

**OFFICE OF POLAR PROGRAMS
ANTARCTIC INFRASTRUCTURE AND LOGISTICS DIVISION**

MEMORANDUM

To: Frank Rack
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From: Jessie Crain, Research Support Manager
Vladimir Papitashvili, Acting Program Director, Earth Sciences

Date: 15 August 2009

Subject: Support Review: ANT-0839108

Title: ANDRILL Coulman High Project -- Investigating Antarctica's Role in
Cenozoic Global Environmental Change: Phase 1 Site Survey

General Comments:

1. The support and operational feasibility for this project have been reviewed by NSF-OPP Antarctic Infrastructure and Logistics (AIL), NSF-OPP Antarctic Sciences (ANT), Raytheon Polar Services Company (RPSC), and the Principal Investigator (PI). The support detailed in this operational review memorandum captures all major requirements for this project. The scope identified below is deemed supportable. If support requirements change the USAP contractor point-of-contact (POC) will work with the PI to modify the project baseline support. Substantial changes will require review and approval by NSF.

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 Coulman High (CH) on the Ross Ice Shelf (RIS) to obtain direct reference records of two stratigraphic intervals from the Antarctic continental shelf in the Ross Sea.

This project is a rescope of Rack ANT-0839108 and will only include Phase 1 site survey activities of the CH drilling area. In 2009-2010, airborne radar data will be collected by the existing CReSIS project, under its current project support planning. In 2010-2011, survey objectives will be as follows:

- Deployment and retrieval of ice-tethered moorings at CH.
- Use of the existing Submersible Capable of Under Ice Navigation and Imaging (SCINI) Remotely Operated Vehicle (ROV) to observe the borehole and the base of the ice shelf.
- Deployment of three UNAVCO global positioning system (GPS) monitoring instruments.

Antarctica New Zealand (ANZ) support of the ANDRILL hot water drill, Caterpillar D6, Caterpillar multi-terrain vehicle, drill site day camp modules, drill site generators, fuel tanks, Hagglands, and support for the training of drilling personnel is currently undetermined and will be resolved before the deployment of this project.

Support for related proposed activities will be reviewed separately in the context of those projects.

2. Major logistic considerations for this project are:

- a. The Center for the Remote Sensing of Ice Sheets (CReSIS), University of Kansas, will collect and process airborne radar data during the 2009-2010 season. One Twin Otter flight will be flown to conduct surface topographic mapping of the traverse route and in the vicinity of the proposed drill sites to understand the RIS structure. No additional support outside of the currently planned level for CReSIS will be provided.
- b. In 2010-11, there will be twenty deployments to McMurdo Station. This total includes:
 - Two participants who will deploy Winfly, 2010 to begin preparations of the ANDRILL equipment currently stored near Pegasus Runway, McMurdo Station.
 - Four participants from Woods Hole Oceanographic Institution (WHOI) or other institutions who will deploy in October, 2010 to deploy moorings and four participants who will return in January, 2011 to retrieve the moorings.
 - Ten ANDRILL participants who will deploy throughout Mainbody, 2010 to support the survey.
- c. The existing ANDRILL hot water drill, equipment, structures, fuel and camp supplies will be transported approximately 70 miles to and from CH by overland traverse. The ANDRILL equipment is currently pre-staged near McMurdo Station, and will be traversed to CH in October, 2010 and back to the McMurdo Station storage location in February, 2011. The traverse prime movers and a fuel sled must be purchased specifically for this traverse, as no suitable USAP vehicles will be available.
- d. The existing ANDRILL kitchen, bunk modules, and possibly other modules, pending ANDRILL approval, will be provided for use at the CH camp. If their use

is not approved, then the USAP will provide alternative camp infrastructure to support up to sixteen participants at the field sites.

- e. A minimum of two, 24" diameter, 300 meter-deep holes will be drilled in the RIS for WHOI to deploy ice-tethered moorings equipped with acoustic Doppler current meter instruments. The moorings will be deployed from October, 2010 through the end of January, 2011.
- f. The existing SCINI ROV will be deployed for observations of the boreholes and the base of the ice shelf. The equipment necessary for the deployment of the ROV will be provided by the SCINI team with the exception of one 5 kW and two 2 kW generators which will be provided by the USAP support contractor.
- g. Three UNAVCO GPS monitoring instruments will be deployed for this project.
- h. Helicopter support up to 26 flight hours and Twin Otter support up to two days will be provided for passenger shuttle and resupply between McMurdo Station and CH.
- i. The USAP support contractor will test computer and data transmission capability from the CH site. Seven additional helo flight hours have been added to the resource allotment to be used by McMurdo IT for this purpose.
- j. 150 sq ft of staging space will be provided during the season for preparation of field instruments, and will be scheduled according to the field deployment.

4. Environmental Review

We anticipate that this project will require a Record of Environmental Review (ROER). The project investigators will need to work with RPSC Environmental to define the scope of work and identify potential mitigating measures to minimize environmental impact.

5. Estimated costs for this project include:

FY10

SIP Requests – none

Grant – \$2400 – batteries for GPS monitoring systems and additional costs related to mooring deployments

FY11

SIP Requests – none

Grant – none

Costs associated with SIP request items are considered a not to exceed amount. When developing the SIP it is expected that the materials requested will be required

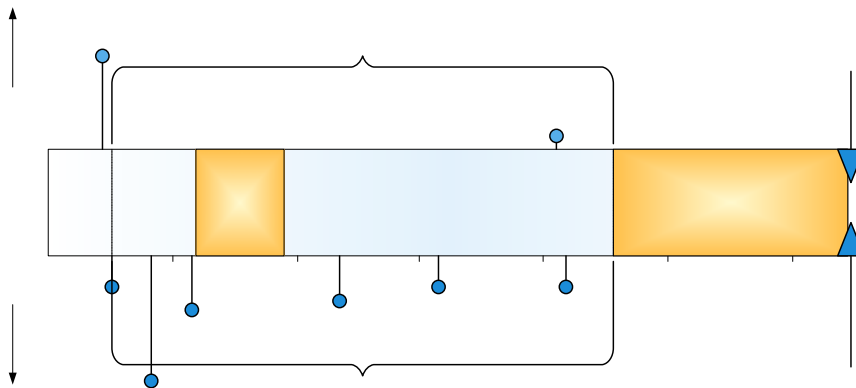
to support only this project.

NSF OPP-ANT will include the dollar amount detailed under the Grant cost category in the award (grant). This cost category details items that the USAP contractor cannot purchase or items that are project specific and are unlikely to be used by another science group in Antarctica.

6. Project Timeline and Planning Deliverables

Below details the project timeline and expected pre-deployment planning milestones.

- PI concurrence of operational review memorandum, 17 Aug, 2009
- Annual SIP submittal by PI, 15 Apr, 2010
- Annual RSP submittal by RPSC and PI concurrence, Jul, 2010
- Project close-out and retrograde, Feb, 2011



7. Project Close-out and Retrograde

At the end of the project all project and personal gear must be retrograded/removed from the CH site and all USAP-issued equipment and unused materials must be returned to the appropriate work center. The ANDRILL hot water drill and associated equipment and facilities will remain on the RIS for use in subsequent field seasons.

8. Change Management

The PI and the USAP contractor POC are responsible to ensure changes to this project baseline support are mutually understood and authorized by your NSF OPP-ANT Program Director and NSF OPP-AIL Research Support Manager. The POC will record information relating to changes to this project baseline in a change management log.

9. Applicable Policies

Approval of this operational review is also agreement that the PI is aware of and agrees to the contents of applicable policies. These policies are located at: <http://www.usap.gov/proposalinformation/>

Note: All support resources will be allocated to this project for planning purposes as a "not to exceed" mark. With respect to air resources, especially helicopter hours, all groups must remain flexible to take advantage of resource optimization where possible. Deployment dates may be adjusted to accommodate air resource scheduling constraints.

Support Requested:

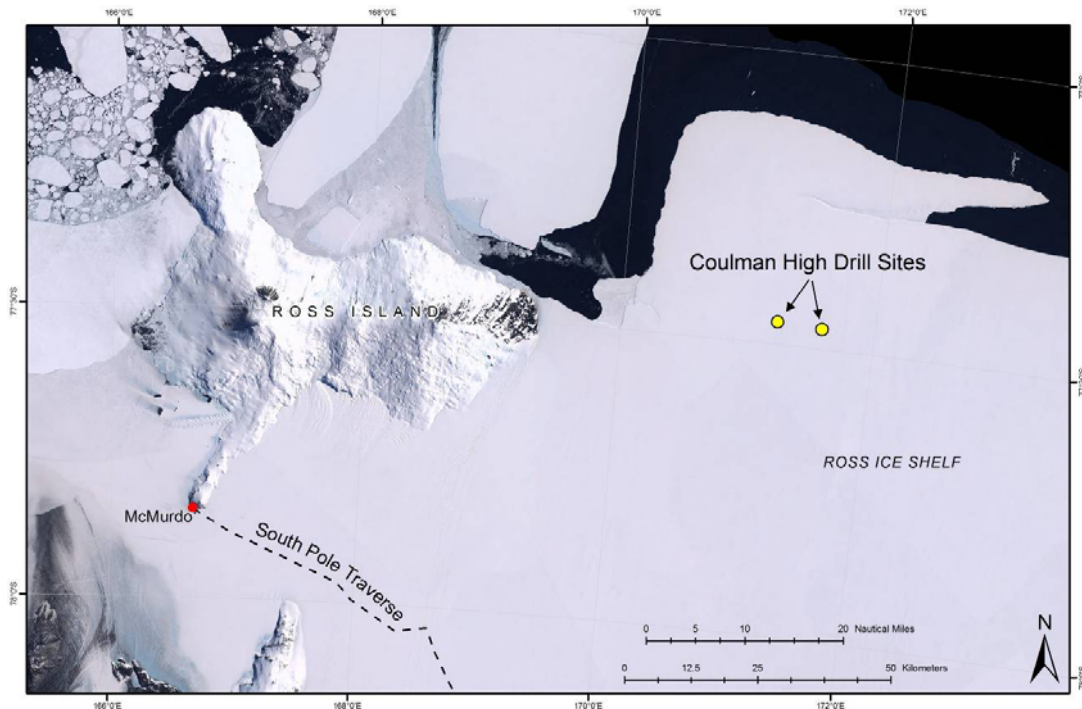
Resources	2010-2011
Location	Coulman High/Ross Ice Shelf
Number in Party	20
Highest Population	16
Deployment date - from	20-Aug-10
Deployment date - to	15-Feb-11
Time Constraint	No
Permits	MAF
Cargo Weight SB (lbs)	10000
Cargo Weight NB (lbs)	5000
Construction Required	Yes
Construction location	Coulman High
Field Camp Structures	2**
Ice Drilling Support	Yes
Connectivity at Field Site	Yes
Data Transmission Bandwidth Quantity	1 Mb
Type of Connectivity at Field Site	Voice/data
Crary Lab (Units)	1
Crary Office (Units)	1
Aquarium	Yes
Cryogens(nitrogen) (liters)	0
Cryogens(helium) (liters)	0
Rads	No
Diving (# of divers)	0
Analytical Support	No
Research Associate (hrs/week)	0
UNAVCO Support	Yes
Tents	22**
Sleeping Bags	16
Sleds	5
LC-130 Missions	0
Twin Otter Days (Utility)	2
Twin Otter Days (Survey)	0

Deleted: 0

Basler Days	0
Helo Mission Time (hours)	62
Helo Flight Time (hours)	33
Average Power (kW)	35
Peak Power (kW)	35
Tracked Vehicles	1
Heavy Duty Snowmobiles	5
PB Pickup	0
Light Duty Snowmobiles	0
PB Pax	1
Vans	0
Mattrack	0
Pick Up Truck	1
Renewable Energy	Yes
Generators	Yes

** Field camp structures and tents will only be needed if the ANDRILL camp modules are unavailable.

Cc: Ops Jacket
 Rob Edwards, RPSC
 Julie Bonneau, RPSC
 Chad Naughton, RPSC
 Leslie Blank, RPSC



ANDRILL PROPOSED COULMAN HIGH DRILL SITES

LIMA 15m
 Polar Stereographic
 WGS 1984
 Central Meridian: 165° E
 Scale 1:725,000

Map created on 11 August 2009 by M. LaRue, AGIC