

**Safety Appendix**  
**Atmospheric Radiation Measurement Program Second Mobile Facility (AMF2)**  
**Operational Support for**  
**Biogenic Aerosols-Effects on Clouds and Climate (BAECC)**  
**Hyytiälä, Finland**

Contractor: Native Energy and Technology, Inc.

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**Designated Competent Person:**

Fall Protection: Patrick Dowell

NFAP 70E: Patrick Dowell

Approved By:

\_\_\_\_\_  
*Project Manager*

Date: \_\_\_\_\_

\_\_\_\_\_  
*AMF2 Site Manager*

Date: \_\_\_\_\_

\_\_\_\_\_  
*AMF2 Technical Operations Manager*

Date: \_\_\_\_\_

\_\_\_\_\_  
*ARM Field Safety Coordinator*

Date: \_\_\_\_\_

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*EVS Division ESH Coordinator*

Date: \_\_\_\_\_

\_\_\_\_\_  
*Lead Technician*

Date: \_\_\_\_\_

Date: December 10, 2013

The purpose of this Appendix is to provide all AMF2 personnel and visitors with important health and safety information, procedures, and requirements particular to the second ARM Mobile Facility (AMF2) operations near Hyytiälä, Finland in support of the DOE approved Field Campaign “Biogenic Aerosols-Effects on Clouds and Climate (BAECC)” This information is a supplemental document to the *Atmospheric Radiation Measurement Program Mobile Facility-2 (AMF2) Safety Plan* (AMF2 Safety Plan).

The AMF-2 Safety Plan provides safety related procedures for all personnel entering the site to work, visit, or observe. The plan presents the site’s ES&H policy, work authorizations and characterizes on-site hazards and identifies mitigations. The intent of this plan is to require workers to conduct their activities in a safe fashion and to provide them with the means to do so. The locations of the AMF2 activities are identified in Table 1 and Figure 1. A pre-site briefing will be required for all visitors in accordance with the AMF2 Safety Plan.

TABLE 1: Site Descriptions

<b>Site</b>	<b>Lat</b>	<b>Lon</b>	<b>Elev (m)</b>
<b>University (M1)</b>	61.843	24.288	153m
<b>AOS (S1)</b>	61.846	24.295	
<b>Calibration Towers</b>			

## BAECC: Initial Site Layout



Fig. 1. Google Earth view of AMF2 sites during BAECC. The site is within proximity to Hyytiälä, Finland.

Table 2. Schedule of Planned Activities

Date	Planned Activities
Jan. 3-30, 2014	Installation
Feb. 1, 2014- Sept. 14, 2014	Operations
Sept. 15, 2014- Oct. 13, 2014	Uninstall
Oct. 15, 2014- Nov. 4, 2014	Relocation to ACAPEX by Air

### On-Site phone Numbers:

AMF2 VOIP: TBD

AMF2 Cell Phone #1: Please contact AMF2 Management for this number

AMF2 Cell Phone #2: Please contact AMF2 Management for this number

To dial cell phones from US: dial 001 then 358 (001 is US exit code and 358 is Finland country code).

## 2. ORGANIZATION

The AMF2 Team will consist of:

Nicki Hickmon- Site Manager  
Mike Ritchie- Technical Operations Manager  
Patrick Dowell- Team Leader  
Mark Smith- Technician  
Brett Bersche- Technician

AMF2 team members from ARM site will primarily be involved in the setup and tear down operations and overall AMF2 management.

## 3. EMERGENCY PLAN

All operations will be under the umbrella of the AMF2 Safety Plan. General emergency response procedures to be followed are:

1. If needed, determine the most rapid method of contacting emergency personnel (phone, radio, or messenger) and initiate contact procedures.
2. Attend continuously to the victim to the extent possible until help arrives.
3. Supply first aid assistance to the victim, consistent with training level, and take other action, as appropriate, to stabilize the situation until professional help arrives.
4. In the event of injuries or accidents, make the following notification as soon as practical (within six hours) after immediate care is provided;
  1. AMF2 Site Manager, Nicki Hickmon, alternate: Michael Ritsche
  2. ACRF Safety Coordinator, Monte Brandner, alternate: Bill Gaspar
  3. Native Energy Team Lead, Pat Dowell

### *EMERGENCY NUMBERS*

In the country of Finland the emergency number works like the United States acute emergency number (911). However the number Europe has programmed is 112. This will contact any fire brigade, ambulatory assistance, or police force nearest to your location.

#### *Fire and Rescue Services*

- Emergency number **112**
- Nearest Health Centre (Orvivesi) +358356554000

These contact numbers will provide any employee with general emergency and accident assistance should any instances arise.

<b>AMF2 Deployment - BAEC</b>			
<b><u>Contact Personnel</u></b>			
<b><u>Contact</u></b>	<b><u>Office</u></b>	<b><u>Cell</u></b>	<b><u>E-Mail</u></b>
Nicki Hickmon (ANL)	630-252-7662	Please contact AMF2 Management for cell phone numbers.	<a href="mailto:nhickmon@anl.gov">nhickmon@anl.gov</a>
Mike Ritsche (ANL)	630-252-1554		<a href="mailto:mtritsche@anl.gov">mtritsche@anl.gov</a>
Patrick Dowell (Native)	580-388-4050		<a href="mailto:pdowell@ops.sgp.arm.gov">pdowell@ops.sgp.arm.gov</a>
Monte Brandner (ANL)	605-574-2116		<a href="mailto:Imbrandner@anl.gov">Imbrandner@anl.gov</a>
Bill Gasper (ANL)	630-252-4878		<a href="mailto:wgasper@anl.gov">wgasper@anl.gov</a>
AMF2 Answering Service	630-790-7149		

**Hyytiala Local Contact Numbers:**

Follow the below list in order listed. On weekends and evenings call Janne and Heikki'e private numbers:

1. Please contact AMF2 Management for these numbers.

US Embassy, Helsinki

Emergency after hours: +3589616250 select 0

Regular phone hours: 2pm – 4pm Mon – Thu +358401405957

Email: [helsinkiACS@state.gov](mailto:helsinkiACS@state.gov)

Address: American Embassy  
 Consular Section/ACS  
 Itainen Puitotie 14 B  
 00140 Helsinki, Finland

#### **4. ACTIVITY REVIEW AND HAZARD ASSESSMENT**

At the outset of each day participating AMF2 team members will discuss the proposed activities to be conducted. Any unusual or new activity not already evaluated will undergo a review by all AMF2 participants and other team members to address safety concerns and questions. Items to be reviewed during these safety discussions include:

- Potential physical and biological hazards
- Site-specific procedures to be followed for particular activities
- Required personal protective equipment or supplies
- Emergency procedures
- Staff responsibilities
- Expected weather conditions and evaluation of exposure danger. See the wind chill chart under frost bite hazards.

#### GENERAL SAFETY PRECAUTIONS

The AMF2 Safety Plan will be the guide to safe operations. In any case, attention to detail and recognition of the equipment and operating procedures by each person will be paramount.

#### SAFETY EQUIPMENT

General Individual safety items required for the trip are listed below:

- Sunscreen, [lip balm](#)
- [Cold Weather gear \(provided by AMF2\)](#)
- Adequate foot protection (toe covers provided by AMF2)
- Hard hats (provided by AMF2)
- Eye protection (provided by AMF2)
- Cell phone or radio available within audible distance (provided by AMF2)
- Work gloves (provided by AMF2)
- Water.

#### COMMUNICATIONS

To facilitate emergency communications, a mobile radio(s) or cell phone(s) shall be available to the field team and all team members will become familiar with operation of the unit. In addition, a list of pertinent emergency phone numbers (included in this plan) shall be readily available to the field team. Communications devices should not be used by the driver of a vehicle (rental car) while the vehicle is in motion.

## 5. PHYSICAL HAZARDS

### Fire

Fire hazards can always occur. Class ABC fire extinguishers are in both the OPS and GP vans. Appropriate authorities will be notified as soon as possible.

### Mechanical Hazards

Mechanical hazards could be posed by equipment used for instrument equipment. The advice of operating personnel will be followed regarding its use and possible danger.

### Lightning Strikes

Weather conditions will be continuously monitored during installation activities. Care will be taken to avoid severe weather. If sudden weather extremes occur, all personnel will take appropriate cover

### Cold Exposure

#### Hypothermia

Air temperatures near the facilities will more than likely be excessively cold during the site installations, air temperatures in Finland average -3 Celsius to -22 Celsius during the winter months. Hypothermia results from a drastic lowering of the body's temperature due to prolonged exposure to the cold. Symptoms include shivering, a low body temperature, loss of cognitive facilities, drowsiness, and possibly unconsciousness. Prevention of hypothermia can be maximized by wearing warm clothing, preferably in layers, when the weather is cold. It is also essential to eat at regular intervals in cold weather in order to maintain energy levels. Treatment for hypothermia includes raising the body temperature through the ingestion of warm (not hot) liquids and application of additional clothing or blankets.

#### Frost Bite

As your blood vessels constrict to keep vital organs warm, hands and feet can experience frostbite. They are the first body parts affected. Usually it begins with a burning sensation followed by numbness. The numbing phase is very dangerous and actual frostbite may occur. It is paramount every member of AMF2 and affiliates use gloves and coverings leaving no exposed flesh during frostbite conditions as mapped by the following table.

<b>WIND CHILL CHART</b>										
		Ambient Temperature (°C)								
		4	-1	-7	-12	-18	-23	-29	-34	-40
Wind km/h	Velocity mph	Equivalent Chill Temperature (°C)								
<b>Calm</b>										
0	0	4	-1	-7	-12	-18	-23	-29	-34	-40
8	5	3	-3	-9	-14	-21	-26	-32	-38	-44
16	10	-2	-9	-16	-23	-30	-35	-43	-50	-57
24	15	-6	-13	-20	-28	-36	-43	-50	-58	-65
32	20	-8	-16	-23	-32	-39	-47	-55	-63	-71
40	25	-9	-18	-26	-34	-42	-51	-59	-67	-76
48	30	-16	-19	-22	-36	-44	-53	-62	-70	-78
56	35	-11	-20	-29	-37	-46	-55	-63	-72	-81
64	40	-12	-21	-29	-38	-47	-56	-65	-73	-82

Adapted from: Threshold Limit Values (TLV™) and Biological Exposure Indices (BEI™) booklet; published by ACGIH, Cincinnati, Ohio

<b>Little danger</b> in less than one hour exposure of dry skin	<b>DANGER</b> – Exposed flesh freezes within one minute	<b>GREAT DANGER</b> – Flesh may freeze within 30 seconds
<b>Maximum danger</b> of false sense of security		

Due to the possible extreme temperatures that are possible coupled with high winds the following limitations on outdoor activities will be imposed during installation, operations and pack up. See Buddy System in Appendix 1.

Temperature	Limitation
Above -10C	No operational limitations. Dress appropriately for weather conditions
-10C to -40C	“Buddy System” implemented. PM’s will be accomplished. All CM work will be evaluated by exposure time expectations and weather conditions.
Below -40C	No outdoor work permitted. All outdoor PM/CM activities suspended. Travel to and from work locations (container to container at M1, living quarters to M1, M1 to S1) allowed only if Buddy System implemented. Emergency outdoor work only allowed if it is to save assets or personnel. BE AWARE any exposure at these temperatures is extremely dangerous.

### First Aid for Frostbite

If your fingers, ears, or other areas are frostbitten, get out of the cold. Warm your hands by tucking them into your armpits; if your nose ears, or face are frostbitten, warm the area by covering it with dry, gloved hands. Do not rub the affected area.

If numbness remains during warming, seek professional medical care immediately. If you are unable to get immediate assistance, warm severely frostbitten hands or feet in warm-not hot-water (between 100 and 105F). When a reddish color returns to the frostbitten skin, take it out of the water and gently pat it dry. Take care not to break any blisters that may have formed and do not rub the skin. Cover the skin with a loose bandage and seek medical help immediately. If the feet or legs are frostbitten, do not attempt to walk unless it is necessary for survival.

### Overheating

Overheating caused by overexertion leads to perspiration, which in turn degrades the insulating value of clothes. Upon cessation of exertions, overheating can easily turn into hypothermia. Exertion and protective clothing need to be carefully balanced and adjusted as needed to minimize or preferably prevent perspiration.

### Dehydration

During any season, dehydration can occur. Increasing the amount of liquids ingested is the most important factor in maintaining comfort, normal mental and physical capacity, and good health. High temperatures in the summer, in combination with increased physical activity can lead to dehydration. Dehydration causes painful constipation and can lead to other illnesses. Persons should drink a total of at least eight glasses of water each day at regular intervals. Caffeinated liquids are not considered hydrating fluids.

### Solar Radiation

Prolonged exposure to the sun can result in painful sunburns. All field personnel should obtain and use a sunscreen or sunblock to prevent sunburns. A sun protection factor (SPF) of 30 is required. Be especially sure to cover sensitive areas (ears, nose, face) and reapply sunscreen or sunblock regularly throughout the day. In addition, a hat is recommended to prevent burning of the scalp and to shade the face and neck.

Sunglasses are strongly recommended, since reflections of solar radiation (albedo at 90%) from the snow-covered ground can be painful to the eyes.

## 6. NATURAL HAZARDS

### Forest Fires

Located right beside the natural forests of Finland, this hazard is very real for our operations to face. It will be important that the AMF2 Team knows proper protocol in contacting local fire emergency management facilities to respond to this possible occurrence. Communication with the SMEARII Management will be paramount in case such an occurrence arises.

In the event of a forest fire that will affect the SMEARII site and the AMF2 decisions on the ability to save equipment and go into “turtle mode” will be made on a case-by-case basis. AMF2 Management, SMEARII Management, ACRF/ARM/ANL Safety personnel and Native Energy Management will all be in contact and part of the decision making process in this eventuality. In any situation the safety of personnel is paramount over AMF2 assets.

### Wildlife Danger

The carnivores of this country are shy and thinly spread out. However, moose and reindeer are possible encounters at our work area. When you plan to go outside of a facility it will be paramount you check the immediate surroundings for any carnivorous animals or large game. If either is present, you will remain indoors until safe passage is available.

### Moose

Moose are usually solitary animals during the warmer months of the year but in winter are known to form small family groups. They are most active during the hours at dawn and dusk. Be aware when driving that they may be in the road. Remain extra vigilant during their active hours when driving. They will attack animals (including humans) if they feel threatened. Moose are adept swimmers and have been known to dive to depths of greater than 4m. Practicing moose safety is as simple as eliminating the potential reason for a charge. If you encounter a moose give it plenty of space (at least 50ft, preferably more) and never force them into a corner. Be especially wary if the moose seem irritable or if calves are around. Never get between a mother and her calf.

Above all, stay aware of your surroundings. Make noise to let the moose know you are coming to help avoid a conflict during a chance encounter.

**Moose etiquette:** If you encounter a moose and it hasn't charged you can probably go about your business as long as you observe the proper moose etiquette. Give the moose space, but if you suspect there may be calves around but you can't see them:

- Go back
- Wait to see if the situation changes
- If you must pass by the moose, give it the widest berth possible or find another way around.

### **Moose Warning Signs:**

- Raised hackles along the moose's shoulder
- Ears pinned back
- Lowered head
- Moving toward you. This is not a good sign. Move away and seek cover

**Moose Charge:** Moose have a top speed of 30+ mph so you will not win a foot race. Instead, run for solid cover like a tree or other obstruction you can hide behind. Climbing a tree is a viable option if there is time. If a moose does knock you down, curl into a ball and stay still. Protect

your head with your hands as best you can. A backpack can offer some protection for your spine. The moose might kick you and stomp you before it decides you are no longer a threat and moves away. Don't get up until the moose leaves you alone AND moves off. If it remains close by and agitated it might interpret your movement as a renewed threat.

### Reindeer

Reindeer are much like deer in the United States but they are shorter and heavier. They are also much slower and less prone to react and run just from seeing a human. The main source of danger from reindeer is as road hazards. Reindeer have been known to stand in the road and not move even if the vehicle is inching up and honking. Be vigilant when driving especially during the hours of dusk and dawn, although reindeer are known to congregate on roads at any time of the day. Reindeer are easily disturbed by loud noises. Yelling, slamming doors, etc can startle them and make the herd more likely to stampede and/or become unpredictable. If you encounter reindeer while on foot, give them a wide berth; try not to startle them by making loud noises. As with any wild animal, respect their space and never get between a mother and her calf.

## 7. CHEMICAL HAZARDS

No chemical hazards are anticipated beyond those in the AMF2 Safety Plan.

## 8. BIOLOGICAL HAZARDS

No biological hazards are likely during this operation.

MODIFICATION AND FEEDBACK ON THE SAFETY PLAN

This plan can be modified if necessary to address unanticipated situations. Any modifications will be made in writing and all AMF2 team members will be informed of changes or additions. Agreement of AMF2 management to any modifications must be indicated by signature.



## **Appendix 1: Buddy System**

Having a buddy system in place increases safety and this is especially important during extreme weather conditions. During the 7-day a week operational phase there will be times that extreme weather conditions require implementation of this system. During these dangerous conditions both technicians will be required to be within eyesight of one another during outside work. Each technician will maintain a working cell phone on or within reach or a hand held radio. Radio and cell phone checks will be accomplished prior to work commencing. Since the AMF2 is implementing a 7-day a week work schedule it will be inevitable that personnel could be scheduled to be working alone during extreme weather events. If the Buddy System is determined to be required due to temperatures and work load the off duty technician will be required to come in during the time outside work is needed. AMF2 technicians should pay special attention to the weather and forecasts for local conditions and ensure that personnel are available in case the Buddy System needs to be implemented. There will be times where the off duty technician will not be available due to a variety of factors (illness) in those instances the on duty technician will implement the Check In system.

### ***Check In System***

In some instances a buddy system is not always feasible due to schedules, sickness, etc and there will not be a second AMF2 person available for duty. In this case it is the on duty technicians' responsibility to review the outside workload and limit the time any work done alone will be accomplished. PM's will still be expected but instead of doing them all at once, split them up so there is a break in between or delay until temperatures rise and the Buddy System is no longer required. Review CM requirements and determine if work can be delayed until temperatures rise, or put off until a later date. If unable to do any of the above, the on duty technician must check in with Hyytiala personnel on a regular basis. It is expected that the on duty technician will review with the Hyytiala personnel the work requirements, time of exposure expected, interval of check in and review any situations with Hyytiala personnel scheduling issues that may prevent them from being able to respond (meetings, conference calls, lunch plans, time of departure from site). If at any time there will not be Hyytiala personnel available to check in (week-ends, holidays), then outdoor activities will be suspended until the weather abates or personnel become available.