THE SECRETARY OF THE NAVY
WASHINGTON, D.C. 20350-1000

DEC 14 2009

Mr. William E. Reukauf, Acting Special Counsel
U.S. Office of Special Counsel
1730 M Street, N.W., Suite 300
Washington, DC 20036-4505

Dear Mr. Reukauf,

Thank you for your letter requesting an investigation of the alleged failure to report a crane mishap at the Naval Surface Warfare Center Carderock Bayview Detachment, Bayview, Idaho, (Office of Special Counsel (OSC) File No. DI-09-1294).

The inquiry led by the Naval Inspector General (NAVINSGEN) determined that Bayview Detachment personnel did improperly fail to report a crane mishap to proper authority, the Navy Crane Center, in violation of NAVFAC P-307 and Carderock Division Instruction 112262/2a because they should have recognized the mishap would be treated as a reportable crane accident under those standards. It found, however, there was no danger to public health or safety because no personnel were at risk of being injured and there was no damage to the crane itself.

The inquiry revealed the failure to report the mishap as required was due to the mistaken belief that the equipment damaged in the mishap was not actually being supported by the crane when the damage occurred. Had that been correct, the mishap would not have been reportable. Subsequent inquiry revealed the equipment was being supported by the crane at the time it was damaged. Appropriate corrective action, including personnel training and revision to the procedures for conducting the activity being accomplished when the mishap took place, has been taken. No disciplinary action is appropriate because the mistake was reasonable given the complex circumstances surrounding the activity in question.

I am enclosing two versions of the report of investigation. The first contains names of witnesses and is for your official use. I understand that you will provide a copy of this version to the Complainant, the President, and the House and Senate Armed Services Committees for their review.

The second version excludes the names of witnesses and is suitable for release to the general public. As has been the case with other reports that the Department has provided to your office since September 11, 2001, I request that you make only this redacted version available to members of the public. Again, thank you for bringing this matter to our attention. If I may be of any further assistance, please let me know at your earliest convenience.

Sincerely,

Ray Mabus
Secretary of the Navy

Enclosures:
1. For Official Use Copy of Report of Investigation
2. Public Release Copy of Report of Investigation

Office of the Naval Inspector General

OSC Case Control Number DI-09-1294
NAVINSGEN Case Control Number 200900425
NAVSEA Case Control Number 090015L

Report of Investigation

8 October 2009

Subj: ALLEGED FAILURE TO REPORT CRANE MISHAP AT NSWC CARDEROCK BAYVIEW DETACHMENT, BAYVIEW IDAHO

Table of Contents

SUITABLE FOR PUBLIC RELEASE
(names removed)

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OSC Case Control Number DI-09-1294

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8 October 2009

Subj: ALLEGED FAILURE OF PROJECT MANAGER TO REPORT CRANE MISHAP AT NSWC CARDEROCK, BAYVIEW DETACHMENT, BAYVIEW, IDAHO

Preliminary Statement

1. This report is issued pursuant to a 20 March 2009 Office of Special Counsel (OSC) letter tasking the Secretary of the Navy (SECNAV) to conduct an investigation under 5 USC 1213.

2. OSC is an independent federal agency whose primary mission is to safeguard the merit system by protecting federal employees and applicants from prohibited personnel practices. OSC also serves as a channel for federal workers to make allegations of: violations of law; gross mismanagement or waste of funds; abuse of authority; and a substantial and specific danger to the public health and safety.

3. Reports of investigations conducted pursuant to 5 USC 1213 must include: (1) a summary of the information for which the investigation was initiated; (2) a description of the conduct of the investigation; (3) a summary of any evidence obtained from the investigation; (4) a listing of any violation or apparent violation of law, rule or regulation; and (5) a description of any action taken or planned as a result of the investigation, such as changes in agency rules, regulations or practices, the restoration of employment to an aggrieved employee, disciplinary action, and referrals to the Attorney General of evidence of criminal violations.

Information leading to the OSC Tasking

4. The Naval Surface Warfare Center, Carderock Division (NSWCCD) consists of approximately 3,200 scientists, engineers and support personnel working in more than 40 disciplines ranging from fundamental science to applied/in-service engineering. NSWCCD is the Navy's expert for maritime technology. Headquartered in West Bethesda, Maryland, the Division houses world-class facilities and laboratories. A

major operating site in Philadelphia is recognized as the center for naval machinery. The Division also conducts research and development at several remote sites across the country. The Acoustic Research Detachment (ARD), which OSC refers to as the "Bayview Detachment," is located at the southern end of Lake Pend Oreille in Bayview, ID.

5. As a major component of the Naval Sea Systems Command, the Carderock Division provides cradle-to-grave support for its technical products over an enormous range of scientific areas related to surface and undersea platforms. The Division addresses the full spectrum of applied maritime science and technology, from the theoretical and conceptual beginnings, through design and acquisition, to implementation and follow-on engineering. This includes all technical aspects of improving the performance of ships, submarines, military water craft, and unmanned vehicles, as well as research for military logistics systems. In addition, the Division is uniquely chartered by Congress to support America's maritime industry.

6. This OSC tasking stems from a complaint received from a whisleblower who declined to consent to disclosure of his/her name to the agency. The OSC indicates the incident occurred on 15 January 2009.

7. The OSC tasking letter states the Whistleblower alleged employees at the ARD failed to report that a crane was damaged during operation, and as a result the crane is still in use, placing staff in danger of injury and government property at risk of further damage.

8. OSC provided the following general summary of Complainant's allegation:

> *The whistleblower explained that on January 15, 2009, an Array prototype (AP) was scheduled to be tested at the Bayview Detachment. The AP was attached to a crane using an aerial work platform controlled by a land-mounted winch. An order was given the Project Engineer in charge of the testing, to lower the platform without detaching the crane from the AP. This resulted in structural damage to the winch and to the support strongback that was attached to the AP and crane. It also severed two power cables connected to the AP. At the time of the accident, the damage to the strongback was recognized and temporarily patched: however, the damage cables were not discovered until the AP was retrieved because it malfunctioned during project testing.*

Pursuant to Section 12 of NAVFAC P-307, as well as OPNAV Instructions 5102.1 and 5100.23, Management of Weight Handling Equipment (June 2006), accidents of this nature must be reported to the Navy Crane Center within 30 days and if necessary, undergo an investigation. However, the whistleblower confirmed that there has been no government property damage report or crane report filed. As a result, the crane has not been load tested or recertified, but is still in use, creating an unsafe environment for employees and the potential for further damage to government property.

Description of Conduct of Investigation

9. On 31 March 2009, Investigator One (Invest-1), Naval Sea Systems Command, Office of the Inspector General (NAVSEAINSGEN), telephoned Investigator Two (Invest-2), Head of the Command Evaluation and Review Office (CERO) at the Naval Surface Warfare Center, Carderock Division (NSWCCD). This telephone call advised a hotline complaint was received by NAVSEAINSGEN from the Naval Inspector General's Office (NAVINSGEN). This complaint alleged a failure to report a crane accident that occurred at NSWCCD's Bayview Idaho Detachment. It should be noted, following the telephone call, Invest-1 sent an email containing a copy of the complaint to Invest-2.

10. On 31 March 2009, Invest-2 telephoned Counsel for NSWCCD (Counsel), to notify her of the complaint. Due to the nature and origin of the complaint (Office of Special Counsel (OSC)), she recommended a meeting should be scheduled with the Commander, NSWCCD at his earliest availability in order to immediately initiate an investigation.

11. On 31 March 2009, a conference call was held by Invest-2 to discuss this matter with the CERO staff (Investigators Three (Invest-3) and Four (Invest-4)). During this call, the specific allegation was disclosed and a general plan to conduct the investigation was developed. Invest-2 was identified as the Investigative Team Leader. Invest-4 was identified as the investigator that would travel to Bayview to conduct on-site interviews and fieldwork.

12. On 1 April 2009, the Deputy Inspector General, NAVSEAINSGEN, SEA-00N, signed the official tasking letter for NSWCCD to conduct an investigation into the allegation of the failure of the Project Engineer to report a crane mishap at NSWC Carderock, Bayview Detachment. This letter was received via an email sent to Invest-2 by Invest-1.

13. On 1 April 2009, a meeting was held with Commander, NSWCCD (CO-NSWCCD), Counsel NSWCCD and Invest-2. During this meeting, the subject complaint was discussed. As a result, CO-NSWCCD directed: (1) the crane (B-17) should be immediately inspected for visible physical damage and/or other indications of safety issues, (2) the CERO will conduct the investigation into this matter and (3) on-site interviews into this matter should commence as quickly as possible.

14. On 1 April 2009, a telephone conference call was placed by CO-NSWCCD to the Site Director, Acoustic Research Detachment (ARD), Bayview Idaho (Site Director). Counsel and Invest-2 were present during this call. CO-NSWCCD provided Site Director a general, brief summary of the complaint. Site Director was not aware of any possible accident involving crane B-17. CO-NSWCCD directed Site Director to conduct an immediate inspection of crane B-17 and, if there was any visible damage or safety issues, the crane should be placed out of service. Site Director was also directed to contact the Navy Crane Center (NCC). He was directed to request: an on-sight inspection of crane B-17, ask the NCC if the events of 15 Jan 09 were considered a crane accident, and whether winches are considered weight handling equipment by the Navy Crane Center. CO-NSWCCD informed Site Director the investigation into this matter would be conducted by NSWCCD HQ personnel.

15. On 1 April 2009, Site Director sent an email to CO-NSWCCD. This email contained a draft document which was a summary of Site Director's initial investigation into the allegation. Site Director stated his initial investigation did not identify, to date, damage to any winch, crane, strongback, or any other weight handling equipment alleged in the complaint. Furthermore, he determined that no crane accident had occurred, therefore, no weight handling equipment has been placed out of service.

16. On 2 April 2009, a conference call was held to discuss Site Director's email and actions. Participants in this call were: CO-NSWCCD, Counsel, Invest-2 and Site Director. Site Director explained he did an initial investigation in an attempt to provide as much information as possible regarding this matter. However, CO-NSWCCD reiterated the investigation into this matter would be done by NSWCCD HQ personnel specifically CERO. CO-NSWCCD directed Site Director not to continue with his efforts or any further actions on this matter except contacting the Navy Crane Center for their opinion on this matter and requesting an on-site inspection of crane B-17. Invest-2 disclosed Invest-4 was scheduled to be on-site at Bayview on 6 April 2009.

17. On 2 April 2009, Invest-4 was issued travel orders to the Acoustic Research Detachment, Bayview Idaho. Invest-4 arrived at the facility on Monday, 6 April 2009 to conduct interviews and fieldwork. He departed on Friday, 10 April 2009.

18. Using the information in the OSC tasking letter, we formulated the following allegation for this complaint:

Allegation One: That ARD Personnel failed to report a crane accident to proper authority, in violation of NAVFAC P-307 and Carderock Division Instruction 11262.2a.

Allegation Two: That the failure to report the crane accident created a danger to public health and safety.

The first allegation is substantiated. ARD personnel failed to identify and report the incident in question as a crane accident as required by the cited regulations. The second allegation is not substantiated because there were no personnel in danger of being injured by the accident and a Navy Crane Center inspection of the crane conducted as a result of this investigation disclosed no damage to the crane or any other unsatisfactory items. In addition, an annual mandatory Crane Condition Inspection also revealed no unsatisfactory conditions pertaining to the crane.

Summary of Evidence Obtained During Investigation

Findings

Background

19. The Array Prototype (AP) is an array of sensors utilized to acquire data during experiments performed at ARD. The AP is a floating structure that is attached to the High Resolution Array (HRA). The HRA is also a floating structure that is secured to the Intermediated Scale Measurement System (ISMS) Model Handling Platform or MHP. The AP is held in place by six support lines that are attached to an aluminum mounting/alignment bar that is secured to the HRA (Appendix C: Picture 2). Once fully configured, the depth of the AP/HRA/MHP assembly is controlled by a shore based winch originally configured to support test models suspended from the MHP with as much as 40,000 lbs of buoyancy (Appendix C: Picture 3). This winch is located at the ISMS OUTPOST facility located on the shore west of the ISMS range.

20. The incident described in the complaint occurred while reorienting the AP from its normal alignment configuration, perpendicular to the HRA, to one that placed the AP parallel to the HRA. During the incident, damage occurred to the AP mounting/alignment bar and two cables that attach to the AP pressure vessel. At the time of the incident, the AP had been reoriented 90 degrees from its' typical (perpendicular to the HRA) position and was in the process of being redeployed in the water in order to conduct another test. The AP is always perpendicular to the mounting/alignment bar.

Order of Events:

21. On November 25, 2008 the AP was successfully installed in preparation for a test. The configuration for this installation was with the AP oriented perpendicular to the HRA. This is the typical AP orientation that requires the mounting/alignment bar aligned with and securely attached to the HRA truss structure (Appendix C: Picture 4). This was the second successful deployment of the AP. In support of a subsequent test, the AP was required to be oriented 90 degrees from the typical configuration so that it is parallel with the HRA. In order to install the AP in this atypical orientation, the AP had to be raised out of the water by the crane in order to reorient the mounting/alignment bar so that the AP would be perpendicular to the HRA truss structure (Appendix C: Picture 5). Raising the AP also required raising the HRA and MHP by paying or spooling out line from the winch to which the MHP is attached in order to adjust the depth of the AP/HRA/MHP assembly in the water.

22. On January 15, 2009, the AP was realigned utilizing a procedure originally developed to support a typical AP installation orientation. Personnel who supported this event consisted of a lead project engineer, ARD wage grade employees, and contractor support personnel. The lead project engineer is responsible for the safe and effective execution of this event, is responsible for giving direction to all support personnel, and is the on-site authority for all issues associated with test execution, safety, environmental, and security during the execution of this event.

23. A summary of the steps performed during the reorientation of the AP on 15 January 2009 are as follows:

1. The AP/HRA/MHP assembly was raised enough to bring the HRA and AP to the surface by spooling out wire rope from the shore mounted ISMS MHP winch.

2. Once on the surface, a 20,000 lb boom crane (Crane B-17), located on the ISMS Experiment Support Platform (ESP), was used to pick up the AP and suspend it overhead so that the mounting/alignment bar could be reoriented on the HRA truss (Appendix C: Picture 6).

3. The AP mounting/alignment bar was reoriented and secured in place with additional ratchet straps (Appendix C: Picture 5).

4. The MHP and HRA were initially lowered, taking slack out of the support lines connecting the AP to the HRA by using the shore based winch to reel in some of the cable attached to the MHP. This was done while the AP was suspended by the ESP crane. This step was performed to ensure that all AP support lines and cabling were run fair to the mounting/alignment bar.

5. Once the alignment of all AP support lines and cables were verified to be clear of any obstruction, the lead project engineer directed the THH be lowered further. Lowering the MHP caused the HRA and AP also to begin descending, as all three are attached to each other. At the same time, the lead project engineer also directed the crane operator to pay out line from the crane at the same rate as the MHP/HRA/AP were being pulled into the water by the winch operator, in order to avoid placing undue strain on any part of the combined MHP/HRA/AP assembly. This is a difficult task to accomplish due to the majority of the AP support lines and cabling being underwater for the latter part of this event. The intent is to continue this lowering procedure until the AP is able to float on its own. Once floating, the AP is released from the crane.

6. While the assembly was being lowered, it became evident, by the AP support lines going slack, that the aluminum mounting/alignment bar could have broken. The AP and HRA were subsequently raised to the surface and it was confirmed that the mounting/alignment bar had broken (Appendix C: Picture 7).

7. The two pieces of the mounting/alignment bar were then reattached to the HRA structure utilizing several different methods including hose clamps, tie wraps, and straps.

8. The AP lowering process of step #5 was then successfully completed. At some time prior to 28 January 2009, while testing the AP in preparation for another test, it was identified that the Group One sensors were inoperable on the AP. Discussions

with the Test Directors, confirmed that the Group One sensors were of secondary importance to the Group Two sensor data, and it was decided to proceed with the planned test without the Group One sensors. The Site Director was informed of the loss of the Group One sensors at this time. After the test, the AP and HRA were retrieved and transported to the ARD. At this time, it was discovered that two AP cables were broken where they attach to the AP pressure vessel. The damage to these two cables was the cause for the Group One sensors to be inoperable. Site Director was informed of the damage to these cables at that time and repair of these cables was directed.

Witness Testimony

24. Between 6 April 2009 and 5 May 2009, Command Evaluation and Review Office (CERO) personnel interviewed the following personnel: Project Engineer; Electrical Technician; Research Lab Mechanic; Mechanical Engineer; Test Operation Manager; Facilities Manager/Crane Program Manager (Facilities Manager); and Site Director. In addition to these interviews CERO consultations were conducted with the Weight Handling Equipment (WHE) Program Manager for Carderock Division (WHE Program Manager); and the Team Leader/Audit Team 4, Navy Crane Center Audit Team (NCC Audit Lead).

25. Project Engineer is a Mechanical Engineer responsible for the day to day operations on the Acoustic Research Detachment (ARD) Intermediated Scale Measurement Systems (ISMS). He has a Category 3 crane operator license and has attended the Navy Crane Center Crane Rigger Course.

26. Project Engineer was the task leader for the deployment, retrieval and modification of the AP on 15 January 2009. Project Engineer provided his recollection of the deployment. He explained the AP was raised to the surface of the water, secured by a crane. The six lines were disconnected between the AP and the HRA. The AP was rotated to the correct orientation and the lines were reattached to the HRA. The AP was lowered into the water with the assistance of the haul down winch. Project Engineer realized some lines needed to be readjusted because the orientation was incorrect. They raised the AP again and readjusted the lines. The AP was lowered again (and pulled into the water) with the use of the haul down winch. Project Engineer stated during this evolution, he saw the AP "bounce". He realized the aluminum bar had broken. To avoid further damage, he hand signaled the crane to lower the AP and he radioed the winch operator to stop. (It should be noted the

winch operator is approximately one mile away in the ISMS Outpost Facility.) The AP was then raised out of the water. The HRA was raised to the surface and Project Engineer saw the aluminum bar had broken in half. He determined the best course of action was to reinstall the AP to avoid losing an entire day of testing. Project Engineer believed the broken bar was the only damage and continued with the deployment of the AP. At that time, there was no indication that any sensor cables were broken. Project Engineer said he reported the broken bar to his supervisor, Test Operation Manager. He did not know if the incident was reported to the Navy Crane Center. However, in his opinion, he did not believe the incident was a crane accident because the aluminum bar was not part of the load. Project Engineer stated no personnel were in danger as a result of the bar breaking. The AP was never in jeopardy of falling from the crane. However, even if for some unknown reason the rigging failed, the AP was being lowered into the lake. No personnel were in the lake.

27. Several days later, during testing, Project Engineer was informed no data was being received from the Group One sensors. He speculated a cable may have broken or a problem occurred in the pressure vessel. After discussing this matter, the operations were continued without the Group One sensor data.

28. Electrical Technician, worked on the deployment, retrieval and modification of the AP on 15 January 2009. Electrical Technician has Category 1, 2, 3 and 4 crane training and has attended the Navy Crane Center Rigger Course. He stated no incidents occurred during the repositioning on the AP. However, upon redeployment of the AP, it appeared that the MHP haul down winch outpaced the crane causing the AP alignment bar to break at the attachment point. The HRA and AP were raised and the bar was reattached to the HRA. The AP was then redeployed. Electrical Technician said he did not believe a crane accident occurred due to the small amount of tension needed to break the attachment bar. He doubted the incident was reported to the Navy Crane Center.

29. Research Lab Mechanic was the crane (B-17) operator on 15 January 2009 for the deployment, retrieval and modification of the AP. Research Lab Mechanic is a licensed crane operator and has attended the Navy Crane Center Rigger Course. Research Lab Mechanic said they were having problems lowering the AP and did not want to get lines tangled. During deployment of the AP, a bar was broken. Research Lab Mechanic realized a problem occurred by the way Project Engineer was acting. When the

incident occurred, Project Engineer signaled him to cease operation of the crane and then they ensured things were safe. Research Lab Mechanic thought the incident was reported to senior management or the Navy Crane Center. He added the "Task Leader was aware of the crane accident and should have notified crane leaders." He did not verbally report the accident to the task leader (Project Engineer) because he knew what happened and was at the scene of the accident. Research Lab Mechanic thought an accident had occurred because the aluminum bar broke.

30. Mechanical Engineer was not present at the test site for the deployment of the AP on 15 January 2009. Therefore, he had no first hand knowledge of the incident. Mechanical Engineer has received Category 2 and 3 crane training and attended the Navy Crane Center Rigging Course. Since Mechanical Engineer was not present, he stated Project Engineer informed him the alignment bar had broken during installation of the AP. However, they reattached the bar and proceeded with the installation. He had no further discussions or comments regarding this incident.

31. Test Operation Manager is the Supervisor of Project Engineer and Electrical Technician. Test Operation Manager has not completed any crane training or rigging course. Test Operation Manager was not present during the 15 January 2009 deployment/retrieval and modification of the AP. However, he was involved in the decision making and directions to perform the work. Test Operation Manager stated Project Engineer reported to him the aluminum bar had broken, but they were able to reattach the bar. Test Operation Manager stated the breaking of the bar and repair was reported in their weekly status report. Test Operation Manager thought the broken bar was a test article structural issue, not an issue with the crane or rigging gear. He believed the reason the aluminum bar broke was because they were trying to adjust (rotate) the AP in a manner that wasn't pre-planned in the design and deployment procedures. Therefore, the incident was not reported as a crane accident.

32. Test Operation Manager stated they discovered the Group One sensors were not working after calibrations on the AP were conducted. A decision was made to take the measurements with only the Group Two sensors and not the sensors; because they were more important (80% of the requirement) and, the schedule and budget was not adequate to retrieve and repair the AP. An alternative plan would have been to retrieve the AP and redeploy after a thorough inspection. Test Operation Manager estimated this inspection would cost in excess of $30K and required two perfect weather days (roughly a week's time in January on

average). The project did not have funding and the schedule window couldn't allow this delay. Test Operation Manager stated, even when the Group One sensors were discovered to be inoperative; it was not known whether it was due to a cable, connector or the pressure vessel. They did not know and could not determine that it was the cables until the AP was retrieved from the ISMS Range in early February 2009.

33. Facilities Manager has attended Category 1, 2, 3 and 4 crane training. Facilities Manager did not participate or observe the deployment/retrieval of the AP on 15 January 2009. He became aware of an incident involving a broken bar and connections on or around 1 April 2009. Facilities Manager stated Site Director briefed him on the incident and showed him a hand sketch and pictures of the AP configuration. Then, they discussed whether this was a crane accident. Facilities Manager said he gave Site Director his short initial interpretation that this was not a crane accident because the aluminum bar and connections were not part of the load. He then inspected the aluminum bar and observed Electrical Technician taking photographs at the request of Site Director. Facilities Manager reviewed the NAVFAC P-307 (specifically the Crane Accident section) and his initial interpretation was a crane accident did not occur. Since the AP was connected to the bar via flexible support lines and cables, he surmised the load of the crane at the time of the event was the AP itself. On the afternoon of 1 April 2009, Facilities Manager met with Project Engineer and Site Director. Facilities Manager asked the questions regarding crane radius and load that was applied to the crane. A radius of approximately 18 feet and a load less than 1,000 pounds was determined. Facilities Manager stated this was well under the load rating of the crane. Therefore, in his opinion, no damage could have occurred to the crane. Facilities Manager furnished to our Office a copy of the ARD WHE Operator/Rigger List. This list revealed Project Engineer, Electrical Technician and Research Lab Mechanic possessed navy Crane licenses and attended the Navy Rigger Training Course.

34. Site Director is responsible for the ARD test execution, security, safety, customer program interface, and public relations to local, county, state and national representatives. Site Director has not attended any crane training or rigging courses. Site Director stated around 28 January 2009, he was informed about inoperable Group One sensors on the AP. At the same time, he was informed the sensors were not required for the successful execution of the test. However, the cause at the time, was not easily identified because the AP was deployed.

Several days after this test, the AP was recovered. Two sensor cables were found to be broken. Site Director directed repair of the cables.

35. Site Director stated that, after the commencement of this investigation, CO-NSWCCD directed him to determine if any crane or winch should be taken out of service. He viewed the AP and noticed the broken bar. Prior to 1 Apr 09, Site Director was not aware of the broken AP mounting/alignment bar. He then asked Project Engineer to bring the ISMS Task Procedures with him for discussion regarding the AP deployment. During this discussion, the order of events of 15 January 2009 were established. Site Director speculated the AP cables may have been damaged when the AP mounting/alignment bar broke.

36. Site Director then discussed the details of the incident with Facilities Manager. During this discussion, they determined this incident was not a reportable crane accident for the following reasons:

a) The AP was the item being supported by the crane and the HRA was held down by the winch.

b) The bar and cables were mechanically secured to the HRA and were typically slack between the AP and HRA.

c) There was limited concern for a crane overload due to the limited amount of strain required to inflict the damage to the bar and only two cables were damaged.

37. Site Director stated he discussed this event with NCC Audit Lead on 7 Apr 2009. NCC Audit Lead, at this time, agreed the incident as explained to him was not a crane accident. NCC Audit Lead confirmed the NAVCRANECEN is not the cognizant authority over the ISMS winch, nor is the ISMS winch covered under NAVFAC P-307 requirements. NCC Audit Lead's suggestion for ensuring continued safe operations of the ISMS winch was to ensure that all original equipment manufacturer recommended maintenance and other Activity required maintenance/inspections are completed.

38. On 21 April 2009, Site Director sent an email with two attachments to Invest-2 regarding crane inspection information. One attachment was an email dated 8 April 2009 from NCC Audit Lead. NCC Audit Lead states: "To recap what was discussed yesterday the incident that happened on the lake involving category 4 crane B-17 and one of the winches located at the outpost was not determined to be considered a crane accident by

myself and [another Auditor]. The bracket that failed at the end of the positively buoyant array was considered to be out of the crane envelope. Additionally we discussed what actions would be necessary to return crane B-17 to service would just be a condition inspection by your crane inspector and an operational test. As we discussed the failure of the two inch square aluminum block did not affect the crane in any way. During the evolution it was determined that a failure had occurred when the slings connecting the array to the strong back were noted to be in a slack condition by the small boat crew and that was the only indication that a problem had occurred. Additionally if you and the Commanding Officer still want to request NAVCRANECEN inspection of crane B-17 we will be glad to provide that additional level of assurance on a cost reimbursable basis."

39. On 22 April 2009, Invest-2 sent an email to Site Director. This email requested Site Director provide our office, via email, additional information regarding the incident on 15 January 2009. In addition, Invest-2 asked several questions regarding Site Director' conversation with NCC Audit Lead.

40. Site Director sent an email reply on 22 April 2009 to Invest-2. In his email, Site Director stated: "During my discussions with the Navy Crane Center, as best as I can recollect, I provided the following details of the event just prior to the stabilization bar and cables sustaining damage: 1. The HRA with attached stabilization bar, AP support lines, and cables, was submerged and being lowered by the ISMS winch. 2. The crane supporting the AP load was lowering the AP in line with the HRA at the same time. The crane operator was attempting to lower the AP at the same rate as the HRA was being lowered. 3. The indication at the time the stabilization bar broke was that the support lines went slack momentarily. It is assumed at that time all the strain transferred from the AP support lines to the AP cables, which damaged the AP cables." Site Director further stated: "to the best of my recollection, I did discuss the cable damage with NCC Audit Lead including the events that lead up to the cables being damaged when the support lines went slack. I agree that NCC Audit Lead's email of April 8, 2009 does not address the cables. Upon your request, I will be happy to contact NCC Audit Lead again to have him provide a clarification, and to specifically address the subject of the cables." In addition, Site Director wrote "One further note: After I received and reviewed NCC Audit Lead's email of April 8, 2009, I noted his statement that read, "During the evolution it was determined that a failure had occurred when the slings

connecting the array to the strong back were noted to be in a slack condition...". After reading this, I immediately contacted NCC Audit Lead again to clarify that the slings connecting the array to the strong back were not noted to go slack, but the lines connecting the AP to the submerged structure (HRA) were found to go momentarily slack. NCC Audit Lead identified that this does not change the determination of the Navy Crane Center because the defined load (the AP) was still not affected."

41. On 27 April 2009, Invest-2 sent an email to NCC Audit Lead regarding his telephone discussion with Site Director about the incident at ARD. The email stated: "After reading your email, I do have a few questions. The questions are: (1) Does your email contain all the information provided to you by Site Director? If no, could you provide me with the details of your conversation with Site Director? 2) Did Site Director provide you with any pictures or illustrations of the arrays or event? (3) Did Site Director inform you of the damage that occurred to two sensor cables that were part of the array attached to the crane hook?"

42. NCC Audit Lead sent an email on 27 April 2009 replying to Invest-2's questions regarding the discussion of the 15 January 2009 incident. NCC Audit Lead's email contained the following: "The email that I sent was my best recollection of the incident on the incident at Bayview. We discussed an attachment block that was damaged during the lift however, no other damage to equipment was mentioned. This is the first time that I have heard of cables also being damaged during the lift. As for pictures or lift sketches being supplied to me none of these were. During our conversation I tried to scribble a picture of what was being discussed. Hope this helps."

43. On 28 April 2009, Invest-2 sent another email to NCC Audit Lead. This email outlined the sequence of events on 15 January 2009 and provided a few pictures/diagrams of the AP mounting/alignment bar. The email stated: "A summary of the steps performed during the reorientation of the AP on 15 January 2009 are as follows: 1. The AP/HRA assembly was raised to the surface by spooling out wire rope from the shore mounted ISMS MHP winch. 2. Once on the surface, a 20,000 lb boom crane (Crane B-17), located on the ISMS Experiment Support Platform (ESP), was used to pick up the AP and suspend it overhead so that the mounting/alignment bar could be reoriented on the HRA truss (Picture 6). 3. The AP mounting/alignment bar was reoriented and secured in place with additional ratchet straps

(Picture 5). 4. The ISMS MHP was initially lowered, taking slack out of the AP support lines, utilizing the shore based winch. This was done while the AP was suspended by the ESP crane. This step was performed to ensure that all AP support lines and cabling were run fair to the mounting/alignment bar. 5. Once the alignment of all AP support lines and cables were verified to be clear of any obstruction, the THM platform was directed to be lowered by the lead project engineer. By lowering the MHP platform, the HRA began to descend. The ESP crane operator, who was suspending the AP, was directed to pay out the crane at the same rate as the HRA was submerging. This is a difficult task to accomplish due to the majority of the AP support lines and cabling being underwater for the later part of this event. The intent is to continue this lowering procedure until the AP is able to float on its own. Once floating, the AP is to be released from the crane. 6. While the AP lowering event was occurring, it became evident by the AP support lines going slack, that the aluminum mounting/alignment bar had broken. The AP and HRA were subsequently raised up and it was confirmed that the mounting/alignment bar had broken (Picture 7). 7. The two pieces of the mounting/alignment bar were then reattached to the HRA structure utilizing several different methods including hose clamps, tie wraps, and straps. 8. The AP lowering process of step #5 was then recommenced successfully. 9. Approximately 2 weeks later, while testing the AP in preparation for a test, it was identified that the Group One sensors were inoperable on the AP. Discussions with the Test Directors, confirmed that the Group One sensors were of secondary importance to the Group Two sensor data, and it was decided to proceed with the test without operational Group one sensors. Subsequent to a successful test, the AP and HRA were retrieved. It was discovered at that time that two AP cables were broken where they attach to the AP pressure vessel. The damage to these two cables was the cause for the AP Group One sensors to be inoperable. The cables are banded and appear to be hard-wired into the AP. I have attached a document containing the pertinent pictures. The sensor cables are visible in pictures 1, 5 and 7. They run down the vertical main beam of the array. The cables are plugged into the red pressure vessel shown in photo 2 that was mechanically mounted to the HRA."

44. In his reply dated 28 April 2009, NCC Audit Lead provided the following: "Based on the description given below specifically in paragraph 6, there seems to be a different description as to what I thought I heard during the telcon with Site Director. I was under the impression at the time of the

noted failure the crane was in a slack condition. What I refer to would be that the rigging supporting the AP would have been slack or loose and not supporting any weight. However, as described in paragraph 6 it appears that crane B-17 was still supporting the AP and that would meet the definition of a crane accident as described in NAVFAC P-307. What I would like to suggest is to get written statements from all parties involved in the lift to determine if the B-17 crane and rigging gear were supporting the AP at the time of failure. If it is determined that this was the case then an accident report needs to be completed and submitted to the NAVCRANECEN."

45. On 29 April 2009, telephone interviews were conducted by the investigator with Project Engineer, Test Operation Manager, Electrical Technician and Research Lab Mechanic. These interviews were conducted to re-affirm the B-17 crane and rigging gear were supporting the AP at the time of incident on 15 January 2009. Project Engineer, Electrical Technician and Research Lab Mechanic confirmed the AP was supported by the crane and rigging gear. However, Research Lab Mechanic stated he could not see the AP and was receiving hand signals from Project Engineer. Test Operation Manager, who was not present at the time, stated as reported to him by Project Engineer, the B-17 crane and rigging gear were supporting the AP at the time of incident.

46. On 30 April 2009, Invest-2 sent an email to NCC Audit Lead. This email contained confirmation that the AP was supported by Crane B-17 and the rigging gear at the time the mounting/alignment bar broke. Specifically, Invest-2 wrote: "Prior to our email exchange, we obtained sworn written statements regarding this incident from all parties. These statements indicate the AP was supported by the crane. However, as a result of your 28 Apr 09 email, we conducted telephone interviews with all parties. In these interviews, we specifically asked if the crane and rigging gear were supporting the AP when the incident occurred. We were given "yes" answers to that question. Do you need to review this information? If you do not need to review the information, in your opinion, does all the information I have sent to you meet the definition of a crane accident as described in NAVFAC P-307? If it does meet the definition, could you please explain?"

47. NCC Audit Lead sent a reply to Invest-2 on 30 April 2009. In his email, NCC Audit Lead provided some additional comments and information relating to the B-17 crane incident. NCC Audit Lead wrote: "I do not have a need to review the information

that was provided to you by the personnel at Bayview. However that information should be included as part of you accident investigation. It has been established that the B-17 crane was supporting the array and we definitely meet the definition of a crane accident and one needs to be completed as required and sent to the NAVCRANECEN. Allow me to explain; below I have attached the words from section 12 of the NAVFAC P-307 that pertains to the definition of a crane accident. In paragraph 12.2 e we can see that the load is considered to be in the operating envelope of the crane. In paragraph 12.2.1 it states "A crane accident occurs when any one or more of the six elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in the following...". If you look at item b you see material or equipment damage. The broken AP mounting/alignment bar falls into that category."

48. WHE Program Manager was consulted on 9 Apr 2009 and 5 May 2009. WHE Program Manager reviewed the information regarding the alleged crane accident, including reports from Site Director and NCC Audit Lead as well as the NAVFAC P-307 and photographs. WHE Program Manager concluded a crane accident had occurred on 15 January 2009 in Bayview, ID. In his opinion, the AP mounting bar and the sensor cables are part of the AP. The AP was the load of the crane; therefore, since damage occurred to the load, it should have been reported. WHE Program Manager stated current regulations state the crane operator must notify their supervisor in the event of a crane accident. WHE Program Manager was also asked if winches were considered to be WHE under the purview of the Navy Crane Center. He stated winches were dropped from Navy Crane Center requirements approximately nine years ago. He stated he would provide to our office the copy of the NAVFAC P-307 that eliminated the requirement.

49. Site Director reported a physical inspection is performed on the ISMS winch prior to any winch operations. It is estimated the winch used in the AP deployment of 15 January 2009 has been operated approximately ten times over the past four months. Site Director stated to date, there has been no report of any physical damage to the winch. In addition, on April 21-23 2009, ARD personnel completed the initial part of the ISMS winch and wire rope inspection. This inspection included a full inspection and lubrication of the entire ISMS wire rope that is accessible without diver or ROV support. There were no anomalies in the winch or wire rope observed during this inspection. This underwater inspection will be completed on 3 Jun 2009, which is when we have scheduled divers to support this

maintenance. The entire underwater section of the ISMS winch wire rope and MHP will be performed at that time. Further inspection results are documented in paragraph 82.

50. ISMS TASK PPROCEDURES 10.011, AP Deployment on the MHP, Date Performed 25 November 2008 revealed the AP is to be installed on the MHP in support of testing. The AP is to be installed above the currently installed HRA/HFA. The AP consists of a horizontal, 40ft. long section of foam filled fiberglass I-beam with a 10 ft. long section attached to the bottom middle of the horizontal section. Both the vertical and horizontal sections are outfitted with Group One and Two sensors. The AP has electrical cables which are connected to a pressure vessel which hangs from the north end of the HRA. There is also an electrical and a fiber optic cable which is attached to the MHP platform. There was a handwritten notation on the last page of the Task Procedures that provided the following: "Jan 15, 2009. Raise AP to re-orient. Swap lines as necessary to rotate 90 degrees. Broken support bar while lowering. Tied bar to PV frame. AP seemed to go down ok." (It should be noted this handwritten notation is the only reference to repositioning the AP attachment beam so that the middle of beam intersects the end of the HRA truss in the printed procedures.)

51. An entry from the Special Projects Weekly Status Report No. 935 for Monday, 19 Jan 2009 revealed: "On 15 January 2009, "[Project Engineer, Electrical Technician] and a wage grade and contractor crew rotated the EM array in support of testing. The task was more difficult then expected. The cold weather attributed to the difficulty. Although, while lowering the array, the support bar was damaged. As a result, the two halves were strapped and tied to the pressure vessel structure. As the AP was lowered, it appeared to submerge level and in the correct orientation."

52. An entry from the Special Projects Weekly Status Report No. 936 for Monday 2 Feb 2009 disclosed: "On 28 January 2009, "[Electrical Technician, Project Engineer, and Research Lab Mechanic] went to the ESP in order to investigate a potential cable problem on the Group One sensor power cable. The weather was not acceptable to perform the task."

53. An entry from the Special Projects Weekly Status Report of 10 Feb 2009 disclosed: - "[Project Engineer, Electrical Technician], and a wage grade and contractor crew retrieved the AP. During the retrieval, it was discovered that the 24 V power cable and the Data In cable were severed at the white pressure

vessel. The damaged likely occurred when the AP was rotated for the final testing, and was the cause of the Group One sensor problems. The Group Two sensors were not effected by this damage."

54. An entry from the Special Projects Weekly Status Report No. 949 for Monday 27 Apr 2009 disclosed the following: "ISMS ACCOMPLISHMENTS & ACTIVITIES:
- 04/20. [Electrical Technician and Project Engineer] delivered the lubricator and lubricant for the Haul Down wire rope to the OUTPOST.
- 04/21. [Project Engineer, Electrical Technician] and [a third person] went to the OUTPOST to lubricate the wire rope. The compressor used for the lubricator could not provide the necessary cfm of air. As a result, they decide to take up a larger compressor the following day.
- 04/21. [Research Lab Mechanic, Project Engineer and two others] removed the temporary Inboard Float and replaced it with the original float. [Research Lab Mechanic and another person] then installed the light and battery box.
- 04/22. [Project Engineer and another person] completed lubricating the Haul Down wire rope.
- 04/22. [Project Engineer] contacted AUS diving service to schedule the diver inspection of the ISMS assets.
- 04/23. [Project Engineer and another person] cleaned the OUTPOST winch building after completing the wire rope lubrication.
- 04/24. [Project Engineer and another person] cleaned the hydraulic fittings on the Haul Down winch. They also laid down new absorbent cloths under the fittings. They also moved the lubricating equipment and compressor to the pier for pick up. [Research Lab Mechanic and another person] took the equipment back to the ARD."

55. Standard Form 1449, Solicitation/Contract/Order for Commercial Items, Contract Number N00167-09-P-0175, dated 15 April 2009 is the Purchase Order for two Cable Assemblies at a total cost of $7,418.00. (It should be noted this purchase was completed to replace the AP sensor cables that were broken on 15 Jan 2009.)

56. Carderock Division Instruction 11262.2A, Subj: MANAGEMENT OF WEIGHT HANDLING EQUIPMENT (WHE), dated 19 July 2004, revealed the purpose was to establish procedures and assign responsibility for the management of weight handling equipment (WHE) at the Naval Surface Warfare Center, Carderock Division. WHE, for purpose of this

directive, shall include: Category 1 (mobile cranes); Category 2 (bridge, wall, and gantry cranes with a capacity of 20,000 pounds r greater); Category 3 (bridge, wall, gantry, monorail, jib, and fixed cranes with a capacity of less than 20,000 pounds); Category 4 (commercial truck mounted cranes, truck mounted articulating boom cranes, and pedestal mounted commercial boom assemblies (fixed length, telescoping, and articulating types) attached to stake trucks, piers, and barges with original equipment manufacturer (OEM) rated capacities of 2,000 pounds and greater); rigging gear (slings, shackles, eyebolts, lifting beams, spreader beams, swivel hoist rings, chain falls, and chain hoists); and all other equipment as defined in NAVFAC P-307. Furthermore, the instruction states: "Crane Accidents.

(1) In case of an accident, the crane operator shall immediately stop all operations and ensure the accident scene is safe, secure and undisturbed. An accident is defined in section 12.3 of NAVFAC P-307.

(2) Follow site emergency response and mishap reporting procedures in case of injury. Follow other site response procedures, such as oil and hazardous materials spill procedures as required.

(3) All accidents are to be reported immediately to the operator's supervisor, the Site Certifying Official, Site WHE Office, and the Site Safety Office. If the accident is required to be reported to the NCC within 24 hours, per NAVFAC P-307, the Division WHE Office and Environmental Safety and Health (ESH) Division Head shall also be notified. The Site Safety Office shall report weight handling accidents per reference (b).

(4) The Site WHE Office will complete the "Weight Handling Equipment Accident Report" specified in NAVFAC P-307, submit it to the NCC within the time required in NAVFAC P-307, and furnish a copy to the Site Certifying Official, the Site Safety Office, the Division WHE Office, and the ESH Division Head.

(5) All accidents shall be investigated by the Site Safety Office and the Site WHE Office. A WHE Accident Review Board may also be convened. This will consist of the Division WHE Office representative, the Division Safety Office WHE representative, the Site WHE Office

representative, the Site Safety Office WHE representative, and the Site Certifying Official and all other personnel involved with any investigated accident."

57. NAVFAC P-307, Management of Weight Handling Equipment, dated June 2006, Section 12 disclosed the following:

"INVESTIGATION AND REPORTING OF CRANE AND RIGGING GEAR ACCIDENTS

12.1 General. In addition to the investigation and reporting requirements of OPNAV Instructions 5102.1 and 5100.23, activities shall investigate and report accidents in accordance with this section. There are two general categories of accidents as defined below. Crane accidents are those that occur during operation of a category 1, 2, 3, or 4 crane. Rigging gear accidents are those that occur when gear covered by section 14 is used by itself in weight handling operation i.e., without category 1 through 4 cranes. Accidents involving the operation of material handling equipment or equipment covered by NAVFAC P-300 are not included. 12.2 Crane Accidents. For the purpose of this definition, it is assumed there is an "operating envelope" around any crane, and inside the envelope are the following elements:
a. The crane.
b. The operator.
c. The riggers and crane walker.
d. Other personnel involved in the operation (supervisor, mechanic, tag line handler, engineer, etc.).
e. The rigging gear between the hook and the load.
f. The load.
g. The crane's supporting structure (ground, rail, etc.).
h. The lift procedure.

12.2.1 Definition. A crane accident occurs when any of the elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in the following:
a. Personnel injury or death. Minor injuries that are inherent in any industrial operation, including strains and repetitive motion related injuries, shall be reported by the normal personnel injury reporting process of the activity in lieu of these requirements.
b. Material or equipment damage.
c. Dropped load.
d. Derailment.
e. Two-blocking.
f. Overload.

g. Collision, including unplanned contact between the load, crane, and/or other objects.

Items c, d, e, f, and g are considered accidents even though no material damage or injury occurs. A component failure (e.g., motor burnout, gear tooth failure, bearing failure) is not considered an accident solely due to material or equipment damage unless the component failure results in damage to other components (e.g., dropped boom, dropped load, roll over, etc.)."

58. NAVFAC P-307, Section 12 further states the following regarding accident reporting:

"12.4 Action. Upon having an accident or having seen evidence of damage (suspected accident), the crane team, riggers, equipment users, etc., shall stop all operations and notify immediate supervisor(s). If there is impending danger to the equipment or personnel, place the crane and/or load in a safe position prior to notifying supervision. Ensure the accident scene is secured and undisturbed so as to facilitate the investigation. The supervisor shall review the situation and take any further emergency action, including stopping production work or other operations that could aggravate the situation. The supervisor shall notify management personnel as well as the activity safety office.

12.4.1 Initial Notification. Notify the Navy Crane Center (Code 06) by fax (610) 595-0812, phone (610) 595-0505, or e-mail (accident@ncc.navfac.navy.mil) as soon as practical but not later than 24 hours after an accident involving a fatality, in-patient hospitalization, overturned crane, collapsed boom, or any other major damage to the crane, load, or adjacent property. If notification is by fax or e-mail, provide a point of contact for additional information.

12.4.2 Investigation and Reporting. For each suspected accident, activities shall promptly perform a comprehensive investigation. Activities shall prepare a Crane and Rigging Gear Accident Report, figure 12-1, and forward a copy to the Navy Crane Center (Code 06) within 30 days of the accident. The activity that is responsible for the weight handling operation at the time of the accident shall initiate and submit the accident report. If the crane or rigging gear is owned by another activity, obtain concurrence from the activity that owns the equipment prior to submitting to the Navy Crane Center. Photographs of the accident scene and material/property damage shall be taken, if possible, and attached to the report. The Navy Crane Center will review accident reports and issue crane

safety advisories and lessons learned as appropriate. The custodian of the Crane and Rigging Gear Accident Report is the activity that generates the report. Any request for copies of these reports should be directed to the originating activity."

59. NAVFAC P-307, Management of Weight Handling Equipment, dated September 2000, states: Paragraph 1.3.2 deletes line handling mechanisms (winch) from the purview of this instruction.

60. A Memorandum, from Director, Navy Crane Center to Director Naval Surface Warfare Center Detachment, Bayview, Idaho, Subj: CRANE CONDITION INSPECTION OF MOBILE CRANE B-17 AT NAVY ACOUSTIC RESEARCH DEPARTMENT, BAYVIEW, IDAHO, dated 28 April 2009 revealed Navy Crane Center was requested to conduct a Crane Condition Inspection Report (CCIR) on subject crane. Crane B-17 is a Category 4 pedestal mounted crane located at the activity's Experimental Support Platform site. This inspection was conducted on 20 April 2009 and there were no unsatisfactory items identified.

61. Crane B-17 was inspected by Navy Crane Center personnel on 20 April 2009. There were no unsatisfactory items identified.

62. The required annual certification and maintenance inspection of Crane B-17 was conducted by ARD personnel on 14 May 2009 and certified on 15 May 09. There were no unsatisfactory items identified during the certification.

Discussion and Analysis

63. The evidence developed during this investigation revealed damage did occur to the AP mounting/alignment bar and two Group One sensor cables. During the deployment of the AP on 15 January 2009, the AP was required to be oriented 90 degrees from the typical configuration so that it is parallel. In order to install the AP in this atypical orientation, the AP mounting/alignment bar had to be installed so that it is perpendicular to the HRA truss structure (Appendix C, Picture 5).

64. During the deployment, the Task Leader, (Project Engineer) witnessed the AP "bounce" which indicated a problem had occurred. Project Engineer hand signalled the Crane Operator (Research Lab Mechanic) to lower the AP into the water. He then radioed the winch operator to stop to avoid further damage. When the AP was examined, the mounting/alignment bar was broken. Project Engineer did not think this incident was a crane

accident because he thought the alignment bar was not part of the load since it was fastened to the HRA. Therefore, in order to meet project taskings, they reattached the AP mounting/alignment bar to the HRA and successfully completed the deployment. Project Engineer did tell his supervisor, Test Operation Manager, about the damage to the bar after the reposition/redeployment.

65. Research Lab Mechanic, operator of Crane B-17, stated he believed the incident was a crane accident because the mounting bar broke. However, since he considered Project Engineer his supervisor at the time, he did not tell him his opinion. Research Lab Mechanic stated Project Engineer was there and witnessed what happened. Therefore, Project Engineer should have known a crane accident occurred. Research Lab Mechanic thought the incident was reported to senior management or the Navy Crane Center. He reiterated the "Task Leader was aware of the crane accident and should have notified crane leaders."

66. Test Operation Manager, ARD Test Operation Manager, was notified about the alignment bar damage. He did not consider the damage a crane accident. He thought the matter was a test article structural issue, not an issue with the crane or rigging gear. Therefore, in his opinion, the bar breaking was not a crane accident. Test Operation Manager has not attended crane or rigging gear training.

67. Facilities Manager did not participate or observe the deployment/retrieval of the AP on 15 January 2009. He became aware of an incident involving a broken bar and connections on or around 1 April 2009. Facilities Manager stated Site Director briefed him on the incident and showed him a hand sketch and pictures of the AP configuration. Then, they discussed whether this was a crane accident. Facilities Manager gave Site Director his short initial interpretation that this was not a crane accident because, in his opinion, the aluminum bar and connections were not part of the load. He then inspected the aluminum bar and observed Electrical Technician taking photographs at the request of Site Director. Facilities Manager reviewed the NAVFAC P-307 (specifically the Crane Accident section) and his initial interpretation was a crane accident did not occur. Since the AP was connected to the bar via flexible support lines and cables, he surmised the load of the crane at the time of the event was the AP itself. There was no material damage to the AP during this event. Further, the damage that did occur was associated with the mounting/alignment bar and AP cabling mechanically secured to the HRA which (the HRA) was clearly not part of the load supported by the crane. At the

time of the incident, a crane radius of approximately 18 feet and a load less than 1,000 pounds was determined. Facilities Manager stated this was well under the load rating (20,000 pounds) of the crane. Also, once the mounting/alignment bar broke, the majority of the load to the crane was released. Therefore, in his opinion, no damage could have occurred to the crane. Furthermore, no observable damage occurred to any weight handling equipment including cranes,
winches, slings, spreader bars, wire ropes, etc.

68. Site Director, ARD Director/Crane Certifying Official was not aware of the damage to the AP mounting/alignment bar until 1 April 2009. However, based on the initial inquiry he conducted, Site Director concluded this incident was not a crane accident. In addition, Site Director' conversation with NCC Audit Lead supported his conclusion it was not an accident.

69. WHE Program Manager was consulted on this matter. Upon review of the pertinent documents, WHE Program Manager concluded the damage done while deploying the AP should have been reported as a crane accident. The AP mounting/alignment bar and the sensor cables would be considered part of the load which is considered within the crane envelope.

70. NCC Audit Lead was provided the sequence of events for the deployment of the AP as well as pertinent photographs by Invest-2. NCC Audit Lead stated it has been established that the B-17 crane was supporting the AP, therefore, the incident definitely meets the definition of a crane accident. A crane accident occurs when any one or more of the six elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in material or equipment damage. The broken AP mounting/alignment bar falls into that category. Therefore, a crane accident report should be completed.

71. Acoustic Research Detachment, Crane Operator's Daily Check List (ODCL), dated 20 April 2009, revealed an operational test conducted by Facilities Manager was satisfactorily completed on Crane B-17.

72. During the 21-23 April 2009 timeframe, the ARD completed the initial part of the ISMS winch and wire rope inspection. This inspection included a full inspection and lubrication of the entire ISMS wire rope that is accessible without diver or ROV support. There have been no anomalies in the winch or wire rope observed during this inspection.

73. On 6 May 09, a Crane and Rigging Gear Accident Report was completed by the required ARD personnel. This report documents the damage that occurred to the AP as a result of the redeployment on 15 January 2009. (See Appendix D). Since the B-17 crane was successfully inspected on 20 Apr 2009, no further action by the NCC is required.

74. During the finalization of our fieldwork, ARD personnel completed the required annual Certification of Load Test and Condition Inspection as well as the Annual Maintenance Inspection Specification and Record of Crane B-17 on 14 May 2009. No unsatisfactory items were identified during these inspections. The inspections were certified on 15 May 2009. (See Appendix E).

Conclusion

75. The allegation that Project Engineer and Research Lab Mechanic failed to report a crane accident is substantiated. The damage (AP mounting/alignment bar and two sensor cables) was determined to have occurred to the load of the crane by Subject Matter Experts NCC Audit Lead and WHE Program Manager. And, therefore by regulation, this incident should have been determined to be a crane accident and subsequently investigated and reported in accordance with current regulations.

76. Although the incident should have been reported as a crane accident, inspections performed during the course and as a result of this investigation of the B-17 crane and the ISMS winch did not disclose any damage or unsatisfactory items. In addition, the crane used on this project is a boom crane rated to 20,000 pounds at 10 feet. At the time of the incident, a crane radius of approximately 18 feet and a load less than 1,000 pounds was determined. Therefore, it is reasonable to conclude imminent personnel safety or damage to government property concerns were highly unlikely.

Listing of Actual/Apparent Violations

77. Failure to comply with requirements of Carderock Division Instruction 11262.2A, Subj: MANAGEMENT OF WEIGHT HANDLING EQUIPMENT (WHE), dated 19 July 2004.

78. Failure to comply with requirements of NAVFAC P-307, Management of Weight Handling Equipment, dated June 2006.

Actions Planned or Taken

79. On 20 April 2009, the Navy Crane Center performed a Crane Condition Inspection at the ARD on Crane B-17. B-17 is a pedestal mounted crane located on the Experimental Support Platform. There were no unsatisfactory items identified.

80. On 21-23 April 2009, ARD completed the initial part of the ISMS winch and wire rope inspection. This inspection included a full inspection and lubrication of the entire ISMS wire rope that is accessible without diver or ROV support. No unsatisfactory items were disclosed.

81. On 6 May 2009, a Crane and Rigging Gear Accident Report was completed by the required ARD personnel as defined and outlined in Carderock Division Instruction 11262.2A, Subj: MANAGEMENT OF WEIGHT HANDLING EQUIPMENT (WHE), dated 19 July 2004 and the NAVFAC P-307, Management of Weight Handling Equipment, dated June 2006. This report documents the damage that occurred to the AP as a result of redeployment on 15 January 2009.

82. An underwater inspection of the ISMS MHP was completed on 3 June 2009. This inspection included: a full inspection of the MHP, MHP structure and all associated wire rope sockets and connections at the platform. On 8 June 2009, an attempt was made to inspect the remaining submerged MHP wire rope and the Kevlar line sections not completed during the 21-23 April 2009 inspection. Unfortunately, lake visibility was too poor to safely perform the inspection due to sediment from the Spring runoff. The next attempt for this inspection was conducted on 9 July 2009. Once again, it was determined that the visibility of Lake Pend Oreille was still too poor to safely perform this inspection. The safety concerns are that the ROV umbilical cables can be easily tangled in the two MHP wire ropes as this inspection is performed. With poor visibility, the ROV operator can easily lose sight of the wire rope under inspection. Maintaining constant visual contact of the wire rope is vital for ensuring safe ROV operations. On 1 September 2009, the ARD was able to complete the ROV inspection of the ISMS MHP wire ropes between the MHP, deployed on the surface, and the bottom mounted sheaves. No anomalies were identified on either of the wire ropes or the sheave. It was further determined that is unsafe to perform a ROV inspection of the Kevlar line between the MHP wire ropes and the winch wire rope. However, the action given to the ARD to inspect the ISMS Winch system is complete based on the supporting information is provided below:

A. A visual or ROV inspection has been successfully completed, with no observed anomalies, for the following ISMS Winch and MHP components:

- ISMS winch.

- ISMS winch wire rope from the winch to the connecting hardware between the winch wire rope and the 3-inch diameter Kevlar line.

- Wire ropes running from the MHP to the bottom mounted sheaves (2 ropes).

- All hardware connecting the MHP wire ropes to the MHP.

B. The 3-inch diameter Kevlar line is rated to 640,000 lbs. breaking strength. This breaking strength is well beyond the capacity of the ISMS winch system.

C. The 1.5" MHP wire ropes have a rated breaking strength of 250,000 lbs.

D. The ISMS winch is designed to stall (stop rotating) at 80,000 lbs of tension. When the MHP is lowered to the bottom in the typical 'docked' condition, the existing procedure calls for lowering the MHP until the ISMS winch stalls. This ensures that the MHP is properly 'docked'.

E. During the repositioning of the AP on 15 January 2009, the ISMS winch was operating to lower the MHP, and did not stall during this operation. This fact assures that the ISMS winch, MHP, wire ropes, and Kevlar line were not stressed beyond the load observed during typical MHP docking events.

Observations and Recommendations

83. The AP deployment procedures need to be strengthened. The deployment method documented during this investigation primary requires the simultaneous operations of the ESP crane and the ISMS MHP winch. The Team Leader is simultaneously giving hand signals to the crane operator and providing instructions to the ISMS winch operator via hand-held radios. The only way to judge the separation of the AP and the HRA during deployment is by the tension in the AP support lines. At some points in the procedure, the AP support lines are submerged making a successful deployment very risky. Therefore, in our opinion,

the entire installation procedure should be reviewed and modified, where necessary. Actions taken are documented in paragraph 86 below.

84. The AP mounting/alignment bar used on 15 January 2009 was not properly constructed, attached or tested before use. As a result of our investigation, in our opinion, the failure of the mounting/alignment bar could have been avoided if it had been tested with a load prior to use. Therefore, the AP mounting/alignment bar should be redesigned and a load analysis completed prior to the next use. Actions taken are documented in paragraph 87 below.

85. The breaking of the AP mounting/alignment bar was not identified as a crane accident and subsequently reported as required. When the redeployment of the AP was in progress, two employees directly involved, the Team Leader (Project Engineer) and the Crane Operator (Research Lab Mechanic), possessed crane licenses and had attended the Navy Crane Center Rigger course. An Electrical Technician (Electrical Technician), who also was present, had taken crane training courses and the Navy Crane Center Rigger course. In addition to the knowledge that should have been obtained from the training, the Crane Operator told the investigator he believed it was a crane accident but he did not inform anyone of his opinion. Although we found no evidence the failure to report the accident was intentional, given the experience and training of all the employees involved, they should have identified and/or reported the accident as required by current regulations. Given these facts, in our opinion, management should consider if action should be taken against the ARD employees (Project Engineer, Test Operation Manager, Site Director, Electrical Technician, Facilities Manager and Research Lab Mechanic) involved in this matter for violating NAVFAC P-307 and Carderock Division Instruction 11262.2A. As a minimum, all employees involved in the 15 January 2009 crane accident should be required to take refresher or remedial training that will assist them in identifying possible future crane accidents. Actions taken are documented in paragraph 88 below.

Management Actions

86. A critique of the current procedure used for deploying the AP was held on May 29, 2009. As a result of the critique, action was assigned to assemble recommended AP modifications to ensure safe and reliable deployment, ensure that there is no need for concurrent and synchronized operations of both the ESP Crane and the ISMS winch, modify the deployment procedure to

incorporate the new deployment approach, and use a dynamometer to monitor crane loading of all lifts of any underwater assets.

87. The AP deployment procedure has been updated providing an alternate approach for safely deploying the AP. This updated procedure will not require concurrent crane and MHP winch operations, and will monitor all crane loading during AP deployment. Further, this procedure calls for modifying the original alignment bar with a frame that will support installing the AP in either North-South or East-West orientation.

88. In order to ensure future safe AP deployments in all potential mounting orientations, an improved design of the broken AP Alignment bar must be identified. Design changes to the alignment bar will be documented in a Design Change Package and modifications implemented. A load analysis of the proposed alignment bar will be conducted as part of the design effort, and a structural load test will be performed following alignment bar fabrication.

89. The modified alignment frame concept has been identified and was necessary to support the completed action in paragraph 83 above. However, the final design, analysis, and fabrication are not complete. The workload at the ARD has been very heavy this summer and given that there are no plans to deploy the AP at this time. The ARD will complete all design and testing of the modified AP alignment frame by 30 October 2009.

90. All employees involved in this matter (listed in paragraph 85) were counseled. A major part of this counseling was requiring attendance of these employees at crane remedial/refresher training. As a result, the ARD Facilities Manager/Crane License Program Official worked with the NSWCCD Instructor for Weight Handling Equipment Operators to develop a curriculum for refresher/remedial training for all ARD crane operators. The training plan convened a half-day crane safety stand-down attended by all ARD crane operators, riggers, and project managers which included all employees involved in the . The agenda for this crane safety stand-down included the following discussion items: Crane Safety, Definition of/reporting requirements for Crane Accidents, expectations for communicating all crane issues, definition of/requirements for complex lifts, and an open discussion for other crane related topics of interest.

91. The training stand-down was conducted at the ARD on 11 August 2009. The training was conducted by WHE Program Manager

and the Head, Safety and Training, Navy Crane Center. The topics covered in this training included crane accident identification, crane accident reporting requirements, crane statistics, crane risk management, and safe crane operations. In addition, a Question and Answer session followed the training. This training was recorded to document that all ARD crane operators, riggers, and ARD project managers have each participated in this training.

92. The Commanding Officer determined that no disciplinary action is appropriate under the circumstances of this case. In his opinion, there was a good-faith, but mistaken, belief that the alignment bar was not part of the crane load when it was damaged. Consequently, the damage to the alignment bar was not thought to be reportable as a crane accident until everyone involved realized that the crane was still supporting the alignment bar when the damage occurred. It was promptly reported at that time and appropriate action was taken.

Appendix A - Reference Documents

1. NAVSEA LTR RE: NAVY HOTLINE COMPLAINT 200900425 (NAVSEA 090015L)

2. Carderock Division Instruction 11262.2A, Subj: MANAGEMENT OF WEIGHT HANDLING EQUIPMENT (WHE), dated 19 July 2004

3. NAVFAC P-307, Management of Weight Handling Equipment, dated June 2006

4. ISMS TASK PPROCEDURES 10.011, AP Deployment on the MHP Platform, Date Performed 25 November 2008

5. Special Projects Weekly Status Report No. 935 for Monday 19 Jan 2009

6. Special Projects Weekly Status Report No. 936 for Monday 2 Feb 2009

7. Special Projects Weekly Status Report of 10 Feb 2009

8. Special Projects Weekly Status Report No. 949 for Monday 27 Apr 2009

9. Standard Form 1449, Solicitation/Contract/Order for Commercial Items, Contract Number N00167-09-P-0175, dated 15 April 2009

10. NAVFAC P-307, Management of Weight Handling Equipment, dated September 2000, Paragraph 1.3.2

11. Memorandum, from Director, Navy Crane Center to Director Naval Surface Warfare Center Detachment, Bayview, Idaho, Subj: CRANE CONDITION INSPECTION OF MOBILE CRANE B-17 AT NAVY ACOUSTIC RESEARCH DEPARTMENT, BAYVIEW, IDAHO, dated 28 April 2009

12. Acoustic Research Detachment, Crane Operator's Daily Check List (ODCL), dated on 20 April 2009

13. Email from Site Director to Invest-2, Subject: ARD CRANE INSPECTION, sent Tuesday, April 21, 2009

14. Email from Invest-2 to Site Director, Subject: QUESTIONS: RE: ARD CRANE INSPECTION, sent Wednesday, April 22, 2009

15. Email from Site Director to Invest-2, Subject: RE: QUESTIONS: RE: ARD CRANE INSPECTION, sent Wednesday, April 22, 2009

16. Email from Invest-2 to NCC Audit Lead, Subject: RE: Telephone conversations on Tuesday 4/7/09, sent Monday, April 27, 2009

17. Email from NCC Audit Lead to Invest-2, Subject: RE: Telephone conversations on Tuesday 4/7/09, sent Monday, April 27, 2009

18. Email from Invest-2 to NCC Audit Lead, Subject: Bayview Incident Information, sent Tuesday, April 28, 2009

19. Email from NCC Audit Lead to Invest-2, Subject: RE: Bayview Incident Information, sent Tuesday, April 28, 2009

20. Email from Invest-2 to NCC Audit Lead, Subject: RE: Bayview Incident Information, sent Thursday, April 30, 2009

21. Email from NCC Audit Lead to Invest-2, Subject: RE: Bayview Incident Information, sent Thursday, April 30, 2009

Appendix B - Witness List

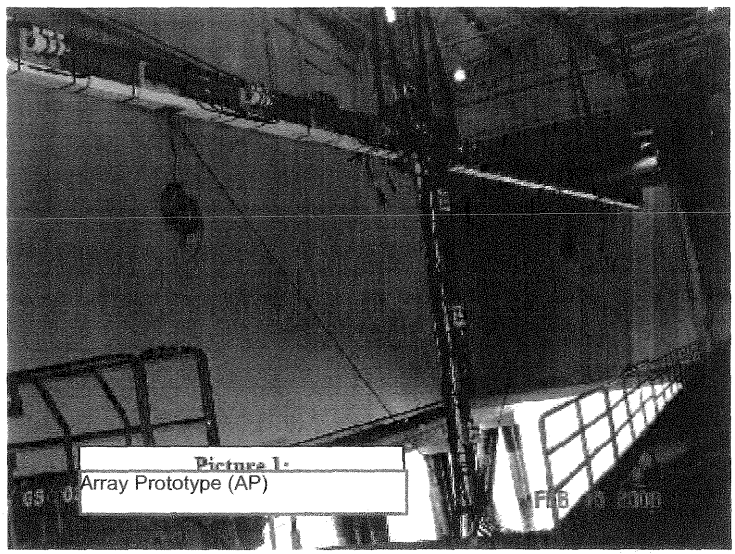
Fact Witnesses

1. NSWCCD-Bayview Project Engineer
2. NSWCCD-Bayview Electrical Technician
3. NSWCCD-Bayview Research Lab Mechnic
4. NSWCCD-Bayview Mechanical Engineer
5. NSWCCD-Bayview Test Operation Manager
6. NSWCCD-Bayview Facilities Manager
7. NSWCCD-Bayview Site Director

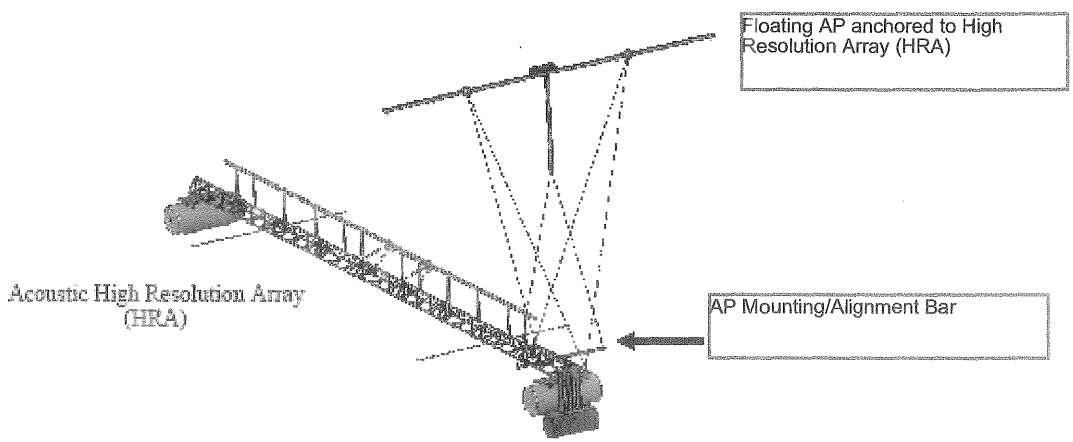
Subject Matter Experts

1. NSWCCD Counsel
2. NSWCCD Invest-2
3. NSWCCD Invest-3
4. NSWCCD Invest-4
5. NSWCCD Weight Handling Equipment (WHE) Program Manager
6. NAVCRANECEN (NCC) Audit (Team) Lead

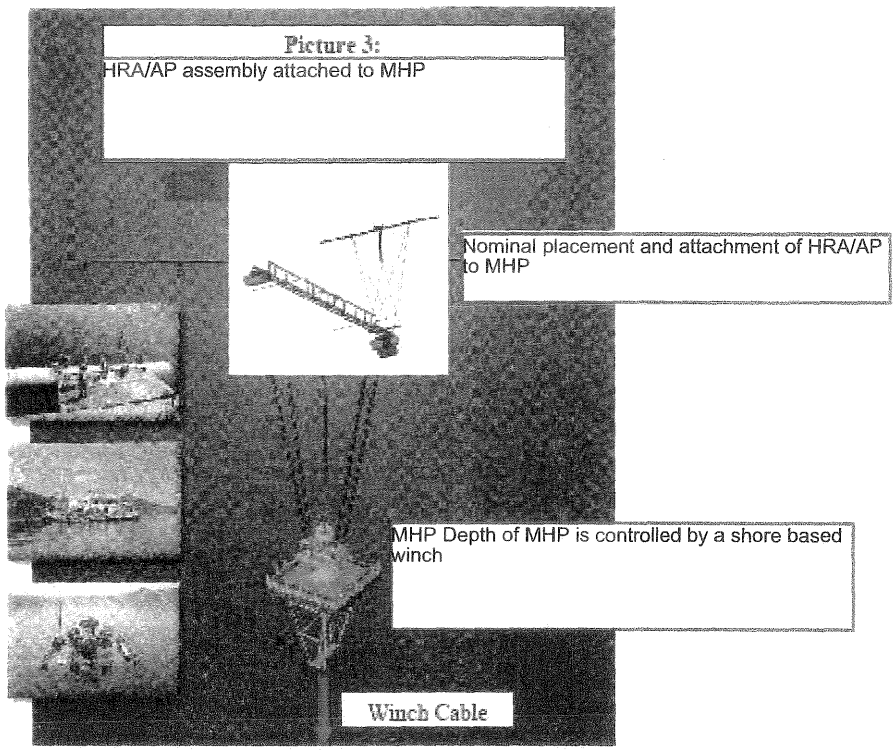
Appendix C - Photographs

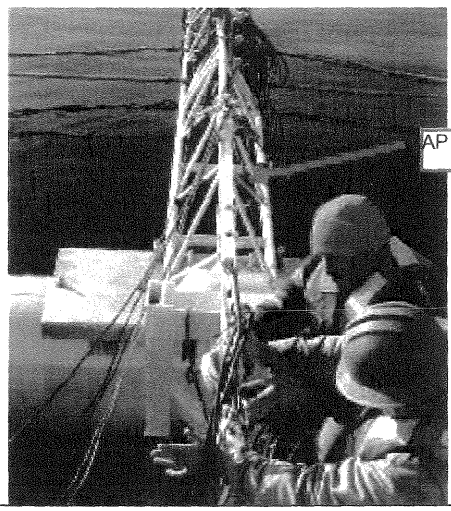


Picture 1:
Array Prototype (AP)

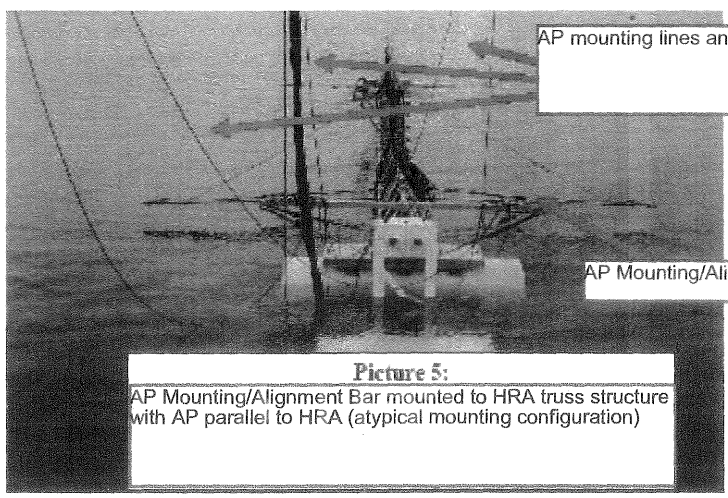


Picture 2:
High Resolution Array with AP Deployed

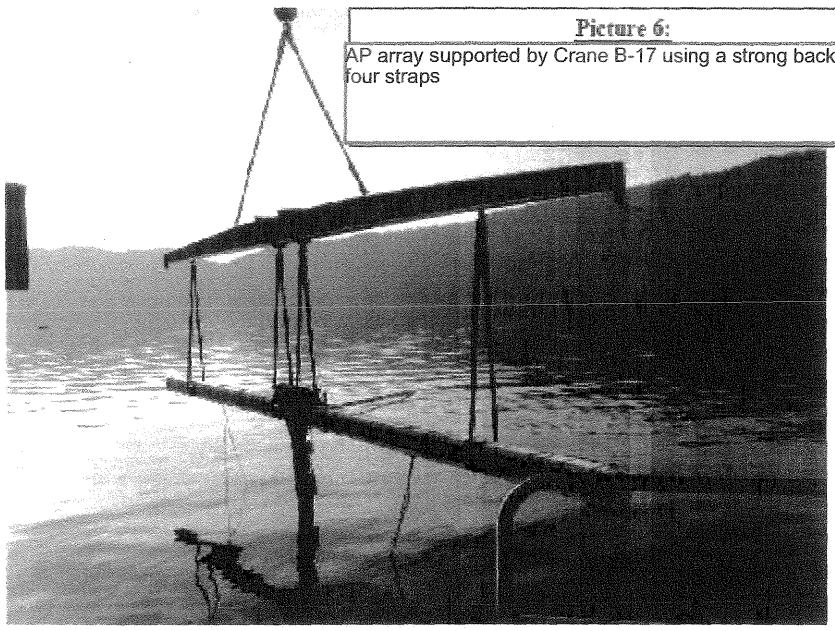

Picture 3:
HRA/AP assembly attached to MHP
Nominal placement and attachment of HRA/AP to MHP
MHP Depth of MHP is controlled by a shore based winch
Winch Cable



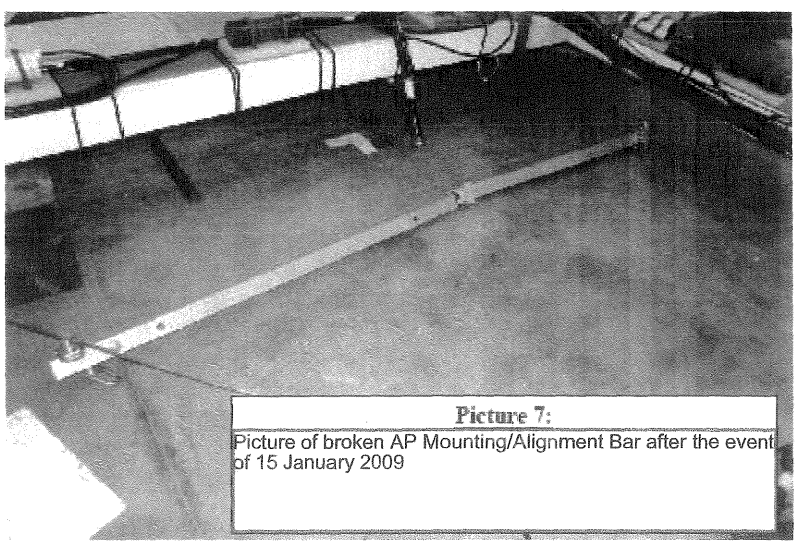
Picture 4:
AP Mounting/Alignment Bar mounted to HRA truss structure with AP perpendicular to HRA (typical mounting configuration)



Picture 5:
AP Mounting/Alignment Bar mounted to HRA truss structure with AP parallel to HRA (atypical mounting configuration)



Picture 6:
AP array supported by Crane B-17 using a strong back and four straps



Picture 7:
Picture of broken AP Mounting/Alignment Bar after the event of 15 January 2009

Appendix D - Crane and Rigging Accident Report

FOR OFFICIAL USE ONLY

CRANE AND RIGGING GEAR ACCIDENT REPORT

Accident Category: [X] Crane Accident [ ] Rigging Gear Accident

From:	To:
Naval Surface Warfare Center Acoustic Research Detachment Bayview, Idaho UIC: N62182	Navy Crane Center Bldg 491 NNSY Portsmouth, VA 23709 Fax (757) 396-1772

Activity: NSWC, Acoustic Research Detachment — Report No: 09-001

Crane No:	Category:	Accident Date:	Time:
B-17	4	1/15/09	1100

Category of Service: [ ] SPS [X] GPS — Crane Type: Pedestal Mt Hydraulic — Crane Manufacturer: Seattle Crane

Location: Experimental Support Platform (ESP) — Weather: Clear, calm, dry

Crane Capacity:	Hook Capacity:	Weight of Load on Hook:
20,000 lbs.	20,000 lbs.	2,350 LBS

Fatality or Permanent Disability? [ ] Yes [X] No — Material/Property Cost Estimate:

Reported to NAVSAFECEN? [ ] Yes [X] No — $8,000.00

Accident Type:
- [ ] Personal Injury
- [ ] Overload
- [ ] Derail
- [ ] Damaged Rigging Gear
- [ ] Load Collision
- [ ] Two Blocked
- [ ] Dropped Load
- [ ] Damaged Crane
- [ ] Crane Collision
- [X] Damaged Load
- [ ] Other Specify _____

Cause of Accident:
- [ ] Improper Operation
- [ ] Equipment Failure
- [ ] Inadequate Visibility
- [ ] Improper Rigging
- [ ] Switch Alignment
- [ ] Inadequate Communication
- [ ] Track Condition
- [X] Procedural Failure
- [ ] Other Specify _____

Chargeable to:
- [ ] Crane Walker
- [ ] Rigger
- [ ] Operator
- [ ] Maintenance
- [X] Management/Supervision
- [ ] Other Specify N/A

Crane Function:
- [ ] Travel
- [X] Hoist
- [ ] Rotate
- [ ] Luffing
- [ ] Telescoping
- [ ] Other
- [ ] N/A

Is this accident indicative of a recurring problem? [ ] Yes [X] No

If yes, list Accident Report Nos.: _____

ATTACH COMPLETE AND CONCISE SITUATION DESCRIPTION AND CORRECTIVE/PREVENTIVE ACTIONS TAKEN AS ENCLOSURE (1). Include probable cause and contributing factors. Assess damages and define responsibility. For equipment malfunction or failure, include specific description of the component and the resulting effect or problem caused by the malfunction or failure. List immediate and long term corrective/preventive actions assigned and respective codes.

Preparer:	Phone and email	Code	Date
b7c	b7c	7260	5/6/09

Concurrences:

	Code	Date
b7c	7260	5/6/09
	Code	Date

Certifying Official (Crane Accidents Only):	Code	Date
b7c	7260	5/6/09

SUITABLE FOR PUBLIC RELEASE
(names removed)

FOR OFFICIAL USE ONLY

CRANE AND RIGGING GEAR ACCIDENT REPORT INSTRUCTIONS

This form is designed for fax transmission without a cover page or by e-mail and, with enclosures and signatures, shall be the official document. Electronic submission will be accepted without signatures but the names of the preparer, concurring personnel, and certifying official (for crane accidents only) must be filled in. The e-mail address is m_lstr_ncc_safe@navy.mil. The fax number is (757) 396-1772.

1. Accident Category: Indicate either crane accident or rigging gear accident.
2. From: The naval activity that is responsible for reporting the accident and UIC number.
3. Activity: The naval activity where the accident took place.
4. Report No.: The activity assigned accident number (e.g., 95-001).
5. Crane No.: The activity assigned crane number (e.g., PC-5), if applicable.
6. Category: Identify category of crane (i.e., 1, 2, 3, or 4), if applicable.
7. Accident Date: The date the accident occurred.
8. Time: The time (24 hour clock) the accident occurred (e.g., 1300).
9. Category of Service: Check the applicable service (SPS as defined by NAVSEA 0989-030-7000).
10. Crane Type: The type of crane involved in the accident (e.g., mobile, bridge), if applicable.
11. Crane Manufacturer: The manufacturer of the crane (e.g., Dravo, Grove, P&H), if applicable.
12. Location: The detailed location where the accident took place (e.g., building 213, dry dock 5).
13. Weather: The weather conditions at time of accident (e.g., wind, rain, cold).
14. Crane Capacity: The certified capacity of the crane (e.g., 120,000 pounds), if applicable.
15. Hook Capacity: The capacity of the hook involved in the accident at the maximum radius of the operation, if applicable.
16. Weight of Load on Hook: If applicable, the weight of the load on the hook.
17. Fatality or Permanent Disability?: Check yes or no.
18. Material/Property Cost Estimate: Estimate total cost of damage resulting from the accident.
19. Reported to NAVSAFECEN?: Self-explanatory.
20. Accident Type: Check all that apply.
21. Cause of Accident: Check all that apply.
22. Chargeable to: Check all that apply.
23. Crane Function: Check the function(s) in operation at time of accident. Check all that apply. Check N/A if a rigging gear accident.
24. Is this a recurring problem?: Check yes or no. Identify any other similar accidents.
25. Situation Description/Corrective Actions: Self-explanatory.
26. Preparer: Self-explanatory.
27. Concurrences: Self-explanatory.
28. Certifying Official (Crane Accidents Only): Self-explanatory.

N62182 -Accident Report 09-001
6 May 2009

This retroactive report addresses a crane accident involving Crane B-17 on January 15, 2009 at the Naval Surface Warfare Center (NSWC), Acoustic Research Detachment (ARD), Bayview, Idaho. At the time of the mishap, it was thought that this event did not meet the definition of a crane accident.

Subsequent to the mishap, on April 1, 2009, an internal investigation was initiated to evaluate damage to components that occurred during this event. As part of this internal investigation, the WHE Program Manager determined that this event did not meet the definition of a crane accident. The NCC Northwest Audit Team was consulted and also determined that this was not a crane accident based on the information provided by the ARD. On April 20, a NCC Representative conducted a Crane Condition Inspection (record attached) and found no deficiencies with the crane. On April 30, the NCC notified the ARD that, after further review, they determined it was a crane accident.

The work event involved reconfiguring of an underwater array system consisting of a High Resolution Array (HRA) and an Array Prototype (AP) (diagram 1). These buoyant components are positioned on the surface of the water using Crane B-17 and then are "pulled down" under the surface of the water using a bottom mounted winch system.

The damaged components (part of the "load") consisted of two pieces of the array system, an aluminum mounting/alignment bar and two electrical cables. The AP (picture 1) was connected to the HRA (picture 2) via the mounting/alignment bar (picture 2). The bar failed while the load was being transferred from the crane to the pull-down winch system. As a result of the bar failure, two electrical cables came under tension and their connectors were broken. Four other cables remained undamaged. It has been calculated that a load of 2,350 lbs. was on the crane when the aluminum bar failed. Crane B-17 is rated for 16,300 lbs. at the radius used during this job.

Root Cause: Too much strain was transferred to the mounting/alignment bar by the AP securing lines while the AP and HRA were being lowered into the water.

Contributing Factor: The procedure for deploying the AP does not take into account all of the risks associated with, and precautions required for, simultaneous crane and pull down winch operations.

Contributing Factor: The mounting/alignment bar was oriented perpendicular to the HRA truss structure (not the normal orientation) and only attached at one point. In this orientation, the bar was not able to support the same amount of strain as during a normal installation.

Corrective Actions:
Modify the AP deployment procedure to ensure that simultaneous coordination is not required between Crane B-17 and the pull down winch.

Conduct crew training on the modified AP deployment procedure.

Perform analysis of loading on the AP mounting/alignment bar for both the typical and atypical AP orientation.

Design and fabricate a replacement mounting/alignment bar.

Use a load cell during deployment operations to verify the load on the crane at all times.

Conduct refresher training for all ARD WHE personnel regarding crane mishaps, near misses, accidents, accident investigation, and reporting.

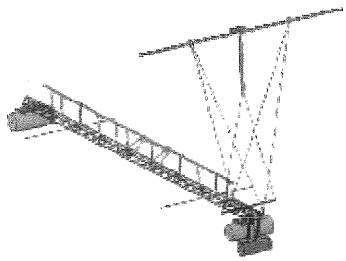
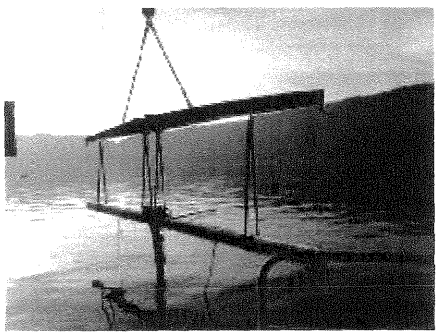
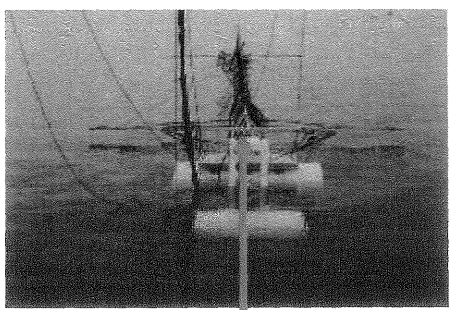


Diagram 1:
Array System



Picture 1:
AP aray supported by Crane B-17 using a lifting beam and four slings



Picture 2:
HRA Array & AP Mounting/Alignment Bar

AP Mounting Alignment Bar

ORIGINAL

CRANE CONDITION INSPECTION RECORD

Note: Inspect components that are reasonably accessible without disassembly.

Crane No.:	Type:	Location:	Operator's Name	Operator's License No.
S-13	GATI Rough	ESP	b7c	b7c

Purpose of Inspection:	Legend: B = Before A = After D = During	Date Started:	Date Completed:
Interim		4-20-09	4-30-09

Item No.	Item Description	B	D	A	Insp Init
1	Inspect structural components for damaged or deteriorated members, and for welds, bent bolts and missing fasteners and cracked welds.	S	n/a	n/a	b7c
2	Inspect wire rope for wear, broken wires, corrosion, kinks, damaged sheaves, crushed or flattened sections, condition of sockets, dead end connections, and for proper lubrication.	S	n/a	n/a	
3	Inspect hooks for cracks, sharp edges, gouges, distortion, and freedom of rotation.	S	n/a	n/a	
4	Inspect hoist brakes and clutches, and rotate brakes on floating cranes for condition, wear, proper adjustment and proper operation. Spot check horizontal movement brakes for, clutches for condition, wear, proper adjustment and proper operation.	S	n/a	n/a	
5	Inspect controls and control components for condition and proper operation.	S	n/a	n/a	
6	Inspect motors for condition and proper operation.	S	n/a	n/a	
7	Inspect limit switches for condition and proper operation. (Hook lower limit switch inspection/verification may be performed at the maintenance inspection in lieu of the CCIR. Annotate in Remarks block if performed at the maintenance inspection.)	S.			
8	If load test is performed, inspect load indicator, load warning devices, and load shutdown devices for condition and working accuracy as specified in Appendix D or E as applicable. (This may be performed at the maintenance inspection in lieu of the CCIR. Mark N/A if performed at the maintenance inspection.)	n/a	n/a		
9	Inspect mechanical equipment (levels, couplings, gearing, bearings, etc.) for condition and proper operation.	S	n/a	n/a	
10	Inspect sheaves for condition and evidence of loose bearings and misalignment.	S	n/a	n/a	
11	Inspect wireway, poles, and trolley rails (as applicable) for uneven wear, cracks, and for condition and evidence of loose bearings and misalignment.	n/a	n/a	n/a	
12	Inspect load chains and sprockets for condition and proper operation.	n/a	n/a	n/a	
13	Verify capacity chart or hook load rating data is in view of operator and/or rigging personnel.	S			

Figure 2-3

Item No.	Item Description	D	D	A	Image/ Ref.
14	Inspect operator's cab for cleanliness and operation of equipment.	S	[redacted]		b7c
15	Inspect machinery houses for cleanliness, proper safety guards, warning signs, and storage of tools and equipment.	N/A	[redacted]		
16	Verify proper operation of indicators, indicator lights, gauges, and warning devices.	S	N/A	N/A	
17	Verify current inspection of fire protection equipment.	N/A	[redacted]		
18	Verify that pressure vessel inspection certificates are posted and current. (See UFC 3-420-07 or appropriate document for test procedures.)	N/A	[redacted]		
19	Inspect outriggers, pads, boxes, wedges, cylinder mountings and level indicators for condition and proper operation.	N/A	N/A	N/A	
20	Inspect tires, crawler tracks, travel, steering, braking, and locking devices for condition and proper operation. (Applies to mobile cranes, boat hoists, runner-fixed gantry cranes, and certain category A cranes.)	N/A	N/A	N/A	
21	Verify accuracy of radius and/or boom angle indicator as specified in appendix C.	N/A	N/A	[redacted]	
22	Inspect pawls, ratchets, and motor locks for proper engagement and operation of mechanism.	N/A	[redacted]		
23	Inspect tanks, lines, valves, drains, filters, and other components of air systems for leakage and proper operation.	N/A	N/A	N/A	
24	Inspect reservoirs, pumps, motors, valves, lines, cylinders, and other components of hydraulic systems for leakage and proper operation.	S	N/A	N/A	
25	Inspect engines and engine-generator sets for condition and proper operation.	N/A	N/A	[redacted]	
26	Inspect counterweights and ballast for condition and evidence of loose and missing fasteners.	N/A	[redacted]		
27	Verify barge compartment (voids) cover bolts are installed.	N/A	[redacted]		
28	Verify accuracy of list and trim indicators against design data or previous test data.	N/A	N/A	N/A	
29	Inspect rotate pair assembly and center pin attachment/support assembly for condition and proper operation.	N/A S	N/A	N/A	
30	Inspect slewing ring bearings for condition and proper operation.	S	N/A	N/A	
31	Inspect travel jacks, equalizers, and guipmats for condition and proper operation.	N/A	N/A	N/A	

Remarks: Noted small bend in fire rope near end fitting. Activity monitors regularly. This is not rejectable.

b7c

N/A

Test Director Signature/Date

Figure 3-3

Appendix E - Crane Condition Inspection Record

CERTIFICATION OF LOAD TEST AND CONDITION INSPECTION

Activity: NSWC DET BAYVIEW	Building/Location: FSP

Crane No.	Type	OEM's Rated Capacity	Certified Capacity (If different from OEM's rated capacity, explain in "Remarks")
B-17	CAT 4 Hyd. Full Pedl. Mt.	Main 20000 lbs. 10 feet	Main 20,000 lbs. 10 feet

☒ Annual Certification

☐ Interim Recertification (Reason: _____)

Category 4 Cranes

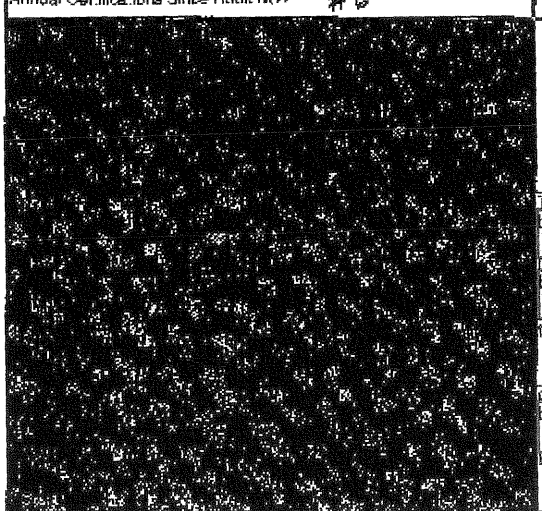
Boom Length Hoist	Test Load %	Minimum Radius Pounds	Minimum Radius Feet	Maximum Radius Pounds	Maximum Radius Feet
Main	110%	22,063	5'	22,063	10'

Hook Tram Measurements (In.)	Base Measurement	Before Test	After Test
Main	5.000	5 1/16"	5 1/16"

Annual Certifications Since Hook NDT: #6

Appendix "E"
Applicable Crane Test Procedure Paragraphs

1.1 1.2 1.3 1.4 1.4.1 1.4.2
1.4.5 1.6.1 1.6.2 1.6.3 1.6.4 1.6.5
1.7 1.7.1 5 5.1 5.2 5.3
5.3.1 5.3.1a 5.3.1b 5.3.2 5.3.2a 5.3.2.b
5.4.1 5.4.1a 5.4.2 5.4.3 5.4.4 5.4.5



Certification
This is to certify that inspections and tests have been conducted in accordance with the procedures set forth in the current NAVFAC P-307. It is further certified that the crane identified above is satisfactory to lift its certified capacity.

Test Director (Signature): b7c — Date: 5/14/09

Inspector (Signature): b7c — Date: 5-14-09

Inspector (Signature) — Date:

Certification Official (Signature): b7c — Date: 5-15-09

Expiration Date: 5-14-2010 ~~5-14-09~~

Remarks

Hook NDT "2010"

TEST LOAD CONFIGURATION FOR TELESCOPING BOOM CRANES

Pedestal Mounted	Test Load	Radius	Boom Length
Minimum Radius Boom Retracted	22,063	10'	31'
Minimum Radius Boom Extended	13,365	15'	50'
Maximum Radius (Boom 50% Extended)	9,961	35'	40'

FJJ 10/21/2008

TEST WEIGHT COMPUTATION SHEET
CATEGORY 1 AND 4 CRANES

CRANE NUMBER: B-17

LOAD TEST TYPE: Max lift

RATED CAPACITY FROM LOAD CHART: 20,000 LBS.

MINIMUM TEST LOAD (110%): 22,000 LBS.

MAXIMUM TEST LOAD (113%): 22,600 LBS.

DEDUCTIONS	WEIGHT (LBS.)
	0
TOTAL (LBS.)	0

MINIMUM TEST LOAD	MINUS DEDUCTIONS	EQUALS MINIMUM NET TEST LOAD	
22,000	0	22,000	(LBS.)

MAXIMUM TEST LOAD	MINUS DEDUCTIONS	EQUALS MAXIMUM NET TEST LOAD	
22,600	0	22,600	(LBS.)

TEST WEIGHT #	WEIGHT (LBS.)
019	5,009
012	2556
003	5036
015	500
013	254
014	1086
010	2546
001	5066
TEST WEIGHT TOTAL (LBS.)	22044

RIGGING ID #	WEIGHT (LBS.)
S-281	19
TOTAL (LBS.)	19

RIGGING WEIGHT TOTAL (LBS.)		TOTAL NET TEST LOAD (LBS.)
19	EQUALS	22,063

PLUS

Total Net Test Load shall be as close to Minimum Net Test Load as practical.

	TOTAL NET TEST LOAD		DEDUCTIONS		TOTAL TEST LOAD
FJJ 10/21/2003	22,063	PLUS	0	EQUALS	22,063

TEST WEIGHT COMPUTATION SHEET
CATEGORY 1 AND 4 CRANES

CRANE NUMBER: B-17

LOAD TEST TYPE: Hydraulic Slippage

RATED CAPACITY FROM LOAD CHART: 12,000 LBS.

MINIMUM TEST LOAD (110%): 13,200 LBS.

MAXIMUM TEST LOAD (113%): 13,560 LBS.

DEDUCTIONS	WEIGHT (LBS.)
	0
TOTAL (LBS.)	0

MINIMUM TEST LOAD	MINUS DEDUCTIONS	EQUALS MINIMUM NET TEST LOAD	
13,200	0	13,200	(LBS.)

MAXIMUM TEST LOAD	MINUS DEDUCTIONS	EQUALS MAXIMUM NET TEST LOAD	
13,560	0	13,560	(LBS.)

TEST WEIGHT #	WEIGHT (LBS.)
019	5000
012	2556
003	5034
015	500
013	254
TEST WEIGHT TOTAL (LBS.)	13,346

RIGGING ID #	WEIGHT (LBS.)
S-281	19
TOTAL (LBS.)	19

TEST WEIGHT TOTAL (LBS.)	PLUS	RIGGING WEIGHT TOTAL (LBS.)	EQUALS	TOTAL NET TEST LOAD (LBS.)
13,346	PLUS	19	EQUALS	13,365

Total Net Test Load shall be as close to Minimum Net Test Load as practical.

	TOTAL NET TEST LOAD		DEDUCTIONS		TOTAL TEST LOAD
FJJ 10/21/2003	13,365	PLUS	0	EQUALS	13,365

TEST WEIGHT COMPUTATION SHEET
CATEGORY 1 AND 4 CRANES

CRANE NUMBER: B-17

LOAD TEST TYPE: "Stabilty"

RATED CAPACITY FROM LOAD CHART: 7750 LBS.

MINIMUM TEST LOAD (110%): 8525 LBS.

MAXIMUM TEST LOAD (113%): 8757 LBS.

DEDUCTIONS	WEIGHT (LBS.)
	0
TOTAL (LBS.)	

MINIMUM TEST LOAD	MINUS DEDUCTIONS	EQUALS MINIMUM NET TEST LOAD	
8525	0	8525	(LBS.)
MAXIMUM TEST LOAD	**MINUS DEDUCTIONS**	**EQUALS MAXIMUM NET TEST LOAD**	
8757	0	8757	(LBS.)

TEST WEIGHT #	WEIGHT (LBS.)
019	5000
012	3556
014	1086
TEST WEIGHT TOTAL (LBS.)	8642

RIGGING ID #	WEIGHT (LBS.)
S-281	19
TOTAL (LBS.)	19

RIGGING WEIGHT TOTAL (LBS.)		TOTAL NET TEST LOAD (LBS.)
19	EQUALS	8661

Total Net Test Load shall be as close to Minimum Net Test Load as practical.

	TOTAL NET TEST LOAD		DEDUCTIONS		TOTAL TEST LOAD
FJJ 10/21/2003	8661	PLUS	0	EQUALS	8661

CRANE CONDITION INSPECTION RECORD

Note: Inspect components that are reasonably accessible without disassembly.

Crane No.:	Type	Location:	b7c	Operator's License No.
B-17	CAT 4	ESP		62182-120

Purpose of Inspection:	Legend: B = Before A – After D = Dur ng	Date Started:	Date Completed:
Annual/Quadrennial		5-14-09	5-14-09

Item No.	Item Description	B	D	A	Insp' Init.
1	Inspect structural components for damaged or deteriorated members, and for evidence of loose and missing fasteners and cracked welds.	S	S	S	b7c
2	Inspect wire rope for wear, broken wires, corrosion, kinks, damage, strands, crushed or flattened sections, condition of sockets, dead and connections, and for proper lubrication.	S	S	S	
3	Inspect hooks for cracks, sharp edges, gouges, distortion, and freedom of rotation.	S	S	S	
4	Inspect hoist brakes and clutches, and rotate brakes on floating cranes for condition, wear, proper adjustment and proper operation. Spot check horizontal movement brakes and clutches for condition, wear, proper adjustment and proper operation.	S	S	S	
5	Inspect controls and control components for condition and proper operation.	S	S	S	
6	Inspect motors for condition and proper operation.	S	S	S	
7	Inspect upper limit switch for condition and proper operation.	S			
8	If load test is performed, inspect load indicators, load warning devices, and load shutdown devices for condition and working accuracy as specified in appendix C or D as applicable. (This may be performed at the maintenance inspection in lieu of the CCIR. Mark N/A if performed at the maintenance inspection.)				
9	Inspect mechanical equipment (shafts, couplings, gearing, bearings, etc.) for condition and proper operation.	S	S	S	
10	Inspect sheaves for condition and evidence of loose bearings and misalignment.	S	S	S	
11	Inspect wheels, axles, and trolley rails (as applicable) for uneven wear, cracks, and for condition and evidence of loose bearings and misalignment.				
12	Inspect load chains and sprockets for condition and proper operation.				
13	Verify capacity chart or hook-load rating data is in view of operator and/or rigging personnel.	S			

KPT 5/09

Item No.	Item Description	B	D	A	Insp Init.
14	Inspect operator's cab for cleanliness and operation of equipment.	[redacted]	[redacted]	[redacted]	b7c
15	Inspect machinery house for cleanliness, proper safety guards, warning signs, and storage of tools and equipment.	[redacted]	[redacted]	[redacted]	[redacted]
16	Verify proper operation of indicators, indicator lights, gauges, and warning devices.	[redacted]	S	S	b7c
17	Verify current inspection of fire protection equipment.	[redacted]	[redacted]	[redacted]	[redacted]
18	Verify that pressure vessel inspection certificates are posted and current. (See UFC 3-430-07 or appropriate document for test procedures.)	[redacted]	[redacted]	[redacted]	[redacted]
19	Inspect outriggers, pads, boxes, wedges, cylinder mountings and level indicators for condition and proper operation.	[redacted]	[redacted]	[redacted]	[redacted]
20	Inspect tires, crawler tracks, travel, steering, braking, and locking devices for condition and proper operation. (Applies to mobile cranes, boat hoists, rubber-tired gantry cranes, and certain category 4 cranes.)	[redacted]	[redacted]	[redacted]	[redacted]
21	Verify accuracy of radius and/or boom angle indicator as specified in appendix C.	S	S	[redacted]	b7c
22	Inspect pawls, ratchets, and rotate locks for proper engagement and operation of interlocks.	[redacted]	[redacted]	[redacted]	[redacted]
23	Inspect tanks, lines, valves, drains, filters, and other components of air systems for leakage and proper operation.	[redacted]	[redacted]	[redacted]	[redacted]
24	Inspect reservoirs, pumps, motors, valves, lines, cylinders, and other components of hydraulic systems for leakage and proper operation.	S	S	S	b7c
25	Inspect engines and engine-generator sets for condition and proper operation.	[redacted]	[redacted]	[redacted]	[redacted]
26	Inspect counterweights and ballast for condition and evidence of loose and missing fasteners.	[redacted]	[redacted]	[redacted]	[redacted]
27	Verify barge compartment (voids) cover bolts are installed.	S	[redacted]	[redacted]	b7c
28	Verify accuracy of list and trim indicators against design data or previous test data.	[redacted]	[redacted]	[redacted]	[redacted]
29	Inspect rotate path assembly and center pin attachment/support assembly for condition and proper operation.	[redacted]	[redacted]	[redacted]	[redacted]
30	Inspect slewing ring bearings for condition and proper operation.	S	S	S	b7c
31	Inspect travel trucks, equalizers, and gudgeons for condition and proper operation.	[redacted]	[redacted]	[redacted]	[redacted]

Remarks:

b7c	b7c	

KPT 5/09

B-17
ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD

Notes:
1 The following are the minimum inspection requirements. Due to the various makes and models of cranes in the Navy inventory with unique or special components, these specifications may require additional instructions. Components need not be disassembled for inspection, except: (a) where noted specifically to disassemble; (b) where activity experience warrants disassembly of specific components; or (c) where problems indicated by these inspections require disassembly for further inspection. Where disassembly and reassembly are required, or for other detailed inspection guidelines, shop repair orders or other work documents shall be utilized to properly document the necessary steps required for disassembly, reassembly, and/or other inspection guidelines. Deleting or reducing the frequency of these inspections requires Navy Crane Center approval. Justification shall be provided with the activity's request. Additional or more frequent inspections based upon activity experience or OEM recommendations may be performed at the discretion of the activity. Additional inspection requirements and recommendations for specific OEM's are also contained in CSAs and EDMs located on the Navy Crane Center website (http://portal.navfac.navy.mil/ecc).

2 These specifications include both non-operational and operational inspection criteria. **Where necessary to ensure the safety of inspection and maintenance personnel, the crane shall be de-energized in accordance with approved lockout procedures.**

3 For inspections that involve fluids (lubricants, coolants, brake fluid, hydraulic fluid, etc.) or grease, inspect the fluid or grease for visual appearance, smell, and feel and inspect for indications of damaged or malfunctioning components.

4 Where an unsatisfactory condition is found, the item shall be identified on the "Unsatisfactory Items" sheet together with a statement of the condition observed. Corrective action in terms of adjustments, repairs, or replacements of items shall be detailed on a shop repair order or other appropriate document. (See NAVFAC P-300 for a sample shop repair order.)

5 Brake data measurements shall be recorded on the "Brake Data" sheet. Measurement attributes and criteria shall be based on brake and/or crane OEM recommendations and/or recommendations of the activity engineering organization. In addition to minimum and maximum settings, a preferred setting shall be specified where appropriate. Where measurements are inaccessible without disassembly, those measurements need only be taken when the brake is disassembled.

6 Where measurements are specified by the activity engineering organization, these measurements shall be recorded. Wire rope dimensional measurements shall be recorded.

7 As an alternative to the above dimensional measurements, gages may be used if supplied by the OEM or as approved by the activity engineering organization. If gages C-2 are used, the gage part number or drawing number shall be recorded on the Maintenance Inspection Specification and Record.

8 Where an inspection item applies to multiple components (e.g., main hoist, auxiliary hoist, whip hoist), each component shall be identified in the "system inspected" column.

9 The inspection criteria address most of the features and components on typical cranes. If a crane is equipped with features or components not specifically covered by these requirements, those features and components shall be inspected (where inspection is practical, as determined by the activity engineering organization and approved by the certifying official) for proper condition and operation, e.g., emergency dynamic braking, motor overspeed sensors, travel and rotate limit switches, load indicating devices, and

Rpt 5409

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD

SHEET 1 OF 6

Crane	Type	Manufacturer	Capacity
B-17	CAT 4 Pedestal Hyd Ext	Seattle Crane	20,000 lbs.

Prior Inspection DATE	Current Inspection DATE
6/13/08	5-14-09

Condition Legend: Mark with an "X" under appropriate condition.
S = Satisfactory C = Corrected (if delayed, leave blank and identify on Unsatisfactory Items sheet)
U = Unsatisfactory NA = Not Applicable

Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition S	U	C	NA
1	Structure (Pedestal, Pedestal Base, Boom, Support Pins, Retainers, Etc)	Inspect structural components for damaged, distorted, or deteriorated members (remove wire rope buffer blocks to ensure they are not hiding boom corrosion), and for evidence of loose or missing fasteners and cracked welds. Inspect support pins for proper lubrication. For damaged booms, see section 4. Ensure drain holes are clear.		X			
2	Handrails, Walkways, Ladders, and Personnel Safety Guards	Inspect for damage or deterioration, and for evidence of loose or missing fasteners and cracked welds.		X			
3	Internal Hydraulic Brake System	Inspect system for damage or leakage, for evidence of binding, loose, and worn components, and for proper lubrication. During operation, verify smooth operation. (See Item 8 for Hydraulic System)	Hoist Brake	X			
			Rotate Brake	X			
4	Shafts and Couplings	Inspect for damage, for leaking seals, and for evidence of loose keys, coupling bolts, and covers. During operation, inspect for vibration and other evidence of misalignment or damaged components. Listen for abnormal noise. Inspect for evidence of bearing damage, overheating, and abnormal wear. Inspect pillow blocks for damage, paying special attention to possible cracks in cast iron pillow blocks loaded in shear and tension, loose or missing fasteners, and cracks caused by overtensioned fasteners.	HPU Coupling	X			
5	Gearing (Rotate) External Gears	Inspect for damaged or worn gears, for evidence of misalignment or loose keys, and for proper lubrication. During operation, listen for abnormal noise, and inspect for other evidence of possible damage.		X			
6	Gearing (Hoist, Rotate) Internal Gears	Inspect for proper gear case lubricant level. Inspect for leaks and for evidence of loose or missing mounting fasteners. Inspect breathers for restrictions. During operation inspect for vibration, overheating, and other evidence of damaged internal components or misalignment. Listen for abnormal noise. Inspect for evidence of bearing damage, overheating, and abnormal wear.	Hoist Internal Gearing	X			
			Rotate Gear-boxes	X			
7	Gearing (Hoist, Rotate) Internal Gears – Oil Analysis	Monitor using an oil analysis program. The oil analysis shall be performed at least once each certification period with results analyzed by a qualified source. The results of the analysis shall be documented and retained in the equipment history file for the life of the component.	Hoist	X			
			Rotate Gear-boxes	X			
8	Hydraulic System	Inspect hydraulic system components, including motors, pumps, valves, cylinders, lines, regulators, and gauges for damage or deterioration, and for evidence of loose or missing fasteners. Inspect reservoir for proper fluid level. During operation, inspect system for leaks, and verify proper operation of motors, pumps, valves, cylinders, regulators, and gauges.		X			
9	Hydraulic System	Monitor using an oil analysis program. The oil analysis shall be performed at least once each certification period with results analyzed by a qualified source. The results of the analysis shall be documented and retained in the equipment history file for the life of the component.		X			

Kpt 5/09

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD

SHEET 7 OF 6

Crane
B-17

Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition S	J	C	NA
10	Telescoping Boom	Check boom straightness and alignment. Inspect boom structure for damaged, distorted, or deteriorated members, and for evidence of loose or missing fasteners and cracked welds. Inspect support pins for proper lubrication, verify smooth operation, and inspect for proper lubrication and evidence of abnormally worn or improperly adjusted wear pads. Ensure drain holes are clear. For damaged booms, see section 4.		X			
11	Center Collector Assembly (Electrical)	Inspect for loose or worn supports. Inspect wiring for damage or deterioration, and for evidence of loose connections. Inspect for worn brushes and proper spring tension. During operation, verify brush to collector ring alignment.		X			
12	Turret Assembly Bearings	Inspect exposed lubricant for evidence of metal flakes or metal or plastic particles. Inspect fasteners for proper tightness, to a torque of 600 ft lbs. Check every fourth fastener annually, alternate each year after. During operation, listen for abnormal noise and inspect for vibration.		X			
13	Wire Rope Drums and Machinery Foundations	Inspect drums for distortion, cracks, worn grooves, and for evidence of loose or missing fasteners and cracked welds. Inspect wire rope followers for proper adjustment and alignment. Inspect bearings for evidence of damage, overheating, or abnormal wear. Inspect machinery foundations for damaged or deteriorated components, and for evidence of loose or missing fasteners and cracked welds. During operation, verify that at least two complete wraps of wire rope remain on grooved drums (at least three complete wraps on ungrooved drums) in all operating conditions including extremes of hook or boom positions. Listen for abnormal noise. Inspect for vibration, overheating, and other evidence of component wear, bearing damage, or misalignment. Inspect pillow blocks for damage, paying special attention to possible cracks in cast iron pillow blocks loaded in shear and tension, loose or missing fasteners, and cracks caused by countersunk fasteners.		X			
14	Sheaves	Inspect for abnormally worn or corrugated grooves, flat spots, abnormal play, and broken or cracked flanges. Inspect for evidence of loose or missing fasteners, keepers, and lubrication fittings. Gauge the wire rope grooves of all sheaves. Expose and examine sections of equalizer sheaves and saddles in contact with wire rope and where corrosion may develop because of poor drainage. During operation, verify free movement of all sheaves. Listen for abnormal noise. Inspect for abnormal play, overheating, and other evidence of component wear or bearing damage. Disassemble boom tip sheaves to inspect for wear, misalignment, and bearing seizure. Note: Boom tip sheave disassembly shall be done quarterly.		X			

Rpt 5/09

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD

SHEET 3 OF 6

Crane
B-17

Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition S	C	C	N/A
15	Wire Rope, Fittings and Terminal Hardware	Thoroughly inspect the entire length of running ropes and standing ropes. The depth and detail of the inspection shall be that necessary to ensure that the entire rope is acceptable with special attention paid to areas of expected wear or damage, and to areas not normally visible to the operator during operation or pre-use inspection. During the inspection the wire rope shall be payed out as far as possible. For sections that can not be spooled off the drum, visual inspection of the wire rope on the drum is sufficient. Where it is not possible to pay out to the lowest layer, the crane shall not be used for applications where the uninspected rope (i.e., covered layers) would be spooled off the drum under load. The first layer of wire rope must be properly reinstalled on the drum to provide adequate support for the upper layers. Remove wire rope dressing from selected areas exposed to significant wear, exposure, and abuse. Dimensional (diameter) measurements shall be taken several places over the length of the rope. Measure and record rope diameter at six locations. Rope Diameter (3/4" Nominal) (45/64" (0.703") Minimum) Location 1 .748 Location 2 .755 Location 3 .753 Location 4 .751 Location 5 .750 Location 6 .753 Expose and examine sections in contact with equalizer sheaves and saddles or where corrosion may develop because of poor drainage. Lubricate areas after inspection. Inspect for defects noted below and proper lubrication. Inspect poured sockets, wedge sockets, swage fittings, eyes, swivels, thimbles, and fasteners for undue looseness, wear cracks, corrosion, and other damage. Undue looseness in poured sockets is defined as looseness or evidence of slippage of wire in the securing material, evidence of deterioration of the securing material, looseness of wire rope strands or wires adjacent to the socket or any looseness resulting from cracks or other defects in the basket. Evidence of looseness between the securing material and the basket resulting solely from seating of the material in the basket is acceptable. Drum end fittings need only be disconnected or disassembled when experience or visible indications deem it necessary. The Federal Specification for wire rope is RR-W-410. Note: Inspection of extend/retract cables internal to telescoping booms may be limited to inspection through boom inspection ports.		X			

*See next page for wire rope rejection criteria.

Rev 1/09

Wire Rope Rejection Criteria. Remove damaged portions (or replace entire length, if necessary) if any of the following are found:

1. Kinked, Birdcaged, Doglegged, or Crushed Sections. Kinked, birdcaged, doglegged, or crushed rope in straight runs where the core is missing or protrudes through or between strands, or where the rope does not fit properly in sheave or drum grooves. (This does not apply to runs around eyes, thimbles, or shackles.)

2. Flattened Sections. Flattened sections where the diameter across the flat is less than 5/8 of nominal diameter. (This does not apply to runs around eyes, thimbles, and shackles.)

3. Wear. Wear exceeding one-third the original diameter of outside individual wires.

4. Broken Wires

a. Running Ropes. Six randomly distributed broken wires in one lay or three broken wires in one strand in one lay. For rotation resistant wire rope, two in a length equal to six times the rope diameter or four in a length equal to 30 times the rope diameter. One outer wire broken at the point of contact with the core of the rope that has worked its way out of the rope structure and protrudes or loops out from the rope structure ("valley break"). For end connections, two broken wires within one lay length of the end connection.

b. Standing, Guy, and Boom Pendant Ropes. Three broken wires in one lay length in sections beyond end connection or two broken wires within one lay length of the end connection.

5. Loss in Diameter. Reduction from nominal diameter of:

1/64" for diameters up to and including 5/16"
1/32" for diameters 3/8" to and including 1/2"
3/64" for diameters 9/16" to and including 3/4"
1/16" for diameters 7/8" to and including 1 1/8"
3/32" for diameters 1 1/4" to and including 1 1/2"
10 percent for diameters over 1 1/2"

6. High Strand. High strand where the height exceeds 10 percent of the nominal diameter.

7. Corrosion. Corrosion such that significant pitting occurs on the surfaces of outside wires. Minor surface roughness on outside wires is acceptable provided no significant pitting occurs and the rope is not corroded internally. Significant pitting is defined as pitting that can not be removed by abrasive removal of less than 1/3 of the original diameter of individual outside wires.

8. Heat Damage. Evidence of heat damage from any cause.

9. Accumulation of Defects. An accumulation of defects that in the judgment of the inspector creates an unsafe condition.

10. Splices. Wire rope shall not contain splices.

Kpt 5:09

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD

SHEET 4 OF 5

Crane
B-17

Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition S	L	C	NA
1E	Hoist Blocks and Hooks	Inspect hoist hooks, cheek plates, swivels, trunnions, and lubrication fittings for damage or deterioration, cleanliness, freedom of movement, and for evidence of loose or missing fasteners. Inspect hooks and retaining devices for damage. Inspect drip pans and gaskets for damage, proper clearance, and for evidence of loose or missing fasteners. Inspect for evidence of bearing damage, overheating, and abnormal wear. See appendix F for further inspection and test of hooks.		X			
17	Machinery House and Operator's Cab	Inspect for leaks, broken glass, deterioration, and cleanliness. Verify proper operation of louvers, doors, windows, windshield wipers, heaters (particularly combustion heaters), air conditioners, operator's chair, and communication equipment.		X			
18	Load Moment Pressure Gauge	Inspect for damage or deterioration and for evidence of loose connections. Verify proper operation and tolerance.		X			
19	Boom Angle Indicator	Verify boom angle indications by comparing the indicated boom angle to the boom angle on the load chart corresponding to the boom length and measured radius. This test shall be accomplished at the minimum and maximum boom operating positions.		X			
20	Capacity Signs and Load Ratings	Inspect capacity signs and brackets for damage or deterioration, and for evidence of loose or missing fasteners. Verify that load ratings are correct, are noted in pounds, and are visible or otherwise available to the operator and riggers.		X			
21	Main Disconnect Switch	Inspect for broken or missing support or operating components and for evidence of overheating, and loose connections. Inspect fuses for proper rating and type. Inspect wiring for damage or deterioration, and for evidence of loose connections. Verify proper operation.		X			
22	Control Panels, Relays, Coils, Transfer and Disconnect Switches, and Conductors	Inspect (without removing) contacts for proper alignment, pitting, and evidence of excess heating and arcing. Inspect transfer and disconnect switches, conductors, coils and contact leads, and ensure for insulation breakdown, missing hardware, and evidence of overheating. Inspect wiring for damage, deterioration, and evidence of loose connections. Inspect fuses for proper rating and type, for evidence of loose connections, and overheating. Inspect overload devices for evidence of loose connections, overheating. Inspect circuit breakers and switches for Cleanliness and proper operation. Inspect panel boards and arc shields for cracks, evidence of loose or missing fasteners, cleanliness, and moisture. Manually operate relays, switches, contactors, and interlocks and verify that all moving parts operate freely without binding or Excessive play. Inspect enclosures for cleanliness or damage, and for evidence of loose or missing fasteners and gaskets. During operation, verify proper operation of panel indicating lights and contactor sequence. Verify proper operation of environmental controls (e.g., strip heaters, cooling fans). Inspect the electronic (solid state) drive control systems wiring for damage or deterioration, and for evidence of loose connections. Visually inspect (without removing) components for evidence of damage or overheating. Verify that the drive is dry and free of dust, dirt, and debris.		X			

Kpl 3-09

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD

SHEET 5 OF 6

Crane
B-17

Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition S	U	C	NA
23	Anti-two-block Limit	Remove covers and inspect electrical and mechanical components and wiring for damage or deterioration, and for evidence of loose connections. Inspect enclosures for evidence of moisture and arcing. Inspect for evidence of loose or missing fasteners.		X			
24	Warning Devices (Horns Lights)	Inspect components and associated wiring for damage or deterioration, and for evidence of loose connections. During operation, verify proper functioning of devices.		X			
25	Electrical Hardware and General Lighting	Inspect conduits, raceways, junction boxes, light fixtures, and associated wiring for damage or deterioration, and for evidence of loose connections. Verify operation of lights.		X			
26	Hydraulic Pump Electric Motor	Inspect motor and associated wiring for dirtiness, damage, deterioration, and evidence of loose connections. Inspect for proper lubrication. Inspect slip rings for damage and commutators for evidence of destructive commutation. Inspect brushes for proper brush tension and length, and for damage and deterioration. Inspect insulation, for deterioration and evidence of overheating. During operation, inspect for vibration, overheating, or other evidence of misaligned, worn or damaged internal components or bearings. Listen for abnormal noise. Verify proper operation of environmental devices (e.g., strip heaters, cooling fans)		X			
27	Electrical Cable Reels	Inspect wiring for damage or deterioration, and for evidence of loose connections. Inspect reel assembly for damage, deterioration, and evidence of loose or missing fasteners. Verify proper operation.		X			
28	Operation of Crane Controls	Verify proper operation of all hoist, rotate, and travel functions, primary and secondary limit switches, bypass switches, indicator lights, and settings.		X			
29	Barge Compartments	Inspect compartments (voids) for standing water.		X			

REMARKS:

Kpt 3/09