

ARCS PROCEDURE	DARWIN CYCLONE RESPONSE PLAN	PRO(ARCS)-047.004
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Darwin Cyclone Response Plan

I. Purpose:

The purpose of this procedure is to provide the necessary guidelines on how to prepare the TWP Darwin facility for a predicted cyclone.

II. Cautions and Hazards:

- The potential threats from cyclones come from flying debris, very strong winds, flooding caused by heavy rains, hazardous surf conditions, and washouts of coastal areas caused by extreme wave actions.
- Strong winds can cause structural damages to buildings, picking up loose objects and propel them with deadly force, and damage utility power poles and power lines.
- Wind-driven rain in a super cyclone can act like a water blaster forcing water through windows, door seals and other openings in buildings.
- After high water, snakes, insects and animals are driven to higher ground by floodwaters.
- All visitors to the Darwin facility should listen to recommendations on local radio; go to designated cyclone shelters; or head inland (100 km).
- Power to site is underground, so power line damage is unlikely.

III. Requirements:

Verify that there are battery-powered equipment and other emergency supplies at the site. At minimum, the supply should include flashlights, battery powered radio, drinking water, first-aid kit, and extra batteries.

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IV. Procedure:

A. Preparing for Possible Cyclone

1. Forty-eight hours before a cyclone is predicted to arrive at the Darwin facility, or if it is within 200 km of the site, contact TWP/AMF Management Office (TWP/AMF MO) for a decision to shut down the site and provide emergency contact phone numbers. TWP/AMF MO shall notify TWP Site Scientist, ARM Operations Manager, and ARM Safety Officer.

The 48-hour time frame is used to allow the on-site technicians to shut down the site and still have the time to deal with their own homes. Also, if only one person is on site, it may take one day to shut down.

2. If the decision is made to shut down the site, proceed with the following (see Attachment 1 for instrument-specific quick reference to shutting down):
 - a) Fill up the GENSET internal diesel fuel tank.
 - b) Inspect van hold-downs.
 - c) Lower the SMET tower, remove the radiometer cross arm and the GNDRAD radiometers, and take them inside a transportainer. Then raise the SMET tower back up with the SMET instruments remaining on the tower.
 - d) Set the solar tracker command to "go home" (i.e., not to track), and remove the shading balls.
 - e) Leave site power on and the air-conditioning units running. Do not close dampers.
 - f) Lock all transportainers.

B. Evacuation of Site during Cyclone Threat

1. If wind speed exceeds 40 mph (64 km/h) during the cyclone approach, all personnel must evacuate the site for safety reasons.

C. Re-establishing Site after Cyclone Threat

1. Watch out for snakes, fallen trees, downed power lines, and debris.
2. Inspect all the transportainers for water intrusion.
3. Verify if grid power is available.
4. Check the GENSET internal diesel fuel tank level.
5. Remove all equipment protective covers and inspect for damage.

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6. Reinstall instruments that were removed and bring the site up.
7. File a report on the effects of the cyclone and related shutdown procedures to the TWP/AMF MO. TWP/AMF MO will then forward the report to TWP Site Scientist, ARM Operations Manager, and ARM Safety Officer.

D. Following Up

1. TWP/AMF MO requests instrument mentors to check data.
2. File a Data Quality Report (DQR) with ARM Data Quality Office.

V. References:

1. Lowering and Raising SMET Tower, PRO(SMET)-005.
2. MWR Restart/Shutdown Procedures, PRO(MWR)-004.
3. Initialization Procedure for the Solar Tracker, PRO(TRK)-001.
4. Ceilometer Shutdown/Restart Procedure, PRO(CEI)-005.

VI. Attachments:

1. Instrument-Specific Site Shutdown Guide during Cyclone Threat.

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Attachment 1: Instrument-Specific Site Shutdown Guide during Cyclone Threat

System/Instrument	Shutdown Instructions
SKYRAD Instruments	
Solar Tracker (TRK)	Leave power on; leave outside; remove shading balls; command to "go home"; leave radiometers on stand
IRT	Leave power on; leave outside
MFRSR	Power off; take inside van
NIP	Leave power on; leave outside (part of TRK)
PSP	Leave power on; leave outside
B/W	Leave power on; leave outside
PIR	Leave power on; leave outside
GNDRAD Instruments	
IRT	Remove from SMET tower (part of cross arm); take inside van
PIR	Remove from SMET tower (part of cross arm); take inside van
PSP	Remove from SMET tower (part of cross arm); take inside van
SMET Instruments	
Barometer (BAR)	Leave power on; leave outside
ORG	Leave power on; leave outside
T/RH	Leave power on; leave outside
Anemometers (WND)	Leave power on, leave outside (replace propeller w/carbon fiber propeller)
Stand-Alone Instruments	
AERI	Power off; manually close hatch
Ceilmeter	Take inside van
CIMEL	N/A – usually not deployed during cyclone season (if deployed, remove and take inside van)
MMCR	Leave power on; check antenna anchorage
MPL	Leave power on
MWR	Power off; take inside van
TSI	Leave power on; leave outside
Others	
Power to Site & GENSET	Leave power on; fill internal fuel tank (fuel should last at least 24 hours)
HVAC	Leave power on
Vans	Check hold-downs; lock doors
OCO Transportainer	Shut down instrument; cover dome w/ aluminum box; leave power to HVAC on
RWP (guest instrument)	Leave power on; leave outside
Ops Building	Leave power on for server (backed up by GENSET)
SDS	Leave power on
Router	Leave power on
GPS Suominet	Leave antenna up