

**WIRELESS COFFERDAM ALARM SYSTEM
OPERATION MANUAL**

OM-UW0850-05-1A



Prepared by:

GPC
P.O. Box JK
Williamsburg, VA 23187

Prepared for:

Supervisor of Salvage
NAVSEA 00C5

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1.0 SYSTEM DESCRIPTION.

The system general set up arrangement and component fabrication are detailed in NAVSEA drawing 6698919, Wireless Alarm, Flood Monitoring System. The system includes:

- a) Wireless cofferdam alarm transmitters with float switch activators enclosed in underwater housings.
- b) Signal repeaters installed within the ship's spaces to collect transmitter signals and boost their strength before sending the signal to a system control station.
- c) Control stations (two per system) collect transmitter and repeater signals and provide operator alarms, read outs and control capability.
- d) Data control unit which collects and records system data.

2.0 SYSTEM APPLICATION AND LOGISTICS.

2.1 System Application.

The wireless cofferdam alarm system was developed to allow Maintenance Activities to monitor cofferdam blanking patch differential pressure seals on patches intended to be in service for extended periods (greater than seven days). The most typical application is for monitoring cofferdam seals for blanking patches use on extended Planned Incremental Availabilities (PIA) on Aircraft Carriers. The remainder of this manual will describe application of the system on this most typical application. Other system applications shall be planned in advance through consultation with NAVSEA 00C5.

2.1.1 Typical Carrier Sea Chests Monitored.

Typical Carrier PIA's may utilize 30-40 cofferdam blanking patches to provide double valve protection for internal ship's work. Normally cofferdam seals on intake sea chests are monitored via an internal vent (steam blow down). The wireless cofferdam alarm system is typically used to monitor cofferdam seals on discharge sea chests with no means of internal venting. One transmitter placed in each sea chest will meet the monitoring requirement of Underwater Ship Husbandry Manual, Chapter 16, Cofferdams, NAVSEA 0600-AA-PRO-160. Two transmitters may be placed in each sea chest at the discretion of the Maintenance Activity to provide additional redundancy. The system is configured to operate with up to 48 water level transmitters. The typical sea chest hull openings monitored on a Carrier PIA are:

Plant #1	Hull Opening #	Plant #2	Hull Opening #
1 MN COND	19	2 MN COND	52
4 MN COND	33	3 MN COND	46
1 CPTG	7	3 CPTG	66
2 CPTG	8	4 CPTG	65
1 SSTG	17	3 SSTG	57
2 SSTG	31	4 SSTG	45

Application of wireless transmitters in other Carrier sea chests or other ship applications shall be planned in advance through consultation with NAVSEA 00C5.

2.1.2 Typical Carrier Repeater Locations.

The typical Carrier repeater locations which support the typical wireless cofferdam transmitter locations of 2.1.1 are:

Space	Description
1 RAR	CG LL Outboard of #2 CTG Mounted Behind the Hear-Here Booth
1 MMR	UL at Hear-Here Booth Between #1 SSTG and #1 PCC
1 MMR	LL Aft Stbd Corner of #2 SSTG Foundation
2 RAR	CG LL Outboard of #4 CTG Mounted Behind Workbench
2 MMR	UL At Fire station Between #3 and #4 SSTG
2 MMR	LL At Bottom of Port Ladder at Frame 170
2 nd Deck	Passage Way 2-113-1-L at Frame 115 Next to Node Room 6
2 nd Deck	FWD of #2 RAR Stbd Access at FM 156
Port Sponson	Port Sponson at FM 118

Application of wireless transmitters in other Carrier sea chests or other ship applications will require establishing alternate repeater locations through trial and error placement to determine optimum transmitter signal acquisition location. Alternate applications shall be planned in advance through consultation with NAVSEA 00C5.

2.1.3 Typical Carrier Control Station Locations.

The system has two identical control stations. One control station is typically installed at DC Central to allow ship's force monitoring of cofferdam transmitter alarm indications. The second control station must be installed at the cofferdam installation dive station during cofferdam and transmitter installations to allow the NAVSEA equipment technician to confirm initial transmitter signal acquisition via the previously installed shipboard repeaters. After all cofferdam and transmitter installations are complete, the second control station may be re-positioned as desired by the Maintenance Activity to facilitate a secondary transmitter monitoring location. Application of wireless cofferdam alarm system in other ship applications will require establishing alternate control station locations through trial and error placement to determine optimum transmitter signal acquisition location. Alternate applications shall be planned in advance through consultation with NAVSEA 00C5.

2.2 System Logistics.

Advance planning and consultation with NAVSEA 00C5 is key to successful system application. Consultation with NAVSEA 00C5 for non-typical applications must include submission of ships drawings which detail hull opening, sea chest and piping configurations. Discussion with Maintenance Activity personnel familiar with the standard operation of the alternate hull openings and sea chests to be cofferdam is critical. NAVSEA 00C5 will provide cost estimates

and schedules for equipment shipment, technician installation support, and post operational refurbishment upon request. The following additional logistic concerns must be addressed:

- a) Installation of the system’s shipboard repeaters and control station and the additional control station placed at the cofferdam installation dive station must be schedule to occur in advance of the diver cofferdam installations. Above equipment installations must be accomplished prior to start of diver cofferdam installations.
- b) NAVSEA equipment technicians can assist with system installation (programming transmitters in advance of cofferdam deployment and ensuring repeaters and control stations are functioning properly) under the direction of Maintenance Activity personnel following a Task Group Instruction or Formal Work Procedure.
- c) All repeaters and control stations must have temporary dedicated 110 VAC power installed at repeater and control station locations by maintenance activity personnel following a task group instruction or formal work procedure.
- d) Ship’s force and Maintenance Activity personnel must be trained in proper system operation and monitoring in accordance with a Maintenance Activity Temporary System Turnover Memorandum (TSTM). A sample TSTM generated by Puget Sound Naval Shipyard is provided in Appendix A as an example of a TSTM which meets this requirement. Individual Maintenance Activities are responsible for generating their own TSTM in accordance with their local requirements.
- e) During diver cofferdam and transmitter installation the NAVSEA technician shall confirm initial signal acquisition at the dive station system control station. Initial signal acquisition is dependent upon complete cofferdam de-watering by the divers and proper repeater function within the ship. If initial signal is not received at dive station system control station, time to confirm cofferdam de-watering and proper shipboard repeater will be required.

3.0 System Set-Up.

3.1 Control Station Setup.

Figure 1. The Cofferdam Alarm Control Station



NOTE

The shipping and storage case has a cutaway next to the carrying handle. The cutaway is placed to allow the power cord to be plugged into an electrical outlet when the storage case lid is closed.

To install, place Cofferdam Alarm Control Station at the desired location and near a 110-volt dedicated electrical outlet. Place the Cofferdam Alarm Control Station on the deck and open the storage case. Take the power cord end out of the case and plug it into a 110-volt electrical outlet.

After power is available, place the repeater and system switches to the ON position.

Control Station display should indicate "System Ready."

3.2 Transmitter Setup.

The Wireless Cofferdam System transmitter is shown in Figure 2. The transmitter is designed to be mounted magnetically to an interior sea chest wall standing upright. The transmitter shall be placed on the sea chest wall so that the float switch is as low as possible within the sea chest while still remaining inside the hull opening. If temporary in port discharge opening diffusers are installed on sea chest hull openings, transmitters shall be inserted past the diffuser and magnetically attached onto the sea chest wall as described above. Each transmitter has an internal power jumper which, when inserted, activates the radio transmitter.

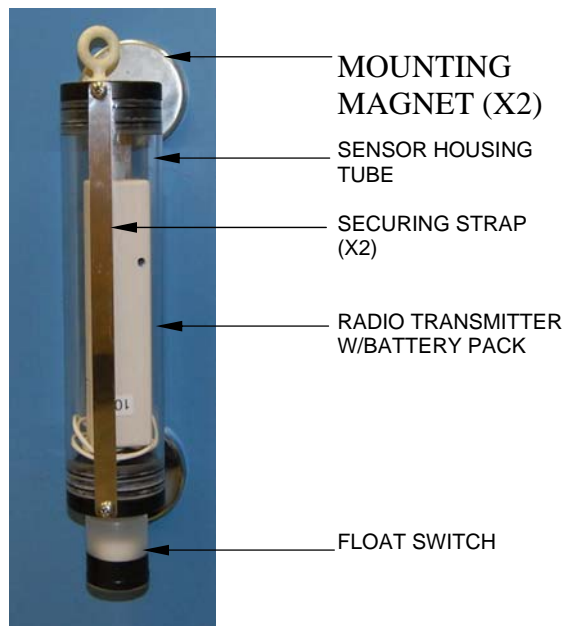


Figure 2. Cofferdam Transmitters

Magnets are attached to the delrin end caps of each transmitter. When fitting magnets to the transmitter, the bolts must be passed through the plastic tubular spacer placed between the transmitter body and the magnet. This prevents inadvertent operation of the reed switch inside

the float switch housing. Even in a dry environment, failure to fit the spacer will likely result in the transmitter assuming the alarm state as soon as it is deployed on a ship's hull.

NOTE

When performing signal checks and any time the transmitter is turned off then back on, there will be a 5- to 15- minute delay before the Cofferdam Alarm Control Station senses the transmitter.

The transmitters are shipped with the power jumper removed to conserve the battery. The transmitters must be turned on, programmed into the control station, and a signal check at the Cofferdam Alarm Control Station conducted prior to installation into the cofferdam.

3.2.1 Programming Transmitters (Points) into Control Station. To add transmitters, proceed as follows:

NOTE:

Pressing [**ADV**] at any time will allow the operator to scroll back to the previous window. Pressing [**REVIEW**] will allow the operator to retreat back to the beginning of an option cycle, or to exit the current level. Pressing [**REVIEW**] twice will exit Installation Program completely.

1. Press [**0000**] [**ADV**] [**3446**]
2. When “INSTALLATION PGM” appears on display, press [**ADV**] until “PROGRAM POINT” appears. Press [**ENTER**].
3. Display will indicate “SYSTEM ID – 110”; press [**ADV**].
4. Display indicates “POINT # ENTER [**01 – 48**]”.
5. Enter transmitter number (e.g., 05) to add, then press [**ENTER**]. Display will now show 05 (the transmitter number you just keyed in).
6. Press [**ADV**]; display will now indicate “ENTER TO PROGRAM, ADV TO REVIEW”. Press [**ADV**].
7. Display will now say “POINT 05, ENTER TO CHANGE”. (*Point 05 is an example; actual number will be transmitter you are adding*). Press [**ADV**].
8. Display now says “POINT # 05 TEXT __. We want the text to say “SPACE 5”.

NOTE

Number keys have alphabetic characters assigned to them much like a phone keypad.

1 = ABC	6 = PQR
2 = DEF	7 = STU
3 = GHI	8 = VWX
4 = JKL	9 = YZ-
5 = MNO	0 = [SPACE] ‘/

Press **[ENTER]** to advance to the next character. After entering the last character, press **[ENTER]** to save the character.

9. Using the number keys, enter the text (e.g., SPACE 5). When finished, press **[ADV]**.
10. Display will say “TYPE – INTRUSION, ENTER TO CHANGE”. Press **[ENTER]** until “SPECIAL” is displayed. Then press **[ADV]**.
11. The next window will say “TX TYPE – N/C. Press **[ENTER]** to change to “N/O”. Then press **[ADV]**.
12. The next window says “EOL RESIST – NO”. Do not change; press **[ADV]** to next window.
13. “INTERNAL REED – NO”; press **[ADV]** to next window.
14. “Monitored – NO”; **[ENTER]** to change to “YES”, then **[ADV]** to next window.
15. “AUDIBLE NO”; **[ENTER]** to change to “YES”, then **[ADV]** to next window.
16. “OUTPUT ON – NO”. Do not change; then **[ADV]** to next window.
17. “DELAYED – NO”. Do not change; then **[ADV]** to next window.
18. “CHECK IN – NONE”; **[ENTER]** to change to “60 SEC”, then **[ADV]** to next window.
19. Display will now say “ENTER TO PROGRAM, ADV TO REVIEW”; press **[ENTER]**. Display now says “PLUG IN XMITTER OR PRESS ADV”; press **[ADV]**. Display will now say “POINT # - ENTER (1 TO 48).
20. Another transmitter may be added by returning to step 1, or the Add Transmitter program may be exited by pressing **[REVIEW][REVIEW]** to return to SYSTEM READY.

All the transmitters required for all the sea chests to be monitored must be programmed into the control station individually.

3.2.2 Deleting Points (Transmitters) from the Control Station. The system is configured to operate with up to 48 water level transmitters. If it is determined by the on-site supervisor that fewer than 48 transmitters are required, the remaining transmitters (48 transmitters minus the total to be used) will need to be deleted to allow the system to function properly. The deleted transmitters can be reprogrammed into the system at a later point, if needed. As the job continues, those transmitters that are no longer needed will need to be deleted. If any transmitter is removed from operation and not deleted electronically from the control station, the keypad display will indicate “SYSTEM NOT READY” and pressing the “REVIEW” button will indicate that transmitter numbers (the ones not in use) are inactive. To delete a transmitter proceed as follows:

1. Press **[0000] [ADV] [3446]**.
2. When “INSTALLATION PGM” appears on display, press **[ADV]** until “DELETE POINT” appears, then press **[ENTER]**.
3. Enter the point number (e.g., 05) then press **[ENTER]**. You will see the point number you just entered show up on the display.
4. Press **[ADV]** and you will hear a short beep and the display will show “ACCOMPLISHED” and will return to “POINT # ENTER (01 TO 48)”.
5. At this point you can continue to delete transmitters until all that are not being used are deleted. When finished, press **[REVIEW] [REVIEW]** to return to “SYSTEM READY”.

3.3 Repeater Set-Up.

Install repeaters in locations identified in 2.1.2. All repeaters must be powered by dedicated 110 VAC power. Additional repeaters may be required in some circumstances where the Control Station does not sense a transmitter due to interference or attenuation of the radio signal.

4.0 Diver Cofferdam and Transmitter Installation

- a. Place transmitters in inside hull opening onto the sea chest wall in accordance with NAVSEA drawing 6698919, Wireless Alarm Flood Monitoring System.
- b. As each transmitter is placed, use the Control Station keypad to monitor the signal strength of each, following procedures outlined in the control station operation procedure, section 5.1.1; this may take five to fifteen minutes.
- c. Once the signal strength of each transmitter is known, a determination of whether or not an extra Repeater is needed can be made. A WEAK or NONE signal strength indication at the control station indicates the need for an additional repeater.

4.1 Diver Check List for Cofferdam Transmitter Placement.

- a. Ensure that the stand-offs are fitted between the transmitter housing and magnetic attachment points.
- b. Ensure that transmitter numbers are noted and compared to the intended cofferdam/hull opening location.
- c. Ensure that the transmitter power jumper is installed and the signal strength checked.
- d. It is strongly recommended that a travel line be attached to the hull opening to be sealed to reduce the chance that the transmitters will be placed in the wrong location.
- e. The diver is to check the transmitter housing for leaks once it is passed from topside, and prior to leaving the surface. While checking the transmitter for leaks, check to see if the signal is received by the Control Station and that it shows an unsecured (alarmed) state. Then, lift the transmitter out of the water to ensure that it resets to a secure (no alarm) state.
- f. The diver placing the transmitters is not to conduct further underwater tasks until transmitter deployment is concluded.
- g. The transmitters are to be placed inside the hull opening, at arms length and ensuring that the float switch is pointing downwards. If a second transmitter is used for redundancy, place one transmitter above the second transmitter inside the hull opening. If possible, the opening in the hull is to be blown down with air so that the transmitters are deployed in a dry environment. This will aid the quick detection of the transmitters' signal inside the ship.
- h. Deployed correctly, the transmitters must be inside the sea chest/hull opening and will not interfere with cofferdam blanking patch placement.

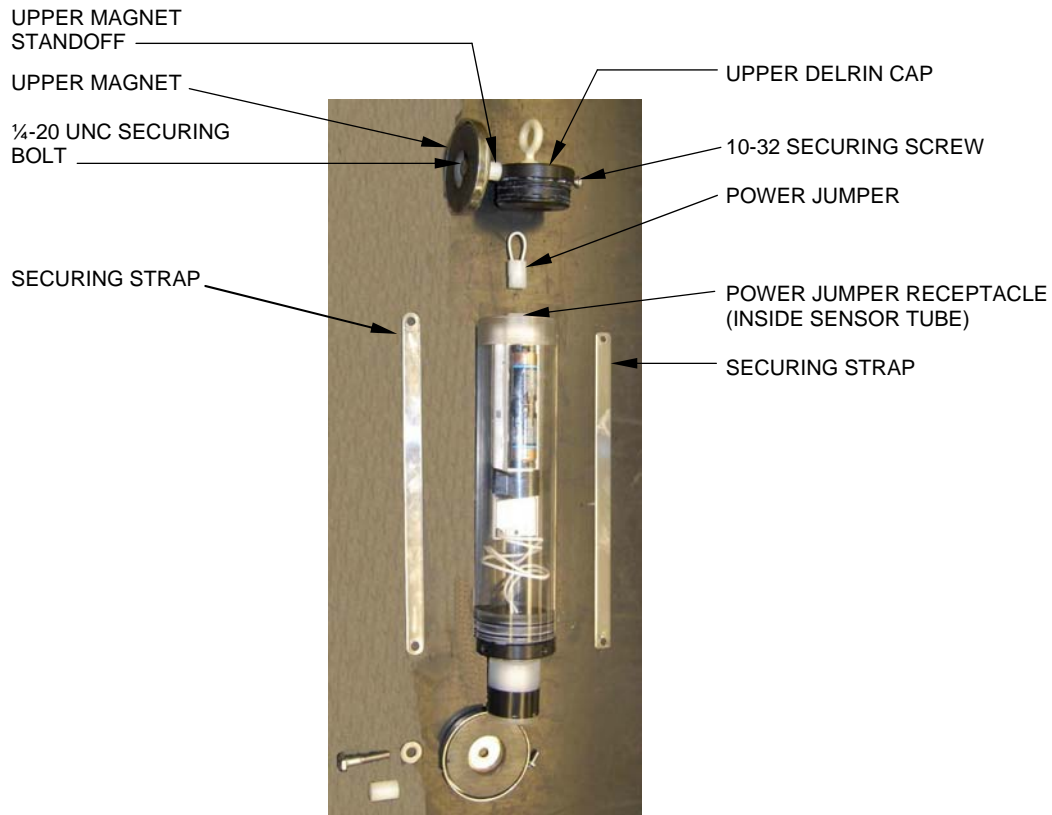


Figure 3. Transmitter Disassembled to Show Power Jumper

4.2 Diver Check List for Cofferdam Transmitter Removal/Recovery.

WARNING

IF SEAWATER COMES INTO CONTACT WITH THE TRANSMITTER BATTERY, CORROSION MAY OCCUR, CAUSING TOXIC FUMES, WASTE WATER, PRESSURE AND HEAT BUILDUP. TAKE APPROPRIATE MEASURES TO PREVENT EXPOSURE TO ANY EFFLUENT FROM THE TRANSMITTER.

- a. Remove the transmitter from the hull opening; inspect the transmitter for water leaks. If the transmitter shows no sign of water leakage, proceed to step b. If water is present inside the transmitter tube, proceed to step c.
- b. Recover the transmitter to the surface and dismantle it for return shipment. Damaged batteries are to be disposed of in accordance with local orders for disposal of hazardous waste. Remove the power jumper to deactivate the transmitter (see Figure 3).

- c. If transmitter housing shows signs of water ingress, tie the transmitter off on a line at a depth of 10 feet below the dive barge to allow any gas pressure in the housing to equalize with the ambient water pressure.
- d. Once satisfied that the housing has equalized with ambient pressure, recover the transmitter to the surface and leave it on the dive barge overnight to ensure that any pressure in the transmitter equalizes with surface ambient pressure.
- e. Dismantle the transmitter for return shipment. Damaged batteries are to be disposed of in accordance with local orders for disposal of hazardous waste. Remove the power jumper to deactivate the transmitter.
- f. Package the components of the damaged sensor (except batteries) in a zip lock bag. Place the bag in the storage container for return with the remainder of the system.

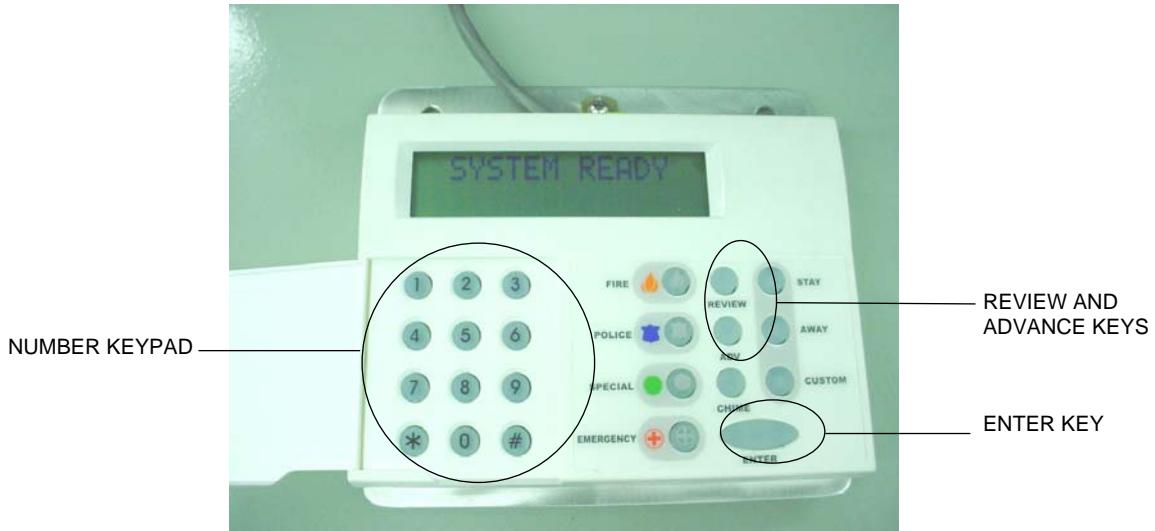
5.0 CONTROL STATION OPERATION.

The following sections outline the steps to operate the Cofferdam Control Station for normal operation and resolution of alarm conditions.

5.1 Normal Operation. The keypad (Figure 4) is used to monitor the status of the installed cofferdam transmitters. During normal operation the operator can access signal levels, review alarms, and clear memory.

After the system set-up is complete the control station will be provided with a complete list of all active transmitters with associated transmitter numbers and the sea chests each transmitter is located in. Before taking responsibility for a control station complete the section 5.1.1 transmitter signal strength check to ensure all active transmitters have “good” signal strength and that no additional transmitters not on the list after set-up are still in the system. Any unused system transmitters still showing up in the system should have been deleted during set-up and must be deleted in accordance with section 3.2.2.

During normal operation, with the active transmitters in place and all the sea chests un-flooded, the keypad display will indicate “System Ready”. A keypad display of “System Not Ready” means that one or more of the transmitters are either in an alarm “unsecured” mode (transmitter float switch lifted by sea chest flooding) or “inactive” because the transmitter housing is completely immersed (signal can not pass through water) or the transmitter battery strength is too low to send a signal. If the system is not ready because one or more of the transmitters are in flooded sea chests (perhaps no work going on in that area so cofferdam seal integrity is not a concern for that area), any transmitters which remain active in dry sea chests will still be monitored and produce alarms if flooding occurs.



Circled keys are only ones used for operation.

Figure 4. Control Station Keypad.

5.1.1 Checking Transmitter Signal Strength. To check the signal strength of any or all installed transmitter(s), proceed as follows:

NOTE:

Steps 1 must be done quickly; i.e., [0000], [ADV], [3446].

1. Enter programming code **0000**, press [ADV], enter programming code **3446**; a short tone will be heard and display will very briefly show “WAITING” then display “INSTALLATION PGM”.
2. Press [ADV] to scroll through options until “SIGNAL LEVEL” is displayed. Press [ENTER]; first point (transmitter) will be displayed.
3. Press [ADV] to scroll through each transmitter. One of the following signal strength indications will appear; take the action as indicated:
 - a. Good = no action required
 - b. Weak = add or reposition repeaters
 - c. None = add or reposition repeaters or check transmitter.
4. To exit signal strength testing, press [REVIEW] [REVIEW]. The keypad display will show “System Not Ready” until a system self-check of all transducer signals is complete. The system may take up to 1.5 hours to complete the self-check of all transducers and show a keypad display of “System Ready”.

5.2 Alarm Conditions. An active alarm indicates that water has entered one or more cofferdams and the float switch has triggered that transmitter(s). In an alarm condition, the keypad display will scroll between current alarming transmitter(s) (top display line shows “Special Alarm” and transmitter number, bottom display line shows transmitter location), the three buttons on the far

right of the keypad will be flashing and, if the audio is enabled, the alarm will sound. Resolve an alarm in accordance with the next section 5.2.1.

5.2.1 Resolve an Alarm Condition:

1. Silence the audio alarm by pressing **[0000]**, then **[REVIEW] [REVIEW]**. This action acknowledges the alarm, secures the audible alarm and stops the three keys on the far right of the keypad from flashing. In an alarm condition, the keypad display will indicate “SYSTEM NOT READY” after the operator silences the alarm. This is normal in an active alarm state; the alarm system is still monitoring all the other transmitters.
2. Determine which cofferdam transmitters are alarming. This is done by observing the keypad display and pressing **[REVIEW]** once. The keypad display will automatically scroll through only the alarming transmitters starting with the most recent alarm and progressing through in chronological order to the oldest alarm. The keypad display will show the “unsecured” alarming transmitter numbers and locations.
3. Have divers remove all water from the effected sea chests by checking the cofferdam seals and de-watering.
4. Once all effected sea chests are confirmed dry by diver action to de-water flooded cofferdams, the keypad display should return to “SYSTEM READY”. The system may take up to 1.5 hours to self check all transmitters and return to system ready.
5. If the keypad display still shows “SYSTEM NOT READY”, then one or more transmitters may be “INACTIVE” either because the transmitter is fully immersed (signal can not pass through water) or the transmitter battery is too low to send a signal. If there are transmitters that are “inactive” the system is waiting for the transmitter to check in during the system self check. Pressing **[REVIEW]** once will scroll the keypad display through any alarming (“UNSECURED”) transmitters and any transmitters which have become “INACTIVE”. If in 1.5 hours the system self checks still show “INACTIVE” transmitters, those transmitters are either fully immersed (sea chest flooded) or the battery strength is too low to send a signal (transmitter batteries have been selected to supply sufficient power well beyond the typical six month availability). Even when the keypad display shows “SYSTEM NOT READY” the system is still monitoring all remaining active transmitters and will alarm if flooding occurs at those transmitters.

5.2.2 Clear Alarm Memory:

1. The system maintains a memory of all past alarming “unsecured” transmitters and transmitters which have gone “inactive”. Over time it may be helpful to reduce the scrolling review history by clearing past alarm memory
2. To clear memory, press **[0000]**, then **[REVIEW]**, then **[ADV]** scrolling until “CLEAR MEMORY” is displayed. Press **[ENTER]** to clear memory. If no transmitters are alarming (“unsecured”) or “inactive” then the keypad display will return to “SYSTEM READY” after the system self check in as much as 1.5 hours. If any transmitters are “unsecured” or “inactive” then the keypad display will show “SYSTEM NOT READY” even after the 1.5 hour self check. Even when the keypad display shows “SYSTEM NOT READY” the system is still monitoring all remaining active transmitters and will alarm if flooding occurs at those transmitters.

6.0 DATA TRANSFER UNIT.

The Data Transfer Unit is comprised of a laptop computer, printer, modem and phone line emulator. Its primary use is to download event memory from the control station. This is particularly useful when the operator wants to view and/or print up to 95 past events that are stored in the control panel memory. The keypad cannot access this information. The printed event log can be useful in providing reports or keeping logs of cofferdam alarm history during a particular job.

6.1 Data Transfer Unit Operation. To view/print the event log, follow these steps:

1. Lay case flat on horizontal surface.
2. Open case, remove power cord, and plug into AC receptacle on control panel.
3. Turn laptop (Figure 5) on; the on/off switch is located on the lower left side of the laptop.



Figure 5. Data Transfer Laptop

4. When the screen comes up, use down arrow key to highlight DOS 6.22 and press **[ENTER]**.

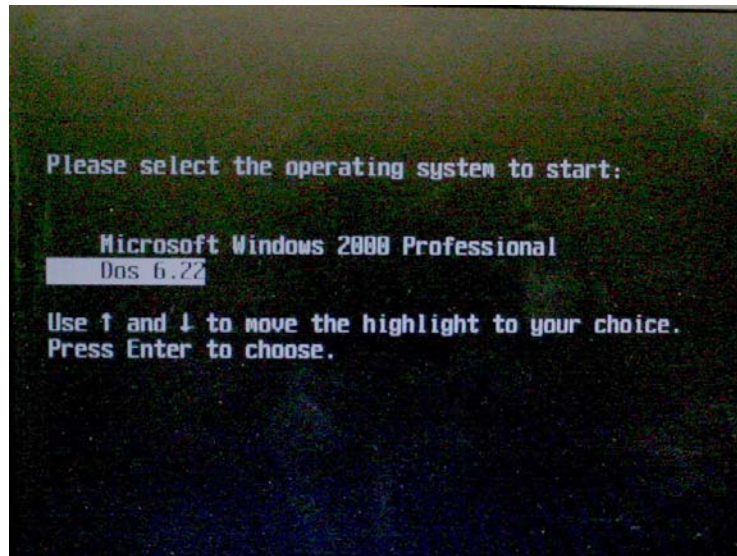


Figure 6. Prompt Screen

5. At the C:\ prompt, type [**cd download**], then press [**ENTER**].
6. At the C:\download> prompt, type [**download.exe**], then press [**ENTER**]. The program comes up and initializes. Press [**ALT**] then down arrow key. See Figure 7.

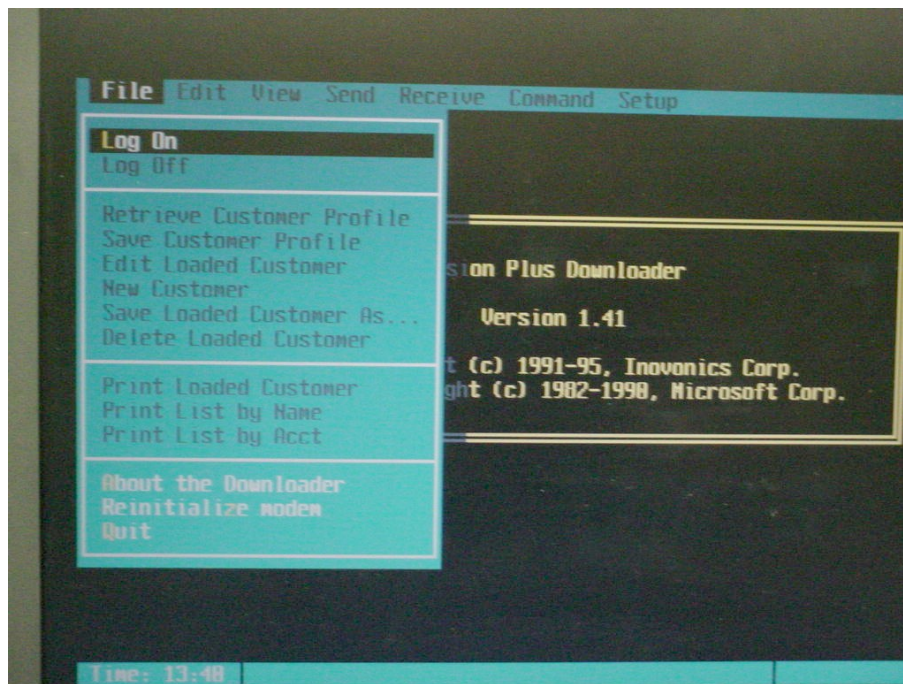


Figure 7. Download Screen.

7. Select [**LOG ON**] then press [**ENTER**].

8. Enter User name: [ESSM]
9. Enter Password: [ESSM], then press [ENTER] Note: Password will appear as “*****”
Press [ALT] then down arrow key to [Retrieve Customer Profile];press [ENTER]

NOTE

The customer number is the name of the job. e.g., USS Barney.

10. Enter customer number [USS NEVER SAIL], then press [ENTER], [ENTER].
11. Plug in phono cable to output jack on Control Station.
12. Press [ALT] then down arrow key. Scroll across screen using the right arrow key until COMMAND is highlighted
13. DIAL PANEL will be highlighted then press [Enter] [Enter]. Screen will say “Dialing...”
Once the screen goes blank, press [ALT], then down arrow key, then right arrow key to [VIEW].
14. Note: The customer number is the name of the job; e.g., USS Barney.

Event	Description	Time	Date
1	Download session	06:58	Tue Apr 19, 2005
2	System power up	06:54	Tue Apr 19, 2005
3	System restoral	unknown	
4	AC Power failed	unknown	
5	System alarm cancelled	unknown	
6	Restored pt 9 (Space 9)	unknown	
7	Alarm pt 9 (Space 9)	unknown	
8	System power up	unknown	
9	AC Power failed	unknown	
10	Inactive pt 19 (Space 19)	unknown	
11	Inactive pt 18 (Space 18)	unknown	
12	Inactive pt 17 (Space 17)	unknown	
13	Inactive pt 16 (Space 16)	unknown	
14	Inactive pt 15 (Space 15)	unknown	
15	Inactive pt 14 (Space 14)	unknown	
16	Inactive pt 13 (Space 13)	unknown	

Figure 8. View Event Memory Screen.

15. With EVENT MEMORY highlighted, press [Enter]
16. The bottom of the screen will display 48 seconds and start counting down while the Event Memory is being downloaded.

17. To view the recorded events and/or print from this screen use the up or down arrow keys to scroll through the recorded events.
 - a. Using the [**Tab**] button, highlight PRINT and press [**Enter**] to print this memory.
 - b. Press [**Enter**] when OK is highlighted to exit the screen.
18. Press [**ALT**] then down arrow key to select [**END DOWNLOAD SESSION**], then press [**Enter**].
19. Press [**ALT**] then down arrow key to log off, then press [**Enter**]. The screen will now display “Disconnect from Panel, Are You Sure?”; press [**Enter**] for OK.
20. Press [**ALT**] then down arrow key to quit, then press [**Enter**]. Screen will prompt “Quit to DOS?” Press [**Enter**] for yes.
21. Turn off the computer; remove the phono plug from the Control Station.
22. Turn off the printer, unplug the power cord from the wall receptacle, and store the components.

APPENDIX A
SAMPLE TEMPORARY SYSTEM TURNOVER
MEMORANDUM (TSTM)

Appendix A provides an example TSTM only.
Each Maintenance Activity is responsible for developing
their own TSTM based on local requirements.

USS RONALD REAGAN (CVN 76)

Temporary System Turnover Memo for Cofferdam Wireless Remote Monitoring System

Review: A76 PSNS&IMF DIVING COORDINATOR

SIGNATURE DATE

Review: A76 PROJECT NON-NUCLEAR CHIEF TEST ENGINEER

SIGNATURE DATE

Review: SHIP'S DIVING OFFICER USS REAGAN (CVN-76)

SIGNATURE DATE

Approved: REACTOR OFFICER (CVN-76)

SIGNATURE DATE

Approved: CHIEF ENGINEER (CVN-76)

SIGNATURE DATE

Approved: A76 PROJECT SUPERINTENDANT

SIGNATURE DATE

Approved: COMMANDING OFFICER (CVN-76)

SIGNATURE DATE

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NSRO-PUGET, NRRO-NASNI, NN-APS, C/270, C/250, CVN 76 REACTOR OFFICER, CVN 76 CHENG, SSO, SHIP'S DIVING OFFICER, PSNS&IMF DIVING COORDINATOR

Purpose:

To establish joint Shipyard/Ship's Force agreement of responsibility assigned for the operation of the Cofferdam Wireless Remote Monitoring System. This system is installed per References (a) and (b).

Scope:

This TSTM is in effect from the date of issue, upon completion of signatures in this agreement and completion of equipment installation (per references (a) and (b)), until the Work Authorization Form (WAF) is issued for removal of the affected cofferdams.

References:

- a) NAVSEA S0600-AA-PRO-160, Underwater Ship's Husbandry Manual (UWSHM)
- b) NAVSEA OM-UW0850-05-1A, Wireless Cofferdam Alarm System Operation Manual

Attachments:

- a) Flowchart of Flooded Cofferdam Actions
- b) Cofferdam Wireless Remote Monitoring Log
- c) Transmitter Locations
- d) Repeater Locations

5. Agreement:

The Shipyard will install and maintain the Wireless Remote Monitoring System and shall be responsible for all maintenance of the system.

Ship's Force should direct emergencies and/or discrepancies involving the Wireless Remote Monitoring System to the Non-Nuclear Chief Test Engineer, PSNS&IMF Diving Coordinator, Non-Nuclear Assistant Project Superintendent, and Project Non-Nuclear Trouble Desk.

Ship's Force will be responsible for operation of the Control Station located in Central Control; see figure 1. The rest of the system will remain under shipyard control; see figure 2.

The PSNS&IMF Diving Coordinator will provide training to Ship's Force on the operation of the Wireless Remote Monitoring System equipment that will be turned over to the ship. Ship's Force to be trained include: Ship's Diving Officer, Reactor Duty Officer, Engineering Duty Officer, Propulsion Plant Watch Supervisor, Propulsion Plant Watch Officer, Load Dispatcher, and Damage Control Watch Supervisor. Ship's Force acknowledges having received this training with the approval signature on the cover sheet by the Ship's Diving Officer. In addition, the Ship's Diving Officer will be responsible for training of all newly qualified watchstanders following implementation of this TSTM.

System Overview

The purpose of the wireless remote monitoring system is to meet the requirements of reference (a) for monitoring the differential pressure seal of installed cofferdams in which there is no means of internal venting (discharge sea chests). If indication is received of a flooded cofferdam, Ship's Force and Shipyard personnel must take appropriate actions to ensure the safety of the ship and personnel as outlined in attachment (a).

- a. The wireless monitoring system consists of two Control Stations, signal repeaters, and transmitters.

- i. **Control Station** - The primary monitoring station will be at the Control Station located in DC Central. Ship's force watch standers will monitor the Control Station on a continual basis and keep logs on the system. A secondary Control Station will be set up on the diver's barge.
 - 1. The Control Station is shown in Figure 1 below. The Control Station in DC Central will be powered by shipyard supplied temporary power. It will be caution tagged at the plug and the supply circuit breaker to ensure continuous power. Additionally, the plugs will be tie-wrapped to the temporary power plug to prevent unplugging.
 - 2. After implementation of this TSTM the Control Station will be the primary monitoring point for cofferdams with no means of internal venting.
 - a. During normal operation, the display on the Control Station will read "SYSTEM READY." In the event of water leakage into a cofferdam, an alarm will be received at the Control Station. The Control Station will beep audibly and lights will flash repeatedly until the alarm is acknowledged.
 - b. After acknowledging an alarm, the Control Station will display "SYSTEM NOT READY" until the alarming condition is cleared. Additionally, "SYSTEM NOT READY" will be displayed on the Control Station if any of the transmitter signals is not adequately reaching the Control Station, any of the transmitters has a low battery, or loss of AC Power to the Control Station.
 - i. To review the condition that is causing a "SYSTEM NOT READY" indication, pressing the [REVIEW] button on the Control Station keypad will cause the Control Station to automatically scroll through the indications. After [REVIEW] is pressed the Control Station will show one or more of the following indications:
 - 1. "ALARM" - Any previously received alarm not manually cleared from memory
 - 2. "INACTIVE" - Any transmitter signal that is not reaching the Control Station
 - 3. "UNSECURED" – Any transmitter that is in an alarm condition
 - 4. "WEAK BATTERY" – Any transmitter that has a weak battery
 - 5. "AC POWER FAULTED" – Loss of AC Power to the Control Station
- ii. **Signal Repeaters** The signal repeaters receive signals from the transmitters installed in the seachests, amplify the signal, and pass the signal to the control station. The signal repeaters are installed in the interior of the ship, and their locations are documented in attachment (d).
 - 1. The signal repeaters will be powered by shipyard supplied temporary power. They will be caution tagged at the plug and the supply circuit breaker to ensure continuous power. Additionally, the plugs will be tie-wrapped to the temporary power plug to prevent unplugging.
- iii. **Transmitters** The transmitters are installed in each seachest to detect flooding and transmit an alarm signal to the Control Station to alert watchstanders. Only one transmitter is required to be placed in each seachest to meet the requirements of reference (a). However, to increase system reliability, it is preferred that a primary and alternate transmitter be installed in each seachest.
 - 1. The actual number of active transmitters installed in each seachest at the time of issue of this TSTM is documented in attachment (c).
 - 2. Action for a flooded cofferdam will only be taken when **all** of the transmitters in a seachest indicate flooding, inactive, or battery failure.

3. If all of the transmitters in a seachest remain inactive after divers have resealed the cofferdam or experience battery failure, the project will decide whether to replace the sensor or use weekly diver visual inspections to monitor the cofferdam based on overall impact to production.
4. If a single transmitter in a seachest monitored by two transmitters becomes inactive, it may be deleted from the control station with concurrence from the cognizant tech code. Additionally, the PSNS&IMF Diving Coordinator will update this TSTM to reflect the number of active transmitters in each seachest.

Control Panel Operating Instructions and Watchstander Actions

This section will inform watchstanders how to monitor the Control Station as well as how to acknowledge and silence the alarms.

Watchstander Duties:

- 1) Acknowledge/silence alarms:
 - a. Enter Master code 0000, then press [REVIEW].
 - b. Record alarms received in the Cofferdam Monitoring log.
 - c. Notify the EDO and RDO of Alarms Received
 - d. If **all** of the transmitters in a **single** cofferdam are alarming, take action required by the "Cofferdam Strategy" flow chart Attachment (a). The transmitter locations are listed in attachment (c).

- 2) Monitor the Control Station keypad, check its status every **four** hours, and keep logs on the system:
 - a. If the Control Station readout shows "SYSTEM READY", Record "System Ready" in the Cofferdam Monitoring log. No further action is required.
 - b. If the Control Station readout shows "SYSTEM NOT READY," Follow up actions are:
 - i. Press the [REVIEW] button once. The display will scroll through all of the transmitter indications making the system not ready. "UNSECURED," "INACTIVE," "WEAK BATTERY," or "AC POWER FAULTED." If required, press the [REVIEW] button to review again.
 - ii. Record the status of all transmitters in the Cofferdam Monitoring Log.
 - iii. Notify the EDO and RDO of any changes in transmitter indications since last log entry.
 - iv. If "AC POWER FAULTED" is displayed, check that the Control Station is energized. Check that the control station is plugged in and that the circuit breaker on the Temporary Power panel that is supplying power is shut.
 - v. If "INACTIVE" is displayed, check that the repeaters are energized. Check that the repeaters are plugged in and that the circuit breakers on the Temporary Power panel that is supplying power is shut. Repeater locations are listed in attachment (d).
 - vi. If **all** of the transmitters in the **same** cofferdam are "UNSECURE" or "INACTIVE" at the same time take action per the flow chart Attachment (a). Transmitter locations are listed in attachment (c)
 1. Notify the following
 - a. Day Shift (0630-1510)
 - i. EDO
 - ii. RDO
 - iii. Ship's Diving Officer
 - iv. PSNS&IMF Diving Coordinator (LT Burkhard (619)572-4825)
 - v. PSNS&IMF C/246 (619)545-7186
 - vi. Ship Safety Officer (James Barr (360)340-2424)

- b. Swing Shift, Graveyard Shift, Weekends
 - i. EDO
 - ii. RDO
 - iii. Ship's Diving Officer
 - iv. PSNS&IMF Diving Coordinator (LT Burkhard (619)572-4825)
 - v. PSNS&IMF C/246 (Gary Campisi (360)535-2296)
 - vi. Ship Safety Officer (James Barr (360)340-2424)
- vii. If a transmitter is indicating "WEAK BATTERY" there is approximately 1 week until the transmitter will cease to operate.
 - 1. Notify the following
 - a. EDO
 - b. RDO
 - c. Ship's Diving Officer
 - d. PSNS&IMF Diving Coordinator (619)572-4825

3) Manually Clear Alarms from Memory – **(Performed only after divers have resealed the leaking cofferdam)**

- a. Enter Master code 0000, then press [REVIEW].
- b. Press [ADV] until "Clear Memory" is displayed.
- c. Press [ENTER] to Clear Memory.

NOTE: If an alarming condition is still present, the alarm will reactivate in approximately 5 minutes.

FIGURE 1

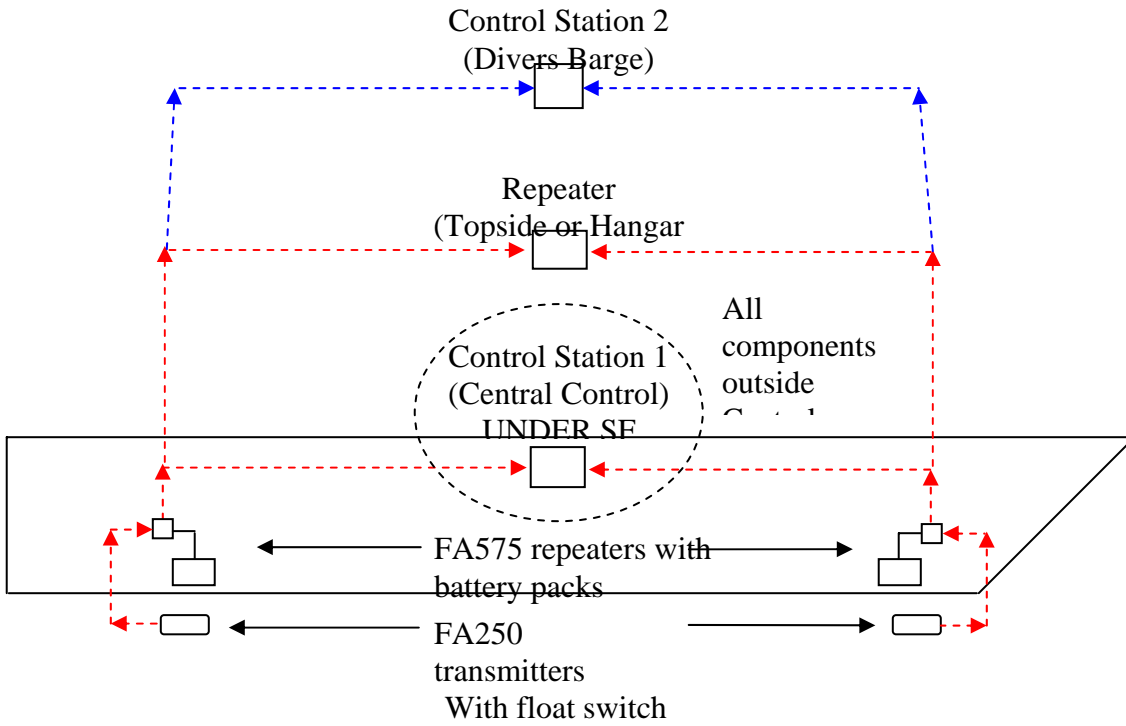


Wireless Remote Monitoring System
Control Station

FIGURE 2
CVN 76 – USS REAGAN

COFFERDAM WIRELESS REMOTE MONITORING SYSTEM

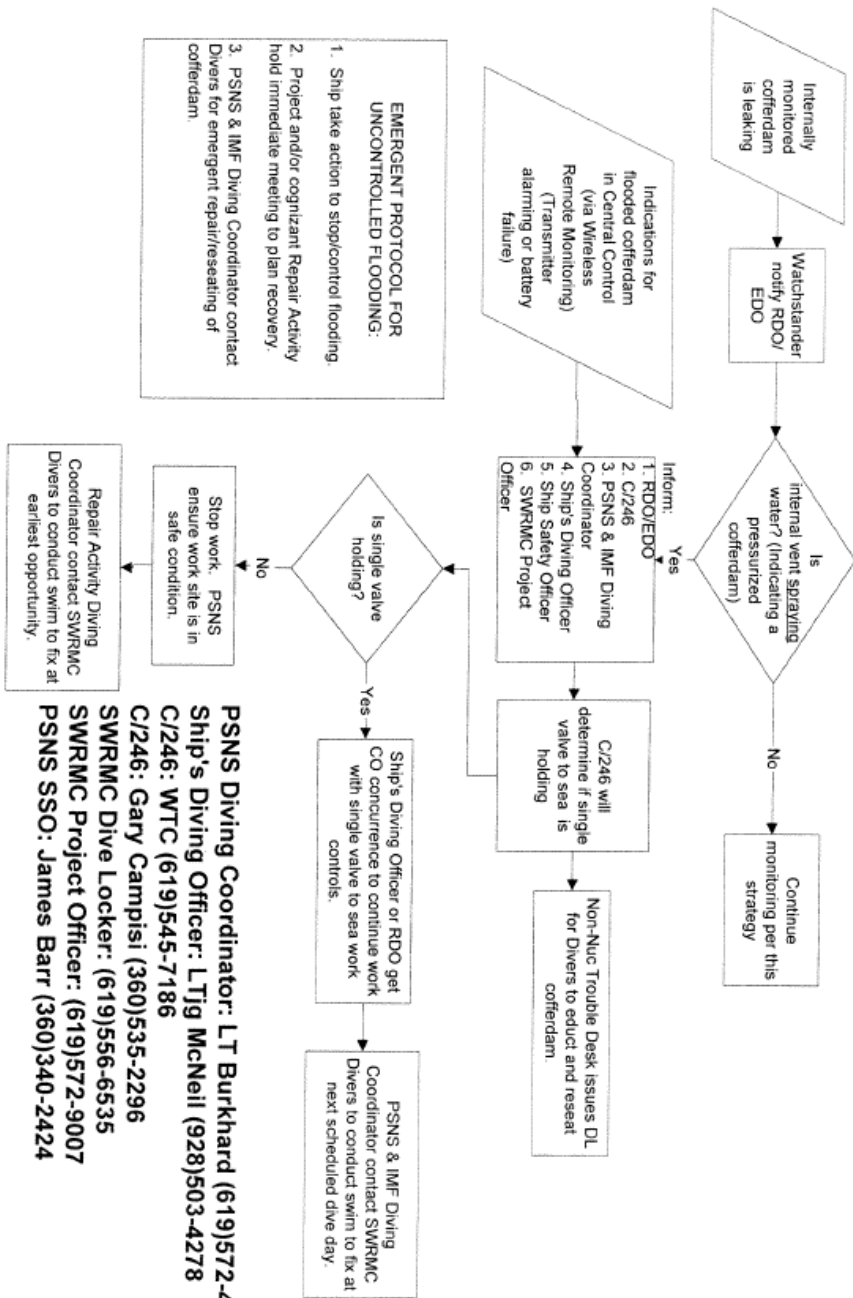
BOUNDARY DIAGRAM ESTABLISHING PORTION OF SYSTEM UNDER SHIP'S FORCE OPERATIONAL CONTROL



NOTE: Dashed arrows indicate signal

**CVN 76 FY 07 PIA QMP STRATEGY 030
COFFERDAM STRATEGY**

Attachment (a) Uncontrolled Flooding Flowchart



Attachment (c)

Transmitter Location

Component	S/C	Number of Transmitters Installed	Transmitter Nomenclature
2 Plant			
2 MN COND	52	1 Transmitter	2 MN COND
3 MN COND	46	1 Transmitter	3 MN COND 2
3 CPTG	66	1 Transmitter	3 CPTG
4 CPTG	65	2 Transmitters	4 CPTG
			4 CPTG 2
3 SSTG	57	2 Transmitters	3 SSTG
			3 SSTG 2
4 SSTG	45	2 Transmitters	4 SSTG
			4 SSTG 2
1 Plant			
1 MN COND	19	2 Transmitters	1 MN COND
			1 MN COND 2
4 MN COND	33	2 Transmitters	4 MN COND
			4 MN COND 2
1CPTG	7	2 Transmitters	1 CPTG
			1 CPTG 2
2CPTG	8	2 Transmitters	2 CPTG
			2 CPTG 2
1 SSTG	17	2 Transmitters	1 SSTG
			1 SSTG 2
2 SSTG	31	1 Transmitter	2 SSTG

Appendix A, attachment (c)

Appendix A, attachment (d)

Attachment (d)

Cofferdam Wireless Repeater Location

Space	Description	Repeater #
1 RAR	CG LL Outboard of #2 CTG Mounted Behind the Hear-Here Booth	4
1 MMR	UL at Hear Here Booth Between #1 SSTG and #1 PCC	6
1 MMR	LL Aft Stbd Corner of #2 SSTG Foundation	7
2RAR	CG LL Outboard of #4 CTG Mounted Behind Workbench	5
2MMR	UL At Firestation Between #3 and #4 SSTG	1
2MMR	LL At Bottom of Port Ladder at Frame 170	8
2nd Deck	Passage Way 2-113-1-L at Frame 115 Next to Node Room 6	3
2nd Deck	FWD of #2 RAR Stbd Access at FM 156	2
Port Sponson	Port Sponson at FM 118	9