NOTE: These documents were secured from the U.S. Coast Guard via a Freedom Of Information act (FOIA) request by the Equipped To Survive Foundation (www.equipped.org). In these documents, "PEPIRB" stands for Personal EPIRB, the designation given by the Coast Guard for their version of the McMurdo "Fastfind" Personal Locator Beacon (PLB), which is coded as an EPIRB, not a PLB, and which is functionally the same as the Fastfind PLB, including the design of its antenna and antenna storage. It is not equipped with an integral GPS receiver.

Coast Guard Test Plan
McMurdo Fast Find PLB

Background:

Starting in FY2002, the Coast Guard began the purchase of over 5000 McMurdo Fast Find PLBs to outfit individual boat crewmembers with an electronic means of signaling distress. On July 1st of 2003, PLBs became legal for use in the U.S. by the general public.

As a result of recent studies of PLBs and their performance under simulated field conditions, Coast Guard personnel in the field have raised questions as to the functional performance of the McMurdo Fast Find PLBs were they required in an actual emergency. In an effort to answer these doubts, Commandant (G-OCS) and (G-OPR) commissioned an analysis of the signal strength of the Fast Find PLB when operated under simulated field conditions where the unit was exposed to water. The findings of this study raised further questions as to the performance in the field. In summary, the findings indicated that the beacons radiated power is extremely degraded by the presence of water in the antenna well. The findings did not indicate if the power degradation would prevent a SARSAT system alert. While this clearly is not desirable for use in the maritime environment, it is important to note that despite this power degradation, the PLBs used in this testing created alerts that were relayed through the system.

Purpose:

This test will evaluate the beacons performance in the actual environmental conditions a Coast Guard boat crew encounters when signaling distress using their PLBs. A second portion of the test will evaluate the battery life of the PLB when operating in the maritime environment. The method of measurement will be to compile all data received by the U.S. SARSAT Mission Control Center (US MCC) from alerts/position information for the activated beacons. The resulting data will be compared against the manufacturers advertised performance of "Alert time within 90 minutes ", "Positional accuracy within 3 nautical miles" and 24 hours battery life. The resulting report should clearly establish if

the McMurdo Fast Find PLBs are an appropriate piece of survival equipment for use by Coast Guard boat crews.

Methodology:

LCDR Jay Dell of Commandant (G-OPR) and CWO Kirk Neprud of Commandant (G-OCS) will coordinate the testing. As the Coast Guard's liaison to the SARSAT program, LCDR Dell will be responsible for providing the necessary registration information on the beacons being tested to the USMCC to ensure system-wide awareness of the planned testing and filtering of the alerts generated. In addition, he will work with the MCC staff to compile the resulting alert and position data to evaluate the performance of the beacons after testing is complete. CWO Neprud will provide PLBs for the test, coordinate testing with the selected field unit, ensure test procedures are understood and activation times/test locations are documented.

Test One: *Boat Crew Activation.* Three crewmembers will be provided with a PLB (one test encoded and two operational PLBs) with fresh batteries that has not been previously activated. Each crewmember will enter the water and activate their PLB. The PLBs shall be activated at approximately 30-second intervals. The test duration will be two hours (of beacon activation). As part of the simulation, the crew may use a flotation device such as a life ring, surfboard or similar floating object to simulate debris used for floatation or partial removal from the water. During the period of immersion/activation, one crewmember with an operational beacon shall keep the PLB and antenna well as dry as possible and the beacon antenna pointed skyward by using whatever means available. The other two crewmembers shall activate their PLBs and then do nothing to protect them from the water but will ensure that they remain secured to their SAR vest by tether line. Over the course of the tests, all three crewmembers shall remain together to simulate a crew staying together in the debris field or near the partially submerged hull of a boat. After a period exceeding two hours of activation, the PLBs will be secured and the crewmembers removed from the water.

Test Two: *Beacon Operational Longevity:* This test will evaluate the battery life/longevity of a PLB activated in the maritime environment. As a control for this test, a test-encoded beacon will be activated and placed on the ground or pier for a period of 24 hours. Simultaneously, a beacon from the Coast Guard operational inventory will be activated, placed in the water and secured to a fixed object (such as a dayboard or piling) with a 8-10' lanyard. The location of the beacon should allow for mild to moderate wave/wake action, tidal change and allow for a clear view of the sky regardless of what direction the beacon drifts from the fixed object. Additionally, the beacon should be a location where its unobstructed floatation can be verified by the unit once every two hours for a 24-hour period. If the beacon either sinks or appears to have stopped functioning the time period should be noted. At the conclusion of the 24-hour period both beacons will be secured.

At the completion of both tests, the selected unit will provide an email report to LCDR Dell containing the activation times and locations of each of the beacons used in the two

tests. This information will be used to compare to the data compiled by the USMCC on the beacon alerts actually received.

Report:

At the conclusion of the test, LCDR Dell and CWO Neprud will generate a written report that will detail the performance of each of the four beacons against the advertised performance criteria provided by the manufacturer. The conclusions of the report should clearly indicate if the units procured by the Coast Guard meet the criteria advertised by the manufacturer in the operating environment we may use them in. If so, this should inspire confidence in the personal survival equipment provided to our boat crews. If the units fail to perform as expected, the Coast Guard should have clear grounds to demand investigation and action by the manufacturer.

Beacon 1

McMurdo Pains Wessex FastFind Evaluation

Training Beacon Number: ADDE489C0000005

Date: 4 November 2003

2-Hour Duration Test

Crewmember Name: SN Leonardo Aspuru

This beacon will be activated by the crewmember and left to transmit without interference. The crewmember will ensure that the beacon remains tethered to the equipment vest.

Time of Activation: 10:08:23

Time Out of Water: 12:10:00

Time of Deactivation: 12:45:00

Comments:

Start LAT: 26 06.94
LON: 080:03:97

End LAT: 26 08.68
LON: 80 04.94

Post tested good.

Dell's Notes:

Site ID: 64650

Start Time: 1508

Received GEO unlocated at CHMCC 1717

No first pass data

No composite received.

Beacon 2

McMurdo Pains Wessex FastFind Evaluation

Training Beacon Number: ADDE489C0800005

Date: 4 and 5 November 2003

24-Hour Duration Test, Ground or Pier

This beacon will be activated and set out on the ground or on a pier and left to transmit for 24 hours.

Time of Activation: 4 November 2003 at 09:19:33

Time of Deactivation: 5 November 2003 at 09:19:35

Comments:

Post tested good.

Dell's Notes:

Site ID: 64644

Start Time: 1419

Received GEO unlocated at 1422

Received first pass at 1438

Received Composite at 1515
LAT: 26-05.1N
LON: 080-06.8W

Beacon 3

McMurdo Pains Wessex FastFind Evaluation

Operational Beacon Number: ADCE893844046D

Date: 4 November 2003

2-Hour Duration Test

Crewmember Name: SN Miguel Calderon

This beacon will be activated by the crewmember and the crewmember will make every effort to keep the beacon as dry as possible. The crewmember will ensure the antenna and antenna well are keep dry by lightly shaking excess water from the well or wiping excess water from the antenna surface. The crewmember will also ensure the antenna stays upright and pointed skyward by keeping the beacon attached as high on the body as possible ensuring the beacon remains tethered to the equipment vest.

Time of Activation: 10:09:45

Time Out of Water: 12:10:00

Time of Deactivation: 12:45:00

Comments:

Start LAT: 26 06.94
LON: 080:03:97

End LAT: 26 08.68
LON: 80 04.94

First alert in 3 minutes, composite solution in 8 minutes.

Post tested good.

Dell's Notes:

Site ID: 64647

Start Time: 1508

Received LEO unlocated at 1512

Received first pass at 1516

Received Composite at 1524
LAT: 26-07.1N
LON: 080-07.1W

Beacon 4

McMurdo Pains Wessex FastFind Evaluation

Operational Beacon Number: ADCE089E784006D

Date: 4 November 2003

2-Hour Duration Test

Crewmember Name: MK3 Jerry Suarez

This beacon will be activated by the crewmember and left to transmit without interference. The crewmember will ensure that the beacon remains tethered to the equipment vest.

Time of Activation: 10:08:55

Time Out of Water: 12:10:00

Time of Deactivation: 12:45:00

Comments:

Start LAT: 26 06.94
LON: 080:03:97

End LAT: 26:08:68
LON: 80:04:94

Post tested good.

Dell's Notes:

Site ID: 64649

Start Time: 1508

Received GEO unlocated at 1537 (1514)

Received first pass at 1734

No composite received.

Beacon 5

McMurdo Pains Wessex FastFind Evaluation

Operational Beacon Number: ADCE0892384046D

Date: 4 and 5 November 2003

24-Hour Duration Test, In-Water, Secured in Location

This beacon will be tethered to a fixed location and allowed to float free on an 8-10 foot long tether. The beacon will be activated and left to transmit for 24 hours.

Time of Activation: 4 November 2003 at 09:34:04

Time in Water: 4 November 2003 at 09:37:09

Time Out of Water: 5 November 2003 09:38:15

Time of Deactivation: 5 November 2003 at 09:39:33

Comments:

Fixed location LAT: 26 05.38
LON: 80 06.81

At time of removal from water the audible tone indication was working but no visual indication of 406 or 121.5 transmissions occurred for a 3-minute duration. The unit was deactivated with no visual indication occurring. The beacon was reactivated 1 minute after test termination to check for tone and visual indications, tone was working, the 121.5 red LED came on and stayed on until the beacon was secured, the green 406 LED never illuminated.

Post tested good with both tone and visual indicators working correctly.

Dell's Notes:

Site ID: 64645

Start Time: 1430

Received GEO unlocated at 1437

Received first pass at 1524

Received Composite at 1702
LAT: 26-05.0N
LON: 080-06.7W

R 261734Z NOV 03 ZUI ASN-A00330000161
FM COMDT COGARD WASHINGTON DC//G-OC//
TO ALCOAST
BT
UNCLAS //N10470//
ALCOAST 518/03
COMDTNOTE 10470
SUBJ: PERSONAL EPIRB TEST RESULTS AND CONFIGURATION CHANGE FOR MCMURDO PAINS WESSEX FASTFIND
A. COMDT COGARD WASHINGTON DC R091744Z MAY 02 ALCOAST 239/02
B. RESCUE AND SURVIVAL SYSTEMS MANUAL, COMDTINST M10470.10E
1. OVER THE PAST TWO YEARS, NUMEROUS INQUIRIES, COMMENTS AND CONCERNS CENTERING ON RELIABILITY OF THE MCMURDO PAINS WESSEX FASTFIND PERSONAL EPIRB (PEPIRB), REQUIRED FOR USE BY REF A, PROMPTED AN OPERATIONAL TESTING SCENARIO. THIS SCENARIO WAS DEVELOPED TO DETERMINE IF THE PEPIRB MEETS THE PERFORMANCE CRITERIA INDICATED BY THE RADIO TECHNICAL COMMISSION FOR MARITIME SERVICES (RTCM) PAPER 5-97/SC110STD AND THE MANUFACTURERS PRODUCT LITERATURE. THE PEPIRB TEST SCENARIO WAS DEVELOPED BY COMMANDANT G-OPR AND G-OCS IN COORDINATION WITH THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATIONS (NOAA) MISSION COORDINATION CENTER(MCC) IN SUITLAND, MARYLAND TO TEST THREE SPECIFIC CAPABILITIES OF THE PEPIRB:
 A. ALERT THE COSPAS/SARSAT SYSTEM WITHIN 90 MINUTES OF ACTIVATION.
 B. PRODUCE A CALCULATED COMPOSITE POSITION OF THE PEPIRB WITHIN 3 NAUTICAL MILES OF ACTUAL DISTRESS LOCATION.
 C. OPERATE CONTINUOUSLY FOR 24-HOURS AFTER ACTIVATION.
2. FIVE PEPIRBS WERE SELECTED FOR THIS TESTING AND ALL FIVE PASSED EACH OF THE REQUIRED CAPABILITIES. THREE PEPIRBS WERE WORN IN INFLATABLE PFDS BY BOAT CREW MEMBERS AND WERE EVALUATED DURING A 2-HOUR DURATION IN-WATER TEST. TWO CREW MEMBERS WERE INSTRUCTED TO ACTIVATE THEIR PEPIRB AND ALLOW IT TO FLOAT FREE ON THE TETHER LINE. THE THIRD CREW MEMBER WAS INSTRUCTED TO ACTIVATE THE PEPIRB AND ENSURE THE PEPIRB STAYED ATTACHED TO THE VELCRO PATCH ON THE BOAT CREW MEMBERS HELMET. IN ADDITION TWO PEPIRBS WERE USED TO DETERMINE THE 24-HOUR OPERATING DURATION. ONE PEPIRB WAS ACTIVATED AND ALLOWED TO TRANSMIT UNDISTURBED FROM THE TOP OF A SIGN POLE. THE SECOND IN-WATER PEPIRB WAS TETHERED TO A DAY BOARD AND ALLOWED TO TRANSMIT AND FLOAT FREE.
3. ALL FIVE PEPIRBS SUCCESSFULLY ALERTED THE COSPAS/SARSAT SYSTEM BY TRANSMITTING THEIR SPECIFIC HEXADECIMAL IDENTIFICATION CODE TO THE NOAA MCC WITHIN 16 MINUTES OF ACTIVATION. WERE THIS NOT A TEST, AN ALERT MESSAGE WOULD FORWARD AUTOMATICALLY TO THE APPROPRIATE COAST GUARD RESCUE COORDINATION CENTER (RCC) IDENTIFYING THE SPECIFIC PEPIRB ACTIVATION. WITH PROPER REGISTRATION AND TIMELY OPERATIONS AND

POSITION REPORTING, THIS ALERT IS SUFFICIENT TO ENSURE DISTRESS ALERTING FOR COAST GUARD BOAT CREW MEMBERS.
4. BOTH 24-HOUR PEPIRB TESTS GENERATED A COMPOSITE POSITION FOR THEIR LOCATION, THE DRY PEPIRB AT 51 MINUTES AND THE IN-WATER PEPIRB AT 139 MINUTES. THESE POSITIONS WERE ACCURATE WELL WITHIN THE 3 NAUTICAL MILE TEST REQUIREMENTS AND BOTH PEPIRBS OPERATED IN EXCESS OF 24-HOURS.
5. THE PEPIRB ATTACHED TO THE BOAT CREW MEMBERS HELMET WAS THE ONLY ONE OF THE 2-HOUR DURATION IN-WATER TESTS TO PROVIDE SUFFICIENT TRANSMISSION OF DATA TO OBTAIN A COMPOSITE SOLUTION DURING THE TEST PERIOD. THE TWO PEPIRBS THAT WERE TETHERED TO THE CREW MEMBERS AND LEFT TO FLOAT FREE DID NOT GENERATE A COMPOSITE POSITION UNTIL AFTER THE 2-HOUR TEST WAS COMPLETE. DURING THE 2-HOUR IN-WATER TEST SCENARIO, THE TWO PEPIRBS THAT DID NOT GENERATE A COMPOSITE POSITION WERE OFTEN OBSTRUCTED BY THE CREW MEMBERS FOR SIGNIFICANT PORTIONS OF THE 2-HOUR TEST. MOST OF THE TIME THESE TWO PEPIRBS WERE NOT VISIBLE TO THE TEST OBSERVERS. THE TEST OBSERVERS INDICATED THAT THE TETHER LINES WERE NOT LONG ENOUGH TO ALLOW THE PEPIRB TO FLOAT AWAY AND FREE OF THE CREW MEMBER. WHILE THESE TWO PEPIRBS DID TRANSMIT THE HEXADECIMAL IDENTIFICATION CODE PERIODICALLY, DUE TO OBSTRUCTION BY THE CREW MEMBER, THE BURST TRANSMISSION SIGNAL WAS DEGRADED ENOUGH TO PREVENT THE COSPAS/SARSAT SYSTEM FROM GENERATING A COMPOSITE POSITION.
6. LESSONS LEARNED FROM THIS TESTING:
A. WHILE ALLOWED TO FLOAT FREE THE PEPIRB CASE IS SUBMERGED IN IT'S NORMAL FLOATING ATTITUDE. IN THIS ATTITUDE, WATER FLOODS THE ANTENNA STORAGE WELL. WHEN ANY AMOUNT OF WATER IS ALLOWED TO COLLECT IN THE ANTENNA STORAGE WELL THE SIGNAL IS DEGRADED AND MAY PREVENT THE COSPAS/SARSAT SYSTEM FROM RECEIVING THE TRANSMITTED SIGNAL. AFTER ACTIVATION, BOAT CREW MEMBERS SHALL MAKE EVERY EFFORT TO KEEP THE PEPIRB OUT OF THE WATER, THE ANTENNA AND ANTENNA STORAGE WELL AS DRY AS POSSIBLE AND THE PEPIRB ORIENTED SO THAT THE ANTENNA HAS AN UNOBSTRUCTED VIEW OF THE SKY. THIS CAN BE ACHIEVED BY ATTACHING THE PEPIRB TO THE HELMET, HOOD OR SURVIVAL VEST/PFD AND ROUTINELY CHECKING TO ENSURE WATER HAS NOT COLLECTED IN THE ANTENNA WELL.
B. CORRECT PEPIRB REGISTRATION WITH NOAA IS CRITICAL. SINCE ALL FIVE PEPIRBS TRANSMITTED THEIR HEXADECIMAL IDENTIFICATION CODE, THE MCC WOULD HAVE CONTACTED THE COAST GUARD UNIT IDENTIFIED AS THE EMERGENCY POINT OF CONTACT, AND THE RCC WOULD HAVE RECEIVED THE AUTOMATIC NOTIFICATION FROM THE COSPAS/SARSAT SYSTEM. WITH LAST KNOWN POSITION INFORMATION TYPICALLY TRANSMITTED DURING OPERATIONS AND POSITION REPORTING FROM OUR BOATS, THE UNIT WOULD KNOW WHERE TO SEARCH. PEPIRB REGISTRATION CAN NOW BE DONE ON LINE AT: HTTP://WWW.BEACONREGISTRATION.NOAA.GOV.

C. VELCRO HOOK TAPE AFFIXED TO THE BACK OF THE PEPIRB ALLOWS THE CREW MEMBER TO ATTACH THE PEPIRB TO THE HELMET OR HOOD AND TRANSMIT THE 406 MHZ SIGNAL UNOBSTRUCTED.
7. MAKE THE FOLLOWING CONFIGURATION CHANGE TO ALL IN SERVICE AND IN STOCK PEPIRBS AND NEW PEPIRBS RECEIVED FROM THE MANUFACTURER:
ATTACH A 2-INCH BY 2-INCH PIECE OF VELCRO HOOK TAPE TO THE PEPIRB BATTERY. DO NOT COVER THE BATTERY EXPIRATION DATE. SELF-ADHESIVE VELCRO HOOK TAPE IS AVAILABLE FROM NUMEROUS SOURCES INCLUDING BURCH FABRICS, 4200 BROCKTON DRIVE, GRAND RAPIDS, MI, 49572, TELEPHONE (800) 543-0441.
8. CONFIGURATION CHANGES TO INFLATABLE PFDS FOR INSTALLING VELCRO PILE TAPE WILL BE DIRECTED IN A FUTURE ALCOAST.
9. AS A RESULT OF THIS TESTING AND AS AN ADDED MEASURE OF SAFETY FOR OUR BOAT CREWS, G-OCS WILL CONSIDER THE INSTALLATION OF 406 MHZ EPIRBS ON COAST GUARD BOATS AT UPCOMING CONFIGURATION CONTROL BOARDS FOR THE MLB AND UTB. SPECIFIC INFORMATION REGARDING STANDARD CONFIGURATION, INSTALLATION AND FUNDING WILL BE FORTHCOMING UNDER SEPCOR UPON APPROVAL.
10. MAINTAIN A COPY OF THIS ALCOAST IN THE FRONT OF REF B PENDING PROMULGATION OF THE NEXT REVISION.
11. INTERNET RELEASE NOT AUTHORIZED.
12. RELEASED BY RADM JAMES C. OLSON, DIRECTOR OF OPERATIONS CAPABILITY.
BT
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