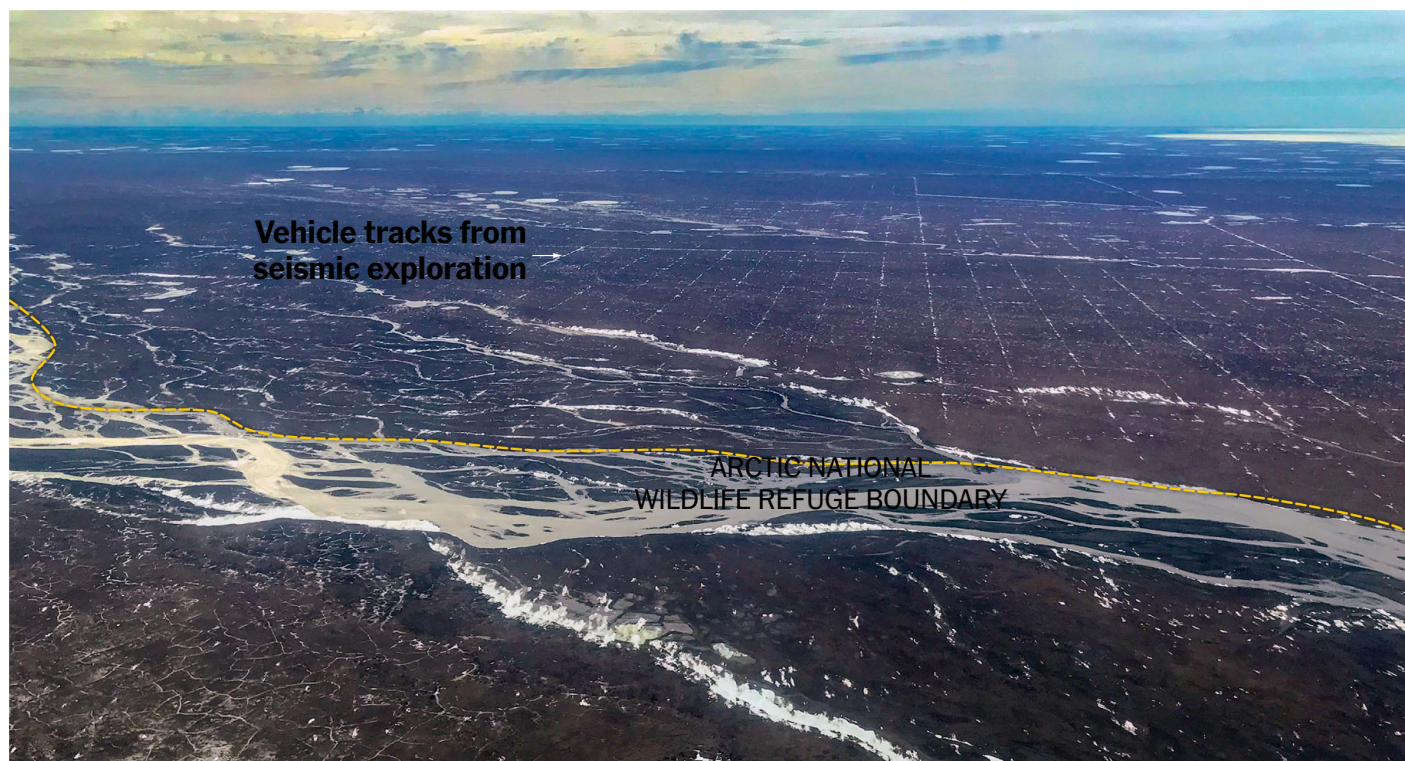
Liz Ruskin covers Alaska issues in Washington as the network's D.C. correspondent. She was born in Anchorage and is a West High grad. She has degrees from the University of Washington and the University of Missouri School of Journalism in Columbia. She previously worked at the Homer News, the Anchorage Daily News and the Washington bureau of McClatchy Newspapers. She also freelanced for several years from the U.K. and Japan, in print and radio. Liz has been APRN's Washington, D.C. correspondent since October 2013.

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The New York Times

See the Scars That Oil Exploration Cut Across Alaska's Wilderness



By The New York Times | Photo by Matt Nolan

By Henry Fountain

Matt Nolan, who runs a mapping business in Alaska using aerial photography, was flying a small plane to the Arctic National Wildlife Refuge in the northeastern part of the state last month when he noticed a pattern on the tundra.

Dr. Nolan, a geophysicist, saw a grid of tracks left by heavy vehicles involved in recent seismic testing for oil and gas exploration in an area called Point Thomson. The tracks, several hundred yards apart, were as regular as a checkerboard and ran across the landscape just outside of the refuge.

A similar dense grid may soon cover some of the refuge itself, perhaps beginning as early as December, if seismic testing starts under a plan to sell leases for oil and gas exploration that was approved by Congress last year and that is strongly opposed by environmental and conservation groups. The northern part of the refuge, 1.5 million acres of the Arctic coastal plain known as the 1002 Area, is thought to overlie billions of barrels of oil and gas.



By Sarah Almukhtar

Disturbances like the tracks Dr. Nolan saw could remain for decades or longer like a tattoo on the refuge, a vast tableau of mosses, sedges and shrubs atop permafrost that is considered one of the most pristine landscapes in North America. There are still signs, for example, of a much less dense pattern of tracks from the only other time testing was allowed there, in the mid-1980s, and of the only drilling pad, which was built at the same time.

Any new tracks could also potentially alter how surface water flows in the tundra, draining lakes or accelerating the thawing of permafrost in some areas.

Decades-old vehicle tracks west of the refuge

The polygonal pattern across the landscape is made by vertical wedges of ice in the permanently frozen ground. • By The New York Times | Photo by Matt Nolan

Dr. Nolan spent most of July flying across the 1002 Area making a high-resolution elevation map that will serve as a baseline for any changes to come. When he saw the tracks outside the refuge (lingering snow and ice made some of them easier to spot) he decided to map those as well. He found that they were up to half a foot deep.

Dr. Nolan, a former research professor at the University of Alaska in Fairbanks who has mapped changes in land and glaciers for years, said he was not taking sides in the fight over drilling in the refuge, “but I want to make sure that whatever happens out here happens in the most responsible way.”

“Leaving grid marks all over — that to me is unacceptable,” he said.

Lingering snow and ice made some tracks easier for Dr. Nolan to spot from a plane. Matt Nolan

Even after the snow had melted, tracks were still faintly visible from the air. Matt Nolan

Environmental and conservation groups, which have fought to preserve the 19-million-acre refuge for decades, say that seismic testing, not to mention eventual drilling and production of oil and gas, could irreversibly alter the 1002 Area and potentially affect the habitat and behavior of caribou, polar bears and other animals there.

“There’s not a lot in here that you can look at and feel good about,” said Kristen Miller, conservation director of the Alaska Wilderness League, referring to a plan for testing in the 1002 Area put forth this year by a seismic services company, SAExploration, and two Alaska native corporations.

That plan proposes that testing begin this winter, when ice and snow provide some protection to the tundra, and resume, if necessary, the following winter. In addition to special trucks that vibrate the ground, the effort would include movable fuel tanks as well as housing and other facilities for two crews of 160 workers each. In the plan, the company said it and its partners were “dedicated to minimizing the effect of our operations on the environment.”

By producing three-dimensional images of the subsurface, the testing would help oil companies determine whether there are enough reserves to make it worth buying leases to drill in the area.

The plan drew criticism from the United States Fish and Wildlife Service when it was first put forth in May. But another agency of the Interior Department, the Bureau of Land Management, will review the plan and decide whether to allow testing. Lesli Ellis-Wouters, a bureau spokeswoman, said that SAExploration had been asked to provide more information.

The approval process includes conducting an environmental assessment, a less-thorough appraisal than an environmental impact statement, or E.I.S., although the bureau can require an E.I.S. later if the initial review finds the work could result in significant impacts.

Ms. Ellis-Wouters said there would be a 30-day public comment period when the assessment is finished. She said there was no time frame for a decision as yet.

But Matt Lee-Ashley, a senior fellow at the Center for American Progress, a liberal research organization in Washington, said the bureau seemed intent on moving quickly so that testing could begin this winter, part of an overall push to conduct lease sales within a few years.

Matt Nolan at his base of operations at Kavik River
Camp.
Joy Juelson



Dr. Nolan has financed his mapping project himself, spending about \$30,000 on fuel for his single-engine Cessna, among other expenses. To make his map he uses a method called photogrammetry, combining tens of thousands of digital aerial photographs, each with precise location data, to form a three-dimensional map of the land surface.

The map, which Dr. Nolan claimed in a blog post would be the best topographic map ever made of the 1002 Area, should have a resolution of about five inches. The map will be, in effect, a snapshot of the current landscape that can be compared to future maps to detect even small changes.

Dr. Nolan said he hoped to sell the finished product to oil companies, environmental groups and government agencies. “My hope is that it’s all of them,” he said. “I’m doing it now to support rational decision-making when it comes to oil and gas stuff.”

He said he thought the seismic work could be done differently to reduce impacts — perhaps using less elaborate, and heavy, facilities for the crews. “This is a place where we’re supposed to do things different and better,” he said.



Vehicles that rove and repeatedly depress the land can affect the flow of surface water. Matt Nolan

Sue Natali, an ecologist at Woods Hole Research Center in Massachusetts who studies Arctic tundra and permafrost, said that depressions, even shallow ones, can have cascading effects. “The ground sinks, so it gets wetter,” she said. Since water carries and conducts heat, the land thaws more and then sinks more. “The impact can last for a very long time,” she said.

“The issue is, you’re causing connections and movements of water across the landscape that perhaps weren’t happening before,” Dr. Natali added.

Ms. Ellis-Wouters, the bureau spokeswoman, said that hydrological and visual impacts, as well as effects on vegetation, would be considered in the review. “The visual impacts are only detected from the air,” she added.

She said the bureau expected that more advanced 3-D testing technology would result in less surface impact than the work done in the 1980s.

Dr. Nolan acknowledged there was little time to pressure the Bureau of Land Management or exploration companies to change their approach. Still, he said, the existence of his new map may have an effect.

“I hope the oil and gas people understand that someone’s watching,” he said. “When you know someone is watching you get on better behavior.”

Mountain ranges and waterways in the Arctic National Wildlife Refuge. U.S. Fish and Wildlife Service

More Reporting on Alaska and the Arctic National Wildlife Refuge

Drilling in Arctic Refuge Gets a Green Light. What's Next? Dec. 20, 2017

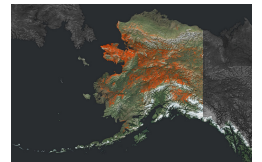


Here's What Oil Drilling Looks Like in the Arctic Refuge, 30 Years Later

Dec. 15, 2017



Alaska's Permafrost Is Thawing Aug. 23, 2017



Correction: August 2, 2018

A picture with an earlier version of this article was credited incorrectly. The photograph of Matt Nolan and his airplane at the Kavik River camp was taken by Joy Juelson, not Mr. Nolan.

A version of this article appears in print on Aug. 3, 2018, on Page A14 of the New York edition with the headline: Search for Energy Underground Leaves Its Imprint on the Land Above