DEPARTMENT OF THE NAVY

UNITED STATES ATLANTIC FLEET

HEADQUARTERS OF THE COMMANDER IN CHIEF

NORFOLK, VIRGINIA 23511-6001

UNCLASSIFIED

5830
Ser N02L/C
24 APR 1991

~~CONFIDENTIAL~~ (Unclassified upon removal of exhibits (19), (124), (129), (147), (168) and (170) to enclosure (1))

SECOND ENDORSEMENT on RADM W. Lewis Glenn, Jr. ltr of 7 Dec 90

From: Commander in Chief, U.S. Atlantic Fleet
To: Judge Advocate General (Code 33) (3)

Subj: COURT OF INQUIRY TO INQUIRE INTO THE IWO JIMA (LPH 2) ENGINEERING CASUALTY WHICH RESULTED IN TEN DEATHS ON 30 OCTOBER 1990

1. Forwarded.

2. The basic correspondence is a one-page letter with one enclosure. The enclosure is the Record of Proceedings of the Court of Inquiry; it includes a lengthy transcript and 195 exhibits. The first endorsement on the basic correspondence consists of nine pages and three enclosures. The pages of the first endorsement are hereby redesignated as pages two through ten, and enclosures (196), (197), and (198) are redesignated as enclosures (3), (4), and (5).

3. Exhibit (144) to enclosure (1) consists of two naval messages: USS IWO JIMA 301811Z Oct 90 and USS IWO JIMA 261752Z Sep 90. Both messages were classified when entered into evidence in these proceedings but are now declassified in accordance with the instructions of each, which provided for declassification on 30 November 1990.

4. The Judge Advocate General (Code 31) is requested to review the Record of Proceedings to examine the affirmative admiralty claims considerations of this incident in accordance with Chapter XII, JAGMAN.

5. Finding of Fact 393 is modified as follows. The current instruction which sets fleet policy on Quality Assurance is CINCLANTFLTINST 4355.1B. The instruction has been continuously in effect since 1 February 1983.

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Subj: COURT OF INQUIRY TO INQUIRE INTO THE USS IWO JIMA (LPH 2) ENGINEERING CASUALTY WHICH RESULTED IN TEN DEATHS ON 30 OCTOBER 1990

7. Finding of Fact 350 warrants comment. A system hydrostatic test verifies system integrity prior to return to operation following repairs or maintenance which breach system integrity. Failure to properly conduct a system hydrostatic test puts equipment and personnel at risk. Although the failure to utilize formal procedures to conduct the hydrostatic test did not directly contribute to the cause or severity of this casualty, the potential did exist and identifies the need for correction.

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plants. Good engineering practice protects our people and ensures engineering readiness.

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OP.03 has good work in progress

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13. Subject to the foregoing, the proceedings, findings of fact, opinions, and recommendations of the Court of Inquiry, as commented upon and supplemented by subsequent endorsement, are approved.

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PAUL DAVID MILLER

Copy to:
COMNAVSURFLANT
NAVSAFECEN
RADM Glenn

DEPARTMENT OF THE NAVY

COMMANDER NAVAL SURFACE FORCE
UNITED STATES ATLANTIC FLEET
NORFOLK, VIRGINIA 23511-5215

5830
Ser N003/C019
17 January 1991

CONFIDENTIAL -- Unclassified upon removal of enclosures (124), (129) and (144)

FIRST ENDORSEMENT on RADM W. Lewis Glenn, Jr. ltr of 7 Dec 90

From: Commander, Naval Surface Force, U.S. Atlantic Fleet
To: Judge Advocate General (33) (3)
Via: Commander in Chief, U.S. Atlantic Fleet

Subj: COURT OF INQUIRY TO INQUIRE INTO THE USS IWO JIMA (LPH 2) ENGINEERING CASUALTY WHICH RESULTED IN TEN DEATHS ON 30 OCTOBER 1990

Encl: (196) COMNAVSURFLANT NORFOLK VA 271900Z Dec 90
(197) COMNAVSURFLANTINST 5040.2C, Tab AL
(198)

1. Forwarded.

2. During mid-October 1990, USS IWO JIMA was experiencing a number of difficulties with her engineering plant. To effect necessary repairs, a decision was made to send the ship to Bahrain where she could go pierside and shut down her boilers. Among the various pieces of equipment to be repaired were main steam valves 1MS-7 and 2MS-7, because steam leaked by one or both of them, thereby preventing two valve protection to be achieved. Two valve protection is required if routine maintenance is to be accomplished on either boiler if the other is lit off.

3. On 20 October 1990, USS IWO JIMA notified Ship Repair Unit Detachment Bahrain (SRU Det Bahrain) of the parts and repairs requested. SRU Det Bahrain in turn requested USS IWO JIMA provide technical documentation and parts status in order to determine necessary repair resources. USS IWO JIMA responded, identifying valves 1MS-7 and 2MS-7 as six inch globe valves, and provided additional repair detail. Based on this information, a surveyor from SRU Det Bahrain prepared work specifications for the valve repairs. The repair contract was awarded to Bahrain Shipbuilding and Engineering Company (BASREC).

4. On 28 October 1990, Mr. a civilian, non-English speaking worker employed by BASREC, arrived on board USS IWO JIMA and proceeded to disassemble valve 2MS-7 by removing all of the fasteners which held the valve bonnet to the main body of the valve. These fasteners consisted of steel studs and nuts.

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Subj: COURT OF INQUIRY TO INQUIRE INTO THE USS IWO JIMA (LPH 2) ENGINEERING CASUALTY WHICH RESULTED IN TEN DEATHS ON 30 OCTOBER 1990

USS IWO JIMA's Chief Engineer and B Division Leading Chief Petty Officer visually inspected the valve and, observing no steam cuts, cracks or other flaws, the Chief Engineer directed the valve to be reassembled.

5. Mr. [redacted] determined the fasteners which he had removed were in too poor condition to be reused. He approached an unidentified USS IWO JIMA crewmember in the fireroom and communicated to him that he needed new replacement fasteners. The crewmember led Mr. Patel to a parts bin in the fireroom from which Mr. Patel took four bolts, eight studs and 20 nuts and used them to reattach the valve bonnet to the valve main body. He told USS IWO JIMA personnel he had finished the job, and left the ship. No one from USS IWO JIMA, SRU Det Bahrain or BASREC properly inspected the valve after reassembly.

6. Fires were lighted in USS IWO JIMA's Number 1 and Number 2 boilers during the early morning hours of 30 October 1990. Sometime between 0630 and 0720, valve 2MS-7 was opened, permitting steam superheated in excess of 800° and at 600 psi pressure to pass through the valve and pressurize the valve bonnet. USS IWO JIMA was underway at 0756. At about 0812, the Boiler Technician of the Watch reported a steam leak behind Number 2 boiler. Almost immediately thereafter a loud boom was heard. The bonnet of valve 2MS-7 had literally blown off under the extreme pressure. Superheated steam flooded the fireroom. By midnight of 30 October 1990, ten USS IWO JIMA crewmembers who had been in the fireroom were dead from thermal injuries. One crewmember who had been in the fireroom's upper level, close to an exit, survived.

7. The Court of Inquiry left no doubt as to the direct cause of this tragedy. When Mr. [redacted] reached into the parts bin for replacement fasteners, he unwittingly selected a number of brass nuts, similar in outward appearance to steel nuts. Brass nuts lose their tensile strength at high temperature and as the superheated steam passed through the valve, it heated the brass nuts to the point where they failed. The high pressure steam blew the bonnet off the valve.

8. Valve 2MS-7 is part of the ship's main steam system, ergo the "MS" designation. Because of the high steam temperature and pressure, the main steam system of a ship is considered to be hazardous to personnel due to the remote possibility of catastrophic failure and at the same time is vital to the mission of the ship. It therefore carries what is known as the highest Level of Essentiality. The Level of Essentiality for production repair work and maintenance refers to the degree of regulation and control required to assure reliable repair and maintenance of the system. The Level of Essentiality is

categorized into four levels of control, the highest being Level I control. Level I control encompasses those systems in which maximum confidence is required in the reliability of repairs and maintenance. In the repair of Level I systems, the use of certified Level I Material is a requirement as specified in the Controlled Work Package. Identifying the appropriate level of control and ensuring all required control procedures are carried out constitutes Quality Assurance (QA). QA are those measures taken to provide a high degree of confidence that repair or maintenance actions are done properly and comply with established standards. The magnitude and complexity of QA procedures is a function of the Level of Essentiality and can be extremely detailed or relatively simple. It is quite clear that Level I systems demand very precise QA.

9. A formalized QA program must not be viewed as a stand-alone entity. It is one part of an overall system of maintenance and repair management requiring the application of sound engineering practices, common sense and, on occasion, more precisely defined measures. Before any maintenance or repair action, sound engineering practices and common sense would dictate that all required or anticipated replacement parts, cleaning and lubricating fluids, and the like, be identified and obtained and that a person qualified to accomplish the maintenance or repair action be designated. If appropriate, a supervisor or inspector who can ensure the action has been properly accomplished would be assigned. On Level I systems, additional, precisely defined measures, such as use of a controlled work package, must also be followed. QA is defined as being a component of maintenance and repair management, in much the same way as in the Preventive Maintenance System (PMS).

10. The Court of Inquiry, in opinion 20, states, "...

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Concur with this opinion. The application of sound engineering practices and common sense, fundamental to effective maintenance and repair management, should have alerted the Commanding Officer and Engineer Officer that a very important and uncommon foreign shipyard repair effort was going to take place. Components of a Level I main steam system were going to be disassembled and worked on by foreign contract personnel. They were not part of a U.S. Intermediate Maintenance Activity (IMA) or a Tender Fly Away Team, and therefore not bound by the same QA requirements and potentially did not possess the same level of training or experience. They were foreign workers opening up the main steam system.

11. COMSERVFORSIXTHFLT Instruction 4700.2B alerts commanding officers that a foreign contractor will very likely not be familiar with the particular make or model of the equipment he will be repairing on board U.S. ships. The following actions would have been appropriate:

a. The Commanding Officer and Engineer Officer of USS IWO JIMA should have directed closer oversight of the repair effort, regardless of who they believed had QA responsibility;

b. The Engineer Officer should have read the specification shown to him by the SRU Det Bahrain surveyor;

c. After the Engineer Officer and BTC examined the disassembled valve, it should not have been reassembled without first repacking it and replacing the gasket;

d. Mr. should not have been allowed to obtain fasteners from within the fireroom;

e. The Engineer Officer should have personally witnessed the hydrostatic and operational pressure tests on valve 2MS-7.

The USS IWO JIMA Engineering Department Organization and Regulations Manual (EDORM) requires him to witness quality control tests, as appropriate, to assure correct work completion. It was definitely appropriate for him to do so in the case of a main steam valve. Had he witnessed the tests, he would have seen that the valve had been prematurely lagged and would have required the lagging to be removed. He might then have noticed the improper combination of studs and bolts connecting the bonnet to the valve, and the brass nuts might have been discovered, although the probability is remote under that scenario. A weeping valve bonnet when subjected to operating pressure (water test) may have alerted him to look further into the repair action.

12. Having stated that the application of sound engineering practices and common sense should have prevented this accident; the deficiencies in QA aboard USS IWO JIMA require examination. While no program involving human discretion is perfect, an effective QA program would have been the best guarantor against error:

a. All ships in SURFLANT are directed to implement a QA program to meet requirements set forth in the COMNAVSURFLANT QA Manual. Training in the QA program afloat is mandated, as are internal and external QA audits. All work requests requiring Level I controls must be properly identified and applicable supporting documentation provided to the maintenance or repair activity.

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b. Current training associated with QA centers on material presented at Surface Warfare Officer School (SWOS) and at the Senior Officer Ship Material Readiness Course (SOSMRC) highlighting the QA requirements for Level I systems. The guidance and training needed to establish an effective QA program on board USS IWO JIMA were provided to the Commanding Officer. Responsibility for failing to implement the Type Commander's QA program in meaningful fashion devolves to him.

c. The Engineer Officer had enough experience to properly cope with the disassembly, inspection, repair, reassembly, and testing of valve 2MS-7. It is also clear that he did not attend SWOS Department Head Training or SOSMRC. In that regard, a thorough review of NMPC assignment policies that permit Limited Duty Officers to assume department head assignments without the formal training afforded Unrestricted Line Officers should be made. All department heads should be trained at SWOS. Chief Engineers of plants in big ships like LHA, LHD, LPH, LKA, and Tenders, should attend SOSMRC.

13. In response to the President of the Court of Inquiry's Executive Summary, and to better ascertain the true state of QA programs throughout SURFLANT, I directed a QA QUICKLOOK, and established a QA Evaluation Team. One hundred fifty-six ships responded to the QUICKLOOK message, enclosure (196), which requested information on their level of knowledge in QA, use of the COMNAVSURFLANT QA Manual, QA training and QA audits. The QA Evaluation Team inspected 16 ships in depth. The response from most ships was that the QA Manual is on board, and QA personnel are designated by letter or ship's notice, but that the requirements of the manual are not always being carried out in day to day maintenance and repair actions. In addition, routine training in QA is not always being accomplished, nor are all required audits. The QA Evaluation Team visits confirmed the results of the QUICKLOOK and also indicated that the deckplate level of knowledge of QA and sound maintenance practices is low, and that the supervisory level of knowledge of QA is likewise lower than it should be. The use of references and specifications to ensure correct materials are used in maintenance and repair is lacking, apparently due to a lack of training. The above information is counter to the fact that in over 100 ships' annual command inspections (administrative) not one discrepancy in QA was ever identified. There are exceptions. The gas turbine maintenance program, the PMS program and ordnance handling programs, all of which contain their own QA procedures, are being carried out effectively.

14. The President of the Court of Inquiry is correct in stating "the failure of USS IWO JIMA to maintain a viable QA program is a tragic example of a greater systemic QA deficiency extant in the non-nuclear Naval Surface Warfare community." This deficiency is

in the process of being corrected. The COMNAVSURFLANT QA Manual is being rewritten to simplify and clarify the ships force QA responsibilities, particularly when repair work is being accomplished on board by foreign contractors. A QA handbook is being prepared which will provide every sailor with an easy to read, pocket-size guide to QA. The QA checklist in the COMNAVSURFLANT Command Inspection Program is being rewritten to provide a more meaningful tool to assess the status of the QA program and the level of QA knowledge on each ship. Required QA audits are being emphasized and will be closely monitored.

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Subj: COURT OF INQUIRY TO INQUIRE INTO THE USS IWO JIMA (LPH 2) ENGINEERING CASUALTY WHICH RESULTED IN TEN DEATHS ON 30 OCTOBER 1990

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Subj: COURT OF INQUIRY TO INQUIRE INTO THE USS IWO JIMA (LPH 2) ENGINEERING CASUALTY WHICH RESULTED IN TEN DEATHS ON 30 OCTOBER 1990

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29. Subject to the foregoing, the proceedings, findings, opinions and recommendations of the Court of Inquiry are approved.

J. S. DONNELL III

Copy to:
JAG (Advance)
NAVSAFECEN

07 DEC 1990

From: Rear Admiral [redacted], Jr., U.S. Navy,
/1110
To: Commander Naval Surface Force United States Atlantic Fleet

Subj: COURT OF INQUIRY TO INQUIRE INTO THE USS IWO JIMA (LPH-2) ENGINEERING CASUALTY WHICH RESULTED IN TEN DEATHS ON 30 OCTOBER 1990; REPORT OF

Ref: (a) COMNAVSURFLANT ltr Ser. N003/12442 of 5 Nov 90

Encl: (1) Subject Record of Proceedings

1. As directed by reference (a), a Court of Inquiry was convened on 13 November 1990 and completed on 28 November 1990. The original record of proceedings and two complete copies are forwarded herewith as enclosure (1).

[redacted]s attached as enclosure (2).

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Executive Summary

This report of the Court of Inquiry is submitted in compliance with COMNAVSURFLANT letter serial N003/12442 of 5 November 1990, appointing a Court of Inquiry to inquire into the circumstances surrounding a fireroom engineering casualty and resulting deaths which occurred on board USS IWO JIMA (LPH-2) on 30 October 1990. The results of the Inquiry, distilled into findings of fact, opinions, and recommendations follow this summary. A sequence of events leading up to and immediately following the accident are listed in TAB A.

The cause of the casualty was a major steam leak resulting from the catastrophic failure of valve 2MS-7, a component of the main steam system of the propulsion plant of USS IWO JIMA, located immediately forward of the number 2 boiler in the fireroom. Failure of the fasteners holding together the bonnet and body of the valve caused the bonnet of the valve, which was subjected to steam pressure of 640 pounds per square inch, to blow away from the main body of the valve, releasing superheated steam at a temperature of 865 degrees fahrenheit into the fireroom, almost immediately engulfing the entire space in deadly steam. Five sailors managed to escape from the fireroom; however, four of those sailors succumbed to thermal injuries aboard the hospital ship USNS COMFORT (T-AH 20) several hours later. Only one sailor escaped injury. The remaining six sailors were overcome by the intense heat and succumbed to thermal injuries in the fireroom. Their delay or inability to exit the fireroom immediately upon the occurrence of the casualty may have been due to their attempts to shut down the steam plant in accordance with applicable casualty control procedures.

The catastrophic failure of valve 2MS-7 resulted from the use of brass nuts to fasten the valve bonnet to the main body of the valve following an inspection of the valve internals during an inport repair availability of the IWO JIMA in Bahrain from 25 - 30 October 1990. Inspection of the valve occurred because of the inability to achieve two-valve protection for the number 2 boiler and the desire to conduct maintenance of that boiler while the other boiler was on line. The inspection and reassembly of the valve was an "add on" to more pressing repair requirements for the IWO JIMA's propulsion plant. It was not a maintenance item that was required to be accomplished prior to the ship's early deployment as part of OPERATION DESERT SHIELD.

Brass nuts are inappropriate for application on any main steam system or components where temperatures greater than 400 degrees fahrenheit are experienced. Brass softens and loses its tensile strength at these temperatures, and, in this instance, the temperature of the superheated steam passing through valve 2MS-7 was approximately 865 degrees fahrenheit. The combination of high temperature and steam pressure approximating 640 psi caused the brass nuts to soften and the threads in the nuts to

give way, resulting in the bonnet violently separating from the main body of the valve.

The brass nuts used in the reassembly of valve 2MS-7 were installed by a pipefitter employed by Bahrain Shipbuilding and Engineering Company (BASREC), a local civilian contractor which had been engaged to conduct specified repairs aboard USS IWO JIMA during the inport availability in Bahrain. The pipefitter, contrary to the repair contract specifications for work on the valve, obtained the nuts, bolts, and studs used to reassemble the valve from a parts bin of spare nuts, bolts, and other fittings located in the fireroom aboard the ship. The nuts chosen and used by the pipefitter were not visibly distinguishable as brass, because the manufacturer had applied a black coating to the nuts, which gave them the appearance of ferrous metal. Although the pipefitter was experienced and knew that brass was not a proper fastener to use in such a high temperature application, he did not realize that the nuts were, in fact, brass. Likewise, neither the Navy Ship Repair Unit surveyor overseeing the work of the local contractor, nor ship's force supervisory personnel noted the use of brass nuts when they observed the valve following reassembly.

USS IWO JIMA's steam plant and propulsion system are some 28 years old, predating the more modern steam systems (1200 psi systems) for which high level quality control and assurance maintenance and repair procedures were developed. Nevertheless, the quality control and assurance procedures applicable to these newer systems also apply to repairs and maintenance of systems aboard Navy ships that employ temperatures 775 degrees fahrenheit or greater. These procedures, which were applicable to IWO JIMA, are known as "Level I" quality control and assurance procedures, and, had they been followed in the maintenance and reassembly of valve 2MS-7, this accident could have been avoided.

The opening, inspection, and reassembly of valve 2MS-7 according to proper Level I quality control procedures required close supervision of all aspects of the work on the valve, by the local contractor, the Navy Ship Repair Unit surveyor, and ship's force personnel. Furthermore, Level I quality assurance requirements demanded use of specified types of materials, tightly controlled and accountable from the manufacturer down to the ultimate user, as well as periodic inspection of the work on the valve at certain "checkpoints" throughout the work progress.

Failure to follow the applicable Level I procedures in this instance was the result of a combination of several factors. The Ship Repair Unit Detachment Bahrain, which was responsible for drafting the work specifications for the contract with the local contractor, and for supervising the work done, failed to recognize that the work to be accomplished on the valve required application of Level I quality assurance controls and procedures. This failure is partially attributable to the failure of the IWO JIMA'S ship's force to clearly identify valve 2MS-7 as a "Level

I" valve when submitting its work requirement to the SRU Detachment, resulting in the drafting of an inadequate work specification.

The failure also was partially attributable to assigning ship repair surveyors to prepare the repair specification who were unfamiliar with Navy shipboard steam systems, specifically with Level I requirements applicable to those systems. Assignment of these surveyors was also occasioned by the dramatic increase in the workload of the SRU Detachment Bahrain due to the rapid buildup of Navy forces in the area as a part of OPERATION DESERT SHIELD, commencing in August, 1990. Additionally, the failure of the local civilian contractor to adequately supervise the work of its employees and to ensure that the requirements of the work specifications contained in the work order were met were key factors contributing to the cause of this tragic accident. There is no evidence whatsoever, however, to suggest that intentional or criminal acts by any person, living or deceased, directly or indirectly caused this tragic accident.

The foregoing failures were an outgrowth of divergent interpretations of applicable Navy directives governing the quality assurance program by SRU Detachment Bahrain personnel and ship's force personnel. On the one hand, ship's force personnel were of the view that quality assurance responsibility lay primarily with the SRU Detachment and the local contractor as is the case with shoreside maintenance and repair activities in the United States (Shipyards, SIMAs, IMAs, & Tenders). Conversely, SRU Detachment personnel considered ship's force personnel primarily responsible for quality assurance, because the SRU Detachment was not considered by them to be a depot-level maintenance activity (voyage repair only). These divergent views led to several fatal "assumptions" concerning quality assurance responsibility, which ultimately resulted in inadequate quality assurance and control procedures being employed, as well as inadequate supervision of the work on the valve by SRU, local contractor, and ship's force personnel. Finally, the absence of an effective quality assurance program aboard USS IWO JIMA was a factor contributing to the accident notwithstanding the inadequacies of SRU Detachment Bahrain and the local contractor. Had IWO JIMA had an effective quality assurance program in effect, the BASREC pipefitter would not have been allowed to gather the inadequate fasteners from the parts bin, and reassembly of the valve would have been closely supervised by ship's force personnel.

The failure of USS IWO JIMA to maintain a viable quality assurance program is a tragic example of a greater systemic quality assurance deficiency extant in the non-nuclear Naval surface warfare community. The inquiry revealed that deficiencies exist in schooling, training, and NEC emphasis and direction on quality assurance, as opposed to that existing in the aviation and submarine communities. Skill schools, such as the Valve Maintenance "A" School, should include quality

assurance training. Intermediate Maintenance Activities (IMAs) should make meaningful quality assurance training readily available to afloat units so that all responsible shipboard personnel can attend. All NEC schools should include quality assurance training, rather than reserving such training for those personnel destined for IMAs. Finally, more attention needs to be focused on quality assurance training by the leadership of the surface warfare community.

The problem of brass fasteners being improperly used in high temperature applications is not new to the Navy. As early as 1977 the danger associated with use of black-coated brass nuts was disseminated to the fleet by the Naval Sea Systems Command. Subsequently, the Naval Ship's Technical Manual on Threaded Fasteners was amended to reflect the concerns over brass fasteners in general and the potentially catastrophic confusion due to the existence of black-coated brass nuts in the Navy supply system. Nevertheless, black coated brass nuts continue to be used in the Navy, and, as long as they are aboard ships, the potential exists for another tragedy such as that aboard USS IWO JIMA. Navy leadership should ensure that these type nuts are removed from the Navy's inventory entirely.

Although many deficiencies and negatives are detailed above, a number of positive aspects were also revealed by the Court of Inquiry. There were many acts of bravery and good judgment under extremely stressful and dangerous conditions. Concern for shipmates was a common thread present throughout the tragedy. Some individual acts of bravery and concern for fellow shipmates should be noted: Lieutenant , the Main Propulsion Assistant, waved BT1 away from valve 2MS-7 (an action which probably saved the life of BT1), and expressed continuing concern for personnel remaining in the fireroom notwithstanding his fatal injuries. BT1 took immediate action to secure the plant by closing the steam stops, an effort which probably prevented extensive damage to the boilers and to the propulsion system. The Machinist's Mate of the Watch, Chief Machinist's Mate performed a quick-thinking departure from standard casualty control procedures in order to draw steam away from the fireroom immediately upon the casualty. The Officer of the Deck, LTJG , and the Commanding Officer, CAPT prevented further damage to the ship and possibly additional personnel casualties by expertly slowing the ship and dropping anchor after propulsion and steering control were lost. The Engineer Officer, LCDR effectively and efficiently controlled the situation immediately following the casualty and conducted casualty control efforts in a thoroughly professional and caring manner. Finally, the investigative teamwork of MM3 ; and MM3 , who were the first personnel to enter the fireroom following the casualty and who endured intense residual heat and the trauma of finding dead shipmates, was professional in all respects. The medical care afforded the injured personnel was uniformly outstanding, from initial first aid rendered on the

mess decks, to preparation and triage in IWO JIMA's medical ward, to the care afforded aboard USNS COMFORT.

The Inquiry highlighted the professionalism and dedication demanded of Navy engineers, and the constant vigilance required of them under all circumstances. It is for the protection of our hard-working and dedicated individuals that the Navy has set in place strict engineering standards and procedures. Our managers and leaders must ensure that proper training and supervision of these personnel are conducted in regards to these standards and procedures. It is hoped that the recommendations contained in this report of the Court of Inquiry will enable the Navy leadership to better focus attention in these important areas, and so help ensure that an accident such as the one that occurred on board USS IWO JIMA on 30 October 1990 is not repeated.

SEQUENCE OF EVENTS

21 October 1990	-	CTG 150.6 decides to bring IWO JIMA to Bahrain on 25 October to effect emergent repairs on #1 Boiler Pilot Safety Valve and #2A Forced Draft Blower. 1MS-7 and 2MS-7 are added to work package.
24 October 1990	-	SRU Det, Bahrain indicates that 1MS-7 and 2MS-7 will be scoped upon arrival as part of IWO JIMA repair package.
25 October 1990	-	IWO JIMA arrives Bahrain. Met by SRU surveyor and NAVSEACENLANT Tech Rep.
28 October 1990		
0800	-	Commenced disassembly of 2MS-7
1602	-	Inspected 2MS-7. Valve in good condition. Disassembled 2MS-7 bypass and commenced relapping the bypass.
1900	-	Repairs to 2MS-7 bypass complete. Valve and bypass reassembled.
(various)	-	Attempts to Hydro #1 Boiler. (Evidence is conflicting concerning hydro of 2MS-7.)
29 October 1990	-	
0332	-	Hydro "sat" on #1 Boiler.
30 October 1990		
0218	-	Fires lighted on #1 Boiler.
0340	-	#1 Boiler on line.
0556	-	Fires lighted on #2 Boiler.
0600	-	Set Special Sea and Anchor Detail.
0630	-	Preps made #1 SSTG
0630-0720	-	(Time unclear) 2MS-7 opened.
0635	-	Opened #2 Boiler Main Steam Stop.
0647	-	Boilers in parallel.
0730	-	Rolled #1 SSTG.
0745 (approx)		Watch on #1 SSTG showed minor steam leak on MS-8 to B Division Officer who showed leak to MPA.
0750 (approx)		BT3 Casey noted smoldering lagging on 2MS-7. Suspected burning lagging paste. No steam noticed. Discussed with MM3 Dewhurst and BT2 Parker.
0754	-	Main Control reports ready to answer all bells.

0755	(approx)	MM3 relieved on #1 SSTG by MM3 , suffering effects of exertion in hot Fireroom, assumed duties on #2 SSTG in cooler Engineroom.
0756	-	Underway
0811	-	Main Control reports steam leak to Bridge and requests permission to secure #2 Boiler.
0812	-	Main Control reports major steam leak in Fireroom and requests General Quarters.
0812	(approx)	BT1 leaves fireroom through Ellison door to messdecks. (is uninjured.)
0813	-	Helm control is lost.
0813	(approx)	BT2 evacuates to messdecks via escape trunk and walks toward Medical.
	-	LT , EM3 and BTFA evacuate onto messdecks via normal access
0814	-	Helm control regained.
	-	Medical response team called to spaces above Engineroom. first aid administered.
0816	-	Dropped port anchor.
0817	-	Dropped starboard anchor.
0835	(Approx)	First two investigators enter Fireroom. Locate and identify 6 personnel showing no signs of life.
1037	-	Four critically injured personnel MEDIVAC'd to USNS COMFORT.
2330	-	Last survivor dies aboard USNS COMFORT.

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Preliminary Statement

By appointing order serial N003/12442 dated 5 November 1990, Commander Naval Surface Force Atlantic Fleet convened a Court of Inquiry to inquire into all the facts and circumstances connected with the USS IWO JIMA (LPH-2) engineering casualty which resulted in ten deaths on 30 October 1990. The Court of Inquiry conducted a thorough investigation into all facts and circumstances surrounding the casualty, the damage resulting therefrom, and deaths of and injuries to naval personnel, performed the duties of an inquest, and, as appropriate, fixed responsibility for the incident. No opinion as to the line of duty and misconduct status of injured personnel is necessary, since there were no injured personnel requiring a detemination of line of duty/misconduct. Recommendations concerning disciplinary action, as appropriate, are included in the recommendations section of the report of the Court of Inquiry. All reasonably available evidence was collected and each directive of the appointing order has been met.

This investigation was conducted and prepared in contemplation of litigation and for the express purpose of assisting attorneys representing interests of the United States in this matter. The Force Judge Advocate, Naval Surface Force Atlantic Fleet should be contacted for direction and guidance as to those matters pertinent to anticipated litigation.

Members and counsel (Counsel and Assistant Counsel) for the Court of Inquiry were informally advised on 1 November 1990 that a Court of Inquiry would be convened by Commander, Naval Surface Force Atlantic Fleet to inquire into the circumstances surrounding a major steam leak and resulting casualties that occurred aboard USS IWO JIMA (LPH-2) on 30 October 1990. Following the signing of the Appointing Order on 5 November 1990, Counsel for the Court travelled from Newport, R. I. to Norfolk, Va. and conferred with the President of the Court on 6 November 1990. Assistant Counsel for the Court had been previously dispatched from Rota, Spain to Bahrain, arriving on 7 November 1990, where he met with staff members of RADM , preliminary inquiry team, obtained copies of the preliminary inquiry and supporting documentation, as well as several statements collected by agents of the Naval Investigative Service. Counsel for the Court departed for Bahrain on 6 November 1990, rendezvoused with court reporters from NLSO, Naples, in Naples, Italy on 7 November, and arrived in Bahrain in the early morning hours of 8 November 1990. Thursday and Friday, 8 & 9 November 1990, were devoted to reviewing the preliminary inquiry and NIS statements, determining recommended parties to the inquiry, securing billeting for members and counsel, and locating a suitable site for the Court of Inquiry hearings. By the time that the Court of Inquiry members arrived in Bahrain on the night of 9 November 1990, arrangements for billeting aboard

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USS IWO JIMA (LPH-2) had been accomplished, a location for the Court of Inquiry hearings had been identified, and recommendations for designation of parties had been prepared. The detailed court reporters had also volunteered to assist the Naval Investigative Service in transcribing statements taken by NIS agents as part of a separate, independent investigation. These statements proved to be invaluable to Counsel for the Court of Inquiry in identifying potential parties, other necessary witnesses, and the overall direction that the Court of Inquiry should take in its fact-finding efforts. NIS was also instrumental in obtaining and safe-guarding items of real evidence that were essential to a thorough investigation of the accident by the Court of Inquiry. Special Agents and cooperated fully with Counsel for the Court of Inquiry, provided absolutely invaluable information and assistance, and are to be highly commended.

Copies of the Preliminary Inquiry, NIS Statements, and supporting documentation were made available to the members of the Court of Inquiry on 10 November 1990, and to counsel for the parties on 11 November 1990. Provision of this material to the Court members was to allow the Court to gain an overview of the circumstances surrounding the accident, and to take advantage of their engineering expertise to assist Counsel in identifying witnesses and documents that should be considered by the Court during the formal fact-finding sessions. The Court members reviewed these materials between 10 - 13 November 1990, when the Court formally convened in open session. Court members also took informal tours of the engineering spaces on board USS IWO JIMA during this period. This unorthodox approach to preparations for the Court of Inquiry was adopted for two reasons: (1) The Court members are recognized experts in steam engineering systems; their advice and assistance in identifying witnesses, documentary evidence, and issues to be examined, was absolutely essential to Counsel for the Court to prepare for the orderly and thorough presentation of relevant evidence to the Court; and (2) Time constraints and an austere quasi-combat environment precluded Counsel for the Court from independently acquiring the necessary expertise, seeking out relevant evidence and witnesses, and preparing all the evidence and witnesses for presentation to the Court in the timeframe allotted for getting the Inquiry hearings underway.

As reflected in the record of proceedings, this approach generated extensive voir dire examination of the Court Members, resulting in challenges for cause of all the members. Although the challenges were not sustained, and it is abundantly clear from the record that the impartiality of the members was not affected by having reviewed this material prior its introduction into evidence, the approach adopted in this instance is not recommended for future Courts of Inquiry.

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Technical expertise prior to and during the formal proceedings was provided to Counsel for the Court and counsel for the parties by CDR , USN, Staff, COMPHIBGRU TWO. Public Affairs advice and assistance was provided by LCDR , USN, Staff, CINCLANTFLT. Absolutely superb administrative and logistical support was graciously provided by the Administrative Support Unit, Bahrain, Commander, Naval Logistics Support Force, Central Command, and USS IWO JIMA (LPH-2).

Formal proceedings commenced at 1300, 13 November 1990 at Bahrain International School, consisting of sworn testimony, introduction of documentary and real evidence, and admission of sworn and unsworn statements. The Court, after hearing arguments of counsel, closed at 1011, 28 November 1990. Court deliberations on the findings of fact, opinions, and recommendations continued during the period 28 November - 7 December 1990, when the Court, with the assistance of Counsel, completed, signed, and authenticated this report.

Notwithstanding the fact that this Court of Inquiry was conducted in an austere, quasi-combat environment, no significant obstacles were encountered in the conduct of these proceedings. Cooperation and support by the Naval Investigative Service, Commander Amphibious Group TWO, Commander Logistics Support Force, Central Command, the Judge Advocate General of the Navy, Naval Legal Service Office, Naples, the Commanding Officer and crew of USS IWO JIMA (LPH-2), and the Bahrain International School, were outstanding in all respects throughout the preparations for, and the conduct of these proceedings.

The findings of fact are presented in this report in chronological order, starting with the repairs to valve 2MS-7, the testing of the valve, the steam leak casualty, casualty control and medical treatment, and the resultant damage to USS IWO JIMA. The findings of fact then address more general subjects of quality assurance and the respective responsibilities therefor by Navy commands, and civilian repair activities. There then follow sections addressing the opinions and recommendations of the Court of Inquiry.

FINDINGS OF FACT

The Court, after inquiring into all the facts and circumstances connected with the incident which occasioned the inquiry, and having considered the evidence, finds as follows: THAT:

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2MS-7 REPAIR

1. Valve 2MS-7 is the root valve supplying main steam (600 psi, 865 degrees F) from Number 2 boiler to Number 1 Ship's Service Turbine Generator (SSTG) (Exhibits 84, 126).

2. Valve 2MS-7 was located behind Number 2 boiler, port side, Frame 75, immediately below the upper level deck plate. It is positioned between two steam lines with its bonnet positioned 90 degrees from the vertical and pointing to starboard, parallel to the back of Number 2 boiler (p 85, Exhibits 74, 121).

3. The 2MS-7 turbo stop valve was fitted with a bonnet drain. It had a dunce cap on its local handwheel to which a remote operating cable was attached that went to a remote operator on the upper level between the two boilers (p 159, Exhibit 126).

4. The installed 2MS-7 turbo stop valve was a 4 inch gate valve, rising stem, bolted bonnet, butt welded, carbon steel, manufacturer Crane (pp 77, 158, 927, 928, Exhibits 123, 125, 126).

5. There was confusion between the ship and SRU Detachment Bahrain as to what type of valve was installed as 2MS-7 (pp 537, 813, 912, Exhibit 19).

6. USS IWO JIMA was familiar with SRU Detachment Bahrain's capabilities since earlier in her deployment BASREC had accomplished some main condenser repairs (p 120).

7. USS IWO JIMA message 200538Z Oct 90 is CASREP 90133/Turbo Steam Stop NR 2 boiler. It lists an APL of 882046785 and references NAVSEA Technical Manual S9221-A7-MMO-010. The CASREP states, "....repair of 2MS-7 is crucial to ship's force ability to properly isolate NR 1 SSTG and provide for two valve protection when affecting repairs or conducting routine maintenance to the boiler...." AIG 71 and 438 are listed as action addressees (Echibit 19).

8. USS IWO JIMA message 200539Z Oct 90 is CASREP 90132/Turbo Steam Stop NR 1 boiler. The verbiage is the same as for CASREP 90133 (Exhibit 19).

9. SRU Det Bahrain message 210845Z Oct 90, in part, states, "CASREP 90133 requested SRU Det arrange for valve 2MS-7 repairs. SRU Det requires technical documentation and parts status prior to determining necessary repair resources...." (Exhibit 19).

10 CTG 150.6 (COMPHIBGRU TWO) message 211647Z Oct 90 addressed emergent repairs in case of USS IWO JIMA with CTF 150. This message in part states, "current material condition of USS IWO JIMA warrants immediate corrective action requiring cold iron plant condition in order to effect repairs. NR 1 boiler pilot safety valve (CASREP 90128) requires Fly Away Team (FAT) to reface drum flange. Unable to obtain two valve protection due to leak-by of valves (CASREP 90132 and 90133), thereby necessitating plant shut down. Repair at anchorage not prudent in view of casualty to one of two diesel generators (CASREP 90121). Additional casualty occurred during start up of forced draft blower for NR 2 boiler...." (Exhibit 19).

11. CTG 150.3 (COMLOGSUPFOR - ASU Bahrain) message 231224Z Oct 90 responds to COMPHIBGRU TWO request for repairs on USS IWO JIMA. It states in part, "....Tender FAT to reface drum flange.... Arrangements are being made with BASREC vice Tender FAT. Tech assist for FDB inspection/repair: SRU Det technicians to meet ship upon arrival....". There are no references made to the 2MS-7 valve in this message (Exhibit 19).

12. LCDR and Mr. were involved in SRU Detachment Bahrain decision to not use a Tender Fly Away Team (FAT) for repairs to the pilot valve flange on NR 1 boiler. This decision was based on a perceived urgency to complete USS IWO JIMA repairs to free up the power barge for use by USS LA SALLE during her PRAV 28 October 1990 (p 751).

13. USS IWO JIMA message 231430Z Oct 90 answers SRU Det Bahrain's request for 1MS-7/2MS-7 turbo stop valve information. This message states in part, "....1MS-7/2MS-7 turbo stop manufacture: Anchor. No APL support. Valve is six inch globe valve, rising stem, bolted bonnet, butt welded, carbon moly steel...." The message provides repair details, material support and schedule for other work requested (pp 921, 922, Exhibit 19).

14. SRU Det Bahrain message 240830Z Oct 90 states in part, "....SRU Det Bahrain will provide tech and contractor assistance to repair 2A FDB. In regards to repairs on 2MS-7 turbo steam stop, job will be scoped upon arrival.... SRU Det Bahrain surveyor, Mr. , will meet ship upon arrival...." (p 527, Exhibit 19).

15. USS IWO JIMA message 241048Z Oct 90 to CTG 150.3 (COMLOGSUPFOR) responds to his 231224Z Oct 90 message and discusses power and schedule requirements. This message states in part, "....in conjunction with repairs to four steam cut flanges/valves on NR 1 boiler, originator intends to conduct EDTA cleaning of same. Additionally, both turbo steam stops 1MS-7 and 2MS-7 require repairs. ....intend to maximize valve maintenance to correct a myriad of small packing and flexitallic leaks...." (Exhibit 19).

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16. The work specification for 2MS-7 repair was written against USS IWO JIMA CASREPs 90132/90133 by the SRU Detachment Bahrain surveyor, Mr. He had not been given a copy of the original CASREP messages which contained the APL and other technical document information (pp 507, 520, 754, 921, Exhibits 130, 145, 188).

17. The APL and technical document information contained in the CASREP for 2MS-7 could have been obtained by SRU Detachment Bahrain through phone/fax to SRU Naples or COMNAVSURFLANT (p 775).

18. Mr. informed his supervisor, Mr. , that he had never before written specifications for repair or replacement of valves (p 922).

19. The work specification written by Mr. was reviewed by his supervisor, Mr. Both individuals stated they were not aware that the valve was in a Level I system and subject to Level I repair controls (pp 507, 519, 520, 898, 921, Exhibit 188).

20. Mr. does not have Level I training in steam systems (Exhibit 188).

21. Mr. stated he was not familiar with the type of steam plant on USS IWO JIMA but is familiar with Level I control requirements (pp 508, 537, 540).

22. Mr. and Mr. thought they were repairing a Level III steam system valve. Neither could state what constitutes a Level III valve application (pp 886, 924).

23. Mr. assigned Mr. to write the USS IWO JIMA work specifications because he was the only surveyor available at the time (pp 515, 516, 921).

24. The writing of the USS IWO JIMA work specifications was complicated by the fact that the contract had to be awarded by noon Thursday, 25 October 1990, to avoid losing repair time over the Bahrainian weekend (Thursday/Friday) (pp 518, 519, 922, 926).

25. Because of time constraints in awarding a repair contract, Bahrain Shipbuilding and Engineering Company (BASREC) was sole sourced for repairs aboard the USS IWO JIMA (p 519, Exhibit 145).

26. The arrival conference for USS IWO JIMA took place on 25 October 1990. In attendance were LCDR (AOIC SRU Det Bahrain), Mr. (Surveyor SRU Det Bahrain), Mr. (NAVSEACENLANT), LCDR (NAVLOGSUPFOR Maintenance Officer), Engineer Officer (IWO JIMA), MPA (IWO JIMA), BTCM (NAVSEACENLANT) and BTC (IWO JIMA) (pp 752, 763, 922, 936).

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27. During the USS IWO JIMA arrival conference, no mention of Level I requirements on any job under consideration was made. The forced draft blower repairs, boiler EDTA, drain valve repairs and time line for repairs were discussed (pp 752, 763, 922, Exhibit 188).

28. During the arrival conference, LCDR was informed by the Engineer Officer that the ship did not have replacement parts for the 2MS-7 valve (pp 756, 923).

29. There were no operational time constraints placed on the USS IWO JIMA to quickly complete repairs and return to sea. (pp 114, 152, 699, 810, 859).

30. At the arrival conference, ship's force was asked for additional technical documentation and material availability to support all work contracted (pp 812, 823, 925, 936, Exhibit 188).

31. According to Mr. , the USS IWO JIMA Engineer Officer was given copies of all four work specifications at the arrival conference (p 922, Exhibit 188).

32. According to the Engineer Officer, he did not receive copies of the work specifications during the arrival conference . He said he only glanced at them because he thought they were preliminary to a ship check being conducted (pp 812, 833, 853).

33. The work specification for the replacement of four - 1/2 inch socket welded globe valves on NR 1 boiler was designated as: Serial - BH-1409; Item - 001; Location - Number One Fireroom; Reference- NAVSEA Standard Item 009-12; GFM - Ship's force provide valves. Mr. wrote the work specification. No level of QA controls annotated (p 922, Exhibit 145).

34. The work specification for 1MS-7/2MS-7 valve repairs was designated as: Serial - BH-1409; Item - 002; Location - Number One Fireroom; Title - Globe and globe stop check valves, inplace repair; Identification - Quantity (2), 6 inch globe valves, rising stem, bolted bonnet, butt welded, carbon moly steel; Manufacturer: Anchor (p 922, Exhibits 130, 145).

35. The work specification for the assist on technical repairs of 2A forced draft blower was designated as: Serial - BH -1409; Item - 003; Location - Number Two Fireroom (in reality is in FDB Flats for Number One Fireroom); No GFM as support services only to be provided. Mr. wrote the work specification (p 922, Exhibit 145).

36. The work specification for pilot safety valve flange repair was designated as: Serial - BH-1409; Item - 004; Location - Number One Fireroom; Title - NR 1 boiler drum pilot safety valve repair; Reference - NAVSEA Standard Item 009-12; No GFM, no post

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repair testing required. Mr. wrote the work specification (p 922, Exhibit 145).

37. The USS IWO JIMA Engineer Officer was aware that 2MS-7 was a Level I valve by application, a Level III valve as designed, and that it would require Level I support if major repairs were required (p 833).

38. On 25 October 1990, following the arrival conference, Mr. accompanied ship's force in an inspection of the repair jobs. 2MS-7 was still hot and lagged which prevented visual determination of valve type (p 923, Exhibit 188).

39. On 26 October 1990, the USS IWO JIMA assigned surveyor (Mr.) was changed to Mr. by Mr. (pp 523, 700, 924, 925, Exhibits 175, 188).

40. Mr. turned over all documentation he had on the four work items to Mr. the afternoon of 26 October 1990. He also informed him of what work was in the contractor's yard and that the ship was assembling what repair parts/technical documentation they had for SRU use (pp 924, 925, 926, Exhibit 188).

41. The new SRU surveyor (Mr. stated that ship's force did not show him any technical documentation for contracted repairs after relieving Mr. p 930, Exhibit 175).

42. USS IWO JIMA had a complete set of NAVSEA Valve Maintenance Manuals (S9253-AD-MMM-010 to 140) available for reference in their technical library (pp 698, 810, Exhibit 151).

43. The COSAL listing under the APL for valve 2MS-7 itemizes only the gasket and packing material as supportable material (Exhibit 123).

44. As part of the turnover between Mr. and Mr. , the two surveyors toured all work sites in the fireroom of USS IWO JIMA (p 926).

45. Mr. does have knowledge of Level I systems and controls on diesel and oxygen generation systems but not on steam systems (p 925).

46. The SRU surveyor (Mr. was under the impression that ship's force was responsible for quality assurance of BASREC work (p 929).

47. LCDR as Assistant OIC testified that he was under pressure from NAVLOGSUPFOR and USS LA SALLE to free up the power barge prior to USS LA SALLE's PRAV (pp 751, 759).

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48. SRU Detachment Bahrain Supervisor Surveyor testified that he was under the impression that USS IWO JIMA repairs needed to be completed quickly for operational reasons (p 550).

49. The major job of concern by SRU Detachment Bahrain on USS IWO JIMA was the 2A forced draft blower repair. It had the longest repair requirements (pp 752, 760, 910).

50. At the time Mr. was assigned as USS IWO JIMA's surveyor, he was also providing oversite on several other ships' repairs (pp 524, 926).

51. The only written modification made to the original work specification (item 002) was the cancellation of 1MS-7 from the work item (Exhibit 146).

52. The 2MS-7 work specification did not list any references in support of the repair procedures. It stated that new fasteners were to be installed , and no government furnished material was to be provided (pp 522, 922, Exhibit 130).

53. Had the work specification, as written, been applicable to the type valve installed, then all check points and tests would be mandatory for completion (p 403).

54. Once valve 2MS-7 was determined to be a gate vice globe valve, the work specification should have been changed. Once work was started on 2MS-7 bypass valve, a work specification change should have been made. Once direction was given to reassemble 2MS-7 vice further repair checks, a work specification change should have been made (pp 412, 450, 531, 538, 539).

55. SRU Detachment Bahrain does have a generic gate valve repair and test work specification (non-Level I). It does not list references, does require liquid penetrant test, blue test, hydro leak test and ship's force to conduct operational test. The specification requires renewal of fasteners (Exhibit 137).

56. The SRU surveyor (Mr.) was aware that the 2MS-7 work specification required changing once the valve was found to be a gate vice globe valve. This was not done because of time constraints, and due to the fact that the valve was not repaired, merely reassembled (p 929).

57. LCDR provided a repair status brief of USS IWO JIMA to LCDR when he returned to Bahrain 27 October 1990. The major topic was problems with the forced draft blower job (pp 753, 911).

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58. LCDR is familiar with Level I procedures and controls from experience as a 1200 psi Engineer and as a nuclear Machinist's Mate. He did not associate Level I requirements with the 2MS-7 repair and had not seen the 2MS-7 work specification (p 954).

59. The OIC, SRU Detachment Bahrain testified that he discussed the 2MS-7 valve with SRU Naples on 28 October 1990. At that time he concluded that it was a Level III valve installed in a Level I system (pp 886, 912).

60. Once LCDR reassumed his OIC duties, LCDR as NAVSEACENLANT Technical Coordinator shifted his attention to the USS IWO JIMA forced draft blower repairs (p 755).

61. SRU personnel involved in the generation of the 2MS-7 work specification and SRU/BASREC personnel involved in the actual work accomplishment testified that they did not equate main steam with Level I work (pp 412, 507, 519, 520, Exhibits 130, 145).

62. Ship's force was periodically monitoring the four BASREC work items (pp 949, 952, Exhibits 186, 187).

63. Amendment P00002 of the Master Agreement for Repair and Alteration of Vessels with BASREC (N68171-85-H-0031) requires at least one English speaking person on board the U.S. Navy vessel whenever work is being accomplished (Exhibit 140).

64. Mr. was BASREC's English speaking surpervisor assigned to work on the USS IWO JIMA (pp 452, 580, 939).

65. The pipefitter who worked 2MS-7 and its bypass was an Indian national who had 10 - 11 years of pipefitter experience, the last seven of which had been with BASREC Shipyard. His name was Atishbhai R. Patel (p 469).

66. Mr. identified the valve he disassembled/reassembled as 2MS-7 and the valve he repaired by lapping as the 2MS-7 bypass valve (p 470).

67. When Mr. was first shown the repair job on 2MS-7, he was with his foreman (Mr.), his supervisor (Mr.), and the SRU surveyor (Mr.) (pp 493, 927, Exhibit 175).

68. Mr. disassembled 2MS-7 by removing 12 studs and 24 nuts (3/4 inch diameter) from the body-to-bonnet seating area. These fasteners were difficult to remove due to corrosion (pp 167, 471).

69. When BASREC personnel worked on 2MS-7, the valve handwheel with dunce cap was still attached to the remote operating cable and the handwheel was physically off the valve stem (p 485).

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70. Mr. witnessed Mr. removing several nuts on 2MS-7 the morning of 28 October 1990 but was not present when the valve was pulled apart. He was also not present when 2MS-7 and its bypass were reassembled (p 582).

71. Mr. provided a second BASREC worker (Mr.), to assist Mr. in 2MS-7 disassembly (p 582).

72. The damaged studs and nuts were placed on top of the remote operator for 2MS-1 (pp 123, 167, 486, 861, Exhibit 121).

73. During BASREC's disassembly of 2MS-7 there were no ship's force personnel in attendance (p 471).

74. After Mr. removed the 2MS-7 bonnet assembly from the valve body, the gate was removed and shown to the Engineer Officer and SRU surveyor (Mr.) who were in the fireroom (pp 348, 471, 702, 814, 927, Exhibit 175).

75. Ship's force personnel (Engineer, BTC) visually inspected the gate and valve body seating surfaces. Based on conditions found, the Engineer Officer told the SRU surveyor to reassemble 2MS-7 and open the 2MS-7 bypass valve (pp 472, 473, 928, Exhibits 175, 186, 187).

76. During 2MS-7 disassembly and reassembly there were no liquid penetrant or blue checks accomplished on the seating surfaces (pp 472, 476, 928).

77. During the reassembly of 2MS-7 a new soft iron gasket was not installed. The old gasket was reused (it was imbedded in one side of the valve body-to-bonnet groove) (pp 493, 928, Exhibit 127).

78. When 2MS-7 was disassembled, the soft iron gasket should have been replaced (p 170, Exhibit 130).

79. During 2MS-7 disassembly, the BASREC workers did not remove the packing gland or stem from the valve bonnet (pp 98, 141, 162, 215, 485, 585).

80. During 2MS-7 reassembly no valve bonnet parts were replaced by BASREC (other than fasteners). The valve was not repacked and no inspection of bonnet parts was conducted (pp 98, 141, 485, 486, 488, 585).

81. BT1 assisted Mr. in the 2MS-7 bypass valve disassembly (pp 348, 473, 928).

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82. BASREC personnel lapped the seating surface of 2MS-7 bypass to remove a steam cut (p 474).

83. A blue check of the 2MS-7 bypass valve seat was accomplished by BASREC personnel and checked by BT2 Vantine prior to the valve reassembly. The SRU surveyor did not witness the blue check (pp 475, 1100).

84. The reassembly of the 2MS-7 bypass valve was accomplished by BASREC personnel using the studs and nuts originally removed (pp 349, 482).

85. Because the fasteners removed from 2MS-7 were not considered reusable by Mr. ., he asked an unidentified enlisted man on USS IWO JIMA if he had replacement fasteners. Note - English was not used during request (pp 477, 487, Exhibit 175).

86. The USS IWO JIMA sailor took Mr. to the spare parts (nuts/bolts/studs) bin located on the second level of the fireroom and told him to select replacements from the bin (p 477).

87. No instruction was provided to ship's force fireroom personnel concerning limitations on the use of material taken from the spare parts bin (pp 984).

88. Mr. selected 4 bolts, 8 studs and 20 nuts from the fireroom parts bin as replacement fasteners. Neither ship's force nor the SRU surveyor were present during the actual selection. (pp 160, 477, 479, 488, 489, 492).

89. It is not good engineering practice to mix studs and bolts in the reassembly of a main steam valve (pp 159, 587, 588, 602, 639, 856).

90. Valve 2MS-7 was reassembled in such a manner that at least one brass nut was attached to each stud or bolt on the body-to-bonnet assembly (p 160, Exhibits, 85, 86, 88-96, 98-101, 126, 193).

91. The mechanical failure of 2MS-7 was caused by the use of brass nuts in reassembly (pp 122, 163, Exhibits 85, 86, 88-96, 98-101, 126, 186, 193, 957).

92. Mr. identified Exhibit 100 (bolt from bonnet) and Exhibit 89 (stud from bonnet) as similar to the studs and bolts he removed from the fireroom parts bin to reassemble 2MS-7 (p 487).

93. Mr. thought the nuts/bolts/studs he selected were of mild steel based on his experience as a pipefitter. No testing

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(filing, magnet) was used to verify metal content (pp 478, 484, 489).

94. The correct material fasteners for the reassembly of 2MS-7 should be B-16 studs and grade 4 nuts, which meet Level I requirements (pp 159, 169, 193, Exhibits 80, 131, 136).

95. Appropriate fastener materials for use on 2MS-7 can be identified by consulting technical documents available on board USS IWO JIMA and at SRU Detachment Bahrain (Exhibits 80, 81, 135, 136, 163).

96. Mr. 's foreman ( ) did not inform him that any parts were to be provided by BASREC (pp 481, 489).

97. Mr. knew that 2MS-7 was installed in a high pressure steam system and that it required steel fasteners. He did not know what Level I meant as applied to USS IWO JIMA's main steam system (p 478).

98. Mr. knew that brass fasteners should not be used in a high pressure steam system (p 484).

99. Brass fasteners are unacceptable for use on high temperature steam systems. Brass has a maximum temperature limitation of 400 degrees F, after which tensile strength is lost (pp 161, 188, 332, 589, 769, Exhibits 126, 135).

100. Mr. did not have a copy of the SRU work specification for the repair of 2MS-7. His supervisor, Mr. did have a copy (pp 479, 581, 591).

101. Mr. , with his BASREC co-worker, reassembled 2MS-7 with the fasteners he had selected from the fireroom parts bin. Ship's force did not assist in the reassembly (pp 478, 479).

102. After 2MS-7 was reassembled, including the attachment of the remote operator, Mr. contacted ship's force, the SRU surveyor and Mr. (all present by switchboard in fireroom) to inspect the valve (p 480).

103. When Mr. finished the reassembly of 2MS-7, the valve was left in the open position. Position of the 2MS-7 bypass valve was unknown (p 496).

104. Mr. was told by the BASREC employees Patel/Sirfras, that they had obtained the replacement 2MS-7 fasteners from the ship. He did not personally check the fasteners for applicability (p 583).

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105. The SRU surveyor (Mr.) stated in his unsworn statement that he did not find out that the contractor had obtained 2MS-7 replacement fasteners from the ship until after the accident. This statement is contrary to his NIS statement which stated he knew about the fasteners before the accident (p 930, Exhibit 175).

106. The SRU surveyor (Mr.) and an unidentified ship's force khaki went behind Number 2 boiler to inspect 2MS-7 and its bypass. The visual inspection was satisfactory since Mr. and his assistant were told they could leave (pp 484, 492, 493).

107. Following the report by BTC that 2MS-7 was reassembled, the Engineer Officer went behind the boiler and looked in the direction of the valve. It appeared intact, and he did not make a close inspection (p 815).

108. On the evening of 28 October 1990, the SRU surveyor (Mr.) informed AIRMAC lagging personnel that they could lag 2MS-7. The lagging took place on 29 October 1990 (pp 355, 605, 928, 948, Exhibit 175).

109. During Mr. examination of Exhibit 97 (a sampling of nuts from the USS IWO JIMA fireroom parts bin), he identified the silver nuts as of the steel family but was unsure of the dark colored nut (p 483).

110. Mr. identified the dark colored nut in Exhibit 97 as similar to the nuts he used in the reassembly of 2MS-7 (p 483).

111. After BASREC completed the repair of 2MS-7, USS IWO JIMA personnel did not disassemble or perform any other maintenance on the valve (pp 742, 851).

112. During cold plant checks, BT1 cycled 2MS-7 using the remote handwheel the evening of 29 October 1990. The valve was cycled from closed to open to closed (p 354).

113. Mr. did not feel a hydro check was accomplished on 2MS-7 since his workers were released from further work before a hydro could be conducted. He had told Mr. to ensure a hydro was accomplished (pp 583, 584).

114. Mr. equates U.S. Navy Level I systems to high pressure steam systems which require high tensile steel components (p 592).

115. Mr. had complete faith in Mr. 's ability to repair a high pressure steam system valve (p 595).

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116. Mr. equated any person in khaki as being a ship's Chief Engineer. He could not specifically identify the USS IWO JIMA's Chief Engineer, LCDR (pp 491, 495, 496).

117. A certification of completion and acceptance of work performed form for USS IWO JIMA, Ship Repair Unit job number BH-1409, Items 001 - 004, Contractor - BASREC was signed off on 30 October 1990. The certification was signed by Mr. (pp 534, 555, 559, 562, Exhibit 146).

118. The SRU surveyor (Mr. stated that he was told to sign the USS IWO JIMA Repair Work Completion form the morning of 30 October 1990 after he had learned of the casualty (p 930, Exhibit 146).

119. SRU Detachment Bahrain was provided funding based on work assignment estimates on USS IWO JIMA job number BH-1409. Work items annotated were 001 - 004. These funds would be used to pay for work satisfactorily completed (Exhibit 150).

120. Concurrent with four BASREC work items, ship's force set a highly ambitious valve maintenance plan in both M and B Divisions (pp 299, 809, 845, Exhibits 157, 164).

2MS-7 TESTING

121. A Hydrostatic Test is a test where the system or portion of the system is pressurized above maximum operating pressure to a specified hydrostatic test pressure and inspected for leakage and visible permanent deformation (Exhibit 190).

122. An Operating Pressure Test is a test where the system or portion of the system is filled with its normal fluid medium, pressurized to maximum operating pressure, and inspected for joint leakage (Exhibit 190).

123. Only an Operating Pressure Test of valve 2MS-7 would have been required provided replacement parts met applicable requirements and specifications (Exhibit 190).

124. NAVSEA Standard Item 009-54 for the in-line repair of a bolted bonnet steam valve requires only an Operating Pressure Test following repair (Exhibit 134).

125. Mr. , head of the fluid systems and components branch of NAVSES Philadelphia, stated that, in his opinion, a hydrostatic test of valve 2MS-7 would not have revealed the fact that incorrect fasteners were installed (p 173).

126. Paragraph 3.5 of the SRU Det Bahrain repair specification for valve 2MS-7 required a post maintenance hydrostatic test be conducted (Exhibit 130).

127. The requirement for a hydrostatic test of 2MS-7 in the SRU Det Bahrain Repair Specification did not indicate the purpose of the test (i.e. tightness, strength, seat leakage), the required test pressure, or the test boundaries (Exhibit 130).

128. The SRU Det Bahrain surveyor, Mr. , stated that he told the Engineer Officer, LCDR , that the hydrostatic test required by the Repair Specification was a 150 percent test (p 928).

129. BTC was assigned the reponsibility for conducting a hydrostatic test of 2MS-7 (p 819).

130. BTC did not consult a technical manual to confirm the requirements for post-maintenance testing of 2MS-7 or to determine a hydrostatic test pressure (p 981).

131. BTC stated that he was not informed that the surveyor had specified a 150 percent hydro for 2MS-7 (p 981).

132. The Engineer Officer and BTC concluded that a 100 percent hydrostatic test would be adequate (pp 817, 981).

133. The Engineer Officer stated that the 100 percent hydrostatic test pressure for valve 2MS-7 was 655 psig (p 851).

134. BTC stated that the 100 percent hydrostatic test pressure for valve 2MS-7 was 650 psig (p 955).

135. BTC stated that valve 2MS-7 and its by-pass were hydrostatically tested to 648 psig (pp 942 thru 945).

136. BTC stated that, based on his experience, the two pound difference between actual and required pressures would not make a difference (p 955).

137. ENS stated that BTC had mentioned to him, prior to boiler light-off, that he was conducting a hydrostatic test of the main steam system (pp 705, 729).

138. The Engineer Officer stated that BTC indicated to him that a hydro of 2MS-7 had been conducted; however, the test pressure was too low (p 820).

139. The Engineer Officer stated that an Operating Pressure Test of 2MS-7 would be conducted because the hydrostatic test "was 10 pounds shy of 655" (p 851).

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140. Both the Engineer Officer and BTC stated that if they had noted a combination of studs and bolts on the bonnet of valve 2MS-7, they would have questioned that as a proper installation (pp 856, 970).

141. BTC stated in testimony that he did not inspect valve 2MS-7 during the hydrostatic test. The inspection was conducted by BT1 , a deceased member of the crew (pp 968, 971, 990, 991).

142. In a sworn statement to NIS on 4 Nov 90, BTC stated several times that he looked at valve 2MS-7 while the valve was under hydrostatic test (Exhibit 187).

143. The Engineer Officer stated that BTC had reported having inspected valve 2MS-7 during the hydrostatic test (p 844).

144. A hydrostatic test of Number 1 boiler was documented as having been accomplished in the Engineering Logs, in the Boilerwater Chemistry Worksheet Logs and in the Fireroom Cold Iron Logs for 28 and 29 Oct 90 (Exhibits 30, 38).

145. There was no documentation in any engineering log that a hydrostatic test of valve 2MS-7 had been conducted (Exhibits 30, 38).

146. BTC stated that the hydro of 2MS-7 was conducted in conjunction with the hydro of Number 1 boiler; by opening the 1MS-1 and 1MS-7 by-pass valves (p 942).

147. BTC stated that after 2MS-7 had been hydrostatically tested, the by-pass to valve 1MS-1 was shut so that Number 1 boiler could be tested to 655 psig (p 943).

148. While attempting to hydro Number 1 boiler it was determined at about 2239, 28 Oct, that the 1MS-1 by-pass valve leaked by its seat (p 945, Exhibits 30, 38).

149. BTC stated that no one else had information concerning the hydrostatic test of valve 2MS-7 because he was the only one left alive who was on the "hydro team" (p 954).

150. BT2 was in the fireroom from about 0730 until about 2400 on 28 Oct (pp 1098, 1107).

151. BT2 was involved in the hydrostatic test of Number 1 boiler but was not aware of a hydrostatic test of 2MS-7 being conducted (pp 1099, 1100, 1109, 1110).

152. BT2 stated that the 1MS-1 by-pass valve was shut while Number 1 boiler was being hydrostatically tested between 2030 and 2230 (p 1110).

all Bb

153. The Engineer Officer stated that BTC reported that he and BT1 had conducted a visual inspection of valve 2MS-7 with full steam pressure against the valve (pp 821, 844, 855).

154. Lagging had been installed around the bonnet of valve 2MS-7 before an Operating Pressure Test could be conducted (p 355, 968).

155. BT1 stated that he was not aware of any tests or inspections of valve 2MS-7 with steam pressure applied (pp 615, 616, 970, 971).

156. BTC stated that he ordered BT1 Fehlberg "...to check all the jobs we had done..." and thought that BT1 Fehlberg had checked valve 2MS-7 (p 971).

157. BTC stated that he opened the by-pass valve around 2MS-7 to apply steam to both sides of the valve, but he did not open valve 2MS-7 (p 958).

158. BTC s action to open the 2MS-7 bypass was not in accordance with EOSS nor did he inform the BTOW that he had opened this valve (pp 969, 970, 1103).

159. Valve 2MS-7 was required to be in the open position to conduct an Operating Pressure Test (pp 168, 169, 855, Exhibit 190).

160. Valve 2MS-7 was opened by the Number 1 SSTG watchstander, using the remote operator between 0630 and 0720 on 30 Oct (p 240).

MAJOR STEAM LEAK

161. BTC supervised the light off of Number 1 boiler at 0218, 30 October 1990 (pp 969, 972, Exhibit 39).

162. The B-Division Officer, ENS directed BTC to call him prior to lighting fires in Number 1 boiler (p 709).

163. The B-Division Officer was not called by BTC prior to lighting fires. ENS awoke at reveille and was told by BTC that "everything went fine and there was no need for [him] to be there. BTC stated that he forgot to wake ENS prior to lighting fires in Number 1 boiler (p 709, 967).

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164. The upstream side of valve 2MS-7 was initially pressurized with steam at 0353, 30 Oct 90 when the main steam stop on Number 1 Boiler (1MS-1) was opened (pp 1076, 1081, Exhibit 38).

165. Valve 2MS-7 was opened sometime between 0630 and 0720 on 30 Oct while starting Number 1 SSTG (p 241, Exhibit 38).

166. After valve 2MS-7 was opened, the bonnet would have pressurized with steam thus heating up the fasteners, including the brass nuts, more rapidly (pp 162, 169, Exhibit 125).

167. Number 1 SSTG was rolled with steam at 0730, 30 Oct 90 (p 240, Exhibit 38).

168. Between about 0730 and about 0745 on 30 Oct 90, MM3 and BT3 noticed what appeared to be smoke emanating from the lagging on valve 2MS-7 (pp 244, 286).

169. BT3 reported the smoking lagging on valve 2MS-7 to the Boiler Technician of the Watch (BTOW), BT2 (p 286).

170. At about 0800, BT2 relieved BT1 as the lower level watch so that King could pick-up the mail for the division (p 356).

171. At 0756, USS IWO JIMA was underway from Bahrain (Exhibits 20, 38).

172. At about 0745, MM3 , with MM3 under instruction, relieved MM3 as the Number 1 SSTG operator because was suffering from the heat. MM3 then took the Number 2 SSTG watch in the engineroom (pp 245, 246).

173. At approximately 0812 on 30 Oct, the BTOW, BT1 , reported to the EOOW that there was a steam leak behind Number 2 boiler at the turbo stop valve. BT1 requested permission to secure Number 2 boiler (p 822, 1092, Exhibit 38).

174. Upon receiving a report from the BTOW of a major steam leak, the Engineer Officer via the 21MC, informed the Officer of the Deck of the leak and requested permission to secure Number 2 boiler (pp 220, 822).

175. Even if Number 2 boiler had been secured quickly, valve 2MS-7 would not have been isolated from Number 1 boiler because valve 1MS-7 was open (pp 959, 1098, Exhibit 84).

176. Once 2MS-7 started leaking, isolation would have required either shutting both boiler main steam stop valves 1MS-1 and

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2MS-1; or shutting 2MS-1, Number 1 boiler turbo steam stop 1MS-7, and one of the engineroom bulkhead stop valves 1MS-2 or 2MS-2 (pp 959, 1089, Exhibit 84).

177. Immediately after requesting permission to secure Number 2 boiler, the Engineer Officer "heard a loud boom" and felt the engineroom vibrate. He informed the OOD there was a major steam leak in the fireroom and requested general quarters be sounded (pp 222, 822).

178. When the major steam leak occurred, the provisions of the Restricted Maneuvering Doctrine (Exhibits 35 and 37) were in effect (pp 222, 821, 842, Exhibit 38).

179. During restricted maneuvering, the Engineer Officer/EOOW is required to delay casualty control actions which involve slowing the engine and/or loss of power to a switchboard, until permission is obtained from the OOD (Exhibits 35 and 37).

180. When requested by the Engineer Officer, general quarters was sounded (p 222, Exhibits 20 and 38).

181. Upon realizing that a major steam leak had occurred in the fireroom, the Engineer Officer, as recommended by the MMOW, ordered the throttles opened wide to reduce the amount of steam escaping into the fireroom (p 823, 1092).

182. The MMOW ordered the Number 2 SSTG watchstander not to secure the TG to help minimize the amount of steam escaping into the fireroom (p 1093).

183. The EOOW ordered the fireroom to be mechanically isolated. On the recommendation of the MMOW, the main steam bulkhead stop valves were left open to bleed steam out of the main steam system (p 1093).

184. The EOCC major steam leak/rupture in propulsion plant procedures, ID No. MMSLR, requires the throttle to be shut and the SSTG to be tripped (Exhibit 36).

185. At about 0812 on 30 Oct 90, BT1 , the Duty Oil King entered the fireroom to obtain boiler samples (p 319).

186. Upon entering the fireroom upper level, BT1 noted approximately four people looking at valve 2MS-7. One was the MPA, LT ; one was probably BT2 , and the other two cannot be positively identified (p 320).

187. BT1 noted steam blowing from valve 2MS-7 which was accompanied by a loud sound (p 321).

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188. The MPA, LT , motioned BT1 to either stay back or to leave the fireroom (p 321).

189. Within a few seconds of entering the fireroom, BT1 heard a loud bang. The people who were looking at the valve 2MS-7 ran past him to the fireroom lower level (p 322).

190. The EOCC major steam leak/rupture in propulsion plant procedures (MMSLR) states ".... personnel should attempt, as time permits, to locate and isolate rupture and secure equipment, including stopping and locking shaft and securing boiler." (p 840, Exhibit 36).

191. Post casualty inspection indicated that the Number 2 Fuel Oil Service Pump (FOSP) had been tripped by fireroom watchstanders (pp 127, 389).

192. Post casualty inspection indicated that watchstanders had attempted to trip both boiler fuel oil quick closing valves and Number 1 FOSP locally. However, mechanical failures of the cable portion of the activating mechanisms apparently prevented the trips from working (p 127).

193. After the casualty, Mr. from NAVSES verified that the fuel oil quick closing valves on the boilers and the quick closing valve for Number 1 FOSP operated by tripping these devices (pp 127, 183).

194. BT1 noted the fireroom rapidly filling with steam and the temperature increasing. He left the fireroom using the ladder for the normal access (p 322).

195. As he was exiting the fireroom, BT1 paused to consider if he would be able to make it out using the normal access because it was becoming extremely hot (p 323).

196. As he was exiting, BT1 noted another individual a distance behind him attempting to exit the fireroom (p 323).

197. BT1 continued out the normal access, opened the Ellison door at the fireroom entrance and escaped safely to the forward mess deck area. He was not injured (pp 323, 325).

CASUALTY CONTROL

198. BT1 , who was in the B-Division berthing compartment, heard a rumbling sound and went to the second deck. BT1 , who was covered in white dust, told him, "the turbo stop blew." (p 357).

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199. BT1 , using the remote operators on the mess decks, shut the auxiliary and main steam stop valves on Number 1 and Number 2 boilers (p 357).

200. BT1 attempted to enter the fireroom Ellison door to pull the emergency trips for both fuel oil service pumps but was unable to do so because of the heat (p 357).

201. Electrical power had not yet been lost when BT1 , shut the boiler stop valves (p 373).

202. BT1 noted that only one of the main and auxiliary steam stop valves indicated shut from the remote station at the time he moved toward the Ellison door (p 357).

203. Valve 2MS-1, the main steam stop for Number 2 boiler, did not shut when operated remotely because the air supply line to the motor had been severed when valve 2MS-7 failed (pp 361, 391).

204. Because valve 2MS-1 could not be shut remotely, the steam leak could not be isolated from Number 2 boiler (Exhibit 84).

205. After ensuring that the throttles were opened, the Engineer Officer proceeded from main control to the mess decks to take charge at the scene (pp 325, 823, 1073, 1093).

206. The situation on the mess decks was confused and disorganized when the Engineer Officer arrived. He took charge and organized the casualty control efforts (pp 325, 828, 1035, 1039, 1040, 1073).

207. Upon arriving on the mess decks, the Engineer Officer observed BTFA Brooks injured and laying on the deck. LCDR administered first aid (p 823).

208. After administering first aid to BTFA , LCDR heard EM2 in pain. He helped the injured man to the deck and administered first aid (p 823).

209. MM3 saw LT exit the fireroom injured, laid him on the deck, and administered first aid until relieved by medical personnel (p 1033).

210. The Engineer Officer ordered positive ventilation set in the engineroom and the four doors to the mess decks shut. This action was taken in an effort to establish air flow into the fireroom to clear the steam and to cool the space (p 823).

211. One investigator, MM3 , donned an OBA and attempted to enter the fireroom through the escape trunk Ellison door on the lower level. He was prevented from entering because of heat in the fireroom (p 1034).

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212. MM3 and MM3 reported to the Repair 5 Locker Leader that the fireroom was too hot to enter and requested permission to don firefighting ensembles so that they could enter the space and search for survivors (p 1033).

213. The Engineer Officer instructed the MM3 and MM3 to assist anyone in the fireroom who required assistance; otherwise, to identify those still in the space (pp 824, 1034).

214. Approximately 15 to 25 minutes after general quarters was sounded, the two investigators entered the fireroom through the normal access (pp 291, 824, 1034, 1073).

215. Upon entering, the investigators noted that the fireroom was covered with a white powder, apparently from steam pipe insulation (p 1035).

216. MM3 stated that while in the fireroom, the firefighting ensembles were steaming, the OBA face pieces felt as though they were melting, and that they "had just gone into the hottest sauna in the world" (P 1036).

217. The investigators found MM3 on the upper level in the vicinity of 1SA switchboard. He appeared to be dead (pp 296, 1035, Exhibit 74).

218. The investigators found MM3 on the upper level near a workbench. He appeared to be dead (pp 293, 1035, Exhibit 74).

219. The investigators found three bodies piled on top of each other in the vicinity of Number 1 main feed booster pump in the fireroom lower level. They were identified as BT2 FN and BT1 . All appeared to be dead (pp 294, 1036, 1037, 1038, Exhibit 74).

220. Prior to the casualty, two deck plates had been lifted or moved to change oil in Number 1 main feed booster pump (pp 366, 825, 1048, Exhibits 74 and 121 (picture 18)).

221. It appeared that BT2 had fallen through the open deck plates (pp 295, 306, 825, 1038, 1058).

222. The investigators found BT3 in front of Number 2 boiler on the lower level. He appeared to be dead (pp 293, 1037, 1038, Exhibit 74).

223. After about five minutes in the fireroom, the two investigators were required to leave because of the heat (pp 1036, 1038).

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224. A second team of investigators entered the fireroom to check for damage and to verify the ventilation system (pp 291, 1040).

225. One of the investigators went behind Number 2 boiler and noted the bonnet of valve 2MS-7 to be missing (p 292).

226. The second team of investigators exited the fireroom after five to seven minutes and reported to the Engineer Officer (pp 293, 823).

227. Exhaust ventilation was started on high speed in the fireroom which quickly cleared the steam and heat; allowing entry into the fireroom without an OBA (p 823).

228. After the fireroom atmosphere was cleared the bodies were removed from the space (p 824).

229. The Engineer Officer found the bonnet to valve 2MS-7 lying on a deck plate on the lower level behind the boilers (p 826).

230. The Engineer Officer noticed a gold colored material imbedded in the threads of the bolts and studs for valve 2MS-7 (p 826).

231. The Engineer Officer determined and reported to the Commanding Officer that the propulsion plant could not be started to provide propulsion for the ship's return to port (p 826).

PERSONNEL CASUALTIES - MEDICAL

232. Five personnel in the fireroom when the steam leak occurred were able to exit the space. The individuals were BT1 [redacted], BT2 F. R. Parker, Jr., BTFA T. M. Brooks, LT J. M. Snyder, and EM2 D. Lupatsky (pp 289, 322, 359).

233. BT1 [redacted] exited the fireroom to the mess decks via the normal access (p 324).

234. BT1 [redacted] felt a searing pain on the side of [redacted] and in his [redacted] but did not require medical attention (p 325).

235. BT2 F. R. Parker Jr., exited the fireroom via the escape trunk to the forward mess decks and walked to medical (pp 58, 568, 825, 1029).

236. BTFA T. M. Brooks exited the fireroom to the mess decks via the normal access where he received first aid (pp 324, 823, 1030).

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237. LT J. M. Snyder exited the fireroom to the mess decks via the normal access where he received first aid (pp 569, 1030, 1033).

238. LT Snyder, although critically injured, expressed concern for personnel still in the fireroom and instructed those attending him that others needed help (p 569).

239. EM2 D. Lupatsky exited the fireroom to the mess decks via the normal access where he received first aid (pp 823, 1030).

240. After receiving first aid on the mess decks; LT Snyder, BTFA Brooks and EM2 Lupatsky were transported to IWO JIMA's medical facilities for treatment (pp 58, 825).

241. All four injured personnel had arrived in medical aboard IWO JIMA by 0900 (pp 58, 825).

242. In the Medical Department aboard IWO JIMA, teams were designated to care for each patient (p 59).

243. Each of the four patients were initially diagnosed as suffering from severe over more than of their bodies and probable (p 58).

244. Initial medical treatment included

or . Because of respiratory injury, each patient was to assist their breathing (pp 59, 998).

245. In the opinion of Captain , MC, USN, and Captain , MC, USN; the patients had virtually no chance of surviving (pp 61, 62, 996).

246. Additional medical procedures were taken to prepare the patients for transfer to USNS COMFORT, a hospital ship with a burn unit (p 59).

247. The decision to transport the four patients to USNS COMFORT was made by Captain , MC, USN; the Senior Medical Officer aboard USS IWO JIMA (pp 55, 59).

248. A CH53 helicopter was used to transport the patients to USNS COMFORT because it permitted an anesthetist, a surgeon, and two corpsmen to accompany each patient (p 60).

249. The decision to use a CH53 helicopter resulted in an approximate 20 minute delay in transporting the four patients to USNS COMFORT (p 68).

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250. In the opinion of Captain , the advantages of using a CH53 helicopter to transport the patients outweighed the attendant delay, and, in his opinion, the delay had no bearing on the ultimate outcome (p 69).

251. After reviewing the medial treatment afforded the four patients, Captain MC, USN, concurred with the decision to delay transport to use a CH53 (p 999).

252. The four patients with attending medical personnel departed USS IWO JIMA for USNS COMFORT at 1037 (Exhibit 20).

253. On board USNS COMFORT, each patient was assigned to a surgical team (p 999, Exhibit 3 through 18).

254. On board USNS COMFORT, an escharotomy was performed on each of the patients to increase blood circulation (pp 67, 999, Exhibits 3, 4, 5, and 6).

255. Fasciatomies were performed on some of the patients to increase the blood supply to injured muscles (pp 67, 1000, Exhibits 3, 4, 5, and 6).

256. On board USNS COMFORT, numerous other medical procedures were conducted in an attempt to save the patients' lives (p 1001, Exhibit 3 through 18).

257. Because of operation Desert Shield, the Medical Department aboard USS IWO JIMA was augmented with a significant number of medical personnel who would not normally have been on board. For the same reason, two hospital ships were in the area (p 70).

258. In the opinion of Captain , the four patients could not have received better medical care (p 1001).

259. LT J. M. Snyder expired on board USNS COMFORT at 1830 on 30 October 1990. Cause of death was thermal injuries (Exhibit 176).

260. BT2 F. R. Parker, Jr. expired on board USNS COMFORT at 2308 on 30 October 1990. Cause of death was thermal injuries (Exhibit 176).

261. EM2 D. Lupatsky expired on board USNS COMFORT at 2308 on 30 October 1990. Cause of death was thermal injuries (Exhibit 176).

262. BTFA T. M. Brooks expired on board USNS COMFORT at 2330 on 30 October 1990. Cause of death was thermal injuries (Exhibit 176).

263. Six personnel in the fireroom when the steam leak occurred were not able to exit the space. They were BT1 R. L. Volden, MM3 J. A. Smith, Jr., FN D. C. McKinsey, MM3 M. N. Manns, Jr., BT2 M. E. Hutchinson, and BT3 D. A. Gilliland (pp 1035, 1036, 1037).

264. BT3 D. A. Gilliland was pronounced dead on board USS IWO JIMA (LPH 2) at 0925 on 30 October 1990. Cause of death was thermal injuries (Exhibit 176).

265. MM3 M. N. Manns, Jr. was pronounced dead on board USS IWO JIMA (LPH 2) at 0929 on 30 October 1990. Cause of death was thermal injuries (Exhibit 176).

266. MM3 J. A. Smith was pronounced dead on board USS IWO JIMA (LPH 2) at 0931 on 30 October 1990. Cause of death was thermal injuries (Exhibit 176).

267. BT1 R. L. Volden was pronounced dead on board USS IWO JIMA (LPH 2) at 0944 on 30 October 1990. Cause of death was thermal injuries (Exhibit 176).

268. FN D. C. McKinsey was pronounced dead on board USS IWO JIMA (LPH 2) at 0955 on 30 October 1990. Cause of death was thermal injuries (Exhibit 176).

269. BT2 M. E. Hutchinson was pronounced dead on board USS IWO JIMA (LPH 2) at 0959 on 30 October 1990. Cause of death was thermal injuries (Exhibit 176).

SHIP CONTROL

270. The Officer of the Deck (OOD) when the casualty occurred was LTJG , USNR (p 219).

271. LTJG MacKenzie had been qualified OOD for one week (p 231).

272. The Commanding Officer was on the Bridge from before the ship got underway until after the ship was anchored (p 794).

273. A navigation brief for leaving Bahrain was conducted during the afternoon of 29 October 1990 (p 219, Exhibit 33).

274. USS IWO JIMA was in restricted waters with the Special Sea and Anchor Detail set and the Restricted Maneuvering Policy in effect when the casualty occurred (pp 219, 221, 794, Exhibits 21, 138).

275. USS IWO JIMA was underway from Bahrain at about 0756 on 30 October 1990 (pp 221, 793, Exhibits 20, 39, 138).

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276. The ship got underway with a pilot and two tugs (p 793 Exhibit 20).

277. Both tugs were released by 0802. The pilot remained on board (p 793 Exhibit 20).

278. At about 0811, the Engineer Officer notified the OOD of a steam leak in the fireroom and requested permission to secure Number 2 boiler. The OOD immediately granted permission to secure the boiler (pp 221, 794).

279. At about 0812, the OOD sounded general quarters as requested by the Engineer Officer. Included with the request was a report that a major steam leak had occurred and that communications were lost with the fireroom (pp 222, 794, Exhibit 20).

280. As a result of the engineering casualty, propulsion and electrical power, including power to steering, were lost (pp 224, 794).

281. Power to steering was lost for about one minute from about 0813 until 0814 (Exhibit 20).

282. When the casualty occurred, the ship's speed through the water was about eight or nine knots (p 794).

283. The Commanding Officer and the OOD felt the ship had to slow to between four and five knots to safely drop an anchor (pp 224, 794).

284. The Commanding Officer (CO) disagreed with the pilot's recommendation to drop the anchor because in the opinion of the CO, the ship had too much way on (p 794).

285. The Commanding Officer delayed dropping the anchor as long as possible to preclude injuring personnel on the forecastle (pp 224, 794).

286. The port anchor was let go at 0816 and the starboard anchor was let go at 0817 (p 225, Exhibit 20).

287. The ship safely anchored 200 yards from the nearest shoal water (p 226).

288. The Commanding Officer did not find it necessary to take the deck or the conn (pp 225, 231).

DAMAGE

289. Inspection of the boilers following the casualty indicated only a small amount of water remained in the boilers (p 180).

290. The deaerating feed tank had about a bucket of water remaining after the casualty (p 184).

291. The burner barrels on Number 2 boiler could not be pulled out because of corrosion which formed as a result of condensation following the major steam leak (p 179).

292. After the casualty, there was no visible damage to the tubes in Numbers 1 and 2 boilers or to the refractory, other than normal wear (p 179).

293. Mr. , the NAVSES boiler inspector who inspected both boilers after the casualty occurred, was surprised with the minimal amount of damage that occurred to the boiler as a result of the failure of 2MS-7 (p 179, Exhibit 129).

294. Mr. stated that significant damage to the ship might have occurred had the boiler fires not been extinguished quickly (p 185).

295. A 100 percent hydrostatic test of both boilers is required to confirm tube tightness (p 179).

296. Mr. stated that the overall condition of valve 2MS-7 following the casualty was good (p 162).

297. The air supply line to the pneumatic motor for valve 2MS-1 was severed (pp 361, 392).

298. The conduit pipes, containing the cables which connected the fuel oil quick closing valves on the boilers with the two pull handles at the BTOW station, had been broken free from their supports (pp 127, 389, Exhibit 121 (picture 17)).

299. Thermal insulation on pipes in the vicinity of 2MS-7 had been blown off the pipes (Exhibit 121 (pictures 2 thru 7, 14, 20, 39, 40)).

300. After the casualty, COMNAVSURFLANT provided replacement valves for 1MS-7, 2MS-7 and MS-9 (pp 148, 149, Exhibits 123, 124).

301. No evidence was presented that suggested that any intentional or criminal actions by any service member, living or deceased, directly or indirectly caused the accident aboard USS IWO JIMA (pp 163, 477, Exhibits 175, 186, 187, 188).

ELLISON DOOR/ESCAPE TRUNK

302. The fireroom escape trunk Ellison door did not operate correctly because, when pushed to its full open position, the door remained open (p 388).

303. The escape trunk had little of the white powder in it that was prevalent throughout the fireroom after the casualty (p 388).

ADMIN - RESPONSIBILITY

304. The Commanding Officer is the officer assigned by CHNAVPERS, who is responsible for safe and proper supervision, operation and maintenance of the propulsion plant. The Commanding Officer's authority and responsibility are established by U.S. Navy Regulations (p 791 Exhibit 160).

305. All personnel on watch in the fireroom at the time of the casualty were qualified for the watch station they were standing (p 102, Exhibit 156, 109 thru 117).

306. Some training had been conducted in major steam leak casualty control procedures. Specifically basic engineering casualty control exercises for this casualty were conducted on 14 June and 23 August 1990 (Exhibits 154, 155).

307. The selected exercise requirement to conduct a major steam leak drill had not yet been conducted for this competitive cycle (Exhibit 51).

308. The Restricted Maneuvering Policy set forth in Exhibits 35 and 37 did not "unambiguously set forth....the end of a 'Restricted Maneuvering Condition'" contrary to the requirements of COMNAVSURFLANTINST 3540.18A (Exhibit 160).

309. The Engineering Department watchbill was not prepared, approved and administered in accordance with the requirements of the Engineering Department Organization and Regulations Manual (pp 262, 266, 371, Exhibits 22, 25, 160).

310. Not all watch stations required to be manned for Sea Detail were included on the Engineering Department watchbill (Exhibits 22, 160).

311. The tag-out posted for the repair of valve 2MS-7 did not adequately isolate the work area (Exhibit 139).

312. No tag-out was posted for the hydrostatic test of Number 1 boiler or for a hydrostatic test of valve 2MS-7 (pp 631, 671, 941, 985, Exhibit 139).

313. BTC stated that the by-pass valve for 1MS-1 was opened with a danger tag attached to hydro valve 2MS-7 (pp 941, 942, 984, Exhibit 139).

314. The bonnet on the by-pass for valve 1MS-1 was removed from the valve at about 0030 on 29 October, without first clearing a danger tag (p 1109, Exhibits 38, 139).

315. BT3 stated he tagged-out Number 1 Main Feed Booster Pump (MFBP) to change oil (p 1075).

316. No tag-out record sheet for changing oil in Number 1 MFBP could be located; nor could the Duty Officers, MMCS and LTJG , recall approving a tag-out for the work (p 1075).

317. ENS G. J. USN, relieved as B. Division Officer on 22 October 1990. There was no formal turnover process nor was there a relieving letter (p 696).

318. ENS had been the Electrical Officer on USS IWO JIMA for ten months and had done very well in this billet (pp 696, 798).

319. ENS had been identified as a "gifted officer" with exceptional engineering knowledge. He was assigned to B-Division because the previous division officer was not doing well (pp 696, 697, 798, 799).

320. BTC was relieved of his duties as B-Division Leading Chief Petty Officer on 24 Aug 90, reportedly because of clashes with the Engineer Officer and/or Division Officer (pp 721, 728, 798, 799).

321. BTC was reassigned as B-Division Leading Chief Petty Officer in mid-October 1990, along with the assignment of a new division officer, because of problems in the division (p 799, Exhibit 187).

322. BTC reported aboard USS IWO JIMA on 7 April 1983 (p 933).

323. BTC will be separated from the Navy because he does not meet the requirements for (p 785).

324. In the opinion of the Commanding Officer, Captain , previous Commanding Officers did not take action on BTC because of the Chief's value to the ship (p 785).

325. Captain expressed total trust and confidence in BTC y (p 785).

all

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326. Although BTC [redacted] was not the B-Division LCPO between 24 Aug 90 and mid-October, he continued to be involved in the day-to-day operation of the division and in decision making processes (pp 637, 721, 728).

327. The Engineer Officer stated that BTC [redacted] s management style gave his subordinates the impression they were not trusted (p 847).

328. Concerning BTC [redacted], ENS [redacted] stated: "During his time when he was back in the division, he was again the center of the division. Everything revolved around him, he did all the coordination, answered all the questions." (p 721).

329. ENS [redacted] stated that BTC [redacted] was not accustomed to having a division officer check on him (p 745).

330. LT Snyder relieved LT [redacted] on 18 Oct 90 as Main Propulsion Assistant. This was a normal rotation relief (p 799, Exhibit 51).

331. Although the Number 1 SSTG watchstander was assigned to a different watch because of heat stress symptoms, no heat stress survey of the area was ordered or conducted (p 1088).

332. The Commanding Officer stated that he did not consider the recent personnel changes in B-Division to have contributed to the cause of the accident (p 799).

333. Engineering Department personnel were divided into three inport duty sections (pp 722, 723).

334. Each day, a "stand-by duty section" assisted the day's duty section (pp 722, 723).

335. The duty section and stand-by duty section normally worked a 16 to 18 hour day. The third section "knocked off" after morning quarters (pp 722, 723).

336. The Engineer Officer stated that Engineering Department personnel had adequate rest during the inport period (p 846).

337. The Commanding Officer stated that he was confident that the Engineer Officer had made sure that his personnel were getting adequate rest (p 797).

338. In the opinion of ENS [redacted], the B-Division Officer, personnel in the division received adequate sleep and liberty. Fatigue did not contribute to the cause of the casualty (p 744).

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339. LCDR V reported to USS IWO JIMA on 5 April 1989 and assumed duties as Engineer Officer. The previous Engineer Officer had been relieved for cause and was not on board when LCDR arrived (pp 804, 829, Exhibit 167).

340. The material condition of the propulsion plant when LCDR assumed duties as Engineer Officer was poor (pp 681, 802, 834, 835, 934).

341. Since LCDR became Engineer Officer, the material condition of the propulsion plant improved significantly as evidenced by an Operational Propulsion Plant examination completed in April 1990 (pp 681, 682, 803, 934, Exhibits 165, 167).

342. In the opinion of the Commanding Officer, LCDR "....is the best thing that has happened to [USS IWO JIMA] in the last five years," and LCDR V should continue as Engineer Officer (p 803).

343. Prior to the accident, manning levels in B-Division were sufficient and met NMP requirements (p 744).

344. The B-Division Supply Petty Officer had been assigned to this position for about three months but had received no training on how to carry out his duties and responsibilities (pp 688, 689).

345. The B-Division Supply Petty Officer had only a basic knowledge of procedures for ordering parts, supplies, and handling requirements (p 685).

BOILER HYDRO

346. A 100 percent hydrostatic test of Number 1 boiler was conducted between 1520, 28 Oct and 0330, 29 Oct (pp 307, 318, 319).

347. The temperature of the water used to hydrostatically test Number 1 boiler was 78 degrees F (p 957).

348. Two one-half inch globe socket welded cut-out valves for the steam drum pressure transmitter were replaced (p 745, Exhibit 150).

349. Following replacement of the steam drum pressure transmitter cut-out valves, a 135 percent hydrostatic test of the weld was required. Only a 100 percent hydro was conducted (p 745, Exhibit 161).

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350. Neither a locally prepared procedure nor NSTM Chapter 221 were used in the fireroom when Number 1 boiler was hydrostatically tested (pp 980, 981).

351. BTC , the individual who supervised the hydrostatic test, was not familiar with the NSTM, Chapter 221 requirements for providing over-pressure protection (p 982, Exhibit 161).

352. LT and LT were designated to witness the hydrostatic test of Number 1 boiler however, neither officer checked the boiler drum pilot valve flange which had just been repaired (p 671).

QUALITY ASSURANCE

353. COMSERVFORSIXTHFLTINST 4700.2B cautions ships on foreign contractor work in paragraph 106.c.(5) that: "Ships representatives should closely monitor all work being accomplished and immediately contact the SRU surveyor if problems arise.... It is important to remember that a foreign contractor will very likely not be familiar with the particular make or model of the equipment that he will be repairing on board U.S. ships...." (pp 137, 402, Exhibit 79).

354. The QA caution in paragraph 106.c.(5) of COMSERVFORSIXTHFLTINST 4700.2B does not appear in any form within the body of the Ship Repair Contracting Manual (NAVSEA 0900-LP-079-5010) or the Master Agreement for Repair and Alteration of Vessels with BASREC (N68171-85-H-0031) (p 402, Exhibits 79, 140).

355. LCDR as OIC for SRU Detachment Bahrain testified that the ship had the ultimate responsibility for all QA on the ship (p 877).

356. The SRU Surveyor (Mr. , was under the impression that ship's force was responsible for QA of BASREC work (p 929, Exhibit 175).

357. The SRU surveyor (Mr. was under the impression that BASREC was supposed to have a QA inspector on-site during the repair process (Exhibit 188).

358. SRU Detachment personnel stated that the surveyor is responsible for ensuring job completion in accordance with the specification, which is not the same as quality assurance (pp 410, 929).

359. The COMSERVFORSIXTHFLT Maintenance Officer stated that quality assurance requirements in repair work accomplishment is a shared responsibility between ship's force and the SRU surveyor (pp 438, 443, 444).

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360. To BASREC personnel, the surveyor is primarily responsible for checking the adequacy of work conducted. Different surveyors will check to the work specifications imposed - U.S. Navy, Lloyds, American Bureau, etc. (p 593).

361. The COMSERVFORSIXTHFLT Maintenance Officer testified that surveyors should have a working familiarity with NAVSEA quality assurance requirements (p 456).

362. There is no separate quality assurance organization within the SRU Detachment Bahrain (pp 422, 423, 532, 872, Exhibit 143).

363. QA training as practiced in the U.S. Navy, has no counterpart at BASREC. All QA training on processes is done on the job by the skilled foreman (p 590).

364. The four work specifications written for USS IWO JIMA did not include NAVSEA Standard Items or other technical documentation references on which to base repair procedures (pp 522, 922, Exhibits 130, 145).

365. The 2MS-7 work specification was not identified as a Level I repair. The references at a minimum should have listed NAVSEA Standard Items and MIL-STD-777 (pp 190, 203, Exhibits 130, 132).

366. NAVSEA S9AA0-AB-GOS-010/GSO, General Specifications for Overhaul of Surface Ships (GSO) shall be invoked by all activities involved in defining the technical requirements for modernization and repair of non-nuclear ships. It is the primary source of technical requirements for the refurbishment and repair of existing ship's equipment and components (Exhibit 80).

367. GSO defines a "Technical Repair Standard" (NAVSEAINST 6160.2) as a technical document which provides the minimum requirements and procedures for the overhaul of an item to a specified condition. The TRS is a standard, not simply a procedure or a substitute for a technical or maintenance manual (Exhibit 80).

368. There were no special material or repair control requirements listed on the four USS IWO JIMA repair specifications written by SRU Detachment Bahrain surveyors (Exhibits 130, 145).

369. SRU Detachment Bahrain has contracted locally for Level I work. The contractor used was BASREC (pp 414, 456, 457, 508, 538, 772, 898, 899).

370. On Level I repair taskings that require material, the material is normally provided by the ship. SRU Detachment Bahrain does not stock Level I material (p 524).

371. The OIC, SRU Detachment Bahrain testified that he discussed the 2MS-7 valve with SRU Naples on 28 October 1990. At that time he concluded that he had a Level III valve installed in a Level I system (pp 886, 887, 912).

372. The SRU surveyors are sent to conduct ship checks in an effort to develop accurate work specifications (pp 433, 439, 530).

373. The ship surveyor conducts in-progress work surveillance to ensure adherence to specification requirements, orders, directives and sound marine practices. He is responsible for final acceptance of all work performed by foreign contractors (Exhibit 143).

374. It is not uncommon for the surveyor to execute corrections and changes to the specification at the work site or to include those changes in a completion report afterwards (pp 429, 451, 883, 884).

375. The Surveyor Supervisor, Mr. , stated that there are no requirements to document the results of check points in a work specification. Satisfactory completion of the repair job, signed by the surveyor, will signify that all checks were done correctly (pp 532, 533).

376. The OIC, SRU Detachment Bahrain stated that repair specifications were kept simple because of worker language barriers and because the contractor would not have copies of the specification reference documentation (p 879).

377. No SRU personnel involved in the generation of the 2MS-7 work specification or SRU/BASREC personnel involved in the actual work accomplishment equated main steam with Level I (pp 412, 433, 507, 520, Exhibits 130, 145).

378. Prior to calling a job complete, the surveyor must inspect the completed product and should contact ship's force for concurrence. The surveyor should then sign off the job as complete (pp 409, 454, 534, 546, Exhibit 143).

379. NAVSEA S9253-AD-MMM-010 to 140 (Maintenance Manual for Valves, Traps, and Orifices (non-nuclear)) provides detailed repair guidance on valves found on U.S. Navy ships (Exhibit 81).

380. NAVSEA S9253-AD-MMM-010 Paragraph 6-3.2.1 defines Level I maintenance and components as, "Systems designated as Level I include main steam systems with a design temperature greater than 775 degrees F and/or that operate at a pressure higher than 1000 psi. Valves used in Level I systems and/or designated as Level I valves must meet contain controlled material requirements...." (Exhibit 81).

381. The procedures required to spot-in a gate valve can be found in NAVSEA S9253-AD-MMM-010 Paragraph 6-7.1.2. The procedure requires the removal of the stem from the bonnet (Exhibit 122).

382. The COSAL listing under the APL for valve 2MS-7 contains a warning which reads "Level III valve, do not install in Level I/Sub Safe service. When valve is no longer repairable order FSN...." (Exhibit 123).

383. During 2MS-7 disassembly and reassembly there were no liquid penetrant or blue checks accomplished on the seating surfaces. During repairs to the 2MS-7 bypass valve, the seat was blued for contact. No documentation could be provided for any of the QA tests (pp 98, 473, 476, 928, Exhibit 132).

384. During the reassembly of 2MS-7, a new soft iron gasket was not installed. The old gasket, which was imbedded in one side of the valve body to bonnet grove, was reused. The condition of the old gasket was not inspected (pp 170, 473, 928, Exhibits 127, 130).

385. The brass nuts removed from the parts bin in the fireroom are visually not distinguishable as brass because of the manufacturer-applied black coating on them (Exhibits 141, 186).

386. COMNAVSEASYSCOM has been aware of a problem with coated brass nuts being used in high temperature applications since 1975. An advisory was issued in warning to all steam propulsion plant ships and an ACN change made to NSTM Chapter 075 (Threaded Fasteners) (Exhibits 162, 163).

387. NSTM Chapter 075 ACN on threaded fasteners states in part, "....there are some copper alloy fasteners in the stock system that are treated with carbon black and look very much like steel. These fasteners may or may not be marked and must not be used in high temperature applications (above 250 degrees F). The Level I system of material control should be adequate to protect main and auxiliary steam systems from using these fasteners, however, make sure of the marking before installing fasteners in high temperature applications and do not rely on looks or what the stock system sends you...." (Exhibit 163).

388. Appropriate fastener material for use in main steam systems can be identified by consulting technical documents available on USS IWO JIMA and at SRU Detachment Bahrain (Exhibits 80, 81, 135, 136, 163).

389. The COMPHIBGRU 2 Material Officer interpreted COMNAVSURFLANTINST 9090.1 as applicable for ship's force work, COMNAVSURFLANTINST 9090.2 as applicable for Intermediate Maintenance Activity (IMA) work, COMNAVSURFLANTINST 9000.1C as applicable for depot level work during availabilities over three months in duration. He is not aware of any instruction that discusses quality assurance for short duration depot level work or availabilities (p 119).

390. CINCLANTFLTINST 5400.2L Article 4403 Paragraph C.(2) states that the Commanding Officer shall "Recognize that they share an equal responsibility with the industrial activity for quality assurance of work accomplished to.... establish a quality assurance organization.... to determine that work by the industrial activity is properly performed in accordance with established technical specifications...." (Exhibit 76).

391. COMNAVSURFLANTINST 9000.1C Article 4711.2 Paragraph 1 states, "Overseas availabilities are assigned for ship repairs requiring industrial assistance from repair facilities remote from those normally used by Atlantic Fleet ships, and which are essential to permit the ship to continue its assignment in a high state of readiness...." (Exhibit 78).

392. COMNAVSURFLANTINST 9000.1C Article 4711.2 Paragraph 1.a. states, "In planning work, consideration need not be limited to the correction of CASREPs; requests are also appropriate for emergent work items. Specifically, items which do not require repair parts (foreign industrial activities will probably not be able to undertake such work unless the ship has the parts)...." (Exhibit 78).

393. The COMNAVSURFLANTINST 9090.1 of 26 December 1978 sets force policy on quality assurance (QA) programs. It references CINCLANTFLTINST 4355.1A/CINCPACFLTINST 4355.1 which has been cancelled (pp 92, 118, Exhibit 82).

394. COMNAVSURFLANTINST 9090.1 Paragraph 2.2 states, "This manual....quality assurance requirements for the repair and maintenance of ships and their equipment by forces afloat. This includes, but is not limited to Level I, Level A...." (Exhibit 82).

395. COMNAVSURFLANTINST 9090.1 Paragraph 2.2.3 states, "The instructions contained herein have applicability to <u>every ship and activity</u> of the force. It is primarily applicable to the repair/maintenance accomplished by force Intermediate Maintenance Activities (IMA). The requirements are also applicable to ship's force when performing maintenance on their own ship...." (Exhibit 82).

396. COMNAVSURFLANTINST 9090.1 paragraph 2.2.4 states, "Because of the wide range of ship types and equipment, and the various resources available for maintenance and repair, the instructions set forth in this manual are necessarily somewhat general in nature. Each activity must implement a quality assurance program to meet the intent of this manual...." (Exhibit 82).

397. USS IWO JIMA promulgated a ship's quality assurance instruction by IWOJIMAINST 9090.2C of 23 July 1989. The reference instruction is COMNAVSURFLANTINST 9090.2 which is the TYCOM QA Manual for Intermediate Maintenance Activities (Exhibit 83).

398. Although USS IWO JIMA has a promulgated quality assurance instruction, it is not being used by the Engineering Department (p 831, Exhibit 83).

399. COMNAVSURFLANTINST 9090.1 Paragraph 2.5 states, "Audits are the tool which will be used to measure the success of this program....Squadron/Groups shall conduct annual audits of all assigned ships as part of the command inspection to ensure compliance with this program...." (Exhibit 82).

400. The USS IWO JIMA has not had a QA program audit by her Squadron/Goup Commander during the last year and a half. No records can be found of any previous audit (p 1057).

401. COMNAVSURFLANTINST 9090.1 Section 4 defines levels of essentiality which includes Level I control systems. Surface ship Level I designation shall apply to piping/components in the main steam systems with a design temperature of 775 degrees F or greater on fossil fuel powered systems. It further states that the boundaries of main steam are defined as originating at the superheater outlet header connection (flanged or butt welded) and terminates at all high pressure turbine inlet connections and shall include all piping and components including main steam drains up to and including the outlet stop valve and/or steam pressure sensing lines (p 134, Exhibit 82).

402. Valves 1MS-1, 2MS-1, 1MS-7, 2MS-7, MS-8 are Level I valves by application as is the piping connecting the valves, drains and bypass valves (p 93, Exhibits 82, 84).

403. COMNAVSURFLANTINST 9090.1 Section 6 Paragraph 6.4.3 states, "The Engineer of a ship shall ensure that controlled material requirements are indicated on work requests where a determination has been made regarding the requirements of Level I,.... or other controlled material, i.e. MILSPEC...." (pp 435, 659, Exhibit 82).

404. COMNAVSURFLANTINST 3540.18A (EDORM) Paragraph 1107.e states, "Engineer Officer responsibilities - establish an organization of qualified personnel to monitor progress and

inspect work performed on Engineering Department equipment by commercial contractors, Intermediate Maintenance Activities (IMA) and Depot Level Repair Activities, and to witness quality control tests as appropriate to assure prompt and correct work completion." (Exhibit 160).

405. COMNAVSURFLANTINST 9090.1 Section 7 Paragraph 7.5.4 states, "All in-place testing of ship systems and components will be performed by qualified ship personnel. All valve lineups, electrical hookups, system lineups and operations necessary to meet testing requirements and perform tests or inspections shall be completed by the ship...." (Exhibit 82).

406. COMNAVSURFLANTINST 9090.1 Section 7 requires ship's force personnel to document hydrostatic tests accomplished on piping systems or portions of a system to recertify the system after maintenance/repair actions have been accomplished. QA Form 18A is to be used and records maintained for 3 years (Exhibit 82).

407. The USS IWO JIMA's quality assurance instruction does not require the use of QA Form 18A when conducting hydrostatic tests of piping systems/components (p 638, Exhibit 83).

408. The USS IWO JIMA Engineer Officer delegated all testing requirements (including hydrostatic) during 25 - 30 October to the MPA, BTC , and BT1 (LPO of the space). He did, however, accomplish the boiler close-out inspections (p 842, Exhibit 186).

409. The Engineer Officer was aware that USS IWO JIMA had a QA instruction promulgated and that he was the Quality Assurance Coordinator (pp 657, 829).

410. The Engineering Department had a QA organization established by the Engineer Officer when he arrived. It deteriorated over time due to a lack of attention (pp 657, 830).

411. Following the USS IWO JIMA's 1989 deployment, the Engineer Officer attempted to obtain quotas for some of his personnel at various NEC QA courses. He was told the training was for enroute or attached Intermediate Maintenance Activity (IMA) personnel only (pp 831, 951).

412. Intermediate Maintenance Activities have trained QA personnel who monitor and administer controlled material programs (includes Level I). Special NEC training is providing these personnel which is not available to non-IMA personnel (pp 446, 447, Exhibit 82).

413. The Engineer Officer on USS IWO JIMA was under the impression that the SRU surveyor was responsible for the QA of all work specification check points (p 832).

414. Senior B Division personnel (BT1 [redacted] and BT1 [redacted]) stated they were under the impression that the SRU surveyor was responsible for QA of the BASREC work (pp 360, 607, 608).

415. The Engineer Officer on USS IWO JIMA had received QA training as an enlisted man in the submarine force where there was a separate QA organization for shipboard work. He stated he does not see a comparative organization in the surface force outside of the Intermediate Maintenance Activities (pp 828, 857).

416. Prior to entering any port for maintenance, the Engineer Officer on USS IWO JIMA would meet with his division officers (or representatives) and discuss the upcoming work requirements, including QA. This was done prior to the inport period starting 25 October 1990 (pp 670, 829).

417. The Engineer Officer on USS IWO JIMA was under the impression that the contractor knew how to work Level I jobs, that the SRU surveyor was familiar with Level I procedures in steam systems and that the work specification called for Level I controls (pp 657, 834).

418. The Engineer Officer on USS IWO JIMA stated that he required his personnel to monitor all work ongoing in the engineering plant regardless of the repairing activity (pp 657, 827).

419. The Engineer Officer of USS IWO JIMA did stress to his personnel the use of correct fasteners for application intended (p 378).

420. Senior personnel in the USS IWO JIMA Engineering Department knew that they must supervise junior personnel in the accomplishment of valve maintenance so as to prevent the use of unauthorized material while training them in proper repair procedures (pp 303, 364, 632, 965, 966, Exhibit 186).

421. Enlisted personnel in B Division stated they were unaware of the existance of a USS IWO JIMA QA instruction but several did know that the COMNAVSURFLANTINST 9090.1 (orange binder) was available for use (pp 254, 338, 368, 610, 977, Exhibit 82).

422. Formal classroom quality assurance training was not being conducted on USS IWO JIMA with any regularity. Some aspects of quality assurance requirements were being addressed during other training lectures such as valve maintenance (pp 254, 300, 340, 341).

423. Ship's force personnel were not familiar with Level I material controls or Type Commander Quality Assurance procedures in general (pp 302, 339, 367, 375, 577, 610).

424. There are no controlled materials and/or storage areas within the M & B Division spaces. The Supply Petty Officers for both divisions are unfamiliar with controlled material handling procedures and have not received training in this area (pp 239, 659, 660, 685, 686, 734, Exhibits 82, 83).

425. The USS IWO JIMA has an extensive technical library which includes quality assurance documentation, equipment technical manuals, NAVSEA Valve Maintenance Manuals (14 vols), General Specifications for Overhaul of Surface Ships (GSO), NAVSEA Technical Manual (NSTM) chapters, etc. This documentation was readily available for use in repair work (p 263, Exhibit 151).

COMSERVFORSIXTHFLT

426. CAPT Van Christopher is the Maintenance Officer on the staff of COMSERVFORSIXTHFLT/CTF 63/COMNAVSURFGRUMED (p 394).

427. SRU Detachment Bahrain reports to SRU Naples which reports to COMSERVFORSIXTHFLT Maintenance Officer, CAPT Christopher (pp 395, 867).

428. COMSERVFORSIXTHFLT is not in the NAVSEA chain of command. If technical assistance for repair support is required, the Maintenance Officer will request it from COMNAVSURFLANT who will in turn request such assistance from various NAVSEA organizations (NAVSEACENLANT, NAVSSES, NAVSEA Technical codes) (p 395).

429. COMSERVFORSIXTHFLTINST 4700.2B is the guiding instruction for Middle East Force Ship Maintenance Policy and Procedures (p 405, Exhibit 79).

430. Prior to a Battle Group deploying from the east coast, COMSERVFORSIXTHFLT Staff would conduct a ship briefing on how maintenance is accomplished in the Mediterranean and Middle East operating areas (pp 396, 428, Exhibit 79).

431. It is COMSERVFORSIXTHFLT's policy that all systems/components that are CASREP items be restored to full operating capability as soon as possible with special consideration given to MIDEASTFOR operational urgency (Exhibit 79).

432. COMSERVFORSIXTHFLTINST 4700.2B directs MIDEASTFOR ships to include AIG SEVEN ONE as an action addressee on all CASREPs and the deployed Mediterranean tender as an information addressee. Additionally, COMSERVFORSIXTHFLT SRU DET BAHRAIN as an action addressee on all CASREPs and maintenance related messages is required (Exhibit 79).

433. A listing of generalized industrial capabilities available in the MIDEASTFOR area can be found in Paragraph 106 of COMSERVFORSIXTHFLTINST 4700.2B (Exhibit 79).

434. The COMSERVFORSIXTHFLT Maintenance Officer felt that the additional surveyors and other technicians sent to SRU Detachment Bahrain since the start of Operation Desert Shield were sufficient for the work load being experienced. Should work load demand or number of ships in the region increase, then support would be adjusted (pp 426, 455).

435. When filling limited surveyor billets at the two SRU offices, COMSERVFORSIXTHFLT maintenance personnel look for diversity of background to try and fill the perceived need (p 426).

436. USS IWO JIMA did not receive an inchop briefing by the COMSERVFORSIXTHFLT Staff on maintenance policy and practices in the Middle East prior to their arrival (p 449).

437. Prior to the accident on USS IWO JIMA, the COMSERVFORSIXTHFLT Staff was in the process of reviewing maintenance/logistics requirements in the Persian Gulf. Manning levels and skill requirements at the SRU Detachment Bahrain are part of that review (pp 881, 890).

SRU MANAGEMENT

438. The COMSERVFORSIXTHFLT Maintenance Officer is COMNAVSURFLANT's agent in all maintenance matters for ships in the Middle East. This responsibility has been further delegated down to the OIC SRU Detachment Bahrain for maintenance matters in the Persian Gulf (p 394).

439. The COMSERVFORSIXTHFLT Maintenance Officer felt that the SRU Detachment Bahrain, OIC, LCDR was meeting his assigned job tasking (pp 420, 424).

440. The SRU Detachment Bahrain personnel support prior to the Operation Desert Shield build-up consisted of one LCDR (OIC), one E8/E9 MOTU Technical Representative Coordinator, three ship surveyors, and four MOTU CETs (Contract Electronic Technicians) (Exhibit 79).

441. On 30 October 1990 there were approximately 84 personnel attached to SRU Detachment Bahrain. The original complement had been augmented by seven surveyors and about sixty NAVSEACENLANT/MOTU Technical Representatives (military/civilian) working in the operating theater (p 868).

442. The work load at SRU Detachment Bahrain significantly increased over the last four months. Ships serviced increased from about seven to 31 ships (pp 421, 505, 511, 766, 807, 808, Exhibit 171).

443. COMSERVFORSIXTHFLT SRU Detachment Bahrain Instruction 5400.1 (series) provides the organizational structure and duties of detachment personnel (p 513, Exhibit 143).

444. SRU Detachment Bahrain has minimal administrative support for its required functions. This problem deteriorated further with the influx of NAVSEACENLANT/MOTU Technicians and increased ship presence (pp 552, 560, 776, 869, 870).

445. There is no separate quality assurance organization within SRU Detachment Bahrain (pp 423, 532, 872, Exhibit 143).

446. LCDR volunteered to be the OIC of the SRU Detachment Bahrain for a six month assignment. He assumed those duties in July 1990 having come from SUPSHIP Jacksonville (pp 424, 448, 865).

447. The OIC billet at SRU Detachment Bahrain is changing to a one year permanent change of station (PCS) assignment (pp 447, 891).

448. Officers assigned to SRU Naples are on PCS orders and civilians are permanent billets. Assignments to Bahrain are temporary (exception is Senior Surveyor Billet) with length based on local needs. Personnel assigned to SRU Detachment Bahrain are volunteers (p 448).

449. The OIC SRU Detachment Bahrain shall remain constantly attuned to the ship's schedules and take all advantage to provide voyage repair assistance. He shall maintain a list of all CASREPs in theater and ensure all those requiring outside assistance are clearly and unambiguously assigned to a repair activity for accomplishment (Exhibit 143).

450. The OIC SRU Detachment Bahrain shall liaison with Type Commanders to ensure adequate support is being provided. He shall provide an inchop brief for all ships upon arrival (Exhibit 143).

451. The OIC for SRU Detachment Bahrain was in Dubai, UAE from 13 - 26 October 1990 (pp 420, 513, 749, Exhibit 142).

452. The OIC, SRU Detachment Bahrain, LCDR] was in daily contact with his office while in Dubai, 13 - 26 October 1990 (p 910).

453. During the OIC's absence from SRU Detachment Bahrain, LCDR , who is the NAVSEACENLANT Technical Coordinator attached to the SRU Detachment was acting as the OIC until relieved of such duties as OIC (pp 420, 514, 749, Exhibit 142).

454. The SRU Detachment Bahrain Technical Coordinator has the collateral duty of Assistant OIC (Exhibit 143).

455. LCDR was assigned TAD to SRU Detachment Bahrain as the Technical Coordinator for the NAVSEACENLANT preposition team billeted at SRU. He arrived 28 August 1990 (p 747).

456. LCDR was not aware that in his capacity as Technical Coordinator he also assumed the responsibilities of Assistant OIC SRU Detachment Bahrain (p 748, Exhibit 143).

457. The Assistant OIC SRU Detachment Bahrain is primarily responsible, under the OIC, for the organization, performance of duty, and good order and discipline of the detachment (Exhibit 143).

458. The Assistant OIC SRU Detachment Bahrain is to ensure that the OIC is advised of all events, casualties, deficiencies, and anticipated difficulties which may significantly affect the detachment (Exhibit 143).

459. The Technical Coordinator SRU Detachment Bahrain shall supervise the routing and internal handling of the detachment's messages (p 761, Exhibit 143).

460. The NAVSEACENLANT Technicians attached to SRU Detachment Bahrain are assigned to provide technical assistance in repairs by the Technical Coordinator, LCDR The surveyors are assigned by the Supervisor Surveyor to write work specifications and monitor work accomplishment on assigned ships. Their duties are not interchangeable (pp 516, 748, 918, Exhibit 143).

461. The NAVSEACENLANT Technicians residing at SRU Detachment Bahrain are available to assist the ship surveyor in preparing work specifications (pp 774, 895).

462. The Resident Detachment Marine Surveyor at SRU Detachment Bahrain is responsible for advising and assisting the OIC in ensuring administrative procedures of the Detachment are proper and responsive to the requirements. He shall supervise through the assigned surveyors the planning, funding, execution and documentation of repairs. He shall also be known as the supervisor surveyor (Exhibits 143, 194).

463. The Resident Detachment Marine Surveyor shall maintain the Detachment's library of official publications and execute an annual review. According to COMSERVFORSIXTHFLT SRU Detachment

Bahrain Instruction 5400.1 a wide variety of general technical material is available, including NAVSEA's General Specifications for the Overhaul of Surface Ships (GSO) and NAVSEA Technical Manual. (Exhibits 143, 194).

464. The Resident Detachment Marine Surveyor shall develop plans, schedules, and administer the repair of ships. He shall advise the OIC daily on the progress of all major repair items and assist the OIC in reviewing requests for repairs (Exhibit 143).

465. The position description for the Marine Surveyor at SRU Detachment Bahrain requires a knowledge of Level I and Level A ship repairs as a requirement for the position (Exhibit 194).

466. The Resident Detachment Marine Surveyor shall supervise all assigned surveyors in the execution of their work. He shall monitor contractors progress, quality of work, ship checks and completion dates (Exhibit 143).

467. The position description of the Marine Surveyor at SRU Detachment Bahrain requires him to coordinate the work required to repair ships. This includes rejecting work of contractors that does not meet contract specifications relative to repair procedures and quality assurance (Exhibit 194).

468. Mr. (GS-12) is the Senior Resident Surveyor assigned to the SRU Detachment, Bahrain. His position makes him the supervisor for all TAD surveyors and Administrative Officer for the Detachment (p 498, Exhibit 143).

469. Mr. 's work credentials include an enlistment in the Coast Guard (Second Class Machinist's Mate) working with diesels, 2 years as Third Engineer Merchant Marine (on tugs), Puget Sound Naval Shipyard as diesel mechanic followed by 2 years as mechanic in nuclear power followed by 9 years as Planner & Estimator, CTF 63 Staff for 5 years and then the last 2 years as Resident Marine Surveyor at SRU Bahrain Detachment (p 498).

470. Mr. is the only Resident Surveyor at the SRU Detachment Bahrain. All other surveyors working in Bahrain are TAD from Naples or CONUS (p 503).

471. SRU Detachment Bahrain has a technical library which is run by Mr. . According to Mr. the technical library is limited in scope and consists mainly of NAVSEA Standard Items, NAVSEA Technical Manual Chapters, cast off publications from other commands and ship's drawings provided during repairs (pp 510, 517, 529, 553, 758, 929, Exhibit 143).

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472. The SRU Detachment Bahrain technical library does not include the Valve Maintenance Manual (14 vols - NAVSEA S9253-AD-MMM-010 to 140) or the General Specifications for Overhaul of Surface Ships (GSO) (NAVSEA S9AA0-AB-G0S-010/GSO) (pp 509, 529).

473. SRU Detachment Bahrain is not on distribution to receive a copy of General Specifications for Overhaul of Surface Ships (NAVSEA S9AA0-AB-G0S-010/GSO) (Exhibit 80).

474. Mr. has requested additional technical documents for the technical library at SRU Detachment Bahrain. The requests went to the OIC for processing (p 535).

475. SRU Detachment Bahrain general ship surveyors work directly for the Resident Marine Surveyor. They coordinate the ship/contractor interface and operate with a high degree of independence in the performance of assignments (Exhibit 143).

476. The ship surveyor conducts pre-arrival conferences with ship's company and/or other U.S. Government representatives, reviews work requests (2K, CSMP, etc), and ship checks work to be performed in the assigned foreign port (pp 444, 530, 536, Exhibit 143).

477. The ship surveyor develops detailed work specifications for review by the supervisor surveyor for work to be performed in accordance with the latest directives, instructions, U.S. Navy Technical requirements and sound marine practices. The ship surveyor is responsible for their technical and contractual validity (Exhibit 143).

478. The ship surveyor conducts an arrival conference with the OIC and on-site ship checks with contractors and ship's company, interprets specification requirements to ensure all parties understand work to be accomplished (Exhibit 143).

479. The ship surveyor conducts in-progress surveillance of work in progress to ensure adherence to specification requirements, orders, directives and sound marine practices. He is responsible for final acceptance of all work performance by foreign contractors (Exhibit 143).

480. The ship surveyor develops required changes, deletions, etc, to basic work specifications. He provides on-site technical assistance and/or technical recommendations for the accomplishment of ship repairs (Exhibit 143).

481. The ship surveyor shall, daily, communicate the progress of major work items, material and technical problems to the surveyor supervisor (Exhibit 143).

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482. Selection of SRU Detachment Bahrain TAD surveyors is made by COMSERVFORSIXTHFLT in Naples. The SRU Detachment Bahrain does provide Naples with it's needs for surveyor personnel (p 504).

483. At the time of the USS IWO JIMA casualty there were seven TAD surveyors attached to the SRU Detachment Bahrain - two from Naples, three from Jacksonville, and two from Puget Sound Naval Shipyard (pp 504, 868).

484. It is not uncommon to have a surveyor assigned to more than one ship at a time or more than one job on a ship (p 440).

485. There are no indoctrination requirements for new surveyors or technical representatives upon arrival at SRU Detachment Bahrain (Exhibit 143).

486. The surveyors attached to SRU Detachment Bahrain are routinely flown to the area of the ships to write work specifications prior to the ship's arrival in the port of repair (pp 429, 513, 868).

487. Mr. [redacted] (Ship Surveyor) is TAD from SUPSHIP Jacksonville. His background is as an electronic's surveyor (10 years). Prior to serving in that capacity he performed duties as an Electronic's Shop supervisor and mechanic and was a planner and estimator at Norfolk Naval Shipyard. He arrived at SRU Detachment Bahrain on 1 October 1990 (pp 504, 921, Exhibit 188).

488. Mr. [redacted] s performance as a surveyor is characterized as "dedicated," "very conscientious," "puts in long hours," "tries to do the best possible job," and "knowledgeable" (pp 522, 764).

489. Mr. [redacted] (Ship Surveyor) is TAD from Puget Sound Naval Shipyard. His background is 17 years as a Machinist (diesel) Planner. He was attached TAD to SRU Detachment Bahrain previously from May 1989 to March 1990 for MSO support. He was specifically brought back on 25 September 1990 to again provide MSO support (pp 504, 525, 925).

490. Mr. [redacted]' performance as a surveyor is characterized as "dedicated," "outstanding work product," "excellent performer," and "tries to do the best he can" (pp 525, 526, 765, 766).

491. Both the OIC and Technical Coordinator at SRU Detachment Bahrain route copies of CASREP messages and other repair support messages to the Resident Detachment Marine Surveyor, Mr. [redacted] (pp 772, 893).

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492. The supervisor surveyor does not screen message traffic at SRU Detachment Bahrain. The OIC and Technical Coordinator screen all message traffic and internally routes copies to action personnel (p 545, Exhibit 143).

493. SRU Detachment Bahrain is an addressee on AIG 438 which means they receive CASREP messages from the Amphibious Task Force (pp 106, 749, Exhibit 147).

494. A message file is kept on each ship and is available to the surveyor. It contains all CASREP and maintenance related messages received by the SRU (p 893).

495. Work specifications written at SRU Detachment Bahrain are significantly different from those used at SUPSHIP/Naval Shipyard commands. The difference results from a lack of personnel specialties/numbers at Bahrain in comparison with CONUS assets (pp 426, 518).

496. The SRU surveyor drafts a work specification for the requested repair work. This specification is given to the Navy Regional Contracting Office who in turn contracts locally for repairs. Once the contract is awarded, the SRU surveyor will work with the contractor and ship to complete the repairs (pp 395, 408, 871, 872, Exhibit 143).

497. If there is no local work specification form on file for the repair requested, the SRU surveyor will create a work specification based on known information, assistance from other surveyors or ship check information when the ship arrives (pp 429, 506, 515, 530, Exhibit 188)).

498. The repair specification forms used at SRU Detachment Bahrain are excerpts from the NAVSEA Standard Items as originated at SRU Naples and modified for local use (pp 505, 530, 915, Exhibit 188).

499. Some but not all work specifications written by SRU Detachment Bahrain surveyors were reviewed by the Supervisor Surveyor (p 505).

500. It is not uncommon in an emergent repair package for the SRU surveyor to execute corrections and changes to the specification aboard ship. It is not uncommon to include those changes in a completion report afterwards (pp 429, 452, 884).

501. There are no requirements to document check point results on a repair specification. Satisfactory completion of the repair job, signed by the surveyor, will indicate that all checks within the specification were satisfactorily completed (p 533).

502. The OIC, SRU Detachment Bahrain stated that repair specifications were kept simple because of worker language barriers and because the contractor would not have copies of the specification reference documentation (p 879).

503. The contractor's worker is not expected to read the repair specification. The worker is to follow general repair guidance provided by his foreman or supervisor who does have the work specification (p 531).

504. Ship repair work is supposed to be signed off as complete prior to the ship departing port unless at sea testing is required. The surveyor signs off the job (pp 409, 534, 546, Exhibit 143).

505. Prior to calling a job complete, the surveyor must inspect the completed product and should contact ship's force for concurrence. The ship's force check allows for rework prior to the ship leaving port (p 454).

506. SRU Detachment Bahrain reviews all contractor bills to the government submitted for work they had contracted. They are responsible for making adjustments based on specification modifications (pp 546, 549, 555, 559, Exhibit 143).

507. SRU Detachment Bahrain personnel feel that Navy ships operating within their area of responsibility do not know the capabilities and/or repair charter of their organization (pp 396, 525).

508. The Ship Repair Contracting Manual (NAVSEA 0900-LP-079-5010), page 237, Paragraph 2-3a, defines Restricted Availability as "an availability for the accomplishment of work which cannot be postponed until the ship's next regularly scheduled overhaul. During which period the ship is rendered incapable of fully performing its assigned mission and task due to the nature of the repair work. During these RAV's, which normally require the ship to be present for performance of the work, the cognizant Type Commander may authorize accomplishment of non-urgent work items concurrently with the emergency work." (p 401).

509. The Ship Repair Contracting Manual (NAVSEA 0900-LP-079-5010) page 237, Paragraph 2-3c, defines emergency Voyage Repairs as "emergency work necessary to enable the ship to continue on it's mission which can be accomplished without requiring a change in the ship's operating schedule on the general steaming notice or the general steaming notice in effect. Voyage Repairs may be arranged by the Commanding Officer of the ship subject to confirmation by the Type Commander." (p 401).

510. Prior to the start of scheduled availabilities at Dubai, the only preplanned availabilities were on the USS LA SALLE. All other work arranged by SRU Detachment Bahrain was emergent or CASREP work (pp 395, 506).

511. The COMSERVFORSIXTHFLT Maintenance Officer and SRU Detachment Bahrain personnel repeatedly stated that they only conduct repairs that are classified as "Voyage Repairs". These repairs may be organizational, intermediate maintenance or depot level repairs in scope (pp 431, 460, 866, 867, 872, 873, 897).

512. The Navy Regional Contracting Center uses the Ship Repair Contracting Manual (Repair Manual - NAVSEA 0900-LP-079-5010) to establish contracts for repairs or establish master ship repair contractor status when dealing with local area contractors (p 396).

513. SRU Detachment Bahrain did not hold a copy of the Master Agreement for Repair and Alteration of Vessels with BASREC (N68171-85-H-0031) (Exhibits 140, 188).

514. If SRU Detachment Bahrain cannot contract locally for the requested work, it can cancel the job, rescreen for a Tender Fly Away Team (FAT), or forward the job to SRU Naples for further action (pp 525, 539, 773, 871).

515. Contractual agreements to accomplish limited hull, mechanical, and electrical repairs currently exist with six companies in Bahrain. These companies are: Arab Shipbuilding and Repair Yard (ASRY), Bahrain Ship Repair and Engineering Company (BASREC), Brown and Root Company, Halliburton Services Corporation, AIRMECH Eastern Engineering Limited, and Maharaque Engineering LTD (p 511, Exhibit 79).

516. SRU Detachment Bahrain oversees contracts with Dubai Drydock which has extensive hull, mechanical and electrical capabilities (pp 408, 512, 868, Exhibit 79).

517. SRU Detachment Bahrain has contracted for Level I work from local industrial repair organizations. The contractor used was BASREC (pp 414, 508, 772, 898, 899).

518. On Level I repair taskings that require material, the material is normally provided by the ship. SRU Detachment Bahrain does not carry Level I material (p 524).

519. If the contractor is required to provide material under a work specification, then the applicable Navy military standard requirements will be annotated. The SRU surveyor will be required to ensure the material provided meets the Navy's specifications (pp 524, 891, 892).

BASREC MANAGEMENT

520. Mr. , the pipefitter who worked on 2MS-7, stated it was common practice to ask ship's force for assistance on a repair job before approaching his foreman, supervisor or SRU surveyor (pp 487, 488, 490, 591).

521. If the BASREC employee could not obtain required material from the ship, he would go to his foreman to ask for the material. The foreman would submit a requisition to the BASREC shop store and provide it to the worker (pp 419, 496, 591).

522. When a check point is reached in a job, the workman is to notify his supervisor. If the foreman is not available, he is to go to the SRU surveyor (p 590).

523. Mr. was Mr. supervisor at BASREC shipyard. His responsibility was to coordinate repairs between the SRU surveyor and contractor workers. Mr. had been employed by BASREC for six years (pp 452, 580, 583).

524. Mr. is a British citizen whose background is as a marine engineer. He is currently working ashore prior to returning to sea to earn his second engineer license (p 580).

525. Mr. supervised seven BASREC workers assigned to complete four work items on USS IWO JIMA 25 - 30 October 1990 (p 581).

526. Mr. cannot converse in Hindi, the language Mr. speaks. He is able to convey work requirements well enough to get what he considers 100 percent work results (p 586).

527. Mr. worked directly with the SRU surveyor to resolve work problems. He also requested BTC to have ship's force personnel witness all valve lapping/bluing (p 588).

528. Work specifications that Mr. received, that included technical references, were usually for technical equipment (machinery) not valves (p 589).

529. QA training as practiced in the U.S. Navy has no counterpart at BASREC. All QA training on repair processes is done on the job by skilled foremen (p 590).

530. BASREC personnel work on all nationality ships both steam and diesel driven. Work specifications on U.S. Navy steam plants are much more restrictive than merchants (p 591).

531. To BASREC personnel, the surveyor is primarily responsible for checking the adequacy of work conducted. Different surveyors will check to the work specifications imposed - U.S. Navy, Lloyds, American Bureau, etc. (p 593).

532. The Master Agreement for Repair and Alteration of Vessels with BASREC (N68171-85-H-0031) does not reference the Ship Repair Contracting Manual (Repair Manual - NAVSEA 0900-LP-079-5010) for applicability (Exhibit 140).

533. The Master Agreement for Repair and Alteration of Vessels with BASREC (N68171-85-H-0031) has been in effect since October 1984. There are two amendments to the contract, P00001 of 5 July 1985 and P00002 or 22 September 1986 (Exhibit 140).

534. Paragraph one of the Master Agreement for Repair and Alteration of Vessels with BASREC (N68171-85-H-0031) states "...It is further agreed that the clauses set forth herein are mandatory and shall, by reference and attachment, be incorporated in each job order awarded pursuant to this agreement" (p 398, Exhibit 140).

535. Contract N68171-85-H-0031, Clause 4, Paragraph (d) states, "Except as otherwise provided in the job order, the contractor shall furnish all necessary material, ...as are necessary for accomplishing the work specified in the job order subject to the right reserved in the government under Clause 9 herein entitled government furnished property" (Exhibit 140).

536. Contract N68171-85-H-0031, Clause 5, Paragraph (a) states "Work shall be performed hereunder in accordance with the job order, and any drawings and specifications made a part thereof, as modified by any change order..." (p 398, Exhibit 140).

537. Contract N68171-85-H-0031, Clause 5, Paragraph (b) states, "All operational practices of the contractor and all workmanship and material, equipment, and articles used in performance of work hereunder shall be in accordance with the best commercial marine practices, except where Navy specifications are specified in the job order in which case Naval standards of material and workmanship shall be followed. The specification shall prescribe the Naval standard whenever applicable..." (p 398, Exhibit 140).

538. Contract N68171-85-H-0031, Clause 5, Paragraph (c) states, "All material and workmanship shall be subject to inspection and test at all times during the contractor's performance of the work to determine their quality and suitability for the purpose intended and compliance with the job order ... As specified in the job order, the contractor shall provide and maintain an inspection system acceptable to the government covering the work specified in the job order. Records of all inspection work by the contractor shall be kept complete and available to the government during the performance of the job order..." (p 398, Exhibit 140).

539. Contract N68171-85-H-0031, Clause 6 states "The Contracting Officer may at any time, by written change order, and without notice to the sureties, make changes within the normal scope of any job order issued under this agreement in (i) drawings, designs, plans and specifications, (ii) work itemized in any job order ... nothing in the clause shall excuse the contractor from proceeding with the job order as changed" (Exhibit 140).

540. Contract N68171-85-H-0031, Clause 9, Paragraph (a) states "The government shall deliver to the contractor... the government furnished property described in the schedule on specifications ...." (p 399, Exhibit 140).

OPINIONS

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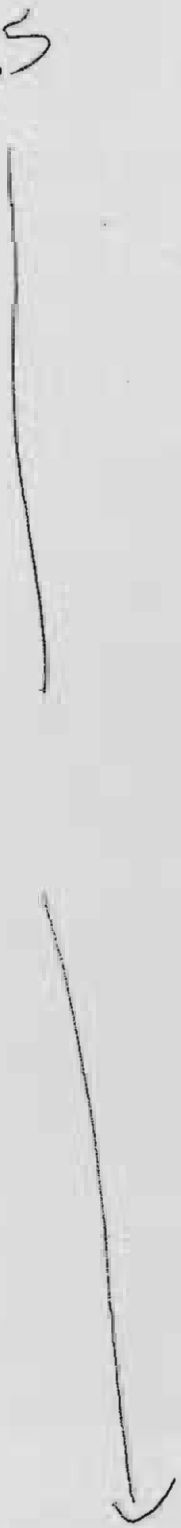


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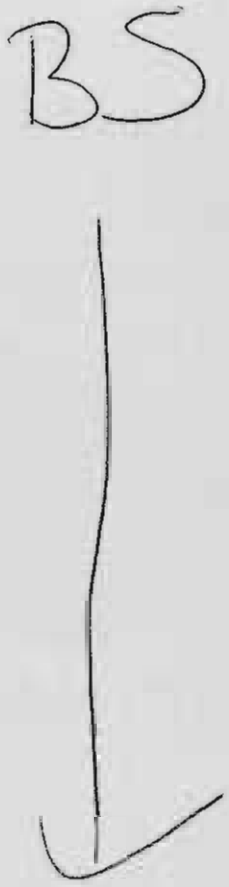
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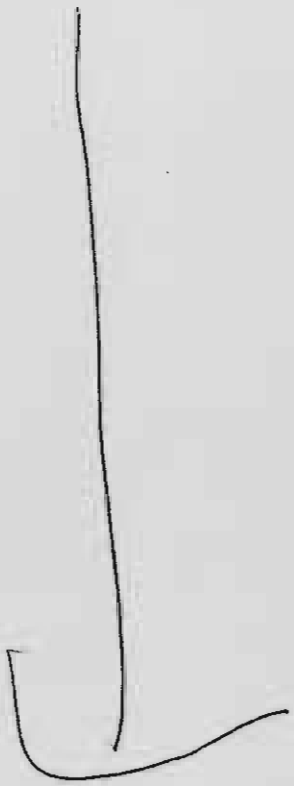

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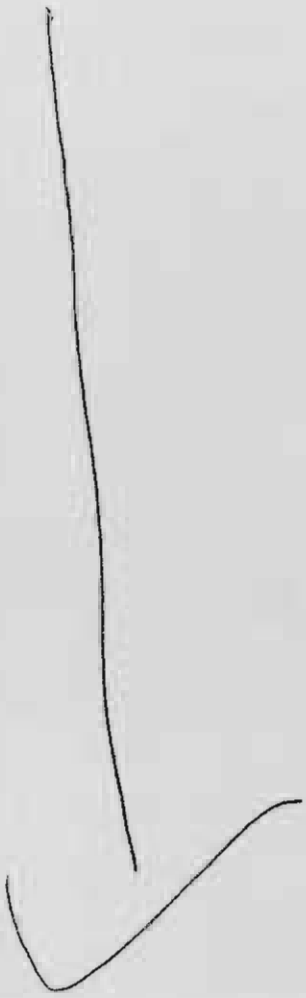

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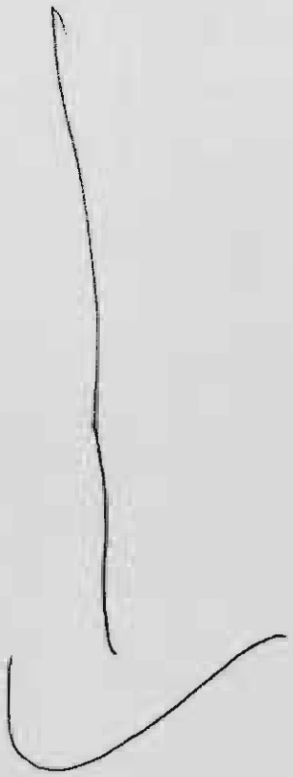

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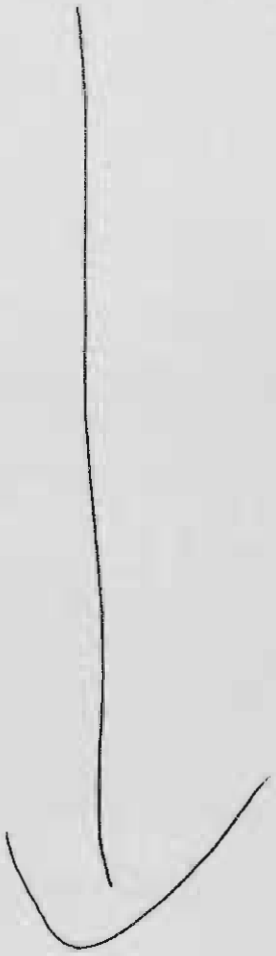

10. That Mr. Ship Surveyor, Ship Repair Unit Detachment Bahrain be presented a Letter of Reprimand pursuant to the Office of Civilian Personnel Management directives.

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Rear Admiral, U.S. Navy
President

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Captain, U.S. Navy
Member

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Captain, U.S. Navy
Member

Authentication

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Rear Admiral, U.S. Navy
President

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Captain, JAGC, U.S. Navy
Counsel for the court

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