MOOS BENTHIC COPPER CABLE SPECIFICATION- PN 1003383DWG-2.0 – FALMAT PN FM022307-3CP

Revision 2.0 February 13, 2007

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Rev. 1.0 – 20SEP06 Derived from previous electro-optical specification. Mrc
1.5 – 05DEC06 Added cable jacket color requirement.
2.0 – 16FEB07 Increased Voltage rating to 425VDC on power conductors.

1.0 Introduction

The Monterey Aquarium Research Institute (MBARI) is currently developing a deep ocean underwater science observatory. The maximum installed depth of the observatory is planned to be 4000 meters deep in seawater. The observatory design includes a wave following buoy system connected to a seafloor anchor with an electro-optical cable strength member referred to as the Riser Cable. Individual instrument installations on the seafloor are connected together with a copper cable to be laid on the seafloor by ROV referred to as the **Benthic Copper Cable**.

All information supplied by cable vendors to MBARI in connection with this cable purchase, including proposed designs, estimated performance and cost will be held in strict confidence by MBARI. Non-disclosure agreements can be executed if necessary.

2.0 Cable Proposal Requirements.

Prospective vendors are invited to submit proposed cable designs and must include the following information:

- **2.1** Design and estimated performance documentation.
  - **2.1.1** Description of the cable construction materials, approximate sectional dimensions and illustration for both armor protected and non-protected cable cross-sections.
  - **2.1.2** Cable weight per meter in air and seawater.
  - **2.1.3** Estimated strain and pressure induced rotation of the proposed cable design.
- **2.2** Cable cost.
- **2.3** Cable delivery time ARO.

3.0 General and Environmental.

- **3.1** Jacket color. The cable jacket shall be high visibility “fluorescent green”
- **3.2** The cable must be water blocked with all interstitial voids filled with suitable filler material.
- **3.3** Temperature. The cable must meet the mechanical and electrical performance specifications and remain flexible enough to spool and un-spool from the specified diameter storage drum from –2 degrees Centigrade to +25 degrees Centigrade (see drum illustration in Fig. 1).
- **3.4** Pressure. The cable must meet the mechanical and electrical performance specifications while continuously submerged in 4000 meters of seawater.

3.5 Materials Compatibility. The cable jacket construction materials must be compatible with 5 years of seawater emersion.

3.6 Storage Conditions. The cable must not be damages by storage for one year on a storage reel meeting the minimum radius specifications.

3.7 Service Life. The benthic copper cable shall provide a minimum of five years of service while continuously submerged in an ocean environment.

4.0 Mechanical Specifications.

4.1 Construction. The cable shall be designed to be as light and small in diameter as possible with synthetic fiber strength members.

4.2 Diameter. The completed cable shall have a maximum diameter of 0.300 inches.

4.3 Working Strength. The cable working load shall be a minimum of 250 lbs.

4.4 Breaking Strength. The cable breaking strength shall be less than 3000 lbs.

4.5 Minimum Bend Diameter. The cable minimum bend diameter at working load shall not exceed 12 inches.

4.6 Suppleness. The cable must be flexible enough to be loaded on the deployment drum, held in place with temporary adhesive and pay out reliably under mild tension.

5.0 Electrical Specifications.

5.1 General. The cable will be used for electrical power and data transmission while submerged in the marine environment.

5.2 Power conductors. The cable shall provide a minimum of two power electrical circuits insulated from one another, and from seawater. The number of actual power conductors may be greater than two in order to optimize the cable package. The power conductors shall be foil shielded separately from the data conductors. The maximum as-built, as-cabled, round trip (two way) resistance of the two cable conductors in series shall be a maximum of 67 ohms per kilometer (nominally 33 ohms per kilometer per conductor, although equal resistances are not required), measured at a conductor temperature of 20 degrees C. The as-built conductor resistance shall have a tolerance of +/- 10%.

5.3 Data conductors. The cable shall provide four 26AWG nominal electrical conductors for data communications arranged as two shielded twisted pairs. The data pairs shall have a nominal impedance of 120 Ohms, +/- 15% at frequencies 0-1 MHz.

5.4 Shield drain. A 26AWG (minimum) shield drain wire in contact with each shield package is required. A single drain wire contacting all shields is acceptable.

5.5 Data Conductor Working Voltage. The cable data conductors will be used at a working voltage between conductors, or between conductors and seawater, of up to 48 Volts DC.

5.6 Power Conductor Working Voltage. The cable will be used at a working voltage between conductors, or between conductors and seawater, of up to 425 Volts DC. The insulation system used must be suitable for continuous high DC electric field stress.

5.7 Insulation Resistance. The Insulation Resistance of each conductor in the as-built cable shall be a minimum of 3,000 Megohms per kilometer, measured at the working voltage of Section 5.5 above. The resistance shall be measured between the test

conductor, and the other conductor(s) plus any other metallic cable elements, tied together.

5.8 Conductor Identification. The individual conductors shall be color coded or otherwise made visually distinguishable from one another, either throughout their length, or at regular increments not to exceed 0.33 meter.

6.0 DELIVERY.

Delivery shall be quoted FOB destination, Moss Landing, California, 95039. Cable shall be delivered suitably packaged for transportation and storage.
Cable shall be delivered in minimum continuous lengths of 210 meters (+5%-0%).

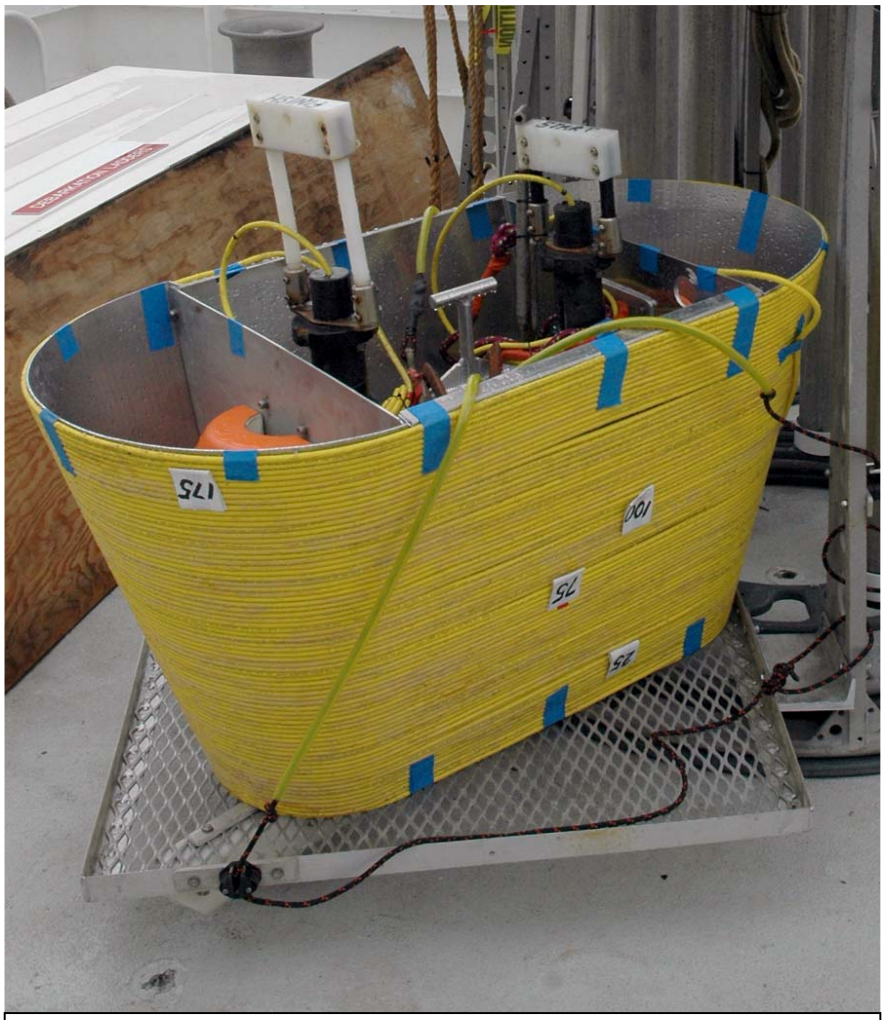

Figure 1. Cable drum pack with loaded cable.