

<p>ARCS PROCEDURE</p> <p>Author: M. Apple</p>	<p>INSPECTION AND REPLACEMENT OF TWP CABLES</p>	<p>PRO(OPS)-037.000</p> <p>27 January 2004 Page 1 of 7</p>
---	---	--

## Inspection and Replacement of TWP Cables

### I. Purpose:

This procedure provides instructions for inspection and replacement of power and data cables at the TWP locales. All cables called out below should be inspected at least once a year at all TWP sites.

### II. Cautions and Hazards:

#### Inspections

- Cable in water – beware of electrical shock.
- Removing plug from connectors. Note proper orientation before re-insertion.
- Insure instrument operation and reporting after cable inspection.
- If cable appears damaged, use test equipment to determine if it is.

#### Replacements

- Insure cable is properly labeled.
- Insure cable is of sufficient length (does not inhibit normal instrument or component movement).
- Insure instrument operates and reports data properly after cable replacement.

### III. Requirements:

#### Labeling

- All cables are to be labeled in accordance with the labeling scheme called out in the TWP cable drawing.

#### Replacement Cables

- Do not remove any cable unless a suitable replacement cable is available and labeled properly.
- Label each cable using a material that will last for five years without degradation.
- General Information on Test Equipment to Find Problems
  1. There are several types of equipment that can be used to identify cable characteristics.

<p>ARCS PROCEDURE</p> <p>Author: M. Apple</p>	<p>INSPECTION AND REPLACEMENT OF TWP CABLES</p>	<p>PRO(OPS)-037.000</p> <p>27 January 2004 Page 2 of 7</p>
---	---	--

- a) A **multimeter** with an “ohms” measurement can be used to measure the resistance of a cable. Unless a cable is short or both ends can be in close proximity to each other, this test will require a jumper on one end so it can be tested for its resistance. On the other hand, a test for shorts can be done with access to only one end, with the other end disconnected from any instrument.
- b) A **megger** is a resistance measurement device that puts a higher voltage across any two lines with nothing connected at the other end to determine that the insulation integrity is within acceptable limits. It is commonly used to identify problems with a cable that cannot be seen with a multimeter. Megger tests are most often done on systems where there are higher voltages present.

#### IV. Procedure:

##### A. Inspecting Power and Data Cables

1. Cables to be inspected
  - a) Data Cables between Dataloggers and Instruments
    - ⇒ SMET
    - ⇒ GNDRAD
    - ⇒ SKYRAD
  - b) Data Cables from Loggers to Vans
  - c) Data Cables from other Instruments to Vans
  - d) Power Cables
  - e) Other Cables (fiber optic, grounding, control, etc.)
2. Inspect the flexibility and condition of all cables once a year per the Maintenance Schedule.
  - a) Observe entire length of cable for brittle exterior sheathing – cracks easily when moved or bent.
  - b) Observe entire length of cable for cuts on or through cable.
  - c) Observe entire length of cable for any kinks in cable.
  - d) Observe for damaged connectors.
  - e) Observe connectors for signs of corrosion.
  - f) Observe cable/wires loosely attached to connector.

<p>ARCS PROCEDURE</p> <p>Author: M. Apple</p>	<p>INSPECTION AND REPLACEMENT OF TWP CABLES</p>	<p>PRO(OPS)-037.000</p> <p>27 January 2004 Page 3 of 7</p>
---	---	--

3. Suspect Cables or Connectors
  - a) If a cable is suspect due to crazing, cracking, abrasion, or kinks, use test equipment to determine operability.
  - b) If a connector is suspect, observe for corrosion or presence of water, and use test equipment to determine operability.

**B. Replacement of Power and Data Cables**

1. Identify cable by label if label is readable, and note in report.
2. Note the following details of the cable if label is not readable:
  - a) Length of cable
  - b) Connector requirement for each end of cable
  - c) Cable type (AC power, DC power, instrument)
  - d) Number, size, type of wires enclosed in sheath
  - e) Instrument, power, or logger description that cable is attached to
3. Replace cable of appropriate length, type, connectors, and labeling.
4. Test replacement cable with above test equipment.
5. Update drawing book with any added or modified cable or connector installed.

**C. Verify Spare Cables and Connectors**

1. AC power cable
2. DC power cable
3. Fiber
4. Connectors

**D. Checklists for Annual Inspection. See Attachments**

1. TWP cable maintenance inspection log
2. Replace cable(s) log
3. Onsite spares

**V. References:**

1. TWP Drawing Book
2. TWP Maintenance Schedule (on the TWPO website)
3. Checklist should be attached to Site Visits Reports (and therefore Tasking Lists prior to Site Visits when cable inspections are due)

ARCS PROCEDURE Author: M. Apple	INSPECTION AND REPLACEMENT OF TWP CABLES	PRO(OPS)-037.000 27 January 2004 Page 4 of 7
------------------------------------	---	--

**VI. Attachments:**

1. TWP Cable Maintenance Inspection Log

**Attachment 1: TWP Cable Maintenance Inspection Log**

TWP Cable Maintenance Inspection Log				
Site:	Inspection date:		Inspector:	
Systems	Problem		Describe Problem	Cable Replaced?
AC Power	Y	N		
AERI				
AWS				
BBSS				
CEIL				
CIMEL				
COMM				
DC Power				
GNDRAD				
GROUNDING				
MMCR				
MPL				
MWR				
SKYRAD				
SMET				
TSI				
VSAT				
WSI				
OTHER				

<b>Replaced Cable Information/Log</b>	
Cable Description	
Cable Length	
Connectors used	
Cable labeled (Y, N)	
Cable Test Method (s)	

<b>Replaced Cable Information/Log</b>	
Cable Description	
Cable Length	
Connectors used	
Cable labeled (Y, N)	
Cable Test Method (s)	

<b>On Site Spares</b>		
<b>Item</b>	<b>P/N or Type</b>	<b>Quantity</b>
AC Power Cable		
DC Power Cable		
Fiber		
Connector		
Connector		
Connector		
Connector		
Connector		
Connector		