Equipment and Tools for Installation of Self-Contained Currents Surveys

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1. **Title:** Equipment and Tools for Installation of Self-contained Currents Surveys

2. **Purpose:** Define tools and equipment necessary for installation of self- contained current surveys. All of the following items will not be required on every installation. This list is intended to serve as a reminder so that necessary tools or equipment are not forgotten. There may be special equipment required at some sites that is not mentioned in this SOP.

3. **Background/History:** CO-OPS uses self-contained (power and processing done inside the instrument) to measure current velocity. Multiple instruments are deployed simultaneously in a CO-OPS Current Survey. These surveys are done regionally. The data obtained is used to make tide and current predictions that are published by NOAA in the annual Tides and Currents Tables.

4. **Scope/Applicability:** This SOP applies to field teams led by the Field Operations Division and Task Managers/Site Representatives overseeing IDIQ contractors who may be installing self- contained current systems.

5. **Main Processes:** This SOP is divided into categories that list equipment and tools needed for the corresponding part of installation. Many of these tools will be used in multiple categories. The lists are divided as follows:

    - Instrumentation Specific
    - Mount Specific
    - Electronic and Test Equipment
    - Personal Equipment
    - Station Specific
    - Standard Tool Bag

Instrumentation Specific

TRDI (See TRDI User's Guide)

1. 2 13mm wrenches
2. 2 10mm wrenches

3. (2) 2-260 O-rings and Dow Corning #111lubricant
4. Desiccant and humidity card

5. Manufacturer supplied Workhorse Sentinel battery
6. Manufacturer supplied RS-232 communication cable

Sontek (See Sontek User's Manual)

1. 3/16 hex screwdriver
2. 5/32 hex screwdriver
3. 3/32 hex screwdriver
4. 7/16 wrench
5. (2) 2-258 nitrile rubber O-rings and Dow Corning #111 lubricant
6. Dessicant and humidity card
7. Manufacturer supplied cable for power. Either to a shore station or Sontek external battery housing. In that case a manufacturer supplied battery will be needed.
8. Manufacturer supplied RS-232 communication cable

Nortek (See Nortek User's Guide)

1. 7/64 hex screwdriver
2. Manufacturer supplied O-rings and Dow Corning #111 lubricant
3. Desiccant and humidity card
4. Manufacturer supplied alkaline or lithium battery
5. Manufacturer supplied RS-232 communication cable

875 Acoustic Release

1. 2 3-8" diameter strap wrenches
2. (2) 2-150, 70 durometer, Buna-N material O-rings (Benthos P/N 0204-150) and Dow Corning #111 lubricant.
3. Manufacturer supplied 875 battery, Benthos P/N B-855-147
4. Desiccant and humidity card
5. Manufacturer supplied magnet

876 A Acoustic Transponding Release

1. (2) 6-12" Diameter strap wrenches
2. ¼" Flathead screwdriver or coin that will fit in ARM Unit slot
3. Manufacturer supplied 875 Battery (Benthos p/n C-867-4)
4. (2)2-242, 70 durometer, Buna-N material O-rings and Dow Corning #111 lubricant
5. Desiccant and humidity card
6. 5/16" Wrench for battery pack replacement
7. 11mm Socket wrench

UAT 376 Underwater Acoustic Transponder

1. (2) 3-8” diameter strap wrenches
2. (6) Off the shelf 9v alkaline or lithium batteries

CART Release

1. (4) 2-154 O-rings (ORE p/n 184411)
2. (1) 2-116 O-ring (ORE p/n 184128)
3. (1) 2-011 O-ring (ORE p/n 24800-B2011)
4. (2) 2-008 O-rings (ORE p/n 24800-B2008
5. Manufacturer supplied alkaline battery (ORE p/n B32174-002)
6. Rubber mallet
7. (2) ¼” wrenches
8. (2) 3/8” wrenches
9. (2) 5/15” wrenches
10. Adjustable wrench

ARGOS Beacons

Mounts

Flotation Technologies AL-200 (TRBM)

1. Line JIG – 5 “ rubber bands for bundles
2. Locking pins
3. 7/16 deep socket wrench
4. 7/16 open or closed wrench
5. 3/8 open closed or socket wrench
6. 3/8” deep socket wrench
7. Tie wraps (>14 inches)
8. (4) zinc anodes 2” x 3” x ½ (51 x 76 x 13 mm) – corner of base
   (4) ¼-20 x 1” bolts – type 316 stainless
8. (1)zinc anode 2” x 6” x ½” (51 x x153 x 13 mm) – cross base of pod pan
   (1) ¼-20 x 1” bolts – type 316 stainless
9. 1 ¼ deep socket
10. Rubber mallet
11. Pry bar
12. Snatch blocks
13. (2) torque wrenches

SUBS

1. 7/16” Combo wrenches
2. 7/16” Deep socket and ratchet
3. 9/16” Combo Wrenches
4. ¾” Combo wrench
5. (8) Awl ¼” shaft
6. 5/32” Allen Key

NOAA ES-2

1. 5/8” Socket
2. ¾” Socket and wrench
3. 1 ¼” wrench
4. Extra ES-2 gimble pins

Electronics and test equipment

1. Laptop computer with rs-232 communication protocol. All required software for self-contained surveys. Refer to SOP 5.2.3.1 Computer and Software Checklist for a comprehensive list of required software and computer accessories.
2. Standard off the shelf digital multimeter. (Fluke 116)
3. Standard off the shelf hand held GPS for station and sensor metadata. (Garmin, Oregon 400c)
4. Standard off the shelf digital camera for photo documentation.
5. Cellular or Satellite phone
6. DS-8000 Deck Unit
7. Calibration table for compass
8. DRI 267 Diver Operated Transponder Interrogator
9. CTD (RBR, YSI Cast Away)

Personal

1. Personal Protective Equipment. Not all PPE will be required at every site.
2. Hard Hat
3. Steel toed shoes
4. Personal Flotation Device
5. Safety Goggles
6. Rain Gear
7. Any site specific equipment. Refer to recon notes regarding items that are required on site. (Identification badges, fire retardant coveralls)

Station specific

1. It is impossible to include all possibilities in this list but you must carefully consider the recon report, site reports, local knowledge and any other sources of information available to be assured of having the necessary tools and equipment. Some sites have very specific tools required, for example Prudhoe Bay needs a purpose made pusher pole and a come-along to raise the wind sensor mast.
2. Secure areas of Ports now require a TWIC card for unescorted access.
3. Military facilities may require a CAC card or prior notification of the Security Officer for clearance.
4. Some sites require specialized training such as Hydrogen Sulfide (H2S) safety, or refinery operations.
5. Many sites require various levels of permits to perform work. These can include Work Permits, Hot Work Permits and a pre-work safety walk through or meeting.
6. Hazardous work sites may vary the work permitted depending on operations being performed at the time i.e. no Hot Work Permits during loading or unloading operations at petroleum terminals.
7. Sites may require PPE such as Nomex clothing, hard hats, steel toe shoes etc.
8. Sites may require certain levels of grooming such as no beards in H2S environments.
9. If unfamiliar with the specific project, task, or location consult more senior personnel with the knowledge and experience to ensure you are prepared for the task. Consult with your supervisor if you are uncertain who to consult.

Standard Tool Bag for Self-contained currents surveys:

Open/Box Wrenches:	**Count**	**Hex Key (Allen wrenches)**	**Quantity**	**Pliers:**
				Diagonal
5/16"	2	.050"	2	(wire cutter)
3/8"	2	1/16"	1	Long nose
7/16"	2	5/64"	1	Slip joint
				Arc joint
1/2"	2	3/32"		(channel lock)
7/16"		7/64"		Vice Grips
9/16"	2	1/8"		
				Flat Head
5/8"	1	9/64"	1	**Screwdrivers:**
11/16"	2	5/32"	1	1/8"
3/4"	1	3/16"	1	1/4"
6mm	1	7/32"		5/16"
8mm	2	1/4"		
10mm	2	5/16"	1	
				Phillips
11mm	2	3/8"	1	**Screwdrivers:**
12mm	2	2mm	1	#0
13mm	1	2.5mm		#1
14mm	1	3mm	1	#2

Sockets:		4mm	1	
				Crescent Wrenches:
5/16"	1	5mm	1	
3/8"	1	6mm	1	6"
7/16"	1	8mm	1	8"
1/2"	1	10mm	1	12"
7/16"	1		1	
9/16"	1	**Nut Drivers:**	1	**Other Item**
5/8"	1	3/16"	1	Small knife
11/16"	1	1/4"	1	Electrical tape
				Splicing tape
3/4"	1	5/16"	1	
6mm	1	11/32"	1	Hammer
8mm	1	3/8"	1	Rubber mallet
10mm	1	1/2"	1	Wire stripper
				Ty-Raps (small,
11mm	1	5mm	1	med.large)
12mm	1	6mm	1	Tape measure
				Electronic hand level
13mm	1	7mm	1	(note 1)
14mm	1	8mm	1	Volt meter
Ball-end Tip Drivers		9mm	1	Liquid wrench (small can)
3/16"	1	10mm	1	Markers
5/32"	1	11mm	1	DeWalt Kit (note2)
3/32"	1	12mm	1	Wire terminal crimp tool
				Assorted wire terminal crimps
				Coax cable crimp tool kit (note 4)
				Gas powered soldering pencil (note 5)
				Assorted fuses 1,3,5,8 amps

Notes:

1. Craftman 10 or 24 " Digital Laser Trac Level
2. Battery powered drill, saw kits
3. Scotch 3M 130C tape
4. Hanlong Industrail HT-330K
5. Weller Portasol Series

6. **Quality Assurance/Control:** The Field Team Leads will ensure that tools and equipment are gathered and used as described in this SOP. The Standard Tool Bag is also always carried in order to have most tools in specific categories.

7. **Management/Responsibility:** The Field Team Lead is to contact the Branch Chiefs of their division and all divisions included in the field team in order to mitigate issues.