UNITED STATES DEPARTMENT OF THE INTERIOR
MINERALS MANAGEMENT SERVICE
ALASKA OCS REGION

NTL No. 05-A01

Effective Date: JUL 25 2005

NOTICE TO LESSEES AND OPERATORS OF FEDERAL OIL AND GAS LEASES IN THE ALASKA OUTER CONTINENTAL SHELF REGION (OCS)

SHALLOW HAZARDS SURVEY AND EVALUATION FOR OCS EXPLORATION AND DEVELOPMENT DRILLING

Authority

This Notice to Lessees and Operators (NTL) is issued pursuant to regulations at 30 CFR 250.201, 30 CFR 250.203, 30 CFR 250.204, 30 CFR 250.414, and 30 CFR 250.901, and supersedes NTL 00-A01, dated February 7, 2000.

In accordance with 30 CFR 250.196, the Minerals Management Service (MMS) may release to the public all high resolution seismic data 60 days after you submit it to us. This provision does not apply to exploration common depth point seismic data, which is held confidential.

Purpose and Need for NTL

This NTL provides guidance for shallow hazards geophysical surveys, evaluations, and reporting procedures for the Alaska Outer Continental Shelf (OCS) Region. It is issued to clarify and interpret requirements contained in regulations and does not impose additional requirements.

The MMS Regional Supervisor for Field Operations (RS/FO) requires pre-exploratory and pre-development investigations by lessees/operators (you) on leased lands to ensure safe conduct of oil and gas operations on the OCS. Before beginning drilling or platform construction activities you must conduct a shallow hazards analysis to evaluate the proposed site for potentially hazardous conditions at or below the sea floor, which could affect the safety of OCS operations. Unless you can demonstrate to us that sufficient data is available to evaluate the site, we will require a shallow hazards geophysical survey.

Potentially hazardous shallow conditions, features, or processes include seismicity, subsurface faults, fault scarps, shallow gas, steep-walled canyons and slopes, buried channels, current scour, migrating sedimentary bedforms, ice gouging, permafrost, gas hydrates, unstable soil conditions, pipelines, anchors, ordinance, shipwrecks, and other geological or man-made features.

Guidance

Your surveys need to be conducted before the Exploration Plan (EP) or the Development and Production Plan (DPP) are submitted, and the analysis and report provided to us for review with the EP or DPP. Your EP or DPP will be considered incomplete without an analysis and report and no sea floor disturbing activities, other than geotechnical investigations, will be allowed until the site is cleared. We recommend that you plan your financial commitments and logistics including mobilization accordingly.

You must conduct the activities described in this notice according to all applicable laws, regulations, rules, and lease stipulations, including the Marine Mammal Protection Act of 1972 (MMPA) as amended and the Endangered Species Act of 1973 (ESA)as amended.

You may be required to collect shallow hazards surveys for verifying that the site is clear of hazards even for sites located in state waters if the well(s) extends into Federal OCS lands (250.203 (b)(1)(ix)).

In areas where data of adequate coverage and quality are available, we may modify or waive specific shallow hazards survey requirements on a case-by-case basis. We will consider new technologies, acquisition or processing techniques, and alternate survey designs. We strongly recommend that you review your proposed survey strategy with appropriate MMS personnel before starting any survey operations.

This NTL does not cover other ancillary activities such as archaeological and biological investigations or pipeline surveys. Pipeline and archaeological survey and reporting guidance is contained in the Pipeline Rights-of-Way (NTL 05-A02) and Archaeological (NTL 05-A03) Survey NTL's. However, we may allow the use of selected shallow hazards data to satisfy or supplement data requirements of an archaeological, biological, or pipeline survey if we determine that such a survey is necessary and that the data satisfies the requirements for that survey. You are encouraged to consult with us about the potential for using shallow hazards data to satisfy these provisions.

Qualified and experienced personnel must perform the field survey, process and analyze data, prepare the report, and acknowledge responsibility by signing the appropriate data logs, analysis and reports as per 30 CFR 250.204(a)(8)(v)(A). You are responsible for obtaining the best possible results using the most appropriate survey technology. Poor quality data due to acquisition or processing technique is not acceptable and could result in the MMS requiring you to resurvey the site.

Notification

All potentially affected OCS lessees are required to be notified of survey actions and schedules prior to survey mobilization.

Lease sale notices may include stipulations or information to lessee clauses which require or encourage additional coordination with other parties (e.g., subsistence users, local communities,

commercial fishing organizations, etc). You are advised to review these provisions and associated requirements for applicability to your proposed survey. If the survey will include state waters, you should contact the appropriate state agency to ascertain and comply with any and all applicable State requirements.

You should be aware that seismic surveys have the potential for incidental take of marine mammals and are subject to the incidental taking provisions of the MMPA and ESA. Under the MMPA and ESA, you could be required to have a Letter of Authorization (LOA) or Incidental Harassment Authorization (IHA) from the U.S. National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (FWS). You should review your proposed activity with the NMFS and the FWS.

You must provide the RS/FO with a notice of intent to conduct preliminary activities in accordance with 30 CFR 250.201. This notice should be submitted a minimum of one month before initiating any field survey operations. The notice should include a description of the type, scope, and timing of the survey. The notice should also include documentation of applicable notifications to other OCS lessees and coordination with other potentially effected parties and a copy of an IHA or LOA application or approved authorization, if applicable.

In addition, you or your contractor should notify the RS/FO at least 72 hours before mobilizing for this survey so that the MMS may make arrangements for an observer to be present.

Shallow Hazard Survey Requirements

Shallow hazards data must provide information on sea floor conditions that may present hazards to rig set down, platform construction, or drilling operations. It must also provide information on sub-seafloor conditions that have to be taken into consideration during design, construction, and operations to mitigate the potential hazards to drilling operations, production activities, and platform integrity. The depth of investigation of the shallow hazards survey must be sufficient to reliably cover any portion of a borehole that will be drilled without a Blowout Preventer (BOP) stack, generally down to the surface casing setting depth.

You may meet shallow hazards survey requirements by a survey strategy that combines different systems. The MMS will consider new technologies and survey strategies if they meet the minimum data requirements.

Survey Design

Survey design requirements are determined by several factors and will vary depending on whether you are drilling from a bottom-founded structure, an artificial island, a floating platform, or a drill ship. They also depend on surveying systems you use; high- or low-frequency profiling systems, magnetometer, side-scan sonar, or multi-beam sonar. The optimum survey area and grid-spacing are also affected by the water depth, degree of certainty on where the well will be located, whether the well-bore will be vertical or slanted in open-hole conditions (before you set conductor casing and install the BOP), and on how many and where the wells will be drilled.

Your shallow hazards survey must provide detailed acoustic reflection data coverage along a closely spaced grid (see below). You must provide coverage to a sufficient distance (usually 2,400 m) in all directions from the proposed surface location and in all directions from the surface projection of a slant well-bore or multiple slant wells that you plan to drill in open-hole conditions. You must extend all lines a sufficient distance beyond intersections to ensure grid closure and subsurface ties. You are encouraged to discuss your survey grid strategy with the MMS during your planning stage. Below are possible survey-grids (see attached examples).

Survey Grids

A survey grid for vertical exploration or production well-sites (Figure 1) consists of a 150 by 300 meter spacing or closer within 600 meters or farther beyond the proposed well site, and a 300 by 600 meter grid extending to a distance of 1200 meters from the surface location, and a 1200 by 1200 meter grid-spacing extending another 1200 meters beyond that limit (to a total of 2400 meters from well site).

A survey grid for directionally-drilled exploration or production wells (Figure 2) requires a 150 by 300 meter spacing or closer within 600 meters or farther beyond the proposed well site, and a 300 by 600 meter spacing along the surface projection of the open-hole slant well bore(s) to a distance of 1200 meters beyond the surface projection of the conductor casing, and extending an additional 1200 meters beyond that limit with a 1200 by 1200 meter line-spacing.

In water depths less than approximately 15 meters, grid-spacing for side scan sonar survey dip-lines may have to be closer than 150 meters apart due to reflection-geometry constraints on reliable far-range horizontal resolution. To achieve 150 percent or better coverage of the sea floor in shallow water depths, side scan sonar record scales may have to be set to 75 meters per side and dip-line spacing reduced to 100 meters within 1200 meters of the surface location, or a similar arrangement. Strike-line grid-spacing may remain unchanged.

In general, for survey strategies, other grid-spacing or configurations may be considered on a case-by-case basis. If a magnetometer is required, consult with the MMS before planning your survey grid as these may vary according to water depth and nature of the targets.

Sea Floor Imagery

Side-scan sonographs or sonograph mosaics of the sea floor are generally used to identify areas of exposed rock outcrops, sea floor scarps, sedimentary textures, underwater obstacles, areas of potential biological activity, or archaeological resources. Recordings must be of optimal quality (good resolution, minimal distortion) resulting in displays automatically corrected for slant range, lay-back and vessel speed, and provide 150 percent coverage of the area to be affected by the proposed exploratory or development operations. The system must, at a minimum, reliably detect and resolve objects 3 feet (1 meter) in diameter. In shallow water, survey line density may need to be increased (see above). The MMS will also consider other systems such multi-beam sonar for this requirement if equivalent or better results can be demonstrated.

Bathymetry

Fathometer data should consist of high frequency (12 kHz or higher) continuous sea floor profiles. In areas of complicated sea floor characteristics a multi-beam system may be needed.

Water-Column Anomaly Detection

Use a system capable of detecting gas in the water column. Analog profiles of bathymetry are capable of detecting gas where it is present in the water-column. To obtain good records, use a higher bandpass frequency during water-column profiling than normally used to record only the sea floor return.

High-resolution seismic profiling systems

Acoustic reflection profiling must continuously resolve geologic features over the survey area from the sea floor surface to a minimum depth beneath the sea floor of 1.0 to 1.5 seconds two-way travel time (800 to 1,000 m or 2,500 to 3,500 ft depending on sound velocity), depending on specific geologic conditions or drilling proposals (i.e. depth of casing point for conductor casing). Horizontal continuity and resolution should be achieved by rapid pulsing approximately every 20 feet (6 m) or less. Vertical resolution should be 1 millisecond (ms) or better immediately below the sea floor, and graduated to not more than 10 ms at maximum penetration depths. Vertical exaggeration should not exceed 10:1 on all geophysical records. Decouple and/or compensate the system for wave heave if you undertake operations in a sea state of greater than Beaufort Code 2. All geophysical systems must be integrated with survey navigation resulting in accurate posting of fixed points on seismic lines.

Marine high-resolution geophysical profiling is generally accomplished with the four following systems, a combination of similar systems, or equivalent equipment that results in the required penetration and resolution:

a. Multi-Channel system such as a sleeve exploder, air gun, water gun, sparker, or equivalent system to provide penetration to 1.0 to 1.5 seconds two-way travel time with a vertical resolution of at least 10 ms. Data should be digitally processed to suppress water bottom multiples. Hydrophone streamer cables must be of appropriate length to ensure coverage and resolution to the maximum depth capability of the system. Displays of both true relative amplitude and automatic gain will be necessary to successfully display and distinguish weak and strong reflections. Migrated displays may be needed on selected profiles in structurally complex areas. Appropriate velocity data should accompany digital displays. Please note that limitations on resolution at depth of most multi-channel high resolution seismic reflection systems will constrain the depth for permitting open hole conditions;

b. Mini-sleeve exploder, air gun, water gun, sparker, or equivalent system to provide penetration of 400 to 600 ms with resolution of 10 ms or less. Analog records of high quality may be accepted. This data may also be digitally processed to suppress water-bottom multiple reflection in shallow water depths;

c. Higher-frequency recording from mini-sleeve exploder, water gun, boomer, or non-reverberatory mini-sparker, or equivalent system to provide resolution of 2 ms. Analog records or digital records with sufficient sampling density is acceptable;

d. 3.5 or 7 kilohertz piezoelectric sediment profiler or equivalent system to penetrate soft sediments with a minimum vertical resolution of 1 ms. However, other systems and techniques that provide equivalent or better results are encouraged such as a digital broadband swept Financial Memorandum (FM) frequency system instead of the 3.5 or 7 kHz subbottom profiler.

You should exercise care in selecting (combining) and operating these systems to minimize pulse reverberation obscuring subsequent reflections, and to assure continuous optimal resolution throughout the depth range in spite of limitation of any one system.

Resolution of amplitude should be such that strong reflections are distinguishable from weak reflections. Digital records must employ a sampling rate that will result in high quality displays at full-scale.

Magnetometer

Magnetometer data may be required if there is reason to believe that shipwrecks, abandoned pipe or other man made metal objects may be present. Magnetometer survey techniques should be capable of detecting and aiding the identification of ferrous, ferric, or other objects having a distinct magnetic signature. We will notify you if this survey system is likely to be needed and we will discuss with you the survey requirements.

Navigation

A state-of-the-art navigational positioning system, with an accuracy of $\pm$ 2 m (6 feet) is required for substantiation and integration of the survey data. For marine surveys the vessel track must not vary more than $\pm$ 15 m (49 feet) from the pre-plot line, except to avoid obstructions. All geophysical systems must be integrated with ships navigation resulting in accurate posting of fixed points on survey lines and records. All fix marks must be easily identified on post-plot maps. For marine deep-tow systems, an ultra short baseline system may be required in order to track the towfish within a 1 percent error margin and must be integrated with the ships navigation. Navigation systems must be calibrated and both relative and absolute position accuracy verified before the start of the survey and after the survey.

Shallow Core Data

If bottom-founded structures including gravel or ice islands will be used, you will need to collect shallow core data for the analysis of shallow hazards, engineering and geotechnical evaluations, and/or archaeological resources.

Survey Report Format and Content

The report is a technical document based on credible analysis of the survey data by qualified personnel. It must present data, maps, graphs, and tables to support all conclusions and interpretations. References cited in the text should be included in a Reference Section. Identification and discussion of geologic conditions and features must be clear and organized. Conclusions must be documented and explained in the text and with figures, maps, and interpreted data records. Failure to submit a report with clear and supported conclusions will result in rejection of the report and an incomplete EP or DPP.

Report Submission

Two copies of the summary narrative report discussing

- field and professional personnel,
- systems and instrumentation,
- operational procedures and conditions including field logs,
- general geologic conditions
- interpretive techniques and results,
- shallow sedimentary environments,
- shallow stratigraphy,
- surface and buried geologic features, and man-made objects, and
- Specifically, the potential for shallow hazards and engineering considerations in the area of the proposed activity.

Two copies each of two structural cross-sections passing at right angles through the proposed well-bore location, with interpretation.

The report should include a short summary table (see attachment Table 1) of potential engineering considerations or drilling hazards in the shallow subsurface that describes the general sediment type, possible nature of the identified anomaly or feature, and its depth. This table should include potential hazards or engineering considerations to both set-down or rig emplacement, and to drilling operations. An example of a short summary table is attached.

Submit the following maps:

a. One page-size geographic index map illustrating survey area(s) relative to geography, sale area, and indicating lease and block numbers associated with survey(s) in North American Datum of 1983 (NAD-83).

b. A digital graphic copy of post plot location map(s) constructed to state plane and appropriate zone Universal Transverse Mercator (UTM) projection and illustrating track lines, fix points, and proposed and existing well location(s) relative to metric X-Y coordinates, geodetic coordinates, and lease block boundaries.

c. Paper prints of post plot location map(s), as above with the following illustrated thereon:

(1) Bathymetry contoured in intervals of 2 meters or less, or in a way not to impair legibility of the map if closely spaced, but sufficient to map shallow or seafloor features.

(2) Thickness and distribution of unconsolidated sediments, when present, contoured in intervals of 5 m or less, or in a way not to impair legibility of the map if closely spaced. The location, datum, soil classification, and graphic soil logs, to an appropriate scale, should also be shown.

(3) Shallow structure contoured at intervals of 20 m or less or in a way not to impair legibility of the map if closely spaced.

(4) Anomalies or potential hazards must be indicated on a base map with sub sea depth to event posted.

d. To facilitate development of the MMS Alaska OCS regional database we request all digitally produced maps that are provided to the MMS in Geographic Information System software such as ArcGIS format with projection information and necessary metadata.

Submission of other analyses and reports as necessary should include two copies each of the results of all geological, geotechnical, and geochemical analyses acquired from any associated soil sampling programs, together with attendant graphic soil logs should be submitted with the Shallow Hazards report.

Data Preparation and Submission:

Paper copies of data must be of optimal quality and Z-folded with identification labels and data headers exposed to facilitate ease of handling during interpretation. Data records must have fix marks with shot point numbers at 100 m or other appropriate intervals. You should display paper records with consistent orientation, such as west to the left and north to the left. Annotate line crossings and corresponding shot-points on the records. The vertical scale should be in seconds or milliseconds of two-way-travel time starting from a "zero" line representing the tow-fish or sled. Do not make interpretative markings on the data portion of the original records or copies you submit. Poor copies or reduced quality reproductions will not be accepted.

Data headers should contain:

- Survey name
- Dates of acquisition and if appropriate date of processing
- Start/Stop times
- Names of operating and responsible personnel
- Ships speed
- Sea state (Beaufort Scale)
- Ice conditions if applicable

- System parameters for seismic source and receivers, such as manufacturer, model, frequency range, power, filter settings, physical characteristics and deployment configuration, including water depth of towed sound source
- Record scale parameters including any changes during recording
- Vertical exaggeration
- Processing information if applicable

Submit the following:

a. One paper print of all profiles and recordings acquired.

b. Disks or CDs of raw and processed digital data.

c. Original magnetometer records, when required.

d. Side-scan sonar records in paper copies. If copies are not of adequate quality to delineate sea bottom conditions, you may need to submit original records. Original records and copies of digital records should be available to us after data is submitted for clearance of the site for geologic hazards.

e. Digital navigation data of the survey area.

Deep Penetration Seismic Profiles and Survey Grids

For exploration wells or first production wells, provide at least two un-interpreted common depth point seismic lines intersecting at the primary well locations and annotated with the surface and bottom hole locations of the well(s). These profiles may come from the prospect's seismic exploration survey and should cover the full depth of the proposed drilling. You should also supply a survey grid map to allow accurate placement of the deep seismic lines in relation to other surveys and the proposed location. The map should clearly show navigation fixes, shot points, and line identifications for the submitted lines. You may use common depth point seismic lines furnished with an exploration plan according to 30 CFR 250.203 (b)(1)(ii) to satisfy this requirement. These data will not be released with the rest of the Shallow Hazards Survey data package.

Paperwork Reduction Act of 1995 (PRA) Statement: The collection of information referred to in this NTL is required in 30 CFR part 250, subparts B, D, and 30 CFR part 251. The Office of Management and Budget (OMB) approved the information collection requirements in these regulations and assigned OMB control numbers 1010-0049, 1010-0141, 1010-0048, and 1010-0044 which is currently in the surnaming process to be consolidated into the primary collection for subpart D which includes Form MMS-123, Application for Permit to Drill that will be superseded by 1010-0141 when OMB approves. This NTL does not impose additional information collection requirements subject to the PRA.

Contacts

The following table provides contact names, telephone numbers, and electronic addresses if you have any questions concerning shallow hazard surveys and evaluation.

Titles	Contact	E-mail address	Phone
Geologist	Doug Choromanski	Douglas.Choromanski@mms.gov	907-334-5308
Geophysicist	Dennis Thurston	Dennis.Thurston@mms.gov	907-334-5338
RS/FO	Jeffrey Walker	Jeffrey.Walker@mms.gov	907-334-5303

JJ Walker

Jeffrey Walker
Regional Supervisor
Field Operations Office

7/25/05
Date

EXAMPLE

Shallow Hazards Summary Table

Depth	Drilling Activity and Safety System	Geology (DEPTH AND LITHO)	Possible Hazards or Conditions (EXAMPLES)	Mitigation
0-400'	-Drive 30" Structural casing -well spud	0 to 400' Seafloor Characteristics (mud, sand, boulders), shallow sediment (peat)	High velocity bottom currents, unstable sediment, boulder or soft sediment bottoms, shallow biogenetic gas, permafrost, etc.	Diverter installed
400-1000'	Drill and set 20" Conductor casing with Diverter	sands with thin coals, Permafrost	Shallow coal seam gas, shallow faults, permafrost	Diverter installed, gas detector in mud tank.
1000-3000'	Drill and set 13 3/8" Surface casing, install BOP system	Unconsolidated to consolidated sands and silts	Shallow gas, faulting, abnormal formation pressures	BOP installed @ 3000', well bore cased.
3000-9500'	Drill and set 9 5/8" Intermediate casing.	consolidated sand and silt	Faults, unconformities, abnormal formation pressures	BOP, Mud weights
9500'-TD	Drill and set 7" Production casing/liner	Sands and gravel, shales	Lost circulation, faults abnormal pressure	BOP, Mud weights, casing.

Shallow Hazard Survey Alaska OCS

Site-Specific Grid for Vertical Well
Open-hole Conditions

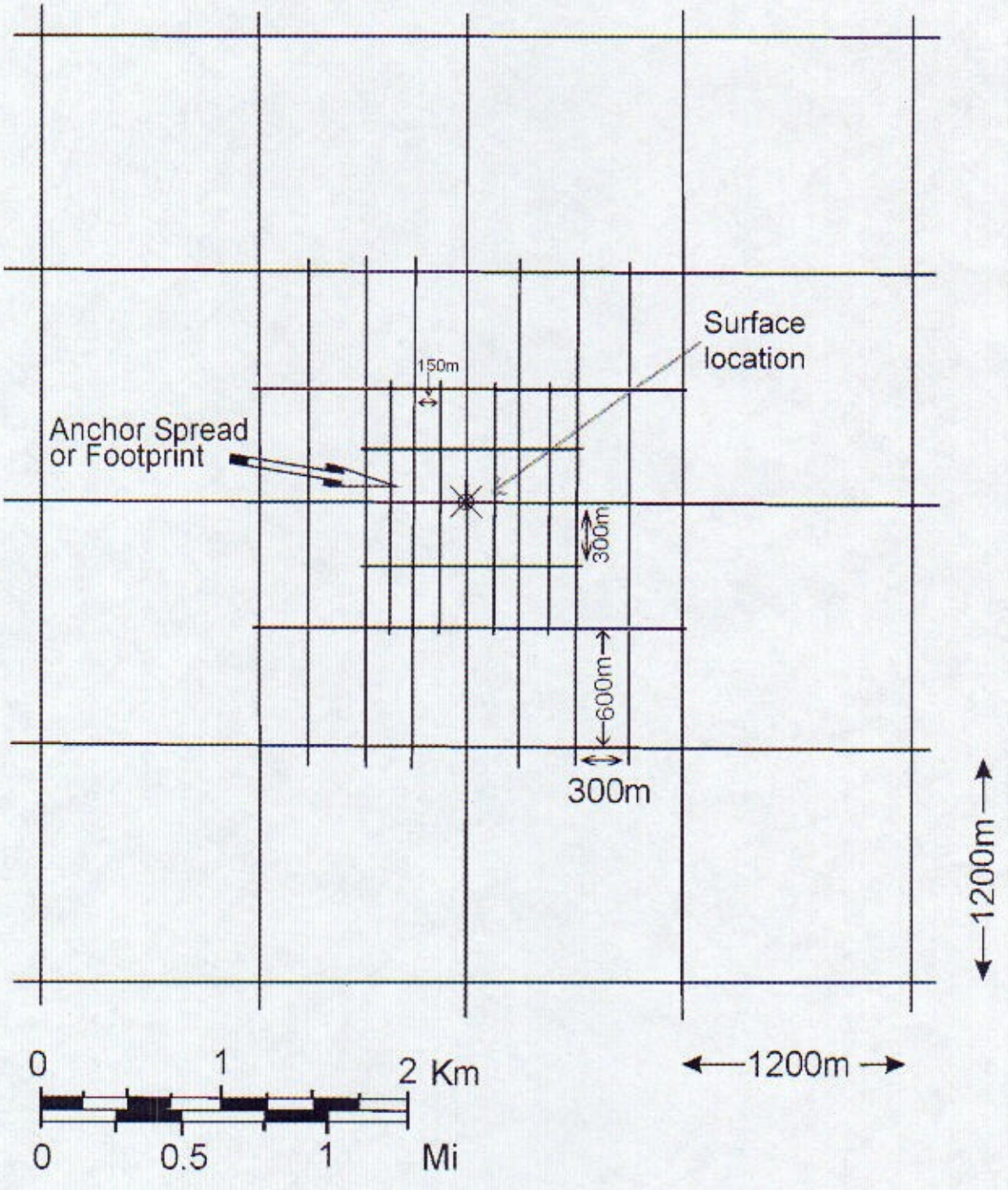

Figure 1

Shallow Hazard Survey Alaska OCS

Site-Specific Grid for Slant-Well Open-hole Conditions

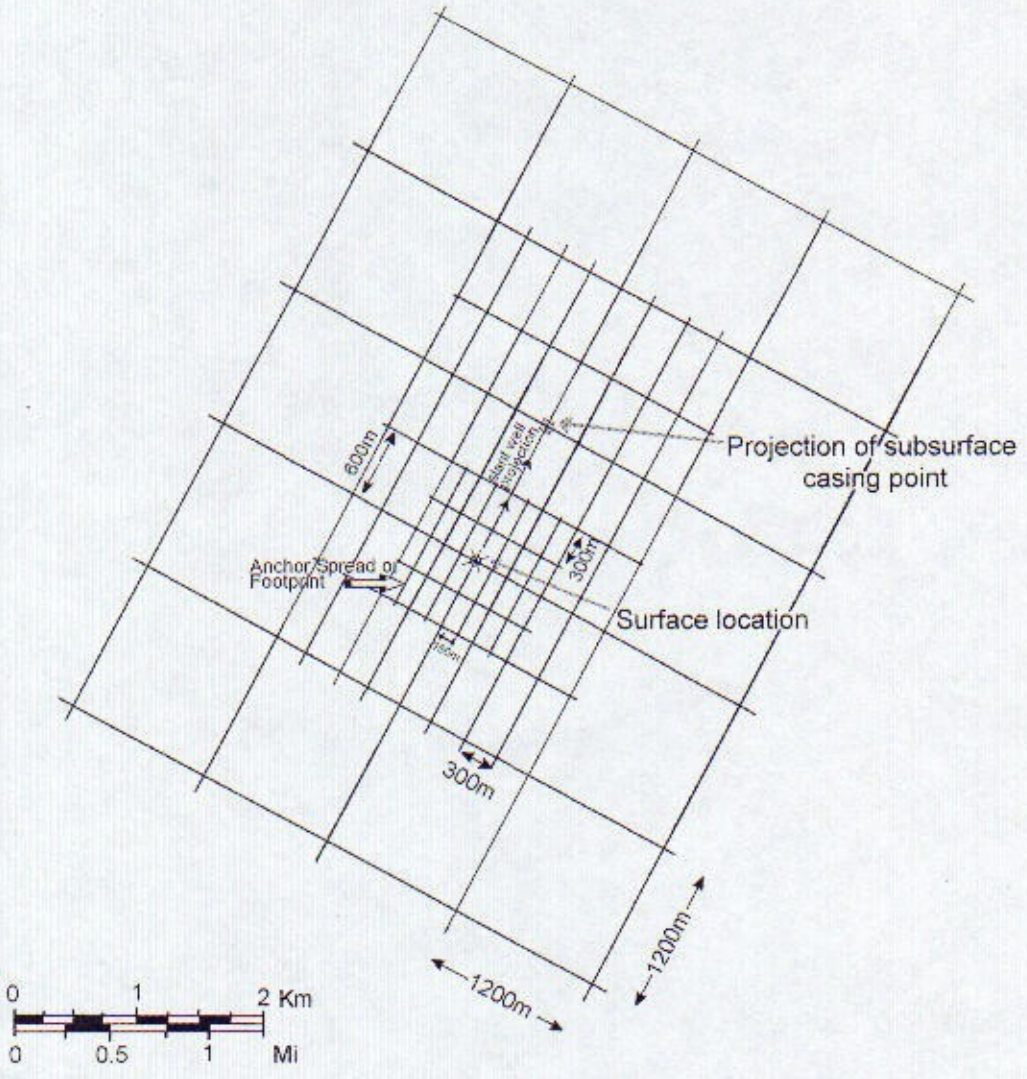

Figure 2