Operational Requirements Worksheet

2010–2011 Season

Applicant Version

Project Name:	ANDRILL Coulman High Project
Principal Investigator:	Frank Rack
Event Number:	Undefined–U
Proposal Number:	N/A
Project Dates:	N/A to N/A
Printed on:	Wednesday, 1 July, 2009 at 12:29 MST
Printed for:	Daren Blythe

Summary of Sections

Project Information

Many of the major USAP resources are heavily committed for the next several seasons. The most constrained of these resources are fixed wing time (LC–130, Basler, and Twin Otter support), ship time, and support and berthing at South Pole Station. General availability information for these resources is presented at www.usap.gov, under the section Information for Proposers. Please consider this information carefully while creating field plans and requesting support.

Welcome to the first page of this worksheet where you will define your project's support requirements. You may navigate through all required pages by clicking the "Continue" button, or select a specific page by clicking any tab or link in the left navigation bar. Your information is automatically saved as you navigate from each page. If you would like to see the overall worksheet site map with a brief description of the information we gather on each page, click the "Site Map" link under **Worksheet Tools** in the left navigation bar and hover your mouse over the "i" icons.

Use this page to describe your research project. This information is required.

* Research Objectives

ANDRILL (ANtarctic geological DRILLing) is an international program designed to investigate Antarctica's role in Cenozoic global environmental change. After two highly successful initial seasons, ANDRILL proposes the next phase of drilling at the Coulman High to obtain direct reference records of two stratigraphic intervals from the Antarctic continental shelf: the early Miocene and Oligocene, and the Eocene to possibly Cretaceous. Four scientific themes continue as ANDRILL's focus in an integrated approach involving geophysical and site surveys, core recovery and analysis, and numerical modeling: (1) history of Antarctic climate and ice sheets; (2) evolution of polar biota; (3) Antarctic tectonism; and (4) Antarctica's role in Earth's ocean?climate system. This proposal requests funding to support drilling two deep (>1200 m) drillholes, science management, over?ice and downhole seismic data acquisition, airborne and over?ice radar surveys, tide and current mooring deployment, monitoring and retrieval, GPS monitoring, site surveying, downhole logging, core characterization, and marine seismic line reprocessing . Results will lead to insights into: (i) the development of the Antarctic cryospheric system (ice sheet, ice shelf, and sea ice); (ii) the magnitude and frequency of cryospheric changes on centennial to millennial timescales; (iii) the influence of Antarctic ice sheets on Eocene to Miocene climate, the modulation of thermohaline ocean circulation, and eustatic change; and (iv) the evolution and timing of major tectonic episodes in Antarctica and the stratigraphic development of sedimentary basins.

* Field–Season Overview

Access and characterize the two Coulman High drill sites for future sediment core extraction: Obtain ground-penetrating RADAR (GPR) data and cross-reference with existing airborne RADAR data for use in safely gaining access to the drill sites and for assessment of the drill sites themselves; obtain seismic reflection and refraction data to determine condtions beneath the two drill sites. Conduct hot water drilling through the ice shelf in order to deploy instrumentation for charcterizing the sub-ice shelf environment (ocean and tidal currents, nature of the underside of the ice shelf) in order to define requirements for coring the sea floor in future seasons.

In past ANDRILL projects, drilling operations activity was organised and supported through AntarcticaNZ/Scott Base, with all operations staff manifesting through the NZ Program, whereas science activity was supported through USAP/McMurdo. Most of the operations equipment is owned by the ANDRILL consortium rather than the National Programs directly. The operating arrangement for the Coulman High project has not been confirmed, but this ORW presumes that the project will be organised along the same lines as previous project operations. Therefore some operational support that will be utilised is NOT requested, as it would be provided either by the ANDRILL project, or

by AntNZ. This is generally referenced in text or attachments.

A variety of scientific work will be conducted at the drill sites including on-ice seismic surveys, ice-based radar surveys, and tide and current monitoring.

The hot water drill and associated equipment will remain on the Ross Ice Shelf for use in subsequent field seasons.

Project Web Site
Important: Please leave blank if the project does not have a website.

http://www.andrill.org

Project Information :: Participant Roster

Please define the Principal Investigator and Primary Contact for this project.

Principal Investigator (PI)	
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ANDRILL Science Management Office 126 Bessey Hall University of Nebraska - Lincoln Lincoln, NE 68588-0341 frack2@unl.edu ph: (402) 472-6745 fax: 4024726724 Inst: University of Nebraska Lincoln (Department of Geosciences)	ORW Access: Read/Write ✔ Send Project Updates

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Project Information :: Project Schedule

Please provide information regarding your deployments by station/vessel and season for this project. The total number of deployments is the number of deploying individuals from your group multiplied by the number of times each individual deploys. For groups that deploy only once per season to the same station/vessel, total deployments is the total number of deploying team members. ***If you enter a total number of deployments, we require you to provide the highest population from your group that will be at the station/vessel at any given time during that season, the date on which the first person from your group will arrive and the date on which the last person will depart***. Please indicate whether or not your deployment dates are flexible. ***If your deployment dates are not flexible, a reason why is also required***.

Station/Vessel	Season	Total # of Deployments	* Highest # on Station at Same Time	* First Arrival	*Final Departure
McMurdo Station	2010–2011	30	30	01 Oct 2010	15 Feb 2011
	Dates flexible? Yes				

Project Information :: Participant Itinerary

Please enter all field site(s) you plan to visit at each main station listed below, if any. Many grids throughout this application have location/site dropdowns. These dropdown lists are prepopulated with the sites you define for each station and season on this page. If you do not plan on visiting any field sites at a main station during a season, leave that table blank.
NOTE: Each column in a table marked with an asterisk is required if a table row has been added.

McMurdo Station :: 2010–2011 Season

Field Site	Activities
Ross Ice Shelf	Test HWD system on RIS; deploy current and tidal monitoring mooring through hole. Test operation of ROV through hole. Test open hole maintenance capability of HWD. Ice density, on-ice radar (site and route to site) and seismic surveys. Characterize ice sheet movement via emplacement of GPS units.

Project Information Comments

The following comments have been left for this section:

DB: I've started this ORW in anticipation of NSF requiring a new one for the 2010–2011 season which (at present) will consist of site survey work only. I've tried to go through and scrub out references to needs in seasons other than '10–'11. I carried over all personnel and access permissions from the original multi–season ORW that Steve Fischbein put together last year. Input/editing from those with more experience on the project than I have is most welcome.
–– Daren Blythe, 07/01/2009 11:57 AM

DB: Note that I've combined the 2 Coulman High sites into one, more generic "Ross Ice Shelf" designation (this was also a pre–existing site in the relevant Polar Ice menus). This has simplified other aspects of the document as well; however, if it's deemed necessary to distinguish between the two Coulman High sites as seen by RPSC we should be able to re–establish the dual–site representation.
–– Daren Blythe, 07/01/2009 12:05 PM

Permits

Depending on the details of your research, some activities may be subject to regulation, such as the Antarctic Conservation Act (ACA), New Zealand Environmental Risk Management Authority, New Zealand Ministry of Agriculture and Forestry, United States Department of Agriculture, or the USAP Master Permit. For more information, refer to the online help. You may also need a permit if you plan to take certain indigenous Antarctic species, to introduce any non–indigenous species to Antarctica, or to enter Antarctic Specially Protected Areas (ASPA's). NOTE: The PI is responsible for obtaining all required permits and clearances, and paying the necessary fees.

The following is an incomplete list of types of samples that may require a MAF, ACA, USDA or ERMA permit:

- **Animal material of any kind**
- **Plant material of any kind, including seeds**
- **Viruses, Bacteria or Cell Cultures**
- **Rock Samples**
- **Soil Samples**
- **Marine Sediment Samples**
- **Freshwater Sediment Samples**
- **Ice Samples**
- **Seawater Samples**
- **Freshwater Samples**
- **Air Samples**
- **Genetically modified organisms**

Below is a summary of informational links concerning the various permits. If you have questions about which permits are required, contact your project POC.

Activity	Yes	No	Description (if applicable)
* Taking or considering importing or exporting samples from Antarctica			
2010–2011	✓		Possible seawater and ice shelf samples.
* Taking native antarctic mammals or birds or parts thereof			
2010–2011		✗	
* Collecting antarctic plants			
2010–2011		✗	
* Exporting antarctic animals or plants from the United States			
2010–2011		✗	
* Introducing non–indigenous species into Antarctica, including micro–organisms			
2010–2011		✗	
* Research involving native flora/fauna			
2010–2011		✗	

* Entering Antarctic Specially Protected Areas or Antarctic Specially Managed Areas			
2010–2011		✘	
* Collecting data/samples within the 200–mile territorial jurisdiction of any country			
2010–2011		✘	
* Importing or exporting new and genetically modified organisms into and through New Zealand			
2010–2011		✘	

Permits :: Permit Applications

Please note the **minimum lead times** required for filing permits with the appropriate agencies.

NOTE: The PI is responsible for obtaining any required ACA permits, USDA permits, ERMA permits, and U.S. Foreign Clearances.

Permit	Lead Time
Antarctic Conservation Act (ACA)	12 weeks
Marine Mammal Protection Act (MMPA)	32 weeks
New Zealand Environmental Risk Management Authority (ERMA)	12 weeks
New Zealand Ministry of Agriculture and Forestry Form A	4 weeks
New Zealand Ministry of Agriculture and Forestry Form B	4 weeks
New Zealand Ministry of Agriculture and Forestry Form C	4 weeks
Research Vessel Clearances for Work in Foreign Exclusive Economic Zone (EEZ)	24 weeks
U.S. Department of Agriculture Permit	16 weeks
U.S. Department of State Foreign Clearance for Sample Collection	28 weeks

Cargo

Cargo Requirements	Yes	No	Description (if applicable)
* Do you have any cargo requirements?			
2010–2011	✔		Equipment necessary to deploy current and tidal monitoring mooring. On-ice RADAR equipment and over-ice seismic survey. Possible project-owned drilling equipment south by ship.

Cargo :: Cargo List

Identify your cargo requirements. DO NOT use this table for baggage, handcarry items, or items the RPSC is purchasing and shipping for you. Please note that you are not allowed to check Shipped via COMAIR for Southbound cargo, and you may not check Needed At Camp or Explosive for Northbound cargo.

If you have a multi–season ORW, enter cargo items for each season before clicking continue button (multiple seasons are links at top of table). If you get a warning notice while validating this section, be sure to check each season for validation issues.

Season: 2010–2011

Item Name	Qty	Total Wt (lbs.)	Avail. 6 wks Prior to Arrival?	Len. (in.)	Width (in.)	Ht. (in.)	Ship Via COMAIR	Cooling Needed	Oversize	Keep Dry	Do Not Freeze	Hazardous	Radioactive	Biological Specimen	Needed at Camp	Fragile	Explosive
No Cargo Items are listed for this worksheet season.																	

Environmental Requirements

Describe your project's impact on the Antarctic environment. This information is required.

Environmental Impacts	Yes	No	Description (if applicable)
* Physical disturbance of land areas			
2010–2011	✔		Establishment of GPS base station &VHF repeater site in the vicinity of Cape Crozier.
* Construction of a field camp requiring full–time personnel for camp operations			
2010–2011	✔		Field camp at Coulman High (Ross Ice Shelf) to support various site survey work.
* Conducting remote field deployment			
2010–2011	✔		Field camp at Coulman High sites 1 and 2 to support various site survey work. Seismic field camp to be established between drill sites 1 and 2, roughly 10km south of ice margin.
* Perturbation experiments, i.e., re–routing water flow or manipulating the habitat of birds or mammals			
2010–2011		✘	
* Use of explosives – if yes, please add details in the Description box			
2010–2011	✔		Seismic survey on ice shelf using explosives. Two 20-km lines to be run north-south from ice margin, each running through one of the Coulman High drill sites.
* Ice, rock, or sediment coring			
2010–2011	✔		Possible sediment grab or short cores. Possible shallow (
* Drilling or the release of drilling fluids			
2010–2011	✔		Hot water drill used to create hole through ice shelf for water column survey, ROV operations and HWD testing.
* Excavation of soil or snow			

2010–2011	✓		Movement of snow at site to create suitable surface for equipment setup. Holes in ice shelf by hot water drill for water column survey and waste disposal.
* Placement of temporary scientific equipment for more than one season that may be irretrievable			
2010–2011	✓		Mooring in water column expected to be recovered after 2-12 months, but may not be recoverable.
* Erecting any structure with a longevity of more than one year			
2010–2011	✓		Field camp at Coulman High to support various site survey work; most of the camp will remain on-site for future seasons.
* Excavation, blasting, or drilling (other than drilling ice cores of 5 meters or less)			
2010–2011	✓		Hot water drilling through ice shelf; also drilling of holes up to 40m deep every 50m for two 20-km lines of seismic charges.
Research-Related Wastes	**Yes**	**No**	**Description (if applicable)**
* Generating any hazardous wastes in a lab or a field location			
2010–2011		✗	
Hazardous Materials Used in the Field	**Yes**	**No**	**Description (if applicable)**
* Use of any hazardous materials in the field			
2010–2011	✓		Industrial lubricants and vehicle- and drilling-related products. Explosives for seismic surveys.
* Managing the fuel used at your field camp			
2010–2011	✓		Fuel use and management as per site policy and CEE-described procedures.
Releases to the Environment	**Yes**	**No**	**Description (if applicable)**
* Excluding the emissions from the combustion of fossil fuels, will the proposed activities result in any release into the Antarctic environment, including irretrievable science equipment, hazardous materials, wastewater, etc.?			
2010–2011	✓		Wastewater disposal into ice shelf and/or water column.

Describe all activities that may affect the Antarctic Environment or any future scientific investigations. Be specific.

All environmental impacts related to drilling activities anre intended to be covered by a Comprehensive Environmental Evaluation (CEE) as was completed by Antarctica New Zealand for earlier ANDRILL drilling activities. Pre-drilling activities such as over-ice seismic, over-ice RADAR and airborne RADAR, tidal/current meter deployment will also need an environmental evaluation, perhaps at a lower level than a CEE.

Environmental Requirements :: Hazardous Materials Used in the Field

Fuels

If you will be managing the fuel used at your camp(s), describe the type and quantity of fuel expected to be used at each camp.

Season: 2010–2011

* Camp Name, Location	* Type of Fuel	* Gallons
Ross Ice Shelf	Diesel	16000
Ross Ice Shelf	Propane	30
Ross Ice Shelf	Gasoline	2500
Ross Ice Shelf	Gas/Oil Mix	200

Hazardous Materials

Identify below the type, location, and quantity of hazardous materials you expect to use in the field. If you will be staying at an RPSC–managed camp, please complete the information below for lab chemicals only.

Season: 2010–2011

* Hazardous Materials Type	* Location of Use	* Material Quantity
Explosives, Incendiary Devices	Ross Ice Shelf	>200 lb

Environmental Requirements :: Projected Release

Describe any solid, liquid, or gaseous substances (e.g., scientific materials, wastewater, equipment) you will be releasing while in the field, excluding air emissions from the combustion of fossil fuels. A release is defined as any intentional discharge or emission to the air, water, land, or ice of the Antarctic environment, and includes the placement of equipment that may be abandoned or become

irretrievable.

Season: 2010–2011

* Substance Name	* Substance Type	* Location of Release	* Release Amount	* Unit of Measure	* Total Number of Releases Per Field Season
Waste water	Wastewater: mixed (urine, greywater, human solid waste)	Ross Ice Shelf	200	liters	48
Tidal and current monitoring mooring	Equipment: Mooring anchors	Ross Ice Shelf	200	kilograms	2
Explosives for over-ice seismic study	Scientific materials: Explosives	Ross Ice Shelf	2000	kilograms	800
Potentially irretrievable tidal and current monitoring equipment	Equipment: Cables, detectors, monitoring sensors, or probes	Ross Ice Shelf	500	meters	2
Potentially irretrievable GPS monitoring sensors	Equipment: Cables, detectors, monitoring sensors, or probes	Ross Ice Shelf	1	each	1

Environmental Requirements Comments

The following comments have been left for this section:

DB: In the fuels section I've added a row for premix and inserted an initial estimate of 200 gallons for the season. Anyone with experience in ANDRILL operations should feel free to revise this estimate.
–– Daren Blythe, 07/01/2009 12:09 PM

Science Construction

Please answer the following questions concerning your science construction requirements. All answers are required.

Science Construction Requirements	Yes	No	Description (if applicable)
* Do you require the construction of field camp structures? If yes, please include the type of structure, use and # of people in the Description box.			
2010–2011		✘	*
* Do you require the use of portable (towable) structures?			
2010–2011	✓		2 sledge-mounted milvans for ROV operations; would potentially stay at site until end of drilling in 2014.
* Do you require the fabrication of materials?			
2010–2011		✘	
* Based on your current understanding of the standard USAP station and field facilties, will these facilities require modifications to meet the needs of your project? If yes, please provide additional details about new or modified facilities and structures when prompted later in this section.			
2010–2011		✘	
* Do you require any surveying services from McMurdo Station?			
2010–2011	✓		For site survey

Describe any other construction requirements.

DB: I assume the milvans mentioned above (I copied them from the older ORW) are ones we're requesting from RPSC and not already owned by ANDRILL.

Computers

The person responsible for implementing and maintaining the deployed systems should fill out this section. Inaccurate or incomplete information in this section may result in delays in processing your SIP.

Ensure your project team is familiar with the most current Information Security Awareness materials. Information Security Awareness training is a Federal requirement and must be completed prior to obtaining access to the USAP network.

All systems connected to the USAP infrastructure are required to meet the most current USAP Computer Screening Requirements materials. Please ensure that everyone on your team is familiar with these requirements as they apply to both project support AND personal systems. All systems unable to meet these requirements will require special approval before being allowed to connect to the USAP infrastructure, either directly or indirectly.

USAP provides standard software on public computers. If you require non–standard software, please include the license costs in your grant proposal.(Standard Software List)

Please answer the following questions concerning your computer requirements. All answers are required.

Computer Support	Yes	No	Description (if applicable)
* Does your project plan to transfer data off land–based stations on a scheduled basis from an installed experiment, instrument or device?			
2010–2011	✓		This season it may be appropriate for USAP support to test computer and data transmission from remote drill sites for use in upcoming (subsequent seasons') operations.
Extensive Data Transmission	**Yes**	**No**	**Description (if applicable)**
* Do you expect your project to require extensive data transmission? Please provide details here and also in your proposal.			
2010–2011		✗	

Computers :: Data Transmission

Please fill out the appropriate grid(s) if you plan to transfer data off station or off vessel on a scheduled or automated basis.

Methods of transferring the data could include:

- installed equipment
- installed instruments
- other devices
- outreach efforts

NOTE: Because of bandwidth limitations, off–ice transfer rates can be very slow. For example, transferring a 500 MB file may take twelve hours or longer.

If your data quantity requirement is equal or less than 1 MB, please enter 1 for your quantity.

Season: 2010–2011

* Qty of Data (MB)	* Transmission Method	Transmission Frequency	Describe Instrument/Experiment/Data/Outreach
1	SFTP	Month	To test data transmission for future seasons if USAP chooses.

If you have additional data transmission requirements, please specify them here.

Communications

Please indicate your communications requirements. All answers are required.

Communications Requirements	Yes	No	Description (if applicable)
* Will your project require additional power supplies?			
2010–2011	✓		Step-down transformer to allow US equipment to run on drill site (NZ) power.
* Will your project require the installation of communications equipment (voice, data, or video)?			
2010–2011	✓		Ideally, phones at drill site and drill site camp, radio for Helo/Flight comms.
* Does your team have voice communication requirements using HF or VHF radios or Iridium?			
2010–2011	✓		Will need voice connectivity between drill site and McMurdo. Also see comms requirements listed in row above.
* Will your team be bringing equipment that operates at radio frequencies, or using RF equipment not issued through RPSC?			
2010–2011	✓		Will be using ANDRILL-owned radios, as well as possible use of radios from Scott Base.
* Does your project require antenna and/or tower support for voice or data transmission by means other than what is provided by the existing infrastructure at McMurdo, South Pole or Palmer Station?			
2010–2011	✓		As needed for data and voice transmission (specifically, may need VHF repeater site in vicinity of Cape Crozier).
* Does your team require line–of–sight radio telephones from McMurdo Station inventory?			
2010–2011		✗	
* Does your team require telephone cabling at currently unserviced locations at McMurdo Station?			
2010–2011		✗	
* Does your project require data connectivity in field sites out of McMurdo, S. Pole or Palmer Stations?			
2010–2011	✓		Set up as possible test

			for remote transmission prior to drilling activities in subsequent seasons.
* Does your project require Iridium service to transfer data from field sites?			
2010–2011		✘	

Please describe any additional communications requirements.

DB: Will the scaled-back nature of the site survey (HW drilling only, without the full rig/camp) require the phones mentioned above?

Laboratory

Please indicate your laboratory, office space, and equipment requirements. All questions are required.

Laboratory Space and Equipment Requirements	Yes	No	Description (if applicable)
* Do you have requirements for Laboratory space at McMurdo Station?			
2010–2011		✘	
* Will your project require the use of radioisotopes?			
2010–2011		✘	
* Will your project require the use of Liquid Cryogens?			
2010–2011		✘	
* Do you have requirements for general–purpose science or laboratory equipment that has an estimated value greater than $5,000 and would be purchased by the USAP and not your grant? (No comment required, further details required in Equipment section)			
2010–2011		✘	
* Will your project require consumable lab materials or supplies? If so, identify the cost of materials and supplies needed to support your project each season. (No comment required, further details required in Equipment section)			
2010–2011		✘	

UNAVCO Support

GPS Requirements	Yes	No
* Do you have requirements for Global Positioning System (GPS) support exceeding the capabilities of handheld recreational units (+–5m) out of McMurdo Station?		
2010–2011	✓	
LiDAR Requirements	**Yes**	**No**
* Do you require ground based, Terrestrial Laser Scanner LiDAR support at McMurdo Station?		
2010–2011		✗
Remote Power Systems Requirements	**Yes**	**No**
* Do you require Remote Power Systems from UNAVCO at McMurdo Station? (UNAVCO provides solar and wind Low Power Systems (~5W) to operate remote autonomous instrumentation. More general power systems (i.e. for camp power needs) should be requested under the Mechanical Equipment tab.)		
2010–2011	✓	

UNAVCO Support :: GPS Requirements

Please indicate your GPS support requirements. All answers are required.

McMurdo Station

Season: 2010–2011

* Range of Accuracy	* Qty of Receivers	From Date	To Date	* Location of Use
1-10 cm	3	18 Oct 2010	14 Jan 2011	Ross Ice Shelf

Please describe what you would like to accomplish using GPS.

We need to establish data on ice shelf movement rates over time, including variability and total movement at both drill sites (Coulman High 1 and 2).

UNAVCO Support :: Remote Power Systems

UNAVCO provides solar and wind Low Power Systems (~5W) to operate remote autonomous instrumentation.
More general power systems (i.e. for camp power needs) should be requested under the Mechanical Equipment tab.

Please indicate your Remote Power Systems support requirements. All answers are required.

McMurdo Station

Season: 2010–2011

* Qty of Remote Power Systems	* Location of Use
3	Ross Ice Shelf

Please describe any additional details in regard to your Remote Instrumentation Power System needs.

Power systems are needed for GPS units.

Scientific Services

Please indicate your scientific services support requirements. All answers are required.

Scientific Services Requirements	Yes	No	Description (if applicable)
* Will your project require research associate support from McMurdo, South Pole or Palmer Station?			
2010–2011		✘	
* Will your project require spatial analysis, remote sensing, or GIS support from McMurdo or Palmer Station?			
2010–2011	✓		See below.
* Will your field team require Biospherical Instruments (BSI) Ultraviolet (UV) data beyond the standard products?			
2010–2011		✘	
* Will your project require ice core drilling support from McMurdo or South Pole Station?			
2010–2011		✘	

Please describe your need for any additional scientific services.

GIS support needed for data entry and plotting of field surveys for airborne and ice-based RADAR, seismic lines, current mooring deployment locations, drill hole locations, and ancillary field locations either on-ice or on-shore related to field excursions. ArcGIS files for transfer to ANDRILL servers and then off-continent.

DB: Am not sure how germaine the implied on-continent ANDRILL server is to the '10-'11 season, so I left it in. I don't know if we will be bringing a server down for the '10-'11 season.

Field Support

Please indicate your field support requirements at remote field camp locations. Refer to the Field Manual of the United States Antarctic Program
for more information about field party support and planning. All questions are required.

Field Camp Support	Yes	No	Description (if applicable)
* Will your team be conducting research from a field campsite, or on any islands out of McMurdo or Palmer Station?			
2010–2011	✓		Ross Ice Shelf over Coulman High
* Will your team require tents at a field camp out of McMurdo Station?			
2010–2011	✓		Camp required for over-ice seismic survey will be located roughly 10 km from ice margin, centrally located between drill sites 1 and 2 to split commute distance for running of seismic lines.
* Will your team require sleds at a field camp out of McMurdo Station?			
2010–2011	✓		For seismic and GPR surveys.
* Will your team require sleeping bags at a field camp out of McMurdo Station? If yes, enter number of bags required in the Description box.			
2010–2011	✓		* 14
* Will your team be working or traveling on the sea ice out of McMurdo or Palmer Station?			
2010–2011		✗	

Additional requirements or comments:

Sleds were requested in the Construction section for sledge-mounted milvans. Seismic and GPR survey will require a remote field camp (10 full-time personnel plus 2 to 4 education/outreach participants; maximum number anitcipated is 14).

Field Support :: Field Camp Tents

Detail your field camp tent requirements.

Season: 2010–2011

* # Tents	* Tent Type
8	Scott polar sleep
1	Scott polar toilet

Field Support :: Field Camp Sleds

We will determine the type of field camp sled(s) you require based on the weight you need to move and the distance you need to travel. Use the comment text area at the bottom of the page to explain in more detail your sled usage and requirements. If you are familiar with our available sleds, you may also enter your preferences in the text area.

Season: 2010–2011

* # Sleds	* Total Weight to Transport – lbs	* Location	* Distance – miles
1	1000	Ross Ice Shelf	100

Please provide any additional details that would help us determine which sled(s) to provide you.

Number shown is an estimate for seismic survey. Should be similar to requirements for previous seismic surveys at McMurdo Ice Shelf and Southern McMurdo Sound (2005 season).

Mechanical Equipment

Please enter your mechanical equipment and generator requirements. All questions are required.

Mechanical Equipment Requirements	Yes	No	Description (if applicable)
* Will your project require a winch? If so, please describe your needs.			
2010–2011		✘	
* Will your project require a hole melter at sites out of McMurdo, S. Pole or Palmer Station? If so, please describe your needs.			
2010–2011	✓		Seismic survey will require use of small hot water drill system from IDDOG (formerly ICDS).
* Will your team require portable generators that they will operate?			
2010–2011	✓		ROV requires portable generator, and possibly for seismic surveys. Ref. previous seismic surveys from 2005.
* Will your project require any renewable energy systems or equipment? If so, please describe your needs.			
2010–2011		✘	

Air Support

Please indicate your air support requirements. All questions are required.

Air Support Requirements	Yes	No	Description (if applicable)
* Do you require support from helicopters from McMurdo to camps or inland stations in Antarctica?			
2010–2011	✓		Helo or Twin Otter put-in of personnel and supplies to Coulman High site. See uploaded "Air Support" document for details.
* Do you require support from LC–130, Basler, or Twin Otter aircraft between McMurdo and other stations/camps in Antarctica?			
2010–2011	✓		Possible Twin Otter support, see above.

Air Support :: Helicopter Support Details

Please detail your support requirements in the section below. Two types of helicopters are typically flown: light–lift AS350/B2, or "A–Star" helicopters and Bell 212 helicopters. Please see the On–line help section for detailed descriptions concerning Support descriptions, payload and flight time restrictions. Estimated Cargo Weight needs to include all anticipated cargo (i.e., science gear, camp gear, food, fuel, dive gear, generators, compressors, samples, etc).

Season: 2010–2011

Flight Date	Date is Flexible?	Departure Location (If Other,Lat/Long in Deg/Min/Dec)	Arrival Location (If Other, Lat/Long in Deg/Min/Dec)	Type of Support	# of Psngrs	Est. Cargo Weight (lbs)
02 Nov 2010	✓	McMurdo Station **Lat:** **Long:**	Ross Ice Shelf **Lat:** **Long:**	Cargo/ Resupply	8	1000

Please provide a description that summarizes your table entry above and generally describes the type of work that you are planning at each site. Please include additional support requirements (photography, time sensitive sample movement, etc.) and any odd–sized, large, or hazardous cargo items. For all large or bulky items, include length, width and height. If "Other" was selected as either a Departure or Arrival location above, be sure to give details on the location including Lat/Long coordinates. The NSF Proposal Review Panel will assess this request.

Flights could be either helo or TO. Put-in and pull-out of field parties and associated equipment to/from Coulman High site(s).

Please FAX a detailed map(s) of your proposed area(s) of study to Science Planning at 303.792.9006. If possible, include on the map(s) any campsites, traverse routes, grid locations, drilling locales, sites of interest, landmarks, and so on. Be sure to include the PI's

name and Proposal/Event number on all pages.

Air Support :: Fixed Wing Support Details

Twin Otter: Generally used for small field teams requiring landings in non–groomed areas. The maximum weight allowed will depend upon distance traveled and the availability of fuel caches. As a general rule, total weight of passengers and cargo should not exceed 2400 lbs and flight time should not exceed three hours (or 500 nautical miles).

Basler: Medium–lift aircraft used for larger teams requiring landings at non–established camps. The maximum weight allowed will depend on distance traveled but is generally 3000 – 6000 lbs.

LC–130: Used for large field teams, heavy cargo, and long distances. Groups heading to existing large camps/stations such as South Pole or WAIS Divide will travel by LC–130.

Season: 2010–2011

Flight Date	Date is Flexible?	Aircraft Req'd	Departure Location (If Other,Lat/Long in Deg/Min/Dec)	Arrival Location (If Other, Lat/Long in Deg/Min/Dec)	Type of Support	Est. Close Support Hours	# of Psngrs	Est. Cargo Weight (lbs)
26 Oct 2010	✔	Twin Otter	McMurdo Station **Lat:** **Long:**	Ross Ice Shelf **Lat:** **Long:**	Passenger Transport	5.0	5	1000

Please provide a description that summarizes your table entry above and generally describes the type of work that you are planning at each site. If you know of any skiway/landing problems at any of the selected sites, please describe them here as well. Be sure to give details on the location including Lat/Long coordinates if known. The NSF Proposal Review Panel will assess this request.

Flights can be helo or TO. Put-in/pull-out of party(ies) to/from Coulman High sites.

DB: I got the impression that the 5 hours of close support was an artifact of the anticipated airborne RADAR survey by CReSIS, but I left it in anyway, just in case.

Diving Support

Please indicate your diving requirements. All questions are required.

Diving Requirements	Yes	No	Description (if applicable)
* Will your project involve research diving? If yes, enter the # of divers in the Description box.			
2010–2011		✘	*
* Will your project require dive tanks for dedicated use at a remote field camp out of McMurdo?			
2010–2011		✘	
* Will your project require dives in the Contaminated Zone near McMurdo Station?			
2010–2011		✘	

Vehicle Support

Please indicate your vehicle requirements. All answers are required.

Vehicle Requirements	Yes	No	Description (if applicable)
* Will your project require the use of any dedicated ATVs, snowmobiles or vehicles from McMurdo Station inventory?			
2010–2011	✓		GPR-capable vehicle for route establishment. Possible Hagglund for seismic survey.

Please describe any additional vehicle requirements.

Traversing support for establishment and supply is detailed under Heavy Equipment.

Vehicle Support :: Vehicle Requirements

Please indicate your dedicated ATV, snowmobile and vehicle requirements from McMurdo inventory.

Season: 2010–2011

* Location of Use	* Vehicle	* Quantity
Ross Ice Shelf	Pisten Bully	3

Heavy Equipment

Please indicate your heavy equipment/drilling requirements. All questions are required.

Heavy Equipment/Drilling Requirements	Yes	No	Description (if applicable)
* Will your team require the use of heavy equipment from McMurdo Station?			
2010–2011	✓		Traversing support for move of appoximately 16 sledge units and possible swap of 15000-liter JP8 tank.
* Will your project require the use of a Reed drill from McMurdo Station?			
2010–2011		✗	

Explosives

Please indicate your explosives requirements. All questions are required.

Explosives Requirements	Yes	No	Description (if applicable)
* Will your team require the use of explosives? If yes, please enter details in the description box.			
2010–2011	✓		For over-ice seismic survey on Ross Ice Shelf. Two seismic lines each running south 20 km from ice margin through the two Coulman High drill sites. Will need Blaster support.
* Will your team require the use of explosives for seismic work?			
2010–2011	✓		See above.

Explosives :: Seismic Work

You indicated that your team will require explosives for seismic work. Please provide details below. The NSF Proposal Review Panel will assess this requirement.

Season: 2010–2011

Explosive Type	Number of Blasts	Site Location	Will You Provide Your Own Blaster ?
Dynamite	800	Ross Ice Shelf	

ODEN

Please review the attached document ODEN Science Capabilites which contains the ODEN capabilities.

Keeping the above information in mind, please upload your requirements for work on the ODEN.

Project Files:

The following requirement documents have been uploaded and should be included with the Fastlane submission.