Operational Requirements Worksheet

2008–2009,2009–2010,2010–2011,2011–2012,2012–2013 Seasons

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:	Thursday, 5 June, 2008 at 09:46 MST
Printed for:	Madison Iler

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

ANDRILL will melt a hole in the Ross Ice Shelf (RIS) and then place a drilling rig over this hole to drill and recover rock core from beneath the sea floor below the RIS at two locations on the Coulman High (CH). ANDRILL will utilize a multiple hole/reentry technique during drilling to compensate for seaward RIS movement rates of roughly 2 m per day. ANDRILL will utilize multiple transport platforms to mobilize equipment and personnel to and from the drill sites.

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.

64 scientists, science support personnel, and educators will live at McMurdo Station. Most science personnel will work in the CSEC and others will be based at the ANDRILL CH drill site camp along with drilling operations personnel who are expected to be supported through Scott Base if AntarcticaNZ agrees to be the project operator.

A wide variety of scientific work will be conducted at the drill site including on-ice seismic surveys, airborne and ice-based radar surveys, tide and current monitoring, initial core characterization, downhole logging, and vertical seismic profiling. Standard initial core data capture activities occur at CSEC.

Fixed-wing, helicopters and tracked vehicles will be utilized to mobilize science team members to several field locations to aide and enhance the analysis and interpretation of cores recovered from the CH beneath the RIS.

Drill rig and camp will winter over on-or-near location at CH-2 until following season. Drill equipment and associated camp and infrastructure will be mobilized back to McMurdo during 2013/2014 field season.

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

www.andrill.org

Project Information :: Participant Roster

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

Principal Investigator (PI)	
Rack, Dr. Frank (m)	
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

Primary Contact	
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Co-PI	
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Co-PI	
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Dept. Earth Science University of California Santa Barbara, CA 93106-9630 luyendyk@geol.ucsb.edu ph: (805) 893-3009 Security/Remote-Passphrase fax: (805) 893-2314 Inst: University of California Santa Barbara (Dept. of Geological Sciences)	ORW Access: Read/Write ✔ Send Project Updates

Co-PI	
Wilson, Dr. Terry J. (f)	
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Security/Remote-Passphrase fax: (614) 292-1496 Inst: Ohio State University (Geological Sciences and Byrd Polar)	

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	2008–2009	2	2	01 Oct 2008	31 Dec 2008
	Dates flexible? Yes				
McMurdo Station	2009–2010	30	30	01 Oct 2009	15 Feb 2010
	Dates flexible? Yes				
McMurdo Station	2010–2011	8	8	01 Oct 2010	31 Dec 2010
	Dates flexible? Yes				
McMurdo Station	2011–2012	94	75	20 Aug 2011	30 Jan 2012
	Dates flexible? Yes				
McMurdo Station	2012–2013	94	75	20 Aug 2012	30 Jan 2013
	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 :: 2008–2009 Season

Field Site	Activities

Coulman High 1	Airborne radar survey over drill site and access transect
Coulman High 2	Airborne radar survey over drill site and access transect

McMurdo Station :: 2009–2010 Season

Field Site	Activities
Coulman High 1	Test hot water drilling system on RIS and deployment of 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. GPS,LIDAR,altimeter, weather surveys.
Coulman High 2	Test hot water drilling system on RIS and deployment of current and tidal monitoring mooring through hole. Test open hole maintenance capability of HWD. Ice density, on-ice radar (site and route to site) and seismic. GPS,LIDAR,altimeter, weather surveys.

McMurdo Station :: 2010–2011 Season

Field Site	Activities
Coulman High 1	Mobilize drilling and support equipment to drill site location.

McMurdo Station :: 2011–2012 Season

Field Site	Activities
Coulman High 1	Erect drill rig at AND-CH#1 and prepare field camp. Mobilize scientific, science support and educator team to McMurdo Station and drill site and commence drilling activities for AND-CH#1. Mob rig to AND-CH#2 winter location at completion of hole.
Coulman High 2	Move equipment to CH#2 winter site at end of season.

McMurdo Station :: 2012–2013 Season

Field Site	Activities
Coulman High 2	Erect drill rig at AND-CH#2 and prepare field camp. Mobilize scientific, science support and educator team to McMurdo Station and drill site and commence drilling activities for AND-CH#2. Teardown and mobilize equipment back to local winter storage site.

Project Information Comments

The following comments have been left for this section:

TF: The number of operations personnel anticipated for the project is outlined below. In previous ANDRILL drilling seasons, all operations personnel were supported and manifested by AntarcticaNZ as part of the role of the ANDRILL Project Operator. The Project Operator role for the Coulman High sites has not yet been confirmed.
2008/09: 0 operations personnel, 2009/10: 4 operations personnel, 2010/11:4, 2011/12 and 2012/13: 30
–– Tamsin Falconer, 06/04/2008 03:33 PM

SMO, Science, EOand support personnel for any given field season for the project are anticipated to be as follows: 2008/2009 = 2; 2009/2010 = 20; 2010/2011 = 4; 2011/2012 = 64; 2012/2013 = 64
–– Steven Fischbein, 06/04/2008 03:36 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.

Activity	Yes	No	Description (if applicable)
* Taking or considering importing or exporting samples from Antarctica			
2008–2009		✗	
2009–2010	✓		Possible sea water and ice shelf samples.
2010–2011		✗	
2011–2012	✓		Subsea rock cores obtained from AND-CH#1 and possible field localities associated with science team field excursions. Possible sea water and ice samples.
2012–2013	✓		Subsea rock cores obtained from AND-CH#2 and possible field localities associated with science team field excursions. Possible sea water and ice samples.
* Taking native antarctic mammals or birds or parts thereof			

2008–2009		✘	
2009–2010		✘	
2010–2011		✘	
2011–2012		✘	
2012–2013		✘	
* Collecting antarctic plants			
2008–2009		✘	
2009–2010		✘	
2010–2011		✘	
2011–2012		✘	
2012–2013		✘	
* Exporting antarctic animals or plants from the United States			
2008–2009		✘	
2009–2010		✘	
2010–2011		✘	
2011–2012		✘	
2012–2013		✘	
* Introducing non–indigenous species into Antarctica, including micro–organisms			
2008–2009		✘	
2009–2010		✘	
2010–2011		✘	
2011–2012		✘	
2012–2013		✘	
* Research involving native flora/fauna			
2008–2009		✘	
2009–2010		✘	
2010–2011		✘	
2011–2012		✘	
2012–2013		✘	
* Entering Antarctic Specially Protected Areas or Antarctic Specially Managed Areas			
2008–2009		✘	
2009–2010		✘	
2010–2011		✘	
2011–2012		✘	
2012–2013		✘	

* Collecting data/samples within the 200–mile territorial jurisdiction of any country			
2008–2009		✘	
2009–2010		✘	
2010–2011		✘	
2011–2012		✘	
2012–2013		✘	
* Importing or exporting new and genetically modified organisms into and through New Zealand			
2008–2009		✘	
2009–2010		✘	
2010–2011		✘	
2011–2012		✘	
2012–2013		✘	

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?			
2008–2009	✔		Possible CReSIS airborne radar survey with support from OPP to be conducted over traverse route and drill sites. May need contingency in following year for equipment mobilization if survey does not happen in 08-09 season.
2009–2010	✔		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.
2010–2011	✔		Drilling and field camp equipment. Project-owned drilling equipment south by ship.
2011–2012	✔		Geologic research support equipment. Project-related drilling consumables south by ship.
2012–2013	✔		Geologic research support equipment.

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: 2008–2009

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
May possibly need shipment of CReSIS Radar Equipment.	5	8000		144	48	48			✓	✓	✓					✓	
Direction: Southbound																	

Season: 2009–2010

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
Current and tidal mooring equipment and deployment tools. Radar survey equipment	15	13000		48	48	48				✓	✓				✓	✓	
Direction: Southbound																	
Over-ice seismic equipment	4	5000		48	48	48				✓	✓				✓	✓	✓
Direction: Southbound																	
Drilling equipment (transport by ship for traverse following season)	15	120000		48	48	48											
Direction: Southbound																	
ROV and support	1	3000		144	48	48				✓	✓				✓	✓	

equipment including winch																	
Direction: Southbound																	
ROV and support equipment including winch	1	3000		144	48	48					✓					✓	
Direction: Northbound																	

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
Drilling support tools and equipment	2	2500	✓	144	48	48				✓	✓				✓	✓	
Direction: Southbound																	
Downhole logging tools and hydrofrac equipment to either be mob to drill site and staged, or staged	15	13000	✓	144	48	48				✓	✓				✓	✓	
Direction: Southbound																	
Drilling equipment (to be sent by ship) - breakdown in comments/attachement	35	575000		144	48	48											
Direction: Southbound																	

Season: 2011–2012

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
Drilling support equipment, logging tools,	15	13000	✓	144	48	48			✓	✓	✓				✓	✓	

hydrofrac.																	
Direction: Southbound																	
US Microscope	1	50	✓	54	54	54				✓	✓				✓	✓	
Direction: Southbound																	
CHC Microscope	1	65	✓	26	18	23				✓	✓				✓	✓	
Direction: Southbound																	
CHC Reference texts	1	15	✓	15	10	9				✓	✓				✓	✓	
Direction: Southbound																	
US microscope	1	50	✓	36	26	24				✓	✓				✓	✓	
Direction: Southbound																	
US Misc items	1	50	✓	24	20	24				✓	✓				✓	✓	
Direction: Southbound																	
US Misc micropaleo supplies	1	45	✓	19	16	13				✓	✓				✓	✓	
Direction: Southbound																	
US Micropaleo processing equipment	1	45	✓	36	22	16				✓	✓				✓	✓	
Direction: Southbound																	
US Microscope	1	55	✓	36	20	16				✓	✓				✓	✓	
Direction: Southbound																	
US Reference literature	1	50	✓	24	20	20				✓	✓				✓	✓	
Direction: Southbound																	
US Microscope	1	35	✓	126	32	70				✓	✓				✓	✓	
Direction: Southbound																	
CHC XRF Scanner	1	2800	✓	32	24	16				✓	✓				✓	✓	
Direction: Southbound																	
CHC Ancillary equipment for XRF	1	90	✓	52	8	5				✓	✓				✓	✓	
Direction: Southbound																	
CHC neutron porosity tool, flowmeter, and	1	45	✓	99	13	7				✓	✓				✓	✓	

handling tools																
Direction: Southbound																
CHC Sonic tool, induction tool, and magnetic susceptibility tool	1	130	✓	94	6	6				✓	✓				✓	✓
Direction: Southbound																
CHC Caliper tool and multifunction tool	1	80	✓	135	6	6				✓	✓				✓	✓
Direction: Southbound																
CHC Gamma density tool	1	70	✓	135	6	6				✓	✓				✓	✓
Direction: Southbound																
CHC Dipmeter	1	100	✓	30	24	24				✓	✓				✓	✓
Direction: Southbound																
CHC Gamma source, Cesium-137, 100 millicurie	1	80	✓	24	24	24				✓	✓				✓	✓
Direction: Southbound																
CHC Neutron source, AmBe-241, 3.16 curie	1	100	✓	24	20	18					✓	✓			✓	✓
Direction: Southbound																
CHC Data acquisition boxes, winch interface, electronics	1	70	✓	32	24	16					✓	✓			✓	✓
Direction: Southbound																
CHC Aluminium boxes(Geotek)	15	1560	✓	24	16	16					✓	✓			✓	✓
Direction: Southbound																
CHC Aluminium boxes(Geotek)	4	290	✓	26	26	32					✓	✓			✓	✓
Direction: Southbound																
CHC Plywood box(Geotek)	1	130	✓	67	24	16				✓	✓	✓			✓	✓

Direction: Southbound																
CHC Plywood box(Geotek)	1	240	✓	67	24	24					✓	✓			✓	✓	
Direction: Southbound																
CHC Plywood box(Geotek)	1	220	✓	48	28	28					✓	✓			✓	✓	
Direction: Southbound																
CHC Plywood boxes (Geotek)	2	93	✓	22	12	12					✓	✓			✓	✓	
Direction: Southbound																
CHC Plywood box(Geotek)	1	100	✓	16	16	19					✓	✓			✓	✓	
Direction: Southbound																
US Geotek Scanner	1	500	✓	76	22	24					✓	✓			✓	✓	
Direction: Southbound																
US Geotek Scanner	1	200	✓	28	24	29					✓	✓			✓	✓	
Direction: Southbound																
US Geotek Scanner	1	200	✓	48	28	28					✓	✓			✓	✓	
Direction: Southbound																
US Rock saw	1	200	✓	42	42	42					✓	✓			✓	✓	
Direction: Southbound																
US SMO office supplies	6	300	✓	30	30	30					✓	✓			✓	✓	
Direction: Southbound																
US Corelyzer Units	2	200	✓	30	31	27					✓	✓			✓	✓	
Direction: Southbound																
US SMO Computer servers	2	150	✓	45	28	22					✓	✓			✓	✓	
Direction: Southbound																
CHC neutron porosity tool, flowmeter, and handling tools	1	50	✓	54	54	54					✓	✓			✓	✓	
Direction: Southbound																

CHC Plywood box(Geotek)	1	100	✓	26	18	23					✓	✓			✓	✓	
Direction: Southbound																	
Drilling support equipment, logging tools, hydrofrac.	1	65	✓	15	10	9					✓	✓			✓	✓	
Direction: Southbound																	
Drilling equipment (mud products consumables) for ship transport to McM	7	260000		240	48	48											
Direction: Southbound																	
US Microscope -	1	15		36	28	24					✓	✓				✓	
Direction: Northbound																	
CHC Microscope	1	50		24	24	24					✓	✓				✓	
Direction: Northbound																	
CHC Reference texts	1	60		19	16	13					✓	✓				✓	
Direction: Northbound																	
US Microscope	1	45		36	22	16					✓	✓				✓	
Direction: Northbound																	
US Microscope	1	55		126	32	70					✓	✓				✓	
Direction: Northbound																	
US Micropaleo processing equipment	1	2800		32	24	16					✓	✓				✓	
Direction: Northbound																	
US Microscope	6	90		52	8	5					✓	✓				✓	
Direction: Northbound																	
CHC XRF Scanner	1	45		99	13	7					✓	✓				✓	
Direction: Northbound																	
CHC Ancillary equipment for XRF	1	130		94	6	8					✓	✓				✓	
Direction: Northbound																	

HC Sonic tool, induction tool, and magnetic susceptibility tool	1	80		135	6	6					✓	✓				✓	
Direction: Northbound																	
CHC Caliper tool and multifunction tool	1	70		30	24	24					✓	✓				✓	
Direction: Northbound																	
CHC Gamma density tool	1	100		24	24	24					✓	✓				✓	
Direction: Northbound																	
CHC Dipmeter	1	100		24	20	18					✓	✓				✓	
Direction: Northbound																	
CHC Gamma source, Cesium-137, 100 millicurie	1	100		32	24	16					✓	✓				✓	
Direction: Northbound																	
CHC Neutron source, AmBe-241, 3.16 curie	1	70		24	16	16					✓	✓				✓	
Direction: Northbound																	
CHC Data acquisition boxes, winch interface, electronics	15	1560		28	26	32					✓	✓				✓	
Direction: Northbound																	
CHC Aluminium boxes(Geotek)	4	290		67	24	16					✓	✓				✓	
Direction: Northbound																	
CHC Aluminium boxes(Geotek)	1	130		48	28	28					✓	✓				✓	
Direction: Northbound																	
CHC Plywood box(Geotek)	1	240		22	12	12					✓	✓				✓	
Direction: Northbound																	
	1	220		16	16	19					✓	✓				✓	

CHC Plywood box(Geotek)																
Direction: Northbound																
CHC Plywood box(Geotek)	2	93		36	24	24					✓	✓				✓	
Direction: Northbound																
CHC Plywood boxes (Geotek)	1	100		60	22	42					✓	✓				✓	
Direction: Northbound																
US Core Scanner	1	150		48	22	15					✓	✓				✓	
Direction: Northbound																
US Core Scanner	1	300		18	12	18					✓	✓				✓	
Direction: Northbound																
US Fracture cart	1	75		50	20	18					✓	✓				✓	
Direction: Northbound																
US UPS	1	75		50	20	18					✓	✓				✓	
Direction: Northbound																
US Fracture logging equipment	2	85		18	12	18					✓	✓				✓	
Direction: Northbound																
CHC Fracture logging equipment	1	50		76	22	24					✓	✓				✓	
Direction: Northbound																
CHC UPS	1	75		28	24	29					✓	✓				✓	
Direction: Northbound																
US Geotek Scanner	1	500		48	28	28					✓	✓				✓	
Direction: Northbound																
US Geotek Scanner	1	200		42	42	42					✓	✓				✓	
Direction: Northbound																
US Geotek Scanner	1	200		144	36	66					✓	✓				✓	
Direction: Northbound																

US Rock saw	1	200		60	48	52					✓	✓				✓	
Direction: Northbound																	
US Core Splitter	1	2000		40	39	39					✓	✓				✓	
Direction: Northbound																	
US Logging Winch	1	6000		40	39	45					✓	✓				✓	
Direction: Northbound																	
US Hydraulic power unit	1	1000		40	30	30					✓	✓				✓	
Direction: Northbound																	
US Hydrofrac skid	1	700		80	6	6					✓	✓				✓	
Direction: Northbound																	
US Support equipment	1	700		80	6	6					✓	✓				✓	
Direction: Northbound																	
US orientation tool	1	80		108	5	5					✓	✓				✓	
Direction: Northbound																	
US Frac tool	1	60		31	38	26					✓	✓				✓	
Direction: Northbound																	
US NQ Packers	4	360		65	50	70					✓	✓				✓	
Direction: Northbound																	
US Water Tank	1	30		45	42	40					✓	✓				✓	
Direction: Northbound																	
US 1/2" hose on reel	1	2700		50	31	27					✓	✓				✓	
Direction: Northbound																	
US 3/16" hose on reel	1	1000		45	28	22					✓	✓				✓	
Direction: Northbound																	
US Corelyzer Units	2	200		45	28	22					✓	✓				✓	
Direction: Northbound																	
US SMO Computer servers	2	150		54	36	36					✓	✓				✓	

Direction: Northbound																
Rock samples containing no organic matter collected from > 5 meters below the sea floor	1000	50000		24	36	4					✓	✓				✓	
Direction: Northbound																
Rock samples	8	5000		48	48	48					✓	✓				✓	
Direction: Northbound																

Season: 2012–2013

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
Drilling support equipment, logging tools, hydrofrac.	16	13000	✓	144	48	48			✓	✓	✓				✓	✓	
Direction: Southbound																	
US Microscope -	1	50	✓	54	54	54				✓	✓				✓	✓	
Direction: Southbound																	
CHC Microscope	1	65	✓	26	18	23				✓	✓				✓	✓	
Direction: Southbound																	
CHC Reference texts	1	15	✓	15	10	9				✓	✓				✓	✓	
Direction: Southbound																	
US microscope	1	50	✓	36	28	24				✓	✓				✓	✓	
Direction: Southbound																	
US Misc items	1	60	✓	24	20	24				✓	✓				✓	✓	
Direction: Southbound																	
US Misc micropaleo supplies	1	45	✓	19	16	13				✓	✓				✓	✓	
Direction: Southbound																	

US Micropaleo processing equipment	1	45	✓	19	16	13				✓	✓				✓	✓	
Direction: Southbound																	
US Microscope	1	55	✓	36	22	16				✓	✓				✓	✓	
Direction: Southbound																	
US Reference literature	1	50		36	20	16				✓	✓				✓	✓	
Direction: Southbound																	
US Microscope	1	35	✓	24	20	20				✓	✓				✓	✓	
Direction: Southbound																	
CHC XRF Scanner	1	2800		126	30	70			✓	✓	✓				✓	✓	
Direction: Southbound																	
CHC Ancillary equipment for XRF	1	90	✓	32	24	16				✓	✓				✓	✓	
Direction: Southbound																	
CHC neutron porosity tool, flowmeter, and handling tools	1	45	✓	52	8	5			✓	✓	✓				✓	✓	
Direction: Southbound																	
CHC Sonic tool, induction tool, and magnetic susceptibility tool	1	130	✓	99	13	7			✓	✓	✓				✓	✓	
Direction: Southbound																	
CHC Caliper tool and multifunction tool	1	80	✓	135	6	6			✓	✓	✓				✓	✓	
Direction: Southbound																	
CHC Gamma density tool	1	70	✓	135	6	6			✓	✓	✓		✓		✓	✓	
Direction: Southbound																	
CHC Dipmeter	1	100	✓	30	24	24			✓	✓	✓				✓		
Direction: Southbound																	
CHC Gamma source, Cesium-137, 100	1	80	✓	24	24	24				✓	✓		✓		✓		

millicurie																	
Direction: Southbound																	
CHC Neutron source, AmBe-241, 3.16 curie	1	100	✓	24	20	18				✓	✓		✓		✓		
Direction: Southbound																	
CHC Data acquisition boxes, winch interface, electronics	1	70		32	24	16				✓	✓				✓		
Direction: Southbound																	
CHC Aluminium boxes(Geotek)	15	1560	✓	24	16	16				✓	✓				✓		
Direction: Southbound																	
CHC Aluminium boxes(Geotek)	4	290		26	26	32				✓	✓				✓		
Direction: Southbound																	
CHC Plywood box(Geotek)	1	130	✓	67	24	16				✓	✓				✓		
Direction: Southbound																	
CHC Plywood box(Geotek)	1	240	✓	67	24	24				✓	✓				✓		
Direction: Southbound																	
CHC Plywood box(Geotek)	1	220	✓	48	28	28				✓	✓				✓		
Direction: Southbound																	
CHC Plywood boxes (Geotek)	2	93	✓	22	12	12				✓	✓				✓		
Direction: Southbound																	
CHC Plywood box(Geotek)	1	100	✓	16	16	16				✓	✓				✓		
Direction: Southbound																	
US Geotek Scanner	1	500	✓	76	22	24			✓	✓	✓				✓		
Direction: Southbound																	
US Geotek Scanner	1	200		28	24	29				✓	✓				✓		
Direction: Southbound																	

US Geotek Scanner	1	200		28	24	29				✓	✓				✓		
Direction: Southbound																	
US Geotek Scanner	1	200	✓	48	28	28				✓	✓				✓		
Direction: Southbound																	
US Rock saw	1	200	✓	42	42	42				✓	✓				✓		
Direction: Southbound																	
US SMO office supplies	6	300	✓	30	30	30				✓	✓				✓		
Direction: Southbound																	
US Corelyzer Units	2	200	✓	30	31	27				✓	✓				✓		
Direction: Southbound																	
US SMO Computer servers	2	150	✓	45	28	22				✓	✓				✓		
Direction: Southbound																	
CHC neutron porosity tool, flowmeter, and handling tools	1	50	✓	54	54	54				✓	✓		✓		✓		
Direction: Southbound																	
CHC Plywood box(Geotek)	1	100		26	18	23				✓	✓				✓		
Direction: Southbound																	
Drilling support equipment, logging tools, hydrofrac.	1	65		15	10	9				✓	✓				✓		
Direction: Southbound																	
US SMO Computer servers	2	1000		54	36	36				✓	✓				✓		
Direction: Southbound																	
US Microscope –	1	15		36	28	24				✓	✓						
Direction: Northbound																	
CHC Microscope	1	50		24	24	24				✓	✓						
Direction: Northbound																	
	1	50		19	16	13				✓	✓						

CHC Reference texts																	
Direction: Northbound																	
US Microscope	1	45		36	22	16				✓	✓						
Direction: Northbound																	
US Microscope	1	55		126	32	70				✓	✓						
Direction: Northbound																	
US Micropaleo processing equipment	1	2800		32	24	16				✓	✓						
Direction: Northbound																	
US Microscope	6	90		52	8	5				✓	✓						
Direction: Northbound																	
CHC XRF Scanner	1	45		126	30	70				✓	✓						
Direction: Northbound																	
CHC Ancillary equipment for XRF	1	130		32	24	16				✓	✓						
Direction: Northbound																	
HC Sonic tool, induction tool, and magnetic susceptibility tool	1	80		135	6	6			✓	✓	✓						
Direction: Northbound																	
CHC Caliper tool and multifunction tool	1	70		30	24	24				✓	✓						
Direction: Northbound																	
CHC Gamma density tool	1	100		24	24	24				✓	✓						
Direction: Northbound																	
CHC Dipmeter	1	100		24	20	18				✓	✓						
Direction: Northbound																	
CHC Gamma source, Cesium-137, 100 millicurie	1	100		32	24	16				✓	✓		✓				
Direction: Northbound																	

CHC Neutron source, AmBe-241, 3.16 curie	1	70		24	16	16				✓	✓		✓				
Direction: Northbound																	
CHC Data acquisition boxes, winch interface, electronics	15	1560		28	26	32				✓	✓						
Direction: Northbound																	
CHC Aluminium boxes(Geotek)	4	290		67	24	16				✓	✓						
Direction: Northbound																	
CHC Aluminium boxes(Geotek)	1	130		48	28	28				✓	✓						
Direction: Northbound																	
CHC Plywood box(Geotek)	1	240		22	12	12				✓	✓						
Direction: Northbound																	
CHC Plywood box(Geotek)	1	220		16	16	19				✓	✓						
Direction: Northbound																	
CHC Plywood box(Geotek)	2	93		36	24	24				✓	✓						
Direction: Northbound																	
CHC Plywood boxes (Geotek)	1	100		60	22	24				✓	✓						
Direction: Northbound																	
US Core Scanner	1	150		48	22	15				✓	✓						
Direction: Northbound																	
US Core Scanner	1	300		18	1	18				✓	✓						
Direction: Northbound																	
US Fracture cart	1	75		50	20	18				✓	✓						
Direction: Northbound																	
US UPS	1	75		28	24	29				✓	✓						
Direction: Northbound																	
	1	500		48	28	28				✓	✓						

US Geotek Scanner																	
Direction: Northbound																	
US Geotek Scanner	1	200		42	42	42				✓	✓						
Direction: Northbound																	
US Geotek Scanner	1	200		144	36	66				✓	✓						
Direction: Northbound																	
US Rock saw	1	200		60	48	52				✓	✓						
Direction: Northbound																	
US Core Splitter	1	2000		40	39	39				✓	✓						
Direction: Northbound																	
US Logging Winch	1	6000		40	39	45				✓	✓						
Direction: Northbound																	
US Hydraulic power unit	1	1000		40	30	30				✓	✓						
Direction: Northbound																	
US Support equipment	1	700		80	6	6				✓	✓						
Direction: Northbound																	
US orientation tool	1	80		31	38	26				✓	✓						
Direction: Northbound																	
US Frac tool	1	60		31	38	26				✓	✓						
Direction: Northbound																	
US NQ Packers	4	360		65	50	70				✓	✓						
Direction: Northbound																	
US Water Tank	1	30		45	42	40				✓	✓						
Direction: Northbound																	
US 1/2" hose on reel	1	2700		50	31	27				✓	✓						
Direction: Northbound																	
US 3/16" hose on reel	1	1000		45	28	22				✓	✓						

Direction: Northbound																	
US Corelyzer Units	2	200		45	28	22				✔	✔						
Direction: Northbound																	
US SMO Computer servers	2	150		54	36	36				✔	✔						
Direction: Northbound																	
Rock samples containing no organic matter collected from > 5 meters below the sea floor	1000	50000		24	36	4				✔	✔						
Direction: Northbound																	
Rock samples	8	1000		48	48	48				✔	✔						
Direction: Northbound																	

Cargo Comments

The following comments have been left for this section:

TF: A breakdown of estimates for drilling equipment cargo is attached (Cargo Drilling Ops–ORW.xls). As some equipment is in development at present, this information can only be considered a best estimate for scoping purposes. In previous ANDRILL operations, this cargo was considered a 'project allocation' and managed by Antarctica New Zealand as Project Operator. All other cargo was considered "Science allocation" and managed by USAP.
Most of the large items included as "Drilling equipment" are anticipated to be sent by ship the season before they will be required on site. These items will mostly be packed in 20' shipping containers, with perhaps 2–4 40' containers in the 2010/11 year.

–– Tamsin Falconer, 06/03/2008 05:59 PM

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			
2008–2009		✘	
2009–2010	✔		TF: Establishment of GPS base station &VHF repeater site in the vicinity of Cape Crozier
2010–2011		✘	
2011–2012	✔		TF: Establishment of GPS base station &VHF repeater site in the vicinity of Cape Crozier
2012–2013	✔		TF: 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			
2008–2009		✘	
2009–2010	✔		TF: Field camp at Coulman High site to support various site survey work.
2010–2011	✔		TF: Establishment of equipment &buildings at Coulman High #1 site – to support traverse and equipment prep.
2011–2012	✔		TF: Camp at Coulman High #1 site to support drilling and science activities.
2012–2013	✔		TF: Camp at Coulman High #2 site to support drilling and science activities.
* Conducting remote field deployment			
2008–2009		✘	
2009–2010	✔		TF: Field camp at Coulman High #1 &#2 sites to support various site survey work. SAF-Seimic field camp to be established between drill

			sites 1 and 2, roughly 10 km south of ice margin.
2010–2011	✔		TF: Establishment of equipment &buildings at Coulman High #1 site - to support traverse and equipment prep.
2011–2012	✔		TF: Camp at Coulman High #1 site to support drilling and science activities. Move equipment to CH#2 at end of season
2012–2013	✔		TF: Camp at Coulman High #2 site to support drilling and science activities.
* Perturbation experiments, i.e., re–routing water flow or manipulating the habitat of birds or mammals			
2008–2009		✘	
2009–2010		✘	
2010–2011		✘	
2011–2012		✘	
2012–2013		✘	
* Use of explosives – if yes, please add details in the Description box			
2008–2009		✘	
2009–2010	✔		TF: Seismic survey on ice shelf, using explosives. SAF-two 20km lines to be run north-south from ice margin to 20 km south of ice margin. One at CH-1, one at CH-2. A contingency line for an alternate drillhole location to CH-2 will also be completed at sp 1990.
2010–2011		✘	
2011–2012	✔		TF: Geophysical seismic survey for downhole measurements after drilling. 240 shots at 5 m spacings for VSP. Explosives may also be used to cut sea riser (Colliding Detonator Cutters) at the completion of drilling.

2012–2013	✓		TF: Geophysical seismic survey for downhole measurements after drilling. 240 shots at 5 m spacing for VSP. Explosives may also be used to cut sea riser (Colliding Detonator Cutters) at the completion of drilling.
* Ice, rock, or sediment coring			
2008–2009		✗	
2009–2010	✓		TF: Sediment grab samples or short cores may be taken. Possible shallow
2010–2011		✗	
2011–2012	✓		TF: Sediment coring to 1000+ metres below sea floor
2012–2013	✓		TF: Sediment coring to 1000+ metres below sea floor
* Drilling or the release of drilling fluids			
2008–2009		✗	
2009–2010	✓		TF: Hot Water drill used to create hole through ice shelf for water column survey, ROV operations and HWD testing.
2010–2011		✗	
2011–2012	✓		TF: Sediment coring to 1000+ metres below sea floor using drill fluids as outlined in the CEE. Hot water drill holes through the ice shelf.
2012–2013	✓		TF: Sediment coring to 1000+ metres below sea floor using drill fluids as outlined in the CEE. Hot water drill holes through the ice shelf.
* Excavation of soil or snow			
2008–2009		✗	
2009–2010	✓		TF: Movement of snow at site to create suitable surface for equipment set up. Create holes with Hot

			Water Drill for water column survey and waste disposal.
2010–2011	✔		TF: Movement of snow at site to create suitable surface for equipment set up. Create holes with Hot Water Drill for water supply and waste disposal.
2011–2012	✔		TF: Movement of snow at site to create suitable surface for equipment set up. Create holes with Hot Water Drill for drilling, water supply, waste disposal.
2012–2013	✔		TF: Movement of snow at site to create suitable surface for equipment set up. Create holes with Hot Water Drill for drilling, water supply, waste disposal.
* Placement of temporary scientific equipment for more than one season that may be irretrievable			
2008–2009		✘	
2009–2010	✔		TF: Mooring in water column expected to be recovered after 2-12 months, but may not be recoverable.
2010–2011		✘	
2011–2012	✔		TF: Possibly long term borehole monitoring equipment left in place for >1yr
2012–2013	✔		TF: Possibly long term borehole monitoring equipment left in place for >1yr
* Erecting any structure with a longevity of more than one year			
2008–2009		✘	
2009–2010	✔		TF: Field camp at Coulman High site to support various site survey work - most of the camp will remain on site for use in future seasons.
2010–2011	✔		TF: Existing field camp at Coulman High site

			remains and is expanded with the arrival of further equipment
2011–2012	✔		TF: Existing field camp at Coulman High site is used and then relocated to Coulman High #2 site for use the following season
2012–2013	✔		TF: Existing field camp at Coulman High is used and relocated to local winter storage site.
* Excavation, blasting, or drilling (other than drilling ice cores of 5 meters or less)			
2008–2009		✘	
2009–2010	✔		TF: Hot water drilling through the ice shelf. SAF-Drilling of holes up to 40 m deep, every 50 m for two 20 km lines for deployment of seismic charges.
2010–2011	✔		TF:Possible hot water drilling through the ice shelf.
2011–2012	✔		TF: Sediment coring to 1000+ metres below sea floor
2012–2013	✔		TF: Sediment coring to 1000+ metres below sea floor
Research–Related Wastes	**Yes**	**No**	**Description (if applicable)**
* Generating any hazardous wastes in a lab or a field location			
2008–2009		✘	
2009–2010		✘	
2010–2011		✘	
2011–2012	✔		TF: Drill fluids analyses at Coulman High site create chemical waste
2012–2013	✔		TF: Drill fluids analyses at Coulman High site create chemical waste
Hazardous Materials Used in the Field	**Yes**	**No**	**Description (if applicable)**
* Use of any hazardous materials in the field			
2008–2009		✘	
2009–2010	✔		TF: Industrial lubricants

			and vehicle- and drilling-related products. Explosives for seismics.
2010–2011	✔		TF: Industrial lubricants and vehicle- and drilling-related products.
2011–2012	✔		TF: Industrial lubricants and vehicle- and drilling-related products. Explosives for seismics. Laboratory chemicals.
2012–2013	✔		TF: Industrial lubricants and vehicle- and drilling-related products. Explosives for seismics. Laboratory chemicals.
* Managing the fuel used at your field camp			
2008–2009		✘	
2009–2010	✔		TF: Fuel use and management as per site policy and CEE-described procedures.
2010–2011	✔		TF: Fuel use and management as per site policy and CEE-described procedures.
2011–2012	✔		TF: Fuel use and management as per site policy and CEE-described procedures.
2012–2013	✔		TF: Fuel use and management as per site policy and CEE-described procedures.
Releases to the Environment	**Yes**	**No**	**Description (if applicable)**
* Any permanent releases into the environment of any hazardous material, science equipment, or wastewater			
2008–2009		✘	
2009–2010	✔		TF: Wastewater disposal into ice shelf and/or water column.
2010–2011	✔		TF: Wastewater disposal into ice shelf and/or water column.

2011–2012	✔		TF: Wastewater disposal into ice shelf and/or water column.
2012–2013	✔		TF: Wastewater disposal into ice shelf and/or water column.
* Excluding the emissions from the combustion of fossil fuels, releasing any solid, liquid, or gaseous substance (e.g., scientific materials, wastewater, equipment) while in the field			
2008–2009		✘	
2009–2010	✔		TF: Wastewater disposal into ice shelf and/or water column.
2010–2011	✔		TF: Wastewater disposal into ice shelf and/or water column.
2011–2012	✔		TF: Possible release of drilling fluids into seafloor and water column. Drill cuttings disposal into ice shelf. Wastewater disposal into ice shelf and/or water column.
2012–2013	✔		TF: Possible release of drilling fluids into seafloor and water column. Drill cuttings disposal into ice shelf. 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.

TF: All environmental impacts related to drilling activities are intended to be covered by a Comprehensive Environmental Evaluation (CEE) as was completed by Antarctica New Zealand for earlier ANDRILL drilling activities.
SAF - Pre-drilling activities such as over-ice seismic, over-ice radar and airborne radar, tidal/current meter deployment will also need an environmental evaluation, but perhaps at lower level the CEE.. A contingency seismic line for an alternate drillhole location to CH-2 will also be completed at sp 1990.

Environmental Requirements :: Research–Related Wastes

It is difficult and expensive to handle hazardous wastes in Antarctica. Please think carefully about chemical needs and minimize the amounts brought to Antarctica.

Indicate if your project will use any hazardous materials and generate any hazardous wastes

Season: 2011–2012

* Material	* Qty	* Unit of Measure	* Field Site	Location of Use
Mixed titration waste	3	liters	Coulman High 1	Drill fluids analysis lab

Season: 2012–2013

* Material	* Qty	* Unit of Measure	* Field Site	Location of Use
Mixed titration waste	3	liters	Coulman High 2	Drill fluids analysis lab

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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: 2009–2010

* Camp Name, Location	* Type of Fuel	* Gallons
Coulman High 1	Diesel	16000
Coulman High 1	Propane	30
Coulman High 1	Gasoline	2500

Season: 2010–2011

* Camp Name, Location	* Type of Fuel	* Gallons
Coulman High 1	Diesel	2500
Coulman High 1	Propane	30
Coulman High 1	Gasoline	1000

Season: 2011–2012

* Camp Name, Location	* Type of Fuel	* Gallons

Coulman High 1	Diesel	60000
Coulman High 1	Propane	50
Coulman High 1	Gasoline	2000

Season: 2012–2013

* Camp Name, Location	* Type of Fuel	* Gallons
Coulman High 2	Diesel	60000
Coulman High 2	Propane	50
Coulman High 2	Gasoline	2000

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: 2009–2010

* Hazardous Materials Type	* Location of Use	* Material Quantity
Explosives, Incendiary Devices	Coulman High 1	>200 lb
Explosives, Incendiary Devices	Coulman High 2	>200 lb
Explosives, Incendiary Devices	Coulman High 2	>200 lb

Season: 2010–2011

* Hazardous Materials Type	* Location of Use	* Material Quantity
Oil & Lubricants	Coulman High 1	1-50 lb

Season: 2011–2012

* Hazardous Materials Type	* Location of Use	* Material Quantity
Explosives, Incendiary Devices	Coulman High 1	>200 lb

Season: 2012–2013

* Hazardous Materials Type	* Location of Use	* Material Quantity
Explosives, Incendiary Devices	Coulman High 2	>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: 2009–2010

* 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)	Coulman High 1	200	liters	48
Tidal and Current Monitoring Mooring	Equipment: Cables, detectors, monitoring sensors, or probes	Coulman High 1	500	meters	1
Tidal and Current Monitoring Mooring	Equipment: Cables, detectors, monitoring sensors, or probes	Coulman High 2	500	meters	1
Explosives to be used in conjunction with over-ice seismic	Scientific materials: Explosives	Coulman High 1	2000	kilograms	400
Explosives to be used in conjuction with over ice seismic	Scientific materials: Explosives	Coulman High 2	2000	kilograms	400
GPS montoring sensors at CH-1 and CH-2	Equipment: Cables, detectors, monitoring sensors, or probes	Coulman High 1	1	each	1
Explosives to be used in conjunction with an additional seismic line that will be completed to prepare for a contingency alternate for proposed hole CH-2 at sp 1990.	Scientific materials: Explosives	Coulman High 2	2000	kilograms	400

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)	Coulman High 1	100	liters	30

Season: 2011–2012

* 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)	Coulman High 1	3000	liters	105
Explosives to be used for verticasl seismic profiling	Scientific materials: Explosives	Coulman High 1	1200	kilograms	240
Drilling fluids	Scientific materials: Drilling Fluids	Coulman High 1	10000	liters	55

Season: 2012–2013

* 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)	Coulman High 2	3000	liters	105
Explosives to be used for vertical seismic profiling	Scientific materials: Explosives	Coulman High 2	1200	kilograms	240
Drilling fluids	Scientific materials: Drilling Fluids	Coulman High 2	10000	liters	55

Environmental Requirements Comments

The following comments have been left for this section:

TF: Quantities for propane are based on 200lbs for 09/10 and 10/11, then 350lbs for 11/12 and 12/13
–– Tamsin Falconer, 06/03/2008 07:11 PM

TF: Hazardous materials: ANDRILL Drill Site operation uses many of the items listed as hazardous materials as part of the camp and drilling operation. In previous ANDRILL operations, the camp/drill site was supplied largely through its own project–resources, including any of these hazardous materials, and it is envisaged this would be the same for Coulman High. Most equipment would travel to the drill site by land traverse, not air.
Only explosives are listed as these require extra special handling.
Further details of haz mats used at the drill site are available from ANDRILL SMO.

–– Tamsin Falconer, 06/03/2008 07:18 PM

TF: Waste water: Release amounts are daily, and frequency is number of days operating. For drilling seasons in 2011/12 and 12/13, it is envisaged that water for the camp may be created by an RO plant. Amounts are estimates based on water production for ANDRILL camp operations in 2007/08 season.
–– Tamsin Falconer, 06/03/2008 07:21 PM

TF: Drilling fluids releases: Release amounts are daily during drilling, based on a total season estimate of drilling fluid lost during 2006/07 season. Not all drill fluid is released, as much as possible is re–used. Drill fluid additives are biodegradable and subject to documentation and approval as part of the CEE process.

–– Tamsin Falconer, 06/03/2008 08:02 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.			
2008–2009		✘	* TF: ANDRILL project would be responsible for construction of field camp structures
2009–2010		✘	*
2010–2011		✘	*
2011–2012		✘	*
2012–2013		✘	*
* Do you require the use of portable (towable) structures?			
2008–2009		✘	
2009–2010	✓		TF: 2 sledge-mounted millvans (for ROV operations &downhole logging operations) - would potential stay at site from 09/10 to end of drilling in 12/13)
2010–2011	✓		TF: 2 sledge-mounted millvans (for ROV operations &downhole logging operations) - would potential stay at site from 09/10 to end of drilling in 12/13)
2011–2012	✓		TF: 2 sledge-mounted millvans (for ROV operations &downhole logging operations) - would potential stay at site from 09/10 to end of drilling in 12/13)
2012–2013	✓		TF: 2 sledge-mounted millvans (for ROV operations &downhole logging operations) - would potential stay at site from 09/10 to end of drilling in 12/13)
* Do you require the fabrication of materials?			

2008–2009		✘	
2009–2010		✘	
2010–2011		✘	
2011–2012		✘	
2012–2013		✘	
* Based on your current understanding of standard USAP station and field facilities, will these facilities meet the needs of your project? If not, please provide additional details about new or modified facilities and structures when prompted later in this section.			
2008–2009	✓		
2009–2010		✘	
2010–2011		✘	
2011–2012		✘	Expanded lab facilities required, see note below (SAF)
2012–2013		✘	Expanded lab facilities required, see note below.
* Do you require any surveying services from McMurdo Station?			
2008–2009	✓		Survey and mark locations of airborne radar lines to box in radar survey over drill sites and traverse route and flag/monument locations. This would allow for later evaluation of differential ice movement through resurvey in subsequent field seasons (SAF)
2009–2010	✓		TF: for site survey
2010–2011	✓		TF: May be required for route &site location
2011–2012	✓		TF: for drilling operations - accurate site location &recording
2012–2013	✓		TF: for drilling operations - accurate site location &recording

Describe any other construction requirements.

Construction of any additional lab related temporary buildings at McMurdo Station to accommodate ANDRILL lab science functions as was done for both MIS and SMS projects. Requisite lab expansion would be same or slightly larger to accommodate new and/or

additional equipment.

Science Construction :: New or Modified Facilities

You indicated that, based on your understanding of standard USAP station and field facilities, these facilities will not meet the needs of your projects. Please describe your requirements in more detail. The NSF Proposal Review Panel will assess this requirement.

TF: ANDRILL drill site operations utilise a large amount of project-owned equipment and can be largely self-sufficient.

Project will require expanded Crary Lab facilities as executed for previous ANDRILL projects (see previous SIPS for MIS and SMS for specifics). We anticipate the same or possibly slightly larger facilities to accommodate new or additional euipment or people (SAF)

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?			
2008–2009		✗	
2009–2010	✓		Possible, see suggestion for testing system under data transmission section (SAF)
2010–2011	✓		Possible, see suggestion for testing system under data transmission section (SAF)
2011–2012	✓		Yes, similar in magnitude to previous MIS and SMS projects (SAF)
2012–2013	✓		Yes, similar in magnitude to previous MIS and SMS projects (SAF)
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.			
2008–2009		✗	
2009–2010	✓		This season it may be appropriate for USAP support to test computer and data transmission from remote drill sites. A hot water drilling test will be operational for ~1 month on site, and a data communication link

			could be established and tested prior to drilling years.
2010–2011	✔		Equipment will be staged to the CH-1 site during this season, with a remote camp established near drill site. As such, this season may also present an opportunity to test data transmission from remote field camp.
2011–2012	✔		It is anticipated that we will transfer approximately 1GB/day of data off continent using a throttled network connection during off-peak network times (12 Midnight - 6AM) as was done during the 2006-2007 and 2007-2008 seasons
2012–2013	✔		It is anticipated that we will transfer approximately 1GB/day of data off continent using a throttled network connection during off-peak network times (12 Midnight - 6AM) as was done during the 2006-2007 and 2007-2008 seasons

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: 2009–2010

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

Season: 2010–2011

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

Season: 2011–2012

* Qty of Data (MB)	* Transmission Method	Transmission Frequency	Describe Instrument/Experiment/Data/Outreach
1000	SFTP	Day	It is anticipated that we will transfer approximately 1GB/day of data off continent using a throttled network connection during off-peak network times (12 Midnight - 6AM) as was done during the 2006-2007 and 2007-2008 seasons

Season: 2012–2013

* Qty of Data (MB)	* Transmission Method	Transmission Frequency	Describe Instrument/Experiment/Data/Outreach
1000	SFTP	Day	It is anticipated that we will transfer approximately 1GB/day of data off continent using a throttled network connection during off-peak network times (12 Midnight - 6AM) as was done during the 2006-2007 and 2007-2008 seasons

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

2009-2010 season it may be appropriate or USAP support to test computer and data transmission from remote drill sites. A hot water drilling test will be operational for ~1 month on site, and a data communication link could be established and tested prior to drilling years.

Communications

Please indicate your communications requirements. All answers are required.

Communications Requirements	Yes	No	Description (if applicable)
* Will your project require additional power supplies?			
2008–2009		✘	
2009–2010	✓		TF: Step down transformer to allow US equipment to run on Drill Site (NZ) power
2010–2011		✘	
2011–2012	✓		TF: 2-3 step down transformers to allow US equipment to run on Drill Site (NZ) power
2012–2013	✓		TF: 2-3 step down transformers to allow US equipment to run on Drill Site (NZ) power
* Will your project require the installation of communications equipment (voice, data, or video)?			
2008–2009		✘	
2009–2010	✓		TF: Ideally phones at drill site and drill site camp, radio for Helo/Flights comms
2010–2011	✓		TF: Ideally phones at drill site and drill site camp, radio for Helo/Flights comms
2011–2012	✓		TF: Ideally phones at drill site and drill site camp, radio for Helo/Flights comms, local data network at drillsite required.
2012–2013	✓		TF: Ideally phones at drill site and drill site camp, radio for Helo/Flights comms, local data network at drillsite required.
* Does your team have voice communication requirements?			
2008–2009		✘	
2009–2010	✓		Ideally phones at drill site and drill site camp,

			radio for Helo/Flights comms
2010–2011	✓		Ideally phones at drill site and drill site camp, radio for Helo/Flights comms
2011–2012	✓		Ideally phones at drill site and drill site camp, radio for Helo/Flights comms
2012–2013	✓		Ideally phones at drill site and drill site camp, radio for Helo/Flights comms
* Will your team be bringing equipment that operates at radio frequencies, or using RF equipment not issued through RPSC?			
2008–2009		✗	
2009–2010	✓		TF: Using ANDRILL owned, and Scott Base radios
2010–2011	✓		TF: Using ANDRILL owned, and Scott Base radios
2011–2012	✓		TF: Using ANDRILL owned, and Scott Base radios
2012–2013	✓		TF: Using ANDRILL owned, and Scott Base radios
* 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?			
2008–2009		✗	
2009–2010	✓		As needed for data and voice transmission
2010–2011	✓		As needed for data and voice transmission
2011–2012	✓		As needed for data and voice transmission
2012–2013	✓		As needed for data and voice transmission
* Does your team require line–of–sight radio telephones from McMurdo Station inventory?			
2008–2009		✗	
2009–2010		✗	
2010–2011		✗	
2011–2012		✗	
2012–2013		✗	

* Does your team require telephone cabling at currently unserviced locations at McMurdo Station?			
2008–2009		✘	
2009–2010		✘	
2010–2011		✘	
2011–2012	✓		In requested expanded lab facilities/temporary lab structures.
2012–2013	✓		In requested expanded lab facilities/temporary lab structures.
* Do you have Iridium requirements for field safety purposes?			
2008–2009		✘	
2009–2010	✓		TF: Backup communications from Coulman High site
2010–2011	✓		TF: Backup communications from Coulman High site
2011–2012	✓		TF: Backup communications from Coulman High site
2012–2013	✓		TF: Backup communications from Coulman High site
* Does your project require data connectivity in field sites out of McMurdo, S. Pole or Palmer Stations?			
2008–2009		✘	
2009–2010	✓		Set up as possible test for remote transmission prior to drilling activities.
2010–2011	✓		Set up as possible test for remote transmission prior to drilling activities.
2011–2012	✓		As needed for drilling program
2012–2013	✓		As needed for drilling program
* Does your project require Iridium service to transfer data from field sites?			
2008–2009		✘	
2009–2010	✓		CReSIS GPR survey team requires iridium data tranfer and communications
2010–2011		✘	

2011–2012		✘	
2012–2013		✘	

Please describe any additional communications requirements.

USAP may consider testing remote data transmission from drill site to McMurdo to ensure viability prior to any drilling activities. CReSIS will require data transmission from GPR survey off continent as a means to check and validate survey results. This effort will require support.

Communications :: Iridium Data Transfer

You indicated that your project will require Iridium services to transfer data from the field. Please describe these requirements in more detail. The NSF Proposal Review Panel will assess this request.

CReSIS require iridium communication and data transfer for off-continent transfer of data from field location of ove-ice GPR data.

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?			
2008–2009		✗	
2009–2010		✗	
2010–2011		✗	
2011–2012	✓		Core analysis laboratory to support AND-CH#1 drilling operations. Same as MIS and SMS Science Operations or possibly larger.
2012–2013	✓		Core analysis laboratory to support AND-CH#2 drilling operations. Same as MIS and SMS Science Operations or possibly larger.
* Will your project require the use of radioisotopes?			
2008–2009		✗	
2009–2010		✗	
2010–2011		✗	
2011–2012	✓		Radioisotopes will be utilized in downhole logging tools. Same as in SMS
2012–2013	✓		Radioisotopes will be utilized in downhole logging tools. Same as SMS.
* Will your project require the use of Liquid Cryogens?			
2008–2009		✗	
2009–2010		✗	
2010–2011		✗	
2011–2012		✗	
2012–2013		✗	
* 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)			

2008–2009		✗	
2009–2010		✗	
2010–2011		✗	
2011–2012		✗	
2012–2013		✗	
* 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)			
2008–2009		✗	
2009–2010		✗	
2010–2011		✗	
2011–2012	✓		
2012–2013	✓		

Laboratory :: McMurdo Laboratory Space

McMurdo Laboratory Space Seasonal Details

Season: 2011–2012

* Type of Space	# of Users	Space Required	Unit of Measure	From Date	To Date
Bench space only	50	25	4' benches	01 Oct 2011	31 Dec 2011
Office space	30	1500	Square feet	01 Oct 2011	31 Dec 2011
Equipment staging/assembly	4	200	Square feet	01 Oct 2011	31 Dec 2011

Season: 2012–2013

* Type of Space	# of Users	Space Required	Unit of Measure	From Date	To Date
Bench space only	50	25	4' benches	01 Oct 2012	31 Dec 2012
Office space	30	1500	Square feet	01 Oct 2012	31 Dec 2012
Equipment staging/assembly	4	200	Square feet	01 Oct 2012	31 Dec 2012

Please discuss any additional details on your laboratory space requirements.

Setup will be much the same as MIS and SMS operations. See previous SIPS for details. Office space listed above requires desks or some reasonable desk-like work surface. There is no listing for under "space required" and "units of measure" to identify that desks are needed. Please note

that space for educators in CSEC 219 or in multipurpose area will be required (6 educators?) and that independent office space will be required for 30 scientists, project managers and support personnel.
The ANDRILL team will occupy much of CSEC Phase II Earth Science Wing and some of the Atmospheric Science Wing. Please see the
CSEC plan document in My Project Files.
We need Nikon coolpix cameras (or other compatible digital cameras) for each the petrographic microscopes (a total of 5). I was
unable to add them through Polar Ice.
We will need dedicated access to the LP50 Auto precision lapping machine and associated jigs. ANDRILL will bring a thin section
technician who will operate this machine on a full?time basis.
The XRF machine uses helium (type: 4.6). We will need one 50 liter bottle at 200 bar with a pressure reducer 0.5 to 1 bar.
Curators have requested two rock saws with spare blades (these saws are in addition to those requested for the 'thin section
room'). Support Information Package ? Laboratory
Support. We will store core at 4 degrees C in the core storage facility. Core will be split in the Florida State University Lab Van, which will be hooked up to the McMurdo water and electricity system. We will erect a RAC tent on a pad near the Core Storage Facility. The RAC tent will be supplied with power and heat.

Laboratory :: Consumable Materials and Supplies

Please identify the consumable materials and supplies that you will need at the stations, or aboard the vessels. Make sure you provide a good estimate of what you will need, as this information will be carefully reviewed and the amount will be incorporated into the overall cost estimate for your project.

Please list all consumables, including those you would consider to come from general laboratory stock. The NSF Proposal Review Panel will assess this request and the associated costs.

Season: 2011–2012

Item	Cost in Whole $ (no cents)
wood stock 6" -1000	0
ziploc bags 12x12 - 450 3x5 - 950 6x6 - 950 8x8 - 450	0
Beaker Glassware 1000 ml - 29 150 ml - 15 2000 ml - 2 250 ml - 34 50 ml - 25 600 ml - 14	0
Bottles - Plastic 250 ml - 7 500 ml 25	0
Carboy 10 l plastic w/spigot - 2 20 l w/o spigot - 2 20 l w/spigot 2	0
Glass Graduated Cylinder 100 ml - 1	0
Glass Flask 100 ml - 4 250 ml - 4 500 ml - 4	0
Plastic Funnel 92 mm - 1	0
Gloves Product Name Qty Vinyl, nonsterile, ambidextrous, non?powdered, large 100EA/BX (D2472) 1 Vinyl, nonsterile, ambidextrous, non?powdered, medium 100EA/BX (D2471) 1	0

Vinyl, nonsterile, ambidextrous, non?powdered, small 100EA/BX (D1685) 1	
small 100EA/BX (D1685) 1	0
Lab Markers Product Name Qty Black, extra fine (D1234) 10 Black, fine (D1305) 10 Red, fine (D1236) 10	0
Black, fine (D1305) 10 Red, fine (D1236) 10	0
Miscellaneous Product Name Qty Aluminum foil, 18" x 25' (0042467) 1 Kimwipes, 12" x 12" (D5512) 6 Kimwipes, 4" x 8" (D1697) 50 Parafilm, 20" x 50' (D4384) 1 Parafilm, 4" x 250' (D4382) 1 Support Information Package ? Laboratory Support	0
Laboratory Support	0
Pipet Tips Product Name Qty 1?5 ml, clear, 96/box rack (D2552) 600 10 ml, clear (D51718) 200	0
Slide: microscope Product Name Qty 1" x 3", plain (D0037) 5000	0
Spatula Product Name Qty 8?1/2", 200 mm (D5808) 20 Double flat blades, square/pointed ends 5 Steel scoop, 6?1/2" (D5816) 5	0
Syringe :: Plastic Product Name Qty 10 cc Luerlok, without needle (D2611) 10 5 cc Luerlok, without needle (D2617) 10	0
Tube: plastic centrifuge, sterile Product Name Qty 15 ml conical (D2567) 24 50 ml conical (D2573) 424	0
Refirigerator/Freezer, Upright, Explosion Proof, for chemical or sample storage. Freezer: ?20C, 2.9 cu ft. Refrigerator: +4C, 9 cu ft. Nine units available.	0
Balance, analytical, 0?1200 g x 1.0 mg, Sartorius LC1201S, 0056452	0
Balance, analytical, dual range, 30 gm x 0.01 mg or 160 gm x 0.1 mg, Mettler AE163, D0333	0
Balance, analytical, dual range, 30 gm x 0.01 mg or 160 gm x 0.1 mg, Mettler AE163, D0333	0
Freeze dryer, benchtop, 3 liter, Virtis, D1378	0
Centrifuge, clinical, tabletop, max rpm 3335, Clay Adams Dynac 0101, D5228	0
Centrifuges, refrigerated, max rpm 20K, Beckman J2?21/J20?XPI, D0383, 0080025	0
Regulator for inert gases (Ar, He, Ne, N2), CGA580, D5855	0
Heat sealer for plastic pouch?type lay?flat tubing, 12 to 18 inch, D4947, 0083813, 0079519	0
General purpose hot plate, D1176 4	0
PH Meter, benchtop, Beckman PHI 72, D5592 1	0
PH Meter, portable, Beckman PHI 10, D7262, PHI 200, 0040430, PHI 12, 0053253 1	0
Pipettor, P?10, 2 to 10 ul, Rainin adjustable volume Pipetman, D2803 1	0
Ultrasonic bath, 0.75 gallon capacity, Bransonic B?2200R?3, D1009 3	0
Oven, drying, 23" x 20" x 18.5", ambient to 250C, VWR 52201?071, 0056288 4	0
Salinity, conductivity, temp meter, benchtop model with 5 ft cable, YSI 3100 with YSI 3252 probe, 0069009	0
Microscope compound, with phase contrast and epifluorescence (EPI) capability, Zeiss Standard 16	0

Microscope, compound with phase contrast, epifluorescence (EPI) capability, and DIC, Zeiss Axioskop 50	0
Microscope, petrographic polarizing, Nikon Optiphot?2 POL	0
Stereoscope, 6.5 to 40X, reflected lignt, Wild M3Z 5	0
Microscope, petrographic polarizing, Olympus BH?2	0
Table, vibration dampening, slab	0
Lapidary saw, trim, 7.5" blade, Lotone FS?8, D10348	0
Lapidary saw, slab and trim, 14" blade, Contempo TR?14, D10349	0
Rock polishing wheel, Maruto, 0026707	0
Sieves, standard 3", ASTM designation, please write in size needed	0
Autoclave N/A Pooled	0
Fume hood. chemical use 1	0

Season: 2012–2013

Item	Cost in Whole $ (no cents)
wood stock 6" -1000	0
ziploc bags 12x12 - 450 3x5 - 950 6x6 - 950 8x8 - 450	0
Beaker Glassware 1000 ml - 29 150 ml - 15 2000 ml - 2 250 ml - 34 50 ml - 25 600 ml - 14	0
Bottles - Plastic 250 ml - 7 500 ml 25	0
Carboy 10 l plastic w/spigot - 2 20 l w/o spigot - 2 20 l w/spigot 2	0
Glass Graduated Cylinder 100 ml - 1	0
Glass Flask 100 ml - 4 250 ml - 4 500 ml - 4	0
Plastic Funnel 92 mm - 1	0
Gloves Product Name Qty Vinyl, nonsterile, ambidextrous, non?powdered, large 100EA/BX (D2472) 1 Vinyl, nonsterile, ambidextrous, non?powdered, medium 100EA/BX (D2471) 1 Vinyl, nonsterile, ambidextrous, non?powdered, small 100EA/BX (D1685) 1	0
Lab Markers Product Name Qty Black, extra fine (D1234) 10 Black, fine (D1305) 10 Red, fine (D1236) 10	0
Miscellaneous Product Name Qty Aluminum foil, 18" x 25' (0042467) 1 Kimwipes, 12" x 12" (D5512) 6 Kimwipes, 4" x 8" (D1697) 50 Parafilm, 20" x 50' (D4384) 1 Parafilm, 4" x 250' (D4382) 1 Support Information Package ? Laboratory Suppor	0
Pipet Tips Product Name Qty 1?5 ml, clear, 96/box rack (D2552) 600 10 ml, clear (D51718) 200	0
Slide: microscope Product Name Qty 1" x 3", plain (D0037) 5000	0
spatula Product Name Qty 8?1/2", 200 mm (D5808) 20 Double flat blades, square/pointed ends 5 Steel scoop, 6?1/2" (D5816) 5	0
Syringe :: Plastic Product Name Qty 10 cc Luerlok, without needle (D2611) 10 5 cc Luerlok, without needle (D2617) 10	0

Tube: plastic centrifuge, sterile Product Name Qty 15 ml conical (D2567) 24 50 ml conical (D2573) 424	0
Chemicals (ml unless noted) Product Name Qty Acetone 10000 Ethanol, denatured 20000 Ethanol, undenatured, 190 pf 1000 Helium, UHP 50000 Hydrochloric acid 1500	0
Incubator, Precision Model 816 or 818, illuminated, range ?10 to 50C; or 10?50C with internal illumination. 15 cu ft storage space. Eighteen units available.	0
Refirigerator/Freezer, Upright, Explosion Proof, for chemical	0
Ultra Cold Freezer, ?80C; Upright. Unit has 5 shelves, each 3 cu ft (9" h x 28" w x 23" d). One unit available.	0
Balance, analytical, 0?1200 g x 1.0 mg, Sartorius LC1201S, 0056452	0
Freeze dryer, benchtop, 3 liter, Virtis, D1378	0
Centrifuge, clinical, tabletop, max rpm 3335,	0
Centrifuges, refrigerated, max rpm 20K, Beckman J2?21/J20?XPI, D0383, 0080025	0
Regulator for inert gases (Ar, He, Ne, N2), CGA580, D5855	0
Heat sealer for plastic pouch?type lay?flat tubing, 12 to 18 inch, D4947, 0083813, 0079519	0
General purpose hot plate, D1176 4	0
PH Meter, benchtop, Beckman PHI 72, D5592 1	0
PH Meter, portable, Beckman PHI 10, D7262, PHI 200, 0040430, PHI 12, 0053253 1	0
Pipettor, P?10, 2 to 10 ul, Rainin adjustable volume Pipetman, D2803	0
Ultrasonic bath, 0.75 gallon capacity, Bransonic B?2200R?3, D1009 3	0
Oven, drying, 23" x 20" x 18.5", ambient to 250C, VWR 52201?071, 0056288 4	0
Salinity, conductivity, temp meter, benchtop model with 5 ft cable, YSI 3100 with YSI 3252 probe, 0069009	0
Microscope compound, with phase contrast and epifluorescence (EPI) capability, Zeiss Standard 16	0
Microscope, compound with phase contrast, epifluorescence (EPI) capability, and DIC, Zeiss Axioskop 50	0
Microscope, petrographic polarizing, Nikon Optiphot?2 POL	0
Microscope, petrographic polarizing, Olympus BH?2	0
Stereoscope, 6.5 to 40X, reflected lignt, Wild M3Z 5	0
Table, vibration dampening, slab	0
Lapidary saw, trim, 7.5" blade, Lotone FS?8, D10348	0
Lapidary saw, slab and trim, 14" blade, Contempo TR?14, D10349	0
Rock polishing wheel, Maruto, 0026707	0
Freeze dryer, benchtop, 3 liter, Virtis, D137810	0
Sieves, standard 8", ASTM designation, please write in size needed	0
Autoclave N/A Pooled	0
Fume hood. chemical use 1	0

Laboratory :: Radioactive Materials and Wastes

The use of radioactive materials (open and sealed sources) in Antarctica requires strict adherence to the Antarctic Conservation Act and the license conditions specified in your institution's U.S. Nuclear Regulatory Commission or State licensing authority's radioactive materials use license.

Please identify the radioisotopes and radioactive wastes you plan to use in Antarctica. If the radioisotope you plan to use is not on the list, select "other"

Radioisotopes

Season: 2011–2012

Isotope	Other Isotope	Chemical Form or Sealed Source	Winterover Activity (mCi)	Activity to be Received This Season	Total Activity (mCi)	# of 4–foot Rad Lab Spaces	Location
137Cs - Cesium		sealed source	0.00	0.00	100.00	0	Coulman High 1
Other	AmBe-241	sealed source	0.00	0.00	3.16	0	Coulman High 1
137Cs - Cesium		sealed source	0.00	0.00	10.00	0	Coulman High 1
137Cs - Cesium		sealed source	0.00	0.00	10.00	0	Coulman High 1

Season: 2012–2013

Isotope	Other Isotope	Chemical Form or Sealed Source	Winterover Activity (mCi)	Activity to be Received This Season	Total Activity (mCi)	# of 4–foot Rad Lab Spaces	Location
137Cs - Cesium		sealed source	0.00	0.00	100.00	0	Coulman High 2
Other	AmBe-241	sealed source	0.00	0.00	3.16	0	Coulman High 2
137Cs - Cesium		sealed source	0.00	0.00	10.00	0	Coulman High 2
137Cs - Cesium		sealed source	0.00	0.00	10.00	0	Coulman High 2

Radioactive Wastes

Season: 2011–2012

* Type	Constituents/ Cocktail	* Isotope	Activity (mCi)	* Amount	* Unit of Measure
Anticipated Environmental Release	none	Other	0.00	1	gm

Season: 2012–2013

* Type	Constituents/ Cocktail	* Isotope	Activity (mCi)	* Amount	* Unit of Measure
Anticipated Environmental Release	none	Other	0.00	1	gm

Please give details on any additional radioisotope requirements below.

Radioactive sources are uitilized in downhole logging tools as used previously for SMS project. These are sealed sources and no waste will be generated. The two rows above do not apply as their will be no waste generated, however we had to put somehting in the ORW here to get it to validate.

UNAVCO Support

GPS Requirements	Yes	No	Description (if applicable)
* Do you have requirements for Global Positioning System (GPS) support exceeding the capabilities of handheld recreational units (+–5m) out of McMurdo Station?			
2008–2009		✘	
2009–2010	✓		TF: GPS set up at Coulman High site to monitor Ice Shelf mvmt during summer site survey season. Will require base station at Cape Crozier or nearby. Alex Pyne has discussed with Thomas Nylen.To determine horizontal (Ice Shelf flow) and vertical (tidal response) motion of the Ross Ice Shelf at two sites (CH1 and CH2) approximately 55 km east of Cape Crozier. A GPS base station sites at C. Crozier and a GPS unit at each site (AH1 and AH2). Duration approximately 2 months in mid October through early January. Differential post processing of data.
2010–2011	✓		TF: GPS for route to drill site and drill site itself.
2011–2012	✓		TF: Near real time GPS recording the drill sites horizontal and vertical motion (October–January). Base Station at Cape Crozier, data telemetry (via repeater) to drill site. GPS unit at the Drill site, periodic (every 3 hours) post processing. Alex Pyne has discussed with Thomas Nylen.
2012–2013	✓		TF: Near real time GPS recording the drill sites horizontal and vertical motion (October–January). Base Station at Cape Crozier, data telemetry (via repeater) to drill

			site. GPS unit at the Drill site, periodic (every 3 hours) post processing. Alex Pyne has discussed with Thomas Nylen.

UNAVCO Support :: GPS Requirements

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

McMurdo Station

Season: 2009–2010

* Range of Accuracy	* Qty of Receivers	From Date	To Date	* Location of Use
1–10 cm	2	18 Oct 2009	14 Jan 2010	Coulman High 1
1–10 cm	1	18 Oct 2009	14 Jan 2010	Coulman High 2

Season: 2010–2011

* Range of Accuracy	* Qty of Receivers	From Date	To Date	* Location of Use
1–10 cm	1	01 Oct 2010	15 Feb 2011	Coulman High 1

Season: 2011–2012

* Range of Accuracy	* Qty of Receivers	From Date	To Date	* Location of Use
1–10 cm	2	05 Oct 2011	30 Jan 2012	Coulman High 1

Season: 2012–2013

* Range of Accuracy	* Qty of Receivers	From Date	To Date	* Location of Use
1–10 cm	2	05 Oct 2012	30 Jan 2013	Coulman High 2

Please describe what you would like to accomplish using GPS.

TF: 2009/10 season to establish data on ice shelf movement rates over time, including variability and total movement at both sites. 2010/11 to establish route to site and location of site for equipment setup. 2011/12 and 12/13 to monitor site movement in near real time (using post processing) for drilling.

UNAVCO Support :: Additional Information

Please provide details about your project's experience, requirements, and support needs.

GPS Experience	Yes	No	Description (if applicable)
* Do you have experience with geodetic surveys?			
2009–2010	✓		
2010–2011	✓		
2011–2012	✓		
2012–2013	✓		
* Is GPS support detailed in your proposal?			
2009–2010		✗	
2010–2011		✗	
2011–2012		✗	
2012–2013		✗	
Special Requirements	**Yes**	**No**	**Description (if applicable)**
* Real–time (RTK) GPS equipment			
2009–2010		✗	
2010–2011		✗	
2011–2012		✗	TF: Near real-time data only.
2012–2013		✗	TF: Near real-time data only.
* Long–term (1–13 months) data collection			
2009–2010	✓		TF: to determine variability, rates and total movement of ice shelf over the summer period, and to allow accurate positioning of drill site on the ice shelf 1year ahead of drilling.
2010–2011		✗	
2011–2012	✓		TF: data collection during drilling will be

			>1month
2012–2013	✔		TF: data collection during drilling will be >1month
* Continuous stations (multi–year data collection)			
2009–2010		✘	
2010–2011		✘	
2011–2012		✘	
2012–2013		✘	
Training and Support	**Yes**	**No**	**Description (if applicable)**
* Training required to operate the GPS or lidar equipment (Trimble 5700/R7/NetRS/Optech ILRIS)			
2009–2010		✘	
2010–2011		✘	
2011–2012	✔		TF: for operation of GPS monitoring &post processing at drill site
2012–2013	✔		TF: for operation of GPS monitoring &post processing at drill site
* Training in the US			
2009–2010		✘	
2010–2011		✘	
2011–2012		✘	
2012–2013		✘	
* Continuous station installation or maintenance			
2009–2010		✘	
2010–2011		✘	
2011–2012		✘	
2012–2013		✘	
* Assistance required for getting started with GPS or lidar surveying in the field			
2009–2010		✘	
2010–2011		✘	
2011–2012	✔		TF: for operation of GPS monitoring &post processing at drill site
2012–2013	✔		TF: for operation of GPS monitoring &post

			processing at drill site
* Assistance required for processing GPS or lidar data (Trimble Geomatics Office, Polyworks software)			
2009–2010		✘	
2010–2011		✘	
2011–2012	✔		TF: Near real time GPS recording the drill sites horizontal and vertical motion (October-January). Base Station at Cape Crozier, data telemetry (via repeater) to drill site. GPS unit at the Drill site, periodic (every 3 hours) post processing. SAF: Processed data from UNAVCO should be sent directly to ANDRILL SMO for entry into GIS database.
2012–2013	✔		TF: Near real time GPS recording the drill sites horizontal and vertical motion (October-January). Base Station at Cape Crozier, data telemetry (via repeater) to drill site. GPS unit at the Drill site, periodic (every 3 hours) post processing. SAF: Processed data from UNAVCO should be sent directly to ANDRILL SMO for entry into GIS database.

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?			
2008–2009		✘	
2009–2010		✘	
2010–2011		✘	
2011–2012		✘	
2012–2013		✘	
* Will your project require spatial analysis, remote sensing, or GIS support from McMurdo or Palmer Station?			
2008–2009	✓		
2009–2010	✓		
2010–2011		✘	
2011–2012	✓		
2012–2013	✓		
* Will your field team require Biospherical Instruments (BSI) Ultraviolet (UV) data beyond the standard products?			
2008–2009		✘	
2009–2010		✘	
2010–2011		✘	
2011–2012		✘	
2012–2013		✘	
* Will your project require ice core drilling support from McMurdo or South Pole Station?			
2008–2009		✘	
2009–2010		✘	
2010–2011		✘	
2011–2012		✘	
2012–2013		✘	

Please describe your need for any additional scientific services.

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

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?			
2008–2009		✗	
2009–2010	✓		Ross Ice Shelf over Coulman High
2010–2011	✓		Ross Ice Shelf over Coulman High
2011–2012	✓		Ross Ice Shelf over Coulman High
2012–2013	✓		Ross Ice Shelf over Coulman High
* Will your team require tents at a field camp out of McMurdo Station?			
2008–2009		✗	
2009–2010	✓		Camp required for over-ice seismic will be located roughly 10 km from ice margin, centrally located between drill sites CH-1 and CH-2 to split commute distance for running of seismic lines. TF: HWD testing/ oceanography/ ROV likely to use ANDRILL camp (self-contained)
2010–2011		✗	TF: Traverse support &mobilistion will use ANDRILL camp (self-contained)
2011–2012		✗	
2012–2013		✗	
* Will your team require sleds at a field camp out of McMurdo Station?			
2008–2009		✗	
2009–2010	✓		Seismic survey and GPR surveys
2010–2011	✓		
2011–2012	✓		

2012–2013	✓		
* 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.			
2008–2009		✗	*
2009–2010	✓		* 14 for seismic, 3 for CReSIS
2010–2011		✗	*
2011–2012		✗	*
2012–2013		✗	*
* Will your team be working or traveling on the sea ice out of McMurdo or Palmer Station?			
2008–2009		✗	
2009–2010		✗	
2010–2011		✗	
2011–2012		✗	
2012–2013		✗	

Additional requirements or comments:

TF: Sleds requested under Construction for sledge-mounted millvans.
Seismic and GPR survey will require a remote field camp. SAF - Seismic field camp will have 10 full-time personnel plus 2 to 4 education-outreach participants. Maximum number anticipated is 14 in seismic field camp. Field camp to be located roughly 10 km from ice margin, halfway between CH-1 and CH-2 drillhole locations.

Field Support :: Field Camp Tents

Detail your field camp tent requirements.

Season: 2009–2010

* # 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: 2009–2010

* # Sleds	* Total Weight to Transport – lbs	* Location	* Distance – miles
1	1000	Coulman High 1	100

Season: 2010–2011

* # Sleds	* Total Weight to Transport – lbs	* Location	* Distance – miles
4	1000	Coulman High 1	100

Season: 2011–2012

* # Sleds	* Total Weight to Transport – lbs	* Location	* Distance – miles
2	1000	Coulman High 1	100

Season: 2012–2013

* # Sleds	* Total Weight to Transport – lbs	* Location	* Distance – miles
2	1000	Coulman High 2	100

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

For Seismic surveys: Provided as similar to previous ANDRILL MIS and SMS seismic survey crews. Set-up should be with roughly the same resources. Two 20 km lines will be run from ice margin 20 km south, one through each drill site location to create grid of siesmic crossing lines for each

drill site location. Unsure at this time if sleds will be required for GPR or other field surveys. Aslo unsure at this time of exact numbers of sleds required for any given field season or the weight. The number shown is an esitmate.

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.			
2008–2009		✗	
2009–2010		✗	TF: ROV project is expected to supply own winch. SAF- Winches also to be supplied by WHOI for current mooring deployment
2010–2011		✗	
2011–2012		✗	
2012–2013		✗	
* Will your project require a hole melter at sites out of McMurdo, S. Pole or Palmer Station? If so, please describe your needs.			
2008–2009		✗	
2009–2010	✓		Seismic prog requires use of small hot water drilling system. Request support for small hot water drill system-shot hole drill from ICDS.
2010–2011		✗	
2011–2012		✗	
2012–2013		✗	
* Will your team require portable generators that they will operate?			
2008–2009		✗	
2009–2010	✓		TF: ROV may require portable gene. SAF-if portable generators were used for seismic in previous seismic surveys, then same would apply to this survey. As needed and per previous ANDRILL related seismic surveys. Similar resources required.
2010–2011		✗	
2011–2012	✓		

			TF: ROV may require portable gene. Similar to what was required for previous ANDRILL VSP activities.
2012–2013	✔		TF: ROV may require portable gene. Similar to what was required for previous ANDRILL VSP activities.

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?			
2008–2009		✘	
2009–2010	✓		TF: Either Helo or Twin Otter put in of personnel and supplies to Coulman High site. See uploaded document "Air Support" for details.
2010–2011	✓		TF: Either Helo or Twin Otter put in of personnel and supplies to Coulman High site. See uploaded document "Air Support" for details.
2011–2012	✓		TF: Either Helo or Twin Otter support for daily core pickup from Coulman High to McM. Helo support for requisite geologic outcrop investigations.See uploaded document "Air Support" for details.
2012–2013	✓		TF: Either Helo or Twin Otter support for daily core pickup from Coulman High to McM. Helo support for requisite geologic outcrop investigations.See uploaded document "Air Support" for details.
* Do you require support from LC–130 (heavy–lift airplane) or Twin Otter (small airplane) aircraft between McMurdo and either camps or Inland stations in Antarctica?			
2008–2009		✘	
2009–2010	✓		TF: Either Helo or Twin Otter put in of personnel and supplies to Coulman High site. Possible Twin Otter support require if airborne radar survey is not conducted on 08-09 season.See uploaded document "Air Support"

			for details.
2010–2011	✓		TF: Either Helo or Twin Otter put in of personnel and supplies to Coulman High site. See uploaded document "Air Support" for details.
2011–2012	✓		TF: Either Helo or Twin Otter support for daily core pickup from Coulman High to McM. See uploaded document "Air Support" for details. SAF- Helo support required for science and educator visits to sites of geologic importance for Coulman High in the Ross Island Dry Valley area, similar to those undertaken in 2006/2007 and 2007/2008 seasons.
2012–2013	✓		TF: Either Helo or Twin Otter support for daily core pickup from Coulman High to McM. See uploaded document "Air Support" for details. SAF- Helo support required for science and educator visits to sites of geologic importance for Coulman High in the Ross Island Dry Valley area, similar to those undertaken in 2006/2007 and 2007/2008 seasons.

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: 2009–2010

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 2009	✓			Cargo/ Resupply	8	1000

		McMurdo Station **Lat:** **Long:**	Coulman High 1 **Lat:** **Long:**			

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)
01 Nov 2010	✓	McMurdo Station **Lat:** **Long:**	Coulman High 1 **Lat:** **Long:**	Camp Put-In	8	1000

Season: 2011–2012

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)
01 Nov 2011		McMurdo Station **Lat:** **Long:**	Coulman High 1 **Lat:** **Long:**	Reconnaissance (Recce)	8	1000

Season: 2012–2013

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)
01 Nov 2012		McMurdo Station **Lat:** **Long:**	Coulman High 2 **Lat:** **Long:**	Reconnaissance (Recce)	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.

TF: Most flights could be either helo or TO.
Possible requirement for Twin Otter support for airborne radar if survey is not conducted in the 08-09 season. Survey would require roughly 5 hours flight time.
For 2009/10 put in and pull out of field party/s and associated equipment to Coulman High site/s
For 2010/11 possible put in and pull out of support staff and equipment for traversing activity.
For 2011/12 and 2012/13 Either Helo or Twin Otter support for personnel and some equipment put in and pull out, plus daily (time sensitive) core pickup from Coulman High to McM. See comments and uploaded file for more details.
SAF - Helo time would also be required during field season to mobilize scientists and educators

to remote outcrops of importance in Dry Valleys/Ross Island area for field evaluations and correlation. Estimate 45 hours Helo time will be required for these excursions. Exact requirments will be different than above. Numbers placed above to allow for validation of ORW.

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

The Twin Otter is generally used for small field teams, moderate cargo, and landings in non–groomed areas. The total weight of passengers and cargo should not exceed 2400 lbs. If your cargo and passenger weight exceed 2400 lbs. or the distance between McMurdo and your field camp location is more than three hours of flight time (500 Nautical Miles), count on using the LC–130.

Season: 2009–2010

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 2009	✔	Twin Otter	McMurdo Station **Lat:** **Long:**	Coulman High 1 **Lat:** **Long:**	Passenger Transport	5.0	5	1000

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:**	Coulman High 1 **Lat:** **Long:**	Passenger Transport	5.0	3	8000

Season: 2011–2012

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 2011	✔	Twin Otter	McMurdo Station **Lat:** **Long:**	Coulman High 1 **Lat:** **Long:**	Passenger Transport	5.0	5	1000

Season: 2012–2013

Flight Date	Date is	Aircraft	Departure Location	Arrival Location	Type of	Est.	# of	Est.

	Flexible?	Req'd	(If Other,Lat/Long in Deg/Min/Dec)	(If Other, Lat/Long in Deg/Min/Dec)	Support	Close Support Hours	Psngrs	Cargo Weight (lbs)
26 Oct 2012	✔	Twin Otter	McMurdo Station **Lat:** **Long:**	Coulman High 2 **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.

TF: All flights could be either helo or TO.
SAF - Possible 5 hours required in 09-10 season if airborne radar survey does not get completed on the 09-09 field season.
For 2009/10 put in and pull out of field party/s to Coulman High site/s
For 2010/11 possible put in and pull out of support staff and equipment for traversing activity.
For 2011/12 and 2012/13 daily core pickup from Coulman High to McM.
See comments and uploaded file for further details.

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 Comments

The following comments have been left for this section:

TF: Air support for operational requirements is outlined in the attachment "ACH air support request.doc". This could be Twin Otter or Helo. Some flexibility over dates is possible, but timing in the early season will be more critical.

Supplementary material for non–drill site activity in all seasons and seismic survey activity in 2009/10 is not included at this stage
–– Tamsin Falconer, 06/03/2008 08:29 PM

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.			
2008–2009		✘	*
2009–2010		✘	*
2010–2011		✘	*
2011–2012		✘	*
2012–2013		✘	*
* Will your project require dive tanks for dedicated use at a remote field camp out of McMurdo?			
2008–2009		✘	
2009–2010		✘	
2010–2011		✘	
2011–2012		✘	
2012–2013		✘	
* Will your project require dives in the Contaminated Zone near McMurdo Station?			
2008–2009		✘	
2009–2010		✘	
2010–2011		✘	
2011–2012		✘	
2012–2013		✘	

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?			
2008–2009		✘	
2009–2010	✓		TF: GPR-capable vehicle for route establishment. SAF-CReSIS is requesting a vehicle similar to a Tucker (pisten bully?) with front mounted boom for deployment of GPR antenna. SAF - Possible Hagglund for seismic survey.
2010–2011	✓		TF: May require GPR-capable vehicle for first traverse.
2011–2012	✓		May need vehicles for support of drill site
2012–2013	✓		May need vehicles for support of drill site

Please describe any additional vehicle requirements.

SAF - CReSIS GPR survey requires a vehicle with front mounted boom to be able to deploy radar antenna in front of survey vehicle. Vechiles may be required for drill science drill site support.

Traversing support for establishment and supply in 09/10, 10/11, 11/12 and 12/13 is detailed under Heavy Equipment.

Vehicle Support :: Vehicle Requirements

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

Season: 2009–2010

* Location of Use	* Vehicle	* Quantity
Coulman High 1	Pisten Bully	3

Season: 2010–2011

* Location of Use	* Vehicle	* Quantity
Coulman High 1	Pisten Bully	2

Season: 2011–2012

* Location of Use	* Vehicle	* Quantity
Coulman High 1	Mattrack	3

Season: 2012–2013

* Location of Use	* Vehicle	* Quantity
Coulman High 2	Mattrack	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?			
2008–2009		✘	
2009–2010	✓		TF: Traversing support for move of approx 16 sledge units and possible swap of 15000 litre JP8 tank
2010–2011	✓		TF: Traversing support for move of 80 sledge units from McM/Pegasus location to CH#1 site. The 80 includes approx 20 units which will arrive by ship in early Feb and need to be at site by early Oct 2011.
2011–2012	✓		TF: Winfly traverse of approx 6 sledge units and assist with ~10km move of all drill equipment to exact drill site. Refuel traverse of 2 x 15000 litre tanks est to be required every 10 days from mid Oct to mid Jan. Possible assistance with end of season move of all drilling equipment to local winter storage location.
2012–2013	✓		TF: Winfly traverse of approx 6 sledge units and assist with ~10km move of all drill equipment to exact drill site. Refuel traverse of 2 x 15000 litre tanks est to be required every 10 days from mid Oct to mid Jan. Possible assistance with end of season move of all drilling equipment to local winter storage location.
* Will your project require the use of a Reed drill from McMurdo Station?			

2008–2009		✖	
2009–2010		✖	
2010–2011		✖	
2011–2012		✖	
2012–2013		✖	

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.			
2008–2009		✘	
2009–2010	✓		For over-ice seismic survey on the ice shelf. Two seismic lines planned of 20 km each, one at CH-1 and one at CH-2. Will need support of a Blaster. A contingency line for an alternate drillhole location to CH-2 will also be completed at sp 1990.
2010–2011		✘	
2011–2012	✓		TF: for downhole geophysical experiments &cutting sea riser casing. SAF- Will need support of a Blaster for VSP work.
2012–2013	✓		TF: for downhole geophysical experiments &cutting sea riser casing. SAF - Will need support of a Blaster for VSP work.
* Will your team require the use of explosives for seismic work?			
2008–2009		✘	
2009–2010	✓		For over-ice seismic survey on the ice shelf. Two seismic lines planned of 20 km each, one at CH-1 and one at CH-2. Will require support of a Blaster. A contingency line for an alternate drillhole location to CH-2 will also be completed at sp 1990.
2010–2011		✘	
2011–2012	✓		TF: for downhole geophysical experiments

			and vertical seismic profiling. Will require support of a Blaster. VSP will require 240 shots a 5 m spacing.
2012–2013	✔		TF: for downhole geophysical experiments and vertical seismic profiling. Will require support of a Blaster. VSP will require 240 shots at 5 m spacing.

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: 2009–2010

Explosive Type	Number of Blasts	Site Location	Will You Provide Your Own Blaster ?
Dynamite	400	Coulman High 1	
Dynamite	400	Coulman High 2	
Dynamite	400	Coulman High 2	

Season: 2011–2012

Explosive Type	Number of Blasts	Site Location	Will You Provide Your Own Blaster ?
Dynamite	240	Coulman High 1	

Season: 2012–2013

Explosive Type	Number of Blasts	Site Location	Will You Provide Your Own Blaster ?

Dynamite	240	Coulman High 2	

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.