

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	Jeffrey Severinghaus
Institute	University of California, San Diego, Scripps Institution of Oceanography
Project Title / Grant #	Is There Cosmogenic Radiomethane in Polar Firn? (0806450)
NSF Program and Manager	NSF\OD\OPP\ARC\ANS, Dr. Brendan Kelly
PFS Project Manager	Sandra Starkweather

LOGISTICS SUMMARY

This project's researchers will test whether direct cosmogenic production of ^{14}C occurs in ice and firn. The test will involve melting large amounts of near-surface firn harvested at Summit Station, Greenland, to extract any cosmogenic ^{14}C .

The PI will visit Summit with a team of 5 personnel for about 3 weeks in late July of 2009. At a trenched site away from station, they will dig/cut 1.5 tons of firn blocks from a depth of 14-18 feet, melt it down on site and extract the gases for further analysis. They also will return a small amount of frozen firn to the home institute to validate the in-field analysis.

CPS will provide ANG flights, access to Kangerlussuaq and Summit infrastructure, and a day of heavy equipment support at Summit to dig a firn trench measuring approximately 14 ft deep x 50 ft long. The PI will plan and pay for all other logistics, including frozen shipment of a small quantity of firn, through 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=0806450

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
Review support plan for accuracy and distribute to all field team members	PI	Pending draft completion
Obtain all necessary permits for fieldwork	PI	Included in the Summit general science permit
Visit all hyperlinks and review all documents referred to in the support plan	Entire field team	June 24, 2009
Contact the GEOSummit Science Coordination Office (SCO) sco at summitcamp.org regarding your project's plans for the season	PI	Summer 2008
Complete medical clearance process 6-8 weeks before desired deployment date	Entire field team	All complete except Severinghaus
Note: Passports are required for Air National Guard and international travel. It is a good idea to bring two IDs and to pack a copy of your passport in case the original is lost.		
Complete Critical Success Factors	PI	June 25, 2009

ALLOCATIONS AND SERVICES

Allocations from Inventory

Quant/Unit	Item
5	Arctic Oven Sleep Tents (Kanger)
5	Sets of Sleep Pads
1-2	Snow Machines, 4-stroke or electric as available
2-3	VHF Radios
1-2	Personal Locator Beacons
1-2	GPS
9	Propane - 33 kg bottles
1	Ladder, 6ft step ladder type (need 1 with diving board, otherwise 2)
1	Fire extinguisher
2	Tarps, large (10'x20')
2	banana sleds
1	Nansen sled for generators
2	~ 100 ft, 30A rated, plug for 30A circuit on 5kw or 6.5kw, 4-outlet box (Kanger)
2	~ 100 ft, 20A rated, regular 3-prong plug type both ends (Kanger)
6	~50 ft, 15A rated, regular 3-prong plug type both ends (Kanger)
3	Power strips, 6 or 7 outlet
2	20L gas cans w/nozzles for Mogas
1	10x10 Arctic oven for keeping propane cyls warm (8x8 OK)
~20	8' Bamboo poles, sturdy with black flags
1	Base for Arctic oven
5	Plastic folding chairs
1	Aluminum folding table, 6 ft
3	Hose clamps, for prop. Fittings, spare (Kanger)
1	Heater for propane
1	Electric space heater – work tent
15 L	Ethanol or Isopropanol
5 drums	Mogas for generators
1	Hurdy-gurdy type fuel pump
2	Generator, 5 kW
1	Generator, 6.5 kW (Kanger)
8	Plywood sheets, 4x8, 1/2" thick (3- trench lining, 3-mine entrance + 2-storm protection)
1	Outhouse, tent + field toilet style
50 ft	Parachute cord
50 ft	Rope, 6-7 mm
4	Shovels, 2 steel spades, 2 alu grain scoops
a bunch	String
2	Large Thermos
1	Microwave (Kanger)
1	Kovacs drill or similar, to drill a hole for a drain hose, 6ft or deeper
15	24Y Eutectic Packs

Other Services

Project Allocations	Comments
Locations	Tentative Location: ~1 km to the NW of the "08" skiway turnaround area. Away from any IceSAT traffic area and not close enough to impact IceSAT accumulation (see Appendix A, Location Map). A flagged route will be provided heading North from Koni's AWS. Route to Koni's AWS is already flagged.

	Location should be fine tuned in the field by Kathy Young to assure that historical traffic has been insignificant.
Facilities	<p>The Mobile Weatherport (~9'x12') will be brought into the trench to serve as the work space for this group. It will be supplied with the tables, chairs and other allocations listed above.</p> <p>Access for water line from melter will be field located. CPS would prefer a solution that does not involve cutting a hole in the weatherport.</p> <p>The 10x10 Arctic Oven will be set up above the trench to serve as warm storage for propane. The explosion proof heater should be used in this space to prevent risk of fire/explosion. The AO will be set up on a standard wooden tent platform.</p> <p>A smaller, floorless Arctic Oven will be set up nearby with field toilet & supplies for an outhouse.</p>
Trench for Firm Sample Access	<p>This project requires a trench cut to create a sampling wall. Site contamination would diminish the value of the samples. The PI also would like the trench cut as close to project start time as possible to prevent contamination.</p> <p>Trench cut by heavy equipment (D-6), specified as:</p> <ul style="list-style-type: none"> - Orient the trench ESE-WNW ~20 CW rotation for sampling to occur out of the S wall – out of the sun - 15' deep. - 50' long at the base, plus length for gentle slope ramp in/out - 14' (D-6 blade) would be a workable minimum width, somewhat wider preferred - To be decided: leave excavated snow piled or spread out. <p>Currently no plans to mitigate drifting of the trench during campaign, PI's request digging support from the camp staff in the event of a storm.</p> <ul style="list-style-type: none"> - Sides of this smaller trench will be lined with plywood to prevent melting / damage of firn walls - We will drill a hole (6ft or a bit deeper) at the far end of the small trench to put the drain hose into; will be used to drain melter (up to 3000 L over the course of the season)
Platform Fabrication Details	<p>Wood base for melting tank, 6x6', strong enough to support at least 800 lbs</p> <p>Wood base for weatherport. This requirement has been removed by PI. A snow surface is acceptable provided improved access to the melting tank is provided in the form of a platform that extends towards the tank. (see Appendix C)</p> <ul style="list-style-type: none"> - Small ramp on hinges to form a short "bridge" from main platform to melting tank. See attached sketch. - The small ramp is needed for loading firn blocks into the melter, as well as access for removing / putting on the very heavy melter lid. It should be on a hinge so that it can be flipped back when the burners are lit. Exact design of this ramp is very much up for discussion. - If the design with the lower melter platform & ramp on hinge is not feasible, loading and lid handling can be accomplished with two ladders though makes these tasks more dangerous. - TBD on how to approach the above request. Ongoing discussion between PI & Construction.
Snow removal	As needed to clear site after a storm or to remove snow in the trench

Sample Retro	Firn samples in 1 insulated “everkool” type box (29x29x22”) provided by the PI. Packed in Eutectics provided by CPS. Stored in Kanger warehouse, -25C required. Additional cold soak in NY if freezer can meet -25C spec, otherwise FEDEX directly to PI. Water samples, 1 small box provided by PI. No special temperature requirements.
GPS Survey After Install	CPS Science techs will survey the area to record impacts

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 content of the *Greenland Guide* and with the guidelines provided in the *Summit Users’ Guide*. Both are available electronically via our Web site’s Greenland menu.

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](#) .

If you need **technical support** with the Cargo Tracking System, contact [Mike Dover](#) .

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

Items	Weight/Cube
Science Gear	1932 lbs

SUPPORT SCHEDULE

Approx Date	Location	Activity
7/27	Scotia>SFJ	Arrive Greenland
7/29/2009	Summit, northwest of 08 skiway turn-around	D-6 Cuts trench for the group and infrastructure (Mobile Weatherport) is prepared at the site. Must be just prior to or after PI arrives on site
7/29/2009	Summit	4 Field Team Members arrive and begin transporting gear to site
8/21/09	Summit>SFJ	Depart Summit
8/24/2009	SFJ>Scotia	Return to the US via Air National Guard

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).

FIELD TEAM INFORMATION

Name	Location	Date In	Date Out	Email
Petrenko, Vasilli	Kangerlussuaq		8/24/2009	vpetrenk@ucsd.edu
Petrenko, Vasilli	Summit		8/21/2009	
Severinghaus, Jeffrey	Kangerlussuaq	7/27/2009	8/24/2009	jseveringhaus@ucsd.edu
Severinghaus, Jeffrey	Summit	7/29/2009	8/21/2009	
Baggenstos, Daniel	Kangerlussuaq	7/27/2009	8/24/2009	
Baggenstos, Daniel	Summit	7/29/2009	8/21/2009	
Takehita, Yui	Kangerlussuaq	7/27/2009	8/24/2009	
Takehita, Yui	Summit	7/29/2009	8/21/2009	
Becker, Katherine	Kangerlussuaq	7/27/2009	8/24/2009	
Becker, Katherine	Summit	7/29/2009	8/21/2009	

PROJECT CONTACT INFORMATION
Research Team

Role	Name	Email	Phone / Fax
Principal Investigator	Jeffrey Severinghaus	jseveringhaus@ucsd.edu	858.822.2483 / 858.822.3310

CPS Team Members

Contact for	Name	Email	Primary Phone(s)
Summit operations	Sandy Starkweather	Sandy@polarfield.com	Denver: 303.518.8714
Greenland planning and project support	Robin Abbott	Robin@polarfield.com	Denver: 303.748.8507
Greenland on-island support	Mark Begnaud	Mark@polarfield.com	Denver: 720.320.6160 Greenland: 011.299.524218
Greenland on-island support, Cargo	Ed Stockard	Ed@polarfield.com	Greenland: 011.299.524281
Scotia operations & customs	Earl Vaughn	EarlVaughn@gmail.com	Scotia: 518.331.3103
Sat phones & comms	Roy Stehle	RoyStehle@sri.com	Menlo Park: 650.859.2552
Medical	Jason Buenning	Jason@polarfield.com	Denver: 303.638.6669
Denver operations	Jill Ferris	Jill@polarfield.com	Denver: 720.320.6155

CPS Offices

Denver	Kangerlussuaq	Scotia
CH2M HILL Polar Services Western Office 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: 011.299.841598	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

Summit Station

Winter	Summer
CH2M HILL Polar Services Western Office Attn: Name of Employee/Researcher 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 - Summit Station C/O Earl Vaughn 109 th Aerial Port Bldg. 20 Stratton Air Base Scotia, NY 12302-9752 Tel: 518.344.2635 Fax: 518.344.2537

Other

Organization	Internet	Phone
Summit Science Coordination Office (SCO)	http://www.geosummit.org sco at summitcamp.org	John Burkhart +47 96 82 5011

SAFETY, ENVIRONMENT, HEALTH and PERMITS

All science teams planning to conduct research in Greenland must complete an **annual application** in order to obtain approval from the Danish Polar Center (DPC). The application forms are available from the DPC at <http://www.dpc.dk/>. Applications are submitted directly through the DPC. For assistance with the application process, contact:

Poul Henrik Sorensen
 E-mail: [phs at dpc.dk](mailto:phs@dpcc.dk)
 Telephone: +45 3288 0100

Medical Clearance

Arctic Program participants traveling into the Greenland field generally must pass a National Science Foundation-mandated physical exam. All field team members should plan to complete their medical 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.

CRITICAL SUCCESS FACTORS

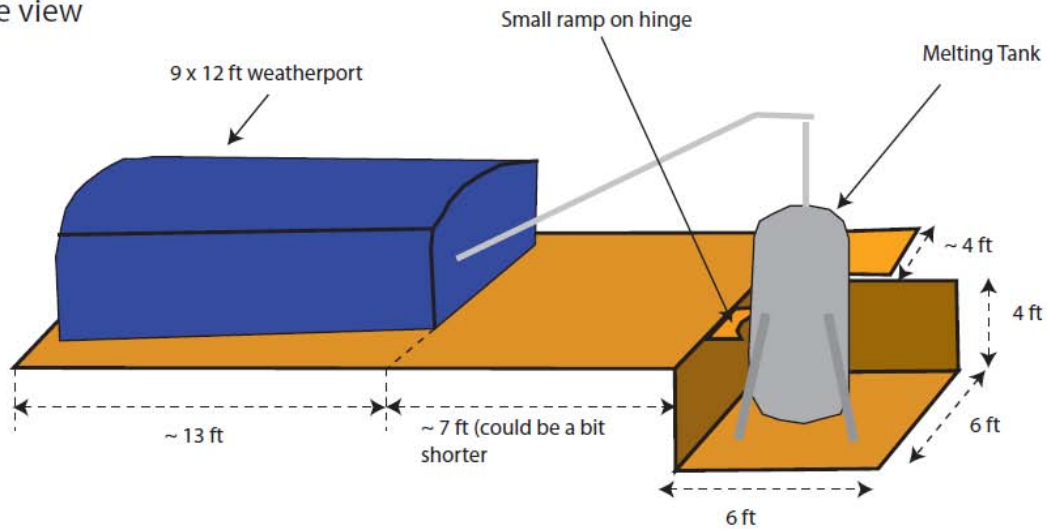
Please list the factors that are most important for the success of your science. We track these factors in order to measure the success of CPS' support. Examples might be the availability of the helicopter or camp gear.

Factors
Provide trench as specified by the PI in services above
Provide functioning generators
Provide snow removal support in case of storm event, snow accumulation in the trench
Provide all requested allocations as specified and in good working order
Provide -25C storage in Kanger for retro samples

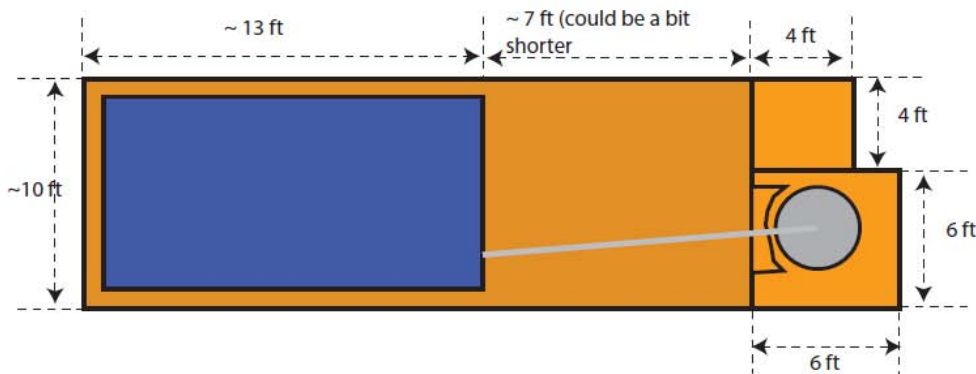
GOVERNMENT AND PERFORMANCE REPORTING ACT OF 1993 (GPRA)

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.

Side view



Top view



Appendix D – Detail Shipping List

# on box	# in CTS	Contents	Weight (lbs)	Dimensions (inches)	Box appearance	Notes
1	0000	Vacuum pump	95	30x14x18	wood	
2	0001	O-rings, gauges, window, valves, spare connections chest, heat tape, some hardware	80	23x22x22	white/blue plastic	
3	0002	Melter line sections, spare tubing, regulators	60	26x18x17	lg action packer	
4	0035	Everkool, 1 chainsaw, eutectics, 3 new bars & chains, 3-way propane jcnct w/ valves, saw tool	117	29x29x22	white plastic	STOPS IN KANGER
5	0003	Compressor pump	44	24x16x17	white/blue plastic	
6	0004	Vacuum pump	44	25x18x15	plastic	
7	0005	Tools, power supplies	60	20x14x12	sm action packer	

8	0006	Air sampling cansiter	25	16.5x16.5x33	plastic	
9	0007	Air sampling cansiter	25	16.5x16.5x33	plastic	
10	0008	Air sampling cansiter	25	16.5x16.5x33	plastic	
11	0009	Air sampling cansiter	25	16.5x16.5x33	plastic	
12	0010	Air sampling cansiter	25	16.5x16.5x33	plastic	
13	0011	Air sampling cansiter	25	16.5x16.5x33	plastic	
14	0012	Air sampling cansiter	25	16.5x16.5x33	plastic	
15	0013	Air sampling cansiter	25	16.5x16.5x33	plastic	
16	0014	Air sampling cansiter	25	16.5x16.5x33	plastic	
17	0015	Air sampling cansiter	25	16.5x16.5x33	plastic	
18	0016	Air sampling cansiter	25	16.5x16.5x33	plastic	
19	0017	Air sampling cansiter	25	16.5x16.5x33	plastic	
20	0018	Air sampling cansiter	25	16.5x16.5x33	plastic	
21	0019	Air sampling cansiter	25	14x14x33	cardboard	
22	0020	Pump Oil, 4 L	10	8x8x15	cardboard	DNF
23	0021	Tools, hardware, notebooks, water traps, T probe, bubbler manifold	60	26x18x17	lg action packer	
24	0022	Chiller	48	22x17x27	white/blue plastic	DNF
25	0023	Aluminum tank, drain hose, plastic sheeting	420	72x38x42	crate	
26	0024	Tools, 1 chainsaw, a few fittings, hardware, pens & pencils	60	22x15x17	olive plastic	DNF
27	0025	Propane burner parts, chisel, drain pipe	80	38x31x11	white/blue plastic	
28	0026	Propane burner, propane hose, Alcatel exhaust hose, 1" vacuum hose, 1/4" and 3/8" lines, clamps	90	37x37x14	white/blue plastic	
29	0027	Steel tubing	35	111x5x5	PVC tube	
30	0028	14C-methane standard	64	8.5x8.5x54	cylinder	
31	0029	nitrogen	64	8.5x8.5x54	cylinder	
32	0030	nitrogen	64	8.5x8.5x54	cylinder	
33	0031	argon	64	8.5x8.5x54	cylinder	
34	0032	air	25	8x8x27	cylinder	
35	0036	corrugated plastic sheet	1	48x48x1	white	

TOTAL WEIGHT

1932