TITLE:	**DART II Buoy and BPR Recovery Procedure**			
NUMBER:	DATE:	AUTHORIZED TO		SHEET:
09-003 Rev. -	2/12/2009	TO 34		1 OF 11
ORIGINATOR:		NDBC KEY CONTACT:		PHONE:
Jeffery Wise		Pete Lessing		

ACTION AUTHORIZED:

TEST ONLY ☒   ADJUSTMENT ☐   REWORK ☐   MODIFICATION ☐   OTHER ☐

INSPECTION REQUIREMENT:

TEST ☒   NTSC QA ☐   NDBC ☐   GOV. QA ☐

ITEM DESCRIPTION:

This procedure is used during the recovery of DART II BPR and/or Buoy systems.

MANUFACTURER:	MODEL:	SERIAL NUMBER:	NDBC NUMBER:
NDBC	Any	Any	N/A

PURPOSE:

See section 1.0 of the procedure.

SIGNATURES
(QA approval is required if QA is to inspect data sheet, NDBC approval is required if directed by TO)

ORIGINATOR:	DATE:	QA REVIEW:	DATE:
ORIGINATOR'S SUPERVISOR:	DATE:	NDBC CONTACT:	DATE:

ACRONYMS AND ABBREVIATIONS

BPR .... Bottom Pressure Recorder

DART .... Deep ocean assessment and reporting of Tsunamis

VDC .... Volts direct current

1.0 PURPOSE

The purpose of this procedure is to ensure a successful recovery of the DART II Buoy and BPR systems at sea. This procedure does not cover decks operations in detail, but instead covers the necessary steps required to ensure the electronics systems is properly recovered.

2.0 APPLICATION

This procedure applies to DART II BPR and buoy systems that have been deployed and are now being recovered at sea.

3.0 PREREQUISITES

Prior experience and training on recovering the BPR and buoy is a required. Release codes for the DART II BPR acoustic release are required.

4.0 DISCUSSION

The DART II system is a Tsunami detection and warning system that is also used to measure and detect other low frequency ocean waves. The DART II system is comprised of a moored surface buoy and a BPR system on the ocean floor. The buoy and BPR are deployed at strategic sites around the globe. Hourly pressure data is transmitted from the BPR to the buoy using acoustic modem telemetry. The buoy stores and processes this data and transmits it every six hours using an Iridium RUDICS session. The BPR also has the ability to detect a Tsunami wave. When this occurs, the BPR will activate a special "event" mode to deliver real time data to the Tsunami warning center.

The steps in this procedure are organized into three sections dealing with recovering the buoy, recovering the BPR and recovering the BPR data. These steps do not necessarily have to occur in order, but should be completed at the first opportunity.

All times in this procedure require a time and date in UTC. The date can often change during an operation and needs to be considered. One method to verify the time is by calling the automated Time-of-Day Service provided by NIST. The numbers are **(303) 499-7111** (Colorado), or **(808) 335-4363** (Hawaii). Otherwise, use a GPS enabled device to get the time.

5.0 MATERIALS REQUIRED

- Deck set with transducer capable of communicating with BPR acoustic release

- Laptop with serial port (or equivalent adaptor) and terminal program

- DART II BPR Communications Cable with DB9 and coaxial connectors.

- DART II Buoy Communications Cable

- Compact Flash Card reader (Control number 14149)

- Handheld GPS, Telephone or equivalent to get present UTC time

6.0 SAFETY

Personnel performing the procedure should be familiar with the NTSC/NDBC Safety and Accident Prevention Program Plan and the NASA Safety Manual HDB 1700.3.

7.0 INSTRUCTIONS

7.1   Administrative

7.1.1   Fill out the administrative section.

7.1.2   Fill out the recovery log as appropriate during the recovery operation. As the buoy and BPR LRUs are recovered, fill out the applicable line and note the condition of the LRU.

7.2   Buoy Recovery

7.2.1   After the buoy is brought on board, check for damage to the buoy hull or other buoy structure. Note condition of buoy and annotate the recovery log.

7.2.2   Gas test the buoy according to any applicable procedure.

7.2.3   Open buoy and inspect for water intrusion or other damage. Annotate the recovery log.

7.2.4   Measure the battery voltages of the Iridium, CPU and Acoustic Modem battery packs. Annotate the recovery log.

7.3   BPR Recovery

7.3.1   Briefly remove the plugs on the battery canisters to release any built up gas. Then replace plugs.

7.3.2   Connect to BPR CPU with a PC and check the time against UTC time. To get the present BPR time send the **time** command. Annotate the recovery log with the time the BPR reported and the actual UTC time.

7.3.3   Send the **batt** command to retrieve the battery voltages from the BPR CPU annotate the recovery log.

7.3.4   Type **mfreq** and then press **1** to switch on the reference oscillator. The reference oscillator output will be switched on to the output of the test cable coaxial connector. Using a counter, measure the period of the reference oscillator. Note that some counters require a warm up period to get an accurate reading. Normal ranges are from .476836476 µs to .476837840 µs. Use a 5 to 10 second sample period. Also, measure the ambient temperature and pressure while taking this measurement. Annotate the recovery log.

7.3.5   Measure the battery voltages of BPR battery packs. Annotate the recovery log.

7.3.6   Disconnect from the BPR and complete the remainder of the recover log as information becomes available.

7.4   BPR Data Recovery

7.4.1   The BPR CPU canister contains valuable data on an internal flash card. To protect the data and to ensure it will be properly recovered, one of the following steps must be performed. Step 7.4.1.1 is the preferred option. Sometimes, conditions make this option difficult or impossible, such as the immediate need for the data, suspected damage to the BPR water integrity or redeployment of the BPR CPU. When this occurs,

use step 7.4.1.2 to recover the BPR data.

7.4.1.1 (Option 1) Using painters tape (or equivalent), label the BPR CPU canister with the following text and return the unit to NDBC:

<div style="border:2px solid black; text-align:center; font-weight:bold">

**ATT: Electronics Lab
Station: #####
Date: MM-DD-YYYY
Recover data via
ETP 08-048**

</div>

Where ##### is the station ID

7.4.1.2 (Option 2) Bring the BPR canister to a safe, dry place.

Be careful to ground yourself to the metal lid of the canister before touching the BPR circuit board. This avoids damaging the board set from static discharge.

Open BPR CPU canister and remove compact flash card.

Using a compact flash card reader, copy (do not erase card) the bpr.dat from the card to another media, such as a flash drive or the computer hard drive. Rename the file in the format **#####-MMDDYY bpr.dat**. Where ##### is the station ID and MMDDYY is the present date. Keep this data as a backup.

Do not replace the compact flash card back into the BPR. Instead, label the card with the Station ID and Date it was downloaded. Keep the card in a safe place and return it to the electronics lab. Upon return to SSC, tell the electronics lab to recover the data via ETP-08-048.

8.0 DATA SHEETS

DART II BPR and Buoy Recovery

Administrative Section			
Equipment	Part Number	NDBC Number	CAL DUE DATE
Acoustic Deckset			
Universal Counter			
Multimeter			

Recovery Log				
Recovery	Date(GMT):		Time(GMT):	
	Station ID:		Hull Number:	
	Vessel:		Location:	
Personnel:				
Buoy Recovery Location		BPR Recovery Location		
Condition of Buoy	☐ OK ☐ Damaged ☐ Missing Components ☐ Water Intrusion ☐ Other:	Condition of Mooring	☐ OK ☐ Cuts in mooring (fish bite, fishing, etc) ☐ Excessive wear on shackles, damaged shackles ☐ Other:	

Buoy LRUs	Primary NDBC Number	Secondary NDBC Number	BPR LRUs	NDBC Number	Condition/Comments (Damaged, Lost, etc)
Transducer			Transducer		
Payload			Payload		
Iridium Modem			Paros		
Iridium Antenna			Acoustic Release		
O&I Light					

Recovery Log

Station ID: **Date:**

Battery Voltages	Primary Voltage	Secondary Voltage		BPR Voltage	Condition/Comments (Damaged, Lost, etc)
Acoustic Modem			Acoustic Modem		
CPU			CPU		
Iridium			Acoustic Modem String on CPU pack		

BPR Measurements	Date	Time			Condition/Comments
BPR Time			Ambient Pressure:		
Actual UTC Time			Ambient Temperature:		
Difference of Time			Oscillator Period:		

BPR Data Recovery		
Circle one option: *Otherwise explain in notes*	**The BPR canister contains data on its flash card. The canister has been labeled according to the full text in step 7.4.1.1. It will be returned to NDBC.**	**The flash card has been removed from the BPR canister. The card has been labeled according to step 7.4.1.2. I will deliver the card to the NDBC electronics lab.**

NOTES:

Include completed procedure with trip report and deliver to DART program manager

Approval Section			
Test Conductor Printed Name:			
Test Conductor Signature:		Date:	