

Please review all of the following information, including the gear allocations and field team information, to ensure accuracy. This plan is an agreement between CH2M HILL Polar Services (CPS) and your group, documenting the logistics support you will receive.

PROJECT INFORMATION

Lead Principal Investigator	James White and Vanya Miteva
Institute	University of Colorado, Boulder, Institute of Arctic and Alpine Research and Penn State University, Biochemistry and Molecular Biology
Project Title / Grant #	Collaborative Research: the NEEM Deep Ice Core (0806387) and Microbiological and geochemical studies along the new Greenland NEEM core: from authenticity to microbial diversity and activity (0909323)
NSF Program and Manager	NSF\OD\OPP\ARC\ANS, Dr. William Wiseman and Dr. Henrietta Edmonds
PFS Project Manager	Robin Abbott

LOGISTICS SUMMARY

<p>White 0806387</p> <p>This project constitutes the US contribution to the Danish-led IPY deep drill camp in northwest Greenland called NEEM (for North EEMian ice core), the goal of which is to drill to the base of the ice cap in a region where Greenland was not ice-free during the last interglacial period. The U.S. collaboration consists of the following grants: 0806387 (White, CU LEAD), 0806339 (Baker, Dartmouth), 0806407 (Sowers, PSU), 0806414 (Brook, OSU), 0806377 (Severinghaus, Scripps), and 0909541 (McConnell, DRI). US NEEM scientists will lead the international NEEM effort in the recovery, analysis, and interpretation of atmospheric gases and their isotopic ratios, as well as the physics of gas trapping in ice and gas mixing in firn.</p> <p>During three consecutive years beginning in 2009, the NEEM camp will be open for about four months, beginning in late April when operational support personnel arrive to open the camp and start grooming the skiway. At different points throughout the 2010 season, a total of 6 American researchers will spend several weeks working at the NEEM site. They will assist with harvesting the core, stabilizing and archiving it in the field, and preparing it for shipment to various institutions for analysis.</p> <p>To ensure the ice core remains cold enough in the field, one researcher (Severinghaus) will travel to the camp on the opening flight to prepare a cold storage cave adjoining the main core processing trench. A passive cooling system using a firm air well should keep the storage cave at a temperature no warmer than -20C to ensure that cores are usable for gas analysis of O2/N2 and Ar/N2. All ice samples can then be safely stored in this area until the end of the season.</p> <p>In 2010, in addition to working at the NEEM deep drilling camp, PI McConnell will join U Colorado's Koni Steffen on his maintenance traverses to TUNU and Humboldt AWS sites (NASAAWS). At each site, McConnell will harvest a 30 m short core to update the aerosol record for these two sites. With the exception of the McConnell AWS traverse participation, all logistics support for the US NEEM effort will be carried under the White project plan.</p> <p>The overall US contribution to the NEEM effort involves provision of the Air National Guard airlift to support the camp. CPS will work with NEEM organizers, NSF, and ANG to coordinate these flights within the overall Greenland flight schedule. For this particular award, CPS support is limited to coordination of ANG flights, meal tickets in Kanger and provision of some field gear. All other support will be provided by NEEM organizers at the University of Copenhagen.</p>
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Miteva 0909323

With this project, the co-PI intends to conduct tracer analysis and other studies on the NEEM ice core to contribute to better understanding both ice-gas fluctuations and microbial infiltration in ice cores; results could help researchers to interpret ice cores. For three years beginning in 2009, the PI will field a team at the NEEM drill camp, operated by the U of Copenhagen, to collect samples and run tests on the cores. Travel to/from the camp will be courtesy of the ANG through the Scotia/Kangerlussuaq logistics chain.

In August 2009, the Co-PI (Sowers) traveled to NEEM under another grant (White, 0806387). He used an existing bore hole adjacent to the main NEEM core site to establish the experimental procedures for assessing fluorescent bead infiltration as a tracer and to establish the optimum bead concentration for ice coating.

In June 2010, Sowers will return to the NEEM site to perform one more fluorescent bead tracer deployment timed to coincide with drilling in the clathrate zone below 1400 m. He will continue periodic sampling of cores for microsphere and fluid penetration during relaxation and will start elemental and isotopic measurements of N₂O accompanied with corresponding microbiological and molecular analysis. Ice samples will be retrograded at the end of the summer season on a cold deck flight to Scotia. A freezer truck will meet the flight and transport the ice samples to Penn State for further analyses.

Work in 2011 is dependent on the outcome of work in 2010. A 2011 field season is TBD.

CPS will provide ANG coordination, Kangerlussuaq meal tickets, and overnight, in-transit core storage in Kangerlussuaq and Scotia. All on-site NEEM support and KISS lodging will be provided by the University of Copenhagen. All other logistics will be paid by the researcher from the grant.

For the complete CPS online project record for this grant, including science objectives, go to:

- http://www.polar.ch2m.com/arlss_reports/arlss_projectsdetail.asp?cbPropNum=0806387
- http://www.polar.ch2m.com/arlss_reports/arlss_projectsdetail.asp?cbPropNum=0909323

For up-to-date information on the project's schedule, please view the online Greenland calendar (<http://www.polar.ch2m.com/> > Greenland > Calendars/Schedules).

OUTSTANDING ACTIONS AND NOTES

Issue	Responsibility	Date Completed/Note
Review support plan for accuracy and distribute to all field team members	PI	
Obtain all necessary permits for fieldwork	PI	Overall station permit provided by NEEM.
Visit all hyperlinks and review all documents referred to in the support plan	Entire Field Team	
Complete medical clearance process 6-8 weeks before desired deployment date and forward results to NEEM Medical personnel	Entire field team	NSF cannot provide copies of your medical paperwork to the NEEM doctor. Therefore, we strongly recommend you send your own copies for the Danish doctor to keep on file at NEEM.
Note: Passports are required for Air National Guard and international travel. Also, please bring TWO copies of your passport to Greenland with you.	Entire field team	
It is the responsibility of each project team to bring their own data loggers for their ice core boxes	PI	

Researchers should bring their own sleeping bags for NEEM camp	Entire Field Team	
Jeff Severinghaus will bring his own 110 power source inverter	Severinghaus	
Finalize core shipment plans and select vendor	CPS	

ALLOCATIONS AND SERVICES

Project Allocations :	Comments
1 ea Sleeping Bag for Jeff Severinghaus for early season work at NEEM	-40 rated bag like issued for Summit
KISS meal tickets for US team members (White, Sowers, Severinghaus, Brook, McConnell, IDDO)	
ISC Ice Core Boxes - 15 ea total estimate for all ice retro (3-5ea for Severinghaus and for Brook, 4ea for Sowers, and 2ea for White/Petrenko) INSTAAR will have 2 boxes from 2009 season returning this summer.	Approximately 35 boxes remain at NEEM from 2009 season.
ISC Ice Core Boxes – 45 ea total estimate for ice retro (McConnell)	TBD how many boxes will be required from Kanger. Estimate ~24ea
Roll of 7" lay flat tubing flexible sleeves (for 3.25" hand auger - in Kanger stock)	1 ea – Sent to NEEM in 2009
Rolls of 6" lay flat tubing flexible sleeves (for 3.25" diameter core being drilled at NEEM); 1500 ft per roll – 4mm thickness	3 ea – Sent to NEEM in 2009
Eutectics stored at NEEM over the winter will be sent back to Kanger and placed in the -25C freezer prior to the arrival of ice retro	1585ea, model XCB-24Y-24 (-10F) ice packs were sent to NEEM last season.
Spacers fabricated in Kanger by Construction staff and sent up to NEEM. They are made from foam insulation and are 9.5" x 4" x 2".	Researchers will place spacers in the packed ice in their ice core boxes. The spacers will be replaced with eutectics in Kanger.
Ice core box straps were procured to new specifications and will be sent up to NEEM. 2 straps per box were ordered.	Made by Cetacea, 7"long with a 45 degree angle tail which helps feed through the double D rings.
For Jeff Severinghaus - 1 ea jiffy head auger provided – gas powered	This will be used as a back-up plan if NEEM electric thread cutter fails.
For Jeff Severinghaus - 10 pieces of 10" dia drill flight sections (8ea middle sections, 1 ea tip with blade ; 1ea adapter piece) to connect to the drill head. They are 36" long.	Procured and shipped to Kanger
For Jeff Severinghaus - 10 pieces of 10" dia drill flight	Procured and shipped to Kanger
Other Services:	
Freezer space (-25C) in Kangerlussuaq for ice cores coming from NEEM. The freezer will be used to store samples until shipment to the USA.	
Arrangements for transport of US team and gear via ANG logistics chain. Includes cold deck flight back to NY. Includes Canadian researchers listed in field team table below.	Two cold deck flights will be scheduled tentatively on 1 July and 22 August
Freezer truck arrangements from Stratton Air Base to multiple points of delivery (TBD)	Truck shipments scheduled to coincide with cold deck flights..
Fuel, diesel for NEEM camp	Delivered from Thule by the 109 th C-130

Other Services **Provided by NEEM Logistics Support**

Project Allocations	Comments
KISS room accommodations	CPS provides US researcher meal tickets
Sleeping accommodations: bunk-beds, mattress, and pillow	Personal sleeping bag brought by each team member.
1kw generator inside sleep tents to maintain temperature above freezing	Maintain temps to keep moisture away and dry out clothing
Qty of Poly-bags	Severinghaus/Brooke projects
For Jeff Servinghaus - electric thread cutter motor to use for drilling freezer cave (Preferred method if possible)	NEEM will make an adapter to attach the jiffy drill flights to the thread cutter
For Jeff Severinghaus – Fans for the freezer cave	Ordered / purchased /provided by NEEM
For Jeff Severinhaus – Hose 50 ft for venting from freezer cave to the outside	Ordered / purchased /provided by NEEM

LOCATION INFORMATION

Please visit <http://www.polar.ch2m.com/> and navigate to the Greenland menu for en route and location-specific Greenland information. Prior to deployment, your entire field team should be familiar with the NEEM Field Season Plan 2010. <http://www.neem.nbi.ku.dk>

CARGO AND CUSTOMS

All cargo required for your project should arrive in Scotia, NY, **no later than 2 weeks prior** to the desired northbound Air National Guard (ANG) flight, must be entered into our online Cargo Tracking System, and must be properly registered with Customs.

For the most current ANG flight schedule go to <http://www.polar.ch2m.com/> and navigate to Greenland > Calendars/Schedules.

If you are a **new user** requiring access to the Cargo Tracking System, contact [Jason Buenning](#).

Customs instructions are available on our Web site at <http://www.polar.ch2m.com/> (go to Greenland > Customs). More information is available via the *Greenland Guide*, under Greenland on the CPS site.

The following is our current understanding of your overall cargo requirements:

Cargo List flying from NY on the 109th Air Guard:

Items	Weight/Cube
10 May flight – Joe McConnell - 3 ea boxes – DNF - SP2 equipment for NEEM & 2-3 cylinders of Ultra Pure Air	~400lbs / 25 cubic feet. DNF
02 June flight - Todd Sowers - camping gear	150 lbs
21 June flight - Julia Rosen (Brook) – skis	20 lbs / 6' x 1' x 1'
Canadian Participants:	
10 May Flight – Jocelyn Bourgeois, Natural Resources Canada:	
1 ea - small pallet with 84 plastic pails w/ lids (all cargo will return South except for pails)	1.07 x 1.17 x 1.56 m, 140 kg
1 ea - Aluminum case	80 x 60 x 41 cm, 50 kg
2 or 3ea - smaller aluminum cases	total ~50 kg
19 July Flight - James Zheng - Natural Resources Canada	
10ea coolers w/sample bottles, 5ea boxes, 1ea duffel; Return flight: all coolers are KEEP FROZEN	400kg North / 800kg South (frozen samples in August)

FIELD TEAM INFORMATION

NEEM PARTICIPANT SUPPORT SCHEDULE - (Other than US researchers)

The following camp staff will travel to NEEM via the Air National Guard. Canadian researchers listed here also will travel via the Air National Guard logistics chain through New York.

Date	Location	Activity
21 April 01 July	Scotia > Kanger Kanger>Scotia	Lou Albershardt -NEEM field assistant arrives via 109 th
26 April 01 July	Scotia > Kanger Kanger>Scotia	Sarah Harvey - NEEM cook arrives via 109 th
10 May 01 July	Scotia > Kanger Kanger>Scotia	Jocelyne Bourgeois – Natural Resources Canada researcher arrives via 109 th
27 July 22 Aug	Scotia > Kanger Kanger>Scotia	Tanner Kuhl – Ice Coring and Drilling Services observer
27 July 22 Aug	Scotia > Kanger Kanger>Scotia	James Zheng – Natural Resources Canada researcher arrives via 109 th
27 July 22 Aug	Scotia > Kanger Kanger>Scotia	Heather Andres – Natural Resources Canada researcher arrives via 109 th

For the most up-to-date information on the project’s schedule, please view the online Greenland calendar (<http://www.polar.ch2m.com/> > Greenland > Calendars/Schedules).

NEEM PARTICIPANT SUPPORT SCHEDULE – (US researchers)

Field Team

Name	Location	Date In	Date Out	Email
Severinghaus, Jeff	Kanger	26 Apr	13 May	jseveringhaus@ucsd.edu
	NEEM	27 Apr	11 May	
McConnell, Joe	Kangerlussuaq	26 Apr	13 May	Joe.McConnell@dri.edu
	NEEM	11 May		
Sowers, Todd	Kangerlussuaq	02 June	24 June	sowers@geosc.psu.edu
	NEEM	03 June	29 June	
Rosen, Julia	Kangerlussuaq	21 June	30 July	julia.rosen@gmail.com
	NEEM	22 June	28 July	
White, Jim	Kangerlussuaq	19 July	30 July	james.white@colorado.edu
	NEEM	20 July	28 July	
Pasteris, Dean (DRI Student)	Kangerlussuaq	19 July	22 Aug	
	NEEM	20 July	17 Aug	

PROJECT CONTACT INFORMATION

Research Team White 0806387

Role	Name	Email	Phone / Fax
Collaborator	Ian Baker	ian.baker@dartmouth.edu	603 646.2184 /
Collaborator	Edward Brook	brooke@geo.orgeonstate.edu	541 737.8197 /541 737.1200
Collaborator	Jeffrey Severinghaus	jseveringhaus@ucsd.edu	858 822.2483 /858 822.3310
Collaborator	Todd Sowers	sowers@geosc.psu.edu	814 863.8093 /
Principal Investigator	James White	james.white@colorado.edu	303 492.5494 /303 492.6399

Research Team Miteva 0909323

Role	Name	Email	Phone / Fax
Principal Investigator	Vanya Miteva	vim1@psu.edu	814 865-3330 /814 863-5304
Co-PI	Todd Sowers	sowers@geosc.psu.edu	814 863.8093 /

CPS Team Members

Contact for	Name	Email	Primary Phone
Greenland science planning & support	Susan Zager	Susan@polarfield.com	Denver: 720.320.6159
Greenland science planning & support	Robin Abbott	Robin@polarfield.com	Denver: 303.748.8507
Kangerlussuaq base operations	Kathy Young	Kathy@polarfield.com	Denver: 720.320.6160 Greenland: 011.299.524218
Scotia (Stratton Air Base) operations & customs	Earl Vaughn	EarlVaughn@gmail.com	Scotia cell: 303.552.6072
Medical/Dental Clearance for NEEM	Ellen Chrillensen	ec@gfy.ku.dk	CPH: +45 3532 05 51

CPS Offices

Denver	Kangerlussuaq	Scotia
Polar Field Services 8110 Shaffer Parkway Suite 150 Littleton, CO 80127 Tel: 303.984.1450/1439 Fax: 303.984.1445	CH2M HILL Polar Services Attn: Name of Employee/Researcher Postboks 1015 DK-3910 Kangerlussuaq, Greenland Tel: 011.299.841598 Fax: 011.299.841599	Earl Vaughn C/O 109 th Aerial Port Bldg. 20 Stratton Air Base Scotia, NY 12302-9752 Tel: 518.344.2635 Cell: 518.331.3103 Fax: 518.344.2537

SAFETY, ENVIRONMENT, HEALTH and PERMITS

Effective January 1, 2010 the Government of Greenland assumed responsibility for the permitting process for research in Greenland. All science teams planning to conduct research in Greenland must complete an **annual application** in order to obtain approval from the Government of Greenland. These permits for working at NEEM have been taken care of by the the overall permit obtained by the University of Copenhagen.

Medical Clearance

Arctic Program participants traveling into the Greenland field generally must pass a National Science Foundation-mandated physical and dental exam. All field team members should plan to complete their Physical Qualification (medical and dental clearance) process 6-8 weeks prior to travelling to Greenland. For more information, refer to CPS' *Greenland Guide*, available at <http://www.polar.ch2m.com/> under Greenland.

US personnel should request to receive a copy of their medical qualification paperwork from NSF; this paperwork should then be forwarded to NEEM Medical personnel for their records: Ellen Chrillensen; ec@gfy.ku.dk (ph: +45 3532 05 51).

Risk Assessment

Please see appendix.

CRITICAL SUCCESS FACTORS

Please list the factors that are most important for the success of your science. We track these factors in order to measure the success of CPS' support. Examples might be the availability of the helicopter or camp gear.

Factors
Sufficient eutectic packs, ice core boxes, and box strapping available for samples shipped from NEEM. CPS will provide.
Samples kept in frozen storage at < -20 C at all times after leaving NEEM except when in transit on ANG cold deck flights. Temperature monitoring by truck drivers of the shipments.
Samples delivered to labs or designated locations without damage to shipping boxes or samples (boxes should be on pallets)
Correct sample boxes delivered to specified lab or designated location.
Important to the Gas Samples: No samples shipped with or stored with dry ice (anywhere in the truck or freezer)
Getting cargo and people into and out of the field in as timely a manner as possible.
Shipping and coordination of samples. The arrival time coordinated for delivery of cores at US locations. Includes: the C-130 and truck arrival in Scotia, delivery and receipt at each designated lab or location. Delivery should be planned to occur sometime between 8am - 4:30pm Monday through Friday only.

GOVERNMENT AND PERFORMANCE REPORTING ACT OF 1993 (GPRA)

NSF/OPP requires your help in complying with the Government Performance and Reporting Act of 1993 (GPRA). One measure of CPS' performance is a "facility-performance metric" which counts the number of productive days your project has in the field while relying on CPS facilities or support. Please keep track of any "lost days" and report these to us at the end of the season.

APPENDIX

RISK FACTORS and MITIGATION

Factor	Mitigation and Control
Cold Weather	-Team members attend a cold weather injury training course such as Wilderness First Aid or Wilderness First Responder -Proper clothing -Appropriate camping gear, insure sleeping bags are adequately rated -Check forecast before going out of camp/town.
Confined Space Work	Confined spaces AHA
Drills/augers	Drill/auger training/AHA
Fixed Wing Travel	-SAR plan in place -Attend a pilot briefing
Heavy lifting/body strains and sprains	-Use proper lifting techniques
Medical fitness for remote work outside ANG flight period	-Follow NSF Physical Qualification process