



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

MAR 14 2006

Scott J. Bloch, Special Counsel
U.S. Office of Special Counsel
1730 M Street, N.W., Suite 300
Washington, D.C. 20036-4505

Dear Mr. Bloch:

Thank you for your recent letter requesting an inquiry into the alleged violations at Naval Air Depot (NADEP) Cherry Point, Cherry Point, North Carolina (OSC File No. DI-05-1175).

Based on the information you provided, the Office of the Naval Inspector General led an inquiry to determine (1) whether artisans in the engine shop had used unauthorized equipment to perform the functional test on the Harrier jet engine exhaust diffuser main repairable assembly and (2) if so, whether Quality Assurance Specialists should have issued a corrective action request form in order to document the deficiency so that the engineering department could determine whether an engine recall was required. The investigation substantiated both allegations, but concluded a product recall is not required because subsequent testing would have revealed any deficiencies that might have been overlooked due to use of the unauthorized test equipment. NADEP Cherry Point has taken appropriate corrective action with regard to both matters.

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

The second version has been edited by removing the names of witnesses and is suitable for release to the general public. As has been the case with other reports the Department has provided the Office of Special Counsel since September 11, 2001, I request that you make only this redacted version available to members of the public.

Again, thank you for bringing this matter to our attention. If I may be of any further assistance, please let me know at your earliest convenience.

Sincerely,

A handwritten signature in cursive script, appearing to read "D. Winter", is written over a horizontal line.

Donald C. Winter

Enclosures:

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

Office of the Naval Inspector General

NAVINGEN Case Number 20050750
 OSC Case Number DI-05-1175
 NAVAIR Case Number 2005-120

Report of Investigation

14 February 2006

Subj: ALLEGED IMPROPER MAINTENANCE PROCEDURES IN THE AV-8B HARRIER
 ENGINE SHOP AT NAVAL AIR DEPOT CHERRY POINT, NC

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Preliminary Statement

1. This report is issued pursuant to a 5 August 2005 Office of Special Counsel (OSC) letter tasking the Secretary of the Navy (SECNAV) to conduct an investigation under 5 USC 1213.
2. OSC is an independent federal agency whose primary mission is to safeguard the merit system by protecting federal employees and applicants from prohibited personnel practices. OSC also serves as a channel for federal workers to make allegations of: violations of law; gross mismanagement or waste of funds; abuse of authority; and a substantial and specific danger to the public health and safety.
3. Reports of investigations conducted pursuant to 5 USC 1213 must include: (1) a summary of the information for which the investigation was initiated; (2) a description of the conduct of the investigation; (3) a summary of any evidence obtained from the investigation; (4) a listing of any violation or apparent violation of law, rule or regulation; and (5) a description of any action taken or planned as a result of the investigation, such as changes in agency rules, regulations or practices, the restoration of employment to an aggrieved employee, disciplinary action, and referrals to the Attorney General of evidence of criminal violations.

Information leading to the OSC Tasking

4. Naval Air Depot Cherry Point, Cherry Point, NC (NADEP CP) is a large industrial complex with approximately 3,500 skilled aircraft and marine tradesmen, planners, and engineers experienced in the depot level maintenance, repair and fabrication of naval aircraft. It is the Cognizant Field Activity (CFA) for the AV-8B Harrier aircraft and, as such, is responsible for all Harrier maintenance, engineering and logistic support. Within NADEP CP, the AV-8B Fleet Support Team (AV8FST) is responsible for depot and fleet support items for the Harrier airframe. NADEP CP is a subordinate command of, and reports to, the Naval Air Systems Command (NAVAIR).
5. The OSC tasking stems from a complaint alleging that NADEP CP artisans had used an unauthorized procedure to conduct the functional testing of the Exhaust Diffuser Major Repairable Assembly (exhaust diffuser MRA), a subassembly of the F402-RR-408A/B jet engine used on the Harrier (hereafter the "F402 engine").

6. OSC identified Mr. Anthony Yoder, a NADEP CP Production Supervisor, as the person who provided OSC information that led it to task this investigation. OSC said Mr. Yoder, hereinafter referred to as Complainant, consents to the release of his name.

7. The OSC tasking letter states that Complainant alleged that the failure to correctly test the exhaust diffuser MRA constitutes gross mismanagement and a substantial and specific danger to public safety because of the potential for the loss of aircraft and military personnel.

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

As Production Supervisor of Shop No. 96556, [Complainant] became aware that the mechanics were using an oil squirt can to perform the functional test of the exhaust diffuser MRA. He states that in order to conduct proper functional tests a flow tester, P/N: 1C3576G3 (flow tester) must be used. Due to his concern that the mechanics were using an unapproved alternate procedure to test the [flow of oil to the] bearings, [Complainant] submitted a request for engineering instruction (REI) on February 24, 2004. REIs are used to request approval for alternate procedures and or clarification of procedures in use. In response to the REI, No. L1084, engineering department staff reviewed the oil squirt can procedure. Subsequently, the use of the flow tester machine was implemented.

Even though the flow tester is now used, [Complainant] states that significant safety concerns remain regarding the build up of exhaust diffuser MRAs previously installed in engines and sent to supply. In order to address these concerns, [Complainant] emphasizes that a Corrective Action Request should be written and a team established to determine if a product recall is necessary.

9. An attachment to the tasking letter provides additional details. It indicates that while he was the Production Supervisor of Shop No. 96556 from January to April 2004, Complainant learned that mechanics in shop No. 96556 were not complying with the procedures specified in various Aircraft Engine Maintenance Manuals for 9 specific repair and maintenance processes. He prepared Requests for Engineering Instructions (REIs)¹ for these processes in February and March 2004. NADEP CP addressed 8 of them to Complainant's satisfaction and he did not ask OSC to require the Navy to address them. In the case of the exhaust diffuser MRA, however, Complainant remained concerned because although the engineering department personnel directed the mechanics to use the flow tester (which we will call the "lube supply flow tester") in response to the REI, they did not direct a retest of exhaust diffuser MRA units on which the flow tester had not been used or conduct a study to determine whether retesting was necessary.

Description of Conduct of Investigation

10. SECNAV referred the OSC tasking letter to the Office of the Naval Inspector General (NAVINGEN), which tasked the NAVAIR Inspector General (NAVAIR IG) to conduct the investigation on 4 September 2005.

11. Upon contacting NADEP CP, the NAVAIR IG learned that Complainant also sent an undated letter of complaint to SECNAV some time after he had contacted OSC. That letter

¹ Per Chapter 11 of NADEP Instruction 4855.8A, Quality Assurance Procedures, an REI is an internal NADEP document Production Department artisans use to request assistance or information from the Engineering Department for procedures and questions that may arise concerning existing maintenance procedures, new failure modes, material or special tools, etc. when the onsite engineer cannot provide an immediate on-the-spot answer. The document is filled-in and routed to the engineers for a response.

includes information Complainant sent to OSC in 2005 about workmanship issues that came up in 2004, but also makes allegations about two separate workmanship issues occurring in June and July 2005. It was sent to NADEP CP for action, and the Command Evaluation Office initiated an inquiry.

12. After reviewing Complainant's letter to SECNAV, NAVINSGEN assumed supervisory responsibility over an inquiry into the workmanship issues raised in the eight REIs that are not included in the OSC 1213 tasking letter. They were reviewed by NAVAIR IG personnel, who determined they were properly addressed by NADEP CP.

13. Complainant's letter to SECNAV also states that in February 2005, Complainant told the Commanding Officer of NADEP CP about his disclosures to OSC. The letter says that a week later, Complainant was transferred from the 2nd shift to the 1st shift and has not been offered an opportunity to return to the 2nd shift, which he prefers, although there have been several openings since then. The letter goes on to state Complainant believes the Commanding Officer told two people about the disclosures and Complainant asserted they have retaliated against him by taking him off the 2nd shift in February 2005 and not returning him to the 2nd shift. The NADEP CP Command Evaluator investigated this allegation and concluded it was not substantiated.

14. NAVAIR assembled a 3-person team to conduct an on-site investigation, consisting of:

- a. a NAVAIR IG command investigator;
- b. a NAVAIR IG command investigator; and
- c. a NADEP CP Command Evaluator.

15. The investigators interviewed 17 people between September and November 2005. Interviewees included Complainant; artisans and quality assurance (QA) personnel identified by Complainant; other artisans, supervisors and managers; and NADEP CP Engineering Department personnel. The investigators reviewed documents they thought were pertinent to the allegations. A list of these documents appears at the end of this report.

16. Counsel, NAVINSGEN and a senior NAVINSGEN Hotline Investigator worked with Counsel, NADEP CP and the NADEP CP Command evaluator to obtain follow-up interviews (5 mechanics not originally interviewed and 5 witness re-interviews), coordinate with six technical subject matter experts (SMEs) and prepare the "actions planned or taken" sections of this report of investigation. They used this information to write the final version of this report.

17. NAVINSGEN used information in the OSC tasking letter, data provided by NADEP CP, and the interviews of Complainant and other NADEP CP personnel to formulate two allegations:

Allegation 1: That NADEP CP mechanics in Shop No. 96556 improperly used an oil squirt can to perform the functional test of the exhaust diffuser MRA on the AV-8B Harrier jet engine, in violation of Maintenance Manual A1-F402B-MMI-220, which requires that a lube supply flow tester provide oil during the test.

Allegation 2: That NADEP CP Quality Assurance Specialists improperly failed to issue a Corrective Action Request in order to determine if a recall of the AV-8 Harrier jet engines containing the exhaust diffuser MRAs tested with the oil squirt can is necessary, in violation of NAVAVNDEPOTINST 4855.8A, Quality Assurance Procedures.

18. For the reasons set forth in the discussion and analysis for each allegation, NAVINSGEN concludes both allegations are substantiated, but no product recall is required because the improperly performed test poses no danger to aircraft operation.

Summary of Evidence Obtained During Investigation

Allegation One

19. That NADEP CP mechanics in Shop No. 96556 improperly used an oil squirt can to perform the functional test of the exhaust diffuser MRA on the AV-8B Harrier jet engine, in violation of Maintenance Manual A1-F402B-MMI-220, which requires that a lube supply flow tester provide oil during the test. (This allegation is substantiated)

Findings

The Exhaust Diffuser MRA and Applicable Standard

20. AV8FST is the AV-8B aircraft Fleet Support Team and the Cognizant Field Activity for the AV-8B aircraft. As such it is responsible for all maintenance engineering and logistic support of the aircraft. The two major areas of AV8FST responsibility are Fleet support and depot rework support. AV8FST.3 is the AV8FST subteam responsible for the AV-8B engine, designated the F402, including the engine control system and the aircraft's auxiliary power and starter system.

21. The exhaust diffuser MRA is a subassembly of the F402 engine. The function of the AV-8B engine exhaust diffuser is to direct the flow of the exhaust gas as it leaves the turbine section of the engine and to reduce the turbulence in the gas stream as the gas enters the exhaust duct. The exhaust duct then divides the flow into two streams and directs the engine exhaust gas into the right and left thrust nozzles on each side of the aircraft. The nozzles increase the velocity of the gas stream and provide approximately half of the total engine thrust.

22. The exhaust diffuser MRA is secured to the rear of the turbine case and is made up of an outer case and 12 equally spaced vanes supporting a conical shaped inner case. The inner case contains the No. 4 main engine bearing and bearing housing. A combination of oil feed tubes and an oil filter assembly provides for the flow of oil in parallel to the No. 3 and 4 main engine bearings. The No. 3 main engine bearing, which is part of the high-pressure compressor rotor assembly, is located just forward of the exhaust diffuser MRA.

23. NADEP CP receives, on average, 4 F402 engines per month to overhaul and return, each having an exhaust diffuser MRA subassembly attached. It also receives, on average, 1½ individual exhaust diffuser MRA subassemblies for rework and return. This occurs, for example, when the subassembly is determined unserviceable for any reason at a lower maintenance activity and requires repair before the engine becomes due for overhaul.

24. Engine and subassembly rework processes for the F402 engine are governed by a set of NAVAIR maintenance publications that are approved and maintained by AV8FST. A1-F402B-MMI-220, the Intermediate Maintenance Assembly Manual (the Manual),² is the standard that governs the procedure for the work performed on the Exhaust Diffuser MRA in Shop No. 96556. The work includes disassembly, cleaning, inspection, repair, reassembly, functional testing, and replacement of the exhaust diffuser MRA.

25. Following successful rework, assembly and testing of the exhaust diffuser MRA, it is fitted to the F402 engine and then the completed engine is tested on an engine test cell, as required by Maintenance publication A1-F402B-MMI-230, WP 206 00. If the test cell run is successful, then the engine is safe for flight. The completed assembly looks like this:

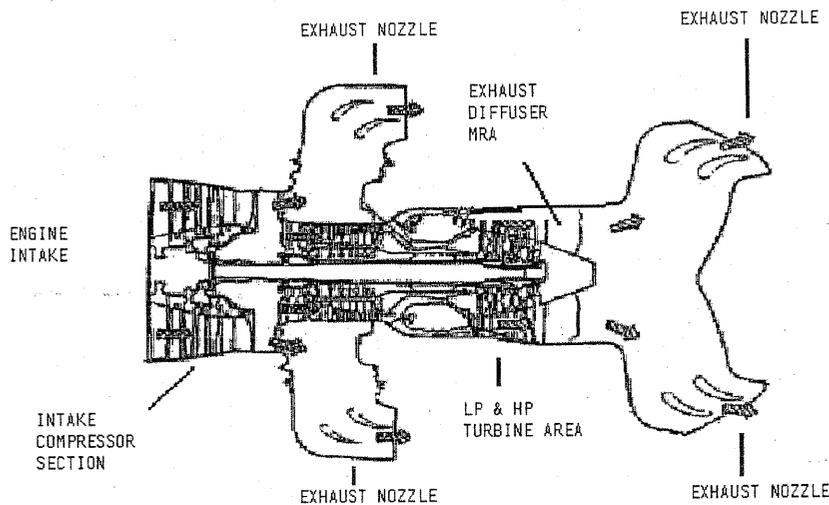


Figure 1: Overhead view of F402 Engine Assembly including Exhaust Diffuser MRA

26. The primary work requirements that are pertinent to this investigation are set forth in two chapters, known as work packages (WP), of the Manual. They are WP 148 00, Intermediate Maintenance Assembly Exhaust Diffuser Major Repairable Assembly, and WP 145 00, Intermediate Maintenance Cleaning, Inspection, Repair, Functional Test and Replacement Exhaust Diffuser Major Repairable Assembly. A third work package contained in the Manual, WP 146 00, addresses how to disassemble the exhaust diffuser MRA.

27. To put the sequence in perspective, the exhaust diffuser MRA is first disassembled in accordance with WP 146 00, then cleaned, inspected, and repaired (if necessary) in accordance with WP 145 00. Finally, it is reassembled using WP 148 00. As part of the reassembly process, WP 148 00 directs maintenance personnel to check for proper oil flow through the oil system portion of the MRA by referring to a functional test for ensuring proper oil flow through the oil feed tubes and assembly that is set forth between pages 11 and 17 of WP 145 00.

28. The exhaust diffuser MRA functional test procedure states that a lube supply flow tester, part number 1C3576G3, is a piece of "required support equipment." It details connecting the

² The investigators consulted the current versions of the work packages in the Manual, dated 1 September 2004, after determining that the procedures specified in them also were in effect during February 2004.

lube supply flow tester to the exhaust diffuser MRA and directs the operator to "operate lube supply flow tester with oil heated to 140 deg. F (60 deg. C)." It then directs the operator to:

Verify free flow of oil from filter housing locations A and B. If oil does not flow freely, fault rectification procedure (detailed subsequently) shall be performed following shut-down and necessary removal operations.

29. To perform the oil flow functional test, the artisan connects the lube supply flow tester to the exhaust diffuser MRA using a supply tube and adaptor assembly and turns the unit on. The flow tester heats the oil to 140 degrees Fahrenheit and supplies it to the assembly at a rate of .5 to 3 gallons per minute. The artisan visually ensures that oil flows from the top of the assembly through the internal oil passages and exits the specified locations on the bottom of the assembly. The artisan can also watch for oil that may seep out of other locations in the assembly, which is evidence of a leak or a crack that needs to be repaired.

30. This is a visual test only; there is no requirement in the manual for the artisan to record any other parameter associated with the check. The artisan merely has to visually confirm that oil flows from the top of the assembly and exits the 2 specified locations on the bottom and to ensure oil is not flowing out of any other location, which would indicate a crack that was not discovered during inspection of the exhaust diffuser MRA. Also, after this visual test is completed, there is no requirement in the manual for a QA Specialist to check the artisan's work or record the results (if a QA Specialist was required to check the artisan's work, this requirement would typically be referred to in the F402 maintenance manual as a "QA call point").

31. This diagram, which appears on page 15 of WP 145 00, shows the exhaust diffuser MRA, the lube supply flow tester, the flow adaptor discussed later in this report, and locations A and B, where oil should be observed to "flow freely" from the filter housing during the functional test:

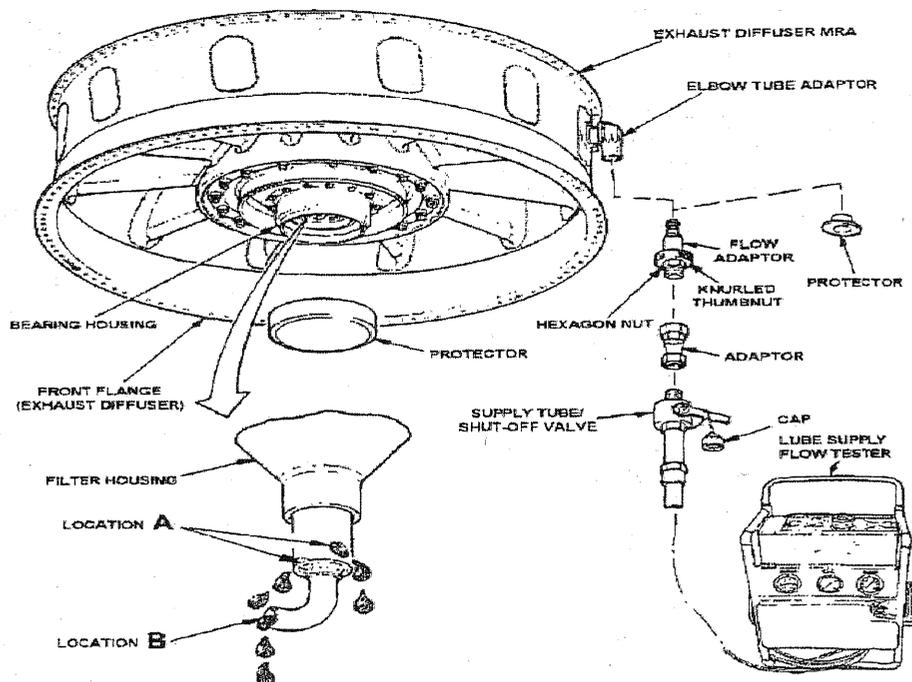


Figure 2: Oil Flow Check Details

What Complainant Told OSC and SECNAV

32. Complainant, an Aircraft Engine Mechanic Supervisor, started working for the Navy at NADEP CP in June 1981. He became a Production Supervisor in October 1989. On 20 January 2004, Artisan-5, Complainant's first line supervisor, assigned Complainant to Engine Shop 96556, and made him the Production Supervisor for the Repair and Overhaul of the F402 jet engine, used in the AV-8B Harrier.

33. In his correspondence to OSC and SECNAV, Complainant stated that during the week of 23 February 2004, all Harrier aircraft were grounded due to a quality control problem not related to the issues discussed in this investigation. As a result of the grounding, Complainant said the Commanding Officer directed a command-wide Safety Stand-Down during the week of 1 March 2004. The Safety Stand-Down included review of the local maintenance manual. Complainant told OSC and SECNAV that on 24 February 2004, before the Safety Stand-Down started, he met with his artisans to tell them to ensure they were complying with the Manual when doing repair processes. He went on to say that if they could not do a process as required by the Manual, they should stop until they could comply with the Manual or get the Engineering Department to authorize a deviation in writing by submitting an REI.

34. In response, and also on 24 February 2004, the Complainant stated that Artisan-3, an artisan under Complainant's supervision, told him that the shop was not adhering to the functional testing procedure specified in the Manual. Specifically, Artisan-3 told Complainant that when he and Artisan-8, another artisan working in the shop, performed the functional test of the exhaust diffuser MRA, they had been using an oil squirt can to check for proper oil flow through the filter housing instead of the lube supply flow tester specified in the Manual.

35. Complainant stated he immediately told them to stop using the oil squirt can and to use the lube supply flow tester instead. But in response, the Complainant said Artisan-8 told him that it must be ok to use the oil can for the test because Supervisor-4, the prior Shop Supervisor, and some QA Specialists knew they were not using the lube supply flow tester. Complainant repeated his instruction to use the flow tester but said he would submit an REI asking whether the oil can could be used to perform the test.³

36. Complainant told OSC and SECNAV that to address this matter he prepared and submitted REI Number L1084 to the Engineering Department later that day. The REI states:

According to the A1-F402B-MMI-220, WP 145 00, page 11 the exhaust diffuser MRA is suppose[d] to be flow tested using Flow Tester IC3576G3. Artisans would like to use alternative method for the flow check. Alternative method suggested is to use oil can and static test the oil passages.⁴

37. Complainant said he informed Supervisor-1 of the REI by email of 8 March 2004. At that time, Supervisor-1 was Complainant's temporary supervisor. Complainant also said he met with QA Specialists QA-3 and QA-4 on 12 March 2004 to discuss the issue with them. He did not report what QA-3 and QA-4 said about the matter, but states he told them a Corrective Action

³ Although when interviewed, Artisan-3 and Artisan-8 told the investigators they used the oil squirt can for a period of about three to four months because an adapter fitting was missing from the oil flow tester, Complainant did not mention this to OSC or SECNAV.

⁴ Of note, the REI does not state the mechanics were already using the oil squirt can.

Request (CAR)⁵ should be written to document non-compliance with the Manual and determine whether there was a need to do a product recall for the engines in which the exhaust diffuser MRAs had been installed. Complainant reported that Engineer-3, an engineer assigned to work the REI, came to the shop and discussed the REI with Complainant and his artisans. Complainant did not, however, state what Engineer-3 said to them.

38. As part of the Safety Stand-Down during the first week in March 2004, Complainant and other personnel in the engine shop reviewed technical manuals to ensure the artisans were complying with maintenance requirements. Also, the Commanding Officer held an all-hands meeting to emphasize the importance of complying with the procedures set forth in the manuals.

39. Complainant told OSC and SECNAV that he thought the artisans working under his supervision had a positive attitude toward the Safety Stand-Down. They identified a number of work processes they were performing in a way that might not be in compliance with the procedures specified in the Manual. Complainant used this information to prepare and submit 9 REIs, including REI L1084, to the Engineering Department between 24 February and 3 March 2004. Complainant submitted some of the 9 REIs electronically, but he personally signed and delivered REI L1084 to the Secretary of the Engineering Department. Complainant explained that he signed the REI because his Supervisor, Artisan-5, was out of the office at the time.

40. Complainant also told OSC and SECNAV that he did not believe REI L1084 was ever "answered," pointing out that the electronic REI database, called "REI Fast Forward (FF)" did not reflect the REI. Complainant explained, however, that this could have been caused by some problems experienced during the transition from a manual tracking system to the new electronic REI tracking system.⁶

What Complainant Told the Investigators

41. When interviewed, Complainant stated that following his meeting with the QA specialists, he spoke with Artisan-3, who then said the shop had always used the oil flow tester and not the oil squirt can, contrary to what he had told Complainant on 24 February 2004. When Complainant asked the other artisans about this, they said he had misunderstood what they were doing. Moreover, Complainant said the QA Specialists agreed with the shop personnel who said they never saw anyone using the oil squirt can. The Complainant felt this made him "look incompetent and like I did not know what I was doing. I would have pursued this, but I was moved [transferred] out of the shop."

42. When later asked by email when the adaptor for the lube supply flow tester was ordered and when it arrived, Complainant said:

I did not have to order an adapter. The mechanics told me they could not use the Flow Tester because they did not have a fitting that they needed and a drip pan to catch the oil. But when I told them we were not processing any more [engine] cases until we could use the Flow Tester, they found the things they needed

⁵ Per Chapter 11 of NADEP Instruction 4855.8A, Quality Assurance Procedures, a CAR is used to document and categorize deficiencies, usually procedural in nature, in order to determine what should be done to address them. The propriety of issuing a CAR for using an oil squirt can instead of a lube supply flow tester for the exhaust diffuser MRA functional test is discussed in Allegation #2.

⁶ This matter is addressed in the "actions planned or taken" section for this allegation.

somewhere and started using the machine within the next day or so. So we started using the machine within a day or two after 2/24/04.

43. On 26 October 2005, Complainant told the investigators that he had never heard of any aircraft flight mishaps and danger to public safety related to the oil squirt can. On 1 November 2005, however, he lined through those words on a statement the investigators gave him to review, and wrote "I have no written documentation, but we have had engine failures in the past involving similar oil flow processes."

44. With respect to his concerns for public safety, Complainant acknowledged that he did not mention the non-conforming tests to the Engineering Department in REI L1084, dated 24 February 2004. He explained that he did not mention them because he thinks the purpose of an REI is to address the use of an alternate method (using the oil squirt can instead of the lube supply flow tester) and not to address a safety of flight issue related to non-conforming work.

45. Complainant told the investigators he isn't sure what a Supervisor should do when he learns about work that is "non-conforming" because it doesn't comply with procedures in the manual, but he believes a CAR should be used to document the non-conforming work. He thinks the procedure requires the Supervisor to contact QA, as he did. He believes QA then becomes responsible for writing the CAR. Once the CAR is written, then the Supervisor puts together a team to address the issue that includes QA, engineering and artisans. Complainant believes the exhaust diffuser MRA functional test is Flight Critical⁷, and that Management should have known that. Complainant also thinks a CAR was required in this case because the artisans were not complying with the manual in an area that affected safety.⁸ But he also told the investigators that he would have to look at the instruction to confirm this.

46. Complaint recalls that QA specialists never said they were not going to write a CAR, apparently because there was a misunderstanding about what process the artisans were using. He added that his only responsibility was to notify his chain of command about the problem and not to follow-up on corrective action.

47. Complainant said he should have asked QA to submit CARs on all the REIs, but was not in the shop long enough. He said he did not pursue his concerns about whether or not the QA Specialists issued a CAR for the exhaust diffuser MRA functional test because he was transferred and relieved by the incoming supervisor, Supervisor-3.

48. When asked why he waited a year to contact OSC, Complainant pointed out that he did go to QA and also reported all non-conforming work to Supervisor-1, Complainant's temporary supervisor⁹ and Supervisor-2 when he learned of them. He did not do any more to pursue the matter of using the oil squirt can because he was transferred out of the shop. But in February 2005, Supervisor-2 selected Supervisor-4 to become the new Engine Branch Head, and Complainant questioned that decision because of the quality issues it raised. He was concerned

⁷ Very critical processes that are directly associated with a flight safety failure mode are labeled "Flight Critical" or "FC" in the Manual and require inspection in accordance with the QA program. Critical tasks not directly related to flight safety are labeled "QA" in the Manual and also require a mandatory inspection.

⁸ Requirements for CARs are discussed in Allegation 2.

⁹ Supervisor-1, was also serving as Complainant's supervisor in March 2004.

that Supervisor-4 would allow the artisans to revert to using the oil squirt can, and would allow other non-conforming work.

What Engine Shop 96556 Artisans Said

49. Artisan-3 confirmed that he informed Complainant that the artisans were using an oil squirt can instead of the lube supply flow tester because some fittings were missing from the lube supply flow tester. Complainant stopped production until a fitting was found. Artisan-3 could not recall how long he had been using the oil squirt can, or when other artisans started using it, but he recalled that he was "trained to use the oil can method "sometime in 2003 or 2004, while Supervisor-4 was the supervisor."

50. Artisan-8 said that he and Artisan-3 told Complainant they were using the oil squirt can. He stated that they used the oil squirt can for a period of about three to four months because an adapter fitting was missing from the lube supply flow tester.¹⁰ Artisan-8 said he was aware that Artisan-6 also used the oil squirt can to perform the test, and said that he had trained Artisan-6 to use it. Artisan-8 said Artisan-3 told Complainant the test "was not being done by the book," that Complainant "shut down the shop for about a week until the tool (flow adaptor) was received," and that "Supervisor-4 was not aware of the oil can method."

51. Artisan-6 said he worked in the Engine Shop from August to October 2002.¹¹ He said he used only the lube supply oil tester and did not see anyone using the oil squirt can for the test. He also said Supervisor-4 was the Shop Supervisor at that time.

What the Supervisors Said

52. Supervisor-4 was Complainant's immediate predecessor as Shop 96556 Supervisor, serving in that position between 1996 and the end of 2003. Supervisor-4 stated that when he took over the shop in May 1996, he saw the artisans using the oil squirt can to perform the test. He was not aware of the lube supply flow tester requirement. He explained that he never worked on that particular engine and, therefore, would not know about the procedure. Supervisor-4 went on to say that he relied on the artisans, QA and other support groups (engineering and production control) to ensure things were being done correctly. He stated the oil squirt can was still being used when he left the shop in December 2003. He said he was not aware that there was a problem with using the oil squirt can instead of the flow tester. If he had known that, then he would have addressed it.

53. Supervisor-3, replaced Complainant in Shop 96556 in April 2004. He testified that Complainant left a folder with him during their turnover, but did not indicate there were any problems. Supervisor-3 said if that had occurred, he would have researched the issues. He looked through the folder and did not see any significant items. Supervisor-3 also stated

¹⁰ The A1-F402B-MMI-220 Intermediate Maintenance Assembly Manual identifies the adapter fitting the mechanics referred to as part number S3S17272000, used to connect the flow tester to the exhaust diffuser MRA.

¹¹ Artisan-6, who still works in the shop, was reinterviewed because a work record check indicated he was assigned to the shop for most of 2003 and 2004. Artisan-6 said he meant to say he only worked on exhaust diffuser MRAs from August to October 2002.

Complainant never mentioned using the oil squirt can for the functional test and that Complainant returned to the shop some months later and retrieved the folder.

54. Artisan-5 was the Engine Shop Branch Head and Complainant's First Line Supervisor when Complainant became the Engine Shop 96556 Supervisor in January 2004. In March 2004, Artisan-5 became a member of the F402 Engine Performance Based Assessment Model Team.¹² Artisan-5 said he learned about this matter from Complainant. His understanding from talking to Complainant was that the oil squirt can was used in the past and that was the way the artisans were taught to do it. He did not know how far back the practice went.

55. Supervisor-2 testified that he first learned of using the oil squirt can on 28 March 2004, when he received a blind copy of Complainant's email regarding the subject. He said that Complainant stopped the practice. Supervisor-2 said that was what Complainant, as a Supervisor, should have done. He added that he spoke with the engineers about the oil squirt can test and they indicated to him that it was insignificant to the operation of the unit.

What the QA Specialists Said

56. QA-3 stated that at the beginning of 2004, he learned the adaptor for the lube supply flow tester was missing. In early 2004, the oil squirt can was used to perform the test. The manual does not specify any oil pressure, nor does it specify flow rate or run time. He explained that the Manual does not state that the exhaust diffuser MRA functional test is a QA Call Point or a Flight Critical Process.

57. QA-3 confirmed that he and QA-4, another QA Specialist, spoke with Complainant about the use of the oil squirt can for the functional test. Complainant questioned whether or not a Corrective Action Request (CAR) was required. QA-3 and QA-4 informed Complainant that neither of them felt a CAR was justified and that Complainant could speak to their Supervisor, QA-2, if he wished to pursue the issue.

58. QA-4 stated that at the beginning of 2004, there were several pieces of tooling missing from the aircraft engine shop, including the adaptor for the lube supply flow tester. So, for a short period of time, an oil squirt can was used to perform the oil flow functional test for the engine diffuser MRA. The Manual states that the exhaust diffuser MRA oil flow check is not a QA call point and there is no Flight Critical mandatory inspection required. Engine shop artisans told QA-4 that "Engineering" said it was ok to use the oil can until they obtained an adaptor. QA-4 did not check this statement with anyone in the Engineering Department. After the adaptor was received, QA-4 told the artisans that if they wanted to use the oil can for the test, they needed to submit an REI, and they went to Complainant to have that done.

59. QA-4 stated that he spoke to the Complainant one time about submitting a CAR to address the use of the oil squirt can. He said that he did not generate a CAR because corrective action was already initiated at the time, e.g., the missing adaptor was placed on order, and the technical directives were to be adhered to. He informed Complainant that there were no problems with the exhaust diffuser MRA oil flow during shop tests, no reported oil flow problems during the engine test cell run-ups and no reports of problems from the fleet. QA-4 thought he had

¹² Supervisor-1 temporarily assumed Artisan-5's Branch Head position between March and June 2004.

mentioned to his Supervisor, QA-2, that the exhaust diffuser matter was handled and the correct procedures were in place. He added that just because a Shop Supervisor, in this case the Complainant, wants a recall, does not necessarily mean that there should be one.

60. QA-4 could not recall a conversation with the Complainant where QA-3 was present; however, he remembered his discussion with the Complainant concerning the oil squirt can, CAR and recall. He said, "I cannot, with all certainty, say that [Complainant] and QA-3 had a one-on-one conversation on this issue, but I am sure that all parties involved were aware that corrective action was to be implemented and was."

61. QA-4 said he could not recall with certainty but he thought he mentioned the oil squirt can and exhaust diffuser issue to his boss, QA-2, and reported, "...the matter is under control and corrective action has already been addressed and put into place." However, he added that he did not think he discussed submitting a CAR with QA-2.

62. QA-2 stated that he did not recall knowing QA-3 and QA-4 spoke with Complainant about using the oil squirt can. He said that in early March 2004 the F402 engine was down and being reviewed for problems with the Fuel Metering Unit and the High Pressure Compressor. It would have been little effort to recall the engines at that time and include the exhaust diffuser MRA. QA-2 added that QA-3 and QA-4 are two of his most conscientious employees and if there was a problem with writing a CAR, he would think that there were reasons that it was not written since both employees do not shy away from safety related issues. In any event, he said, ... "[m]y standing order to all QA [Specialists] is that if the customer (in this case, [Complainant]) is not happy with a response given by the QA [Specialist], the QA [Specialist] should inform the customer to contact me. I do not recall this particular occasion."

63. QA-1 is a Program Analyst in the Industrial Quality Department. He said the policy for depot employees not assigned to code 6.4 to submit concerns and non-conformances using a CAR is unclear. The "understood" policy is that the QA Specialist, not the shop supervisor, is the person in the production shop responsible for submitting the CAR if a non-conformance is identified. For example, if there is a problem or a nonconformance with following a production manual, the shop supervisor makes production personnel follow the manual and may request the QA Specialist issue a CAR. If the supervisor and the QA Specialist disagree, there are at least two avenues of recourse: (1) go up the Production Management Chain of Command; (2) to follow the QA Chain of Command.

What the Engineers Said

64. Engineer-3 was one of two engineers who responded to REI L1084 by visiting the Shop. He said he first saw the REI around 26 February 2004. He stated that following his review and inquiry concerning the REI, he determined that using the oil squirt can was not adequate and the flow tester must be used. When he met with the shop artisans, they explained that they thought using the oil squirt can made it easier and faster to complete the test, but Engineer-3 told them to use the oil flow tester. Engineer-3 added that he never met with the Complainant or received any feedback from him regarding REI L1084. When asked if he had ever observed an oil squirt can being used to perform the functional test, Engineer-3 said the artisans never made him aware that

they had used the oil squirt can for the test and he never observed any artisan using an oil squirt can.

65. Engineer-3, who was responsible for responding to REI L1084, asked Engineer-2 to go to the shop with him to discuss the REI. Engineer-2 recalled they discussed the matter with one of the artisans. Complainant was not present for the meeting. The artisan did not say anything to indicate the mechanics had been using the oil squirt can for the functional test and Engineer-2 did not observe anything during the visit that made him suspect they may have been using it instead of the lube supply flow tester.

66. Engineer-2 believes the mechanic thought using the oil squirt can was a way of achieving the objective of the functional test by a quicker, easier method. Engineer-2, however, did not feel confident in the proposed procedure as he felt that it was heavily dependent on artisan technique. He felt that if the oil flow check was performed using the oil squirt can, it may not adequately address the assembly related discrepancies that the oil flow test was designed to reveal. Engineer-2 also felt that it increased the likelihood of introducing oil borne debris into the oil passages and associated No. 3 and No. 4 Main Engine Bearing sediment filters as oil injected from an oil squirt can does not have any in-line filtration. Engineer-2 did not discuss this matter with any of the QA Specialists and has not heard or seen anything since the meeting with the artisan in the shop that would indicate mechanics have continued to use the oil squirt can instead of the lube supply flow tester.

67. SME-3 stated that the L1084 was submitted to engineering on 24 February 2004 and the engineering personnel responded by visiting the shop and talking to the artisans about the request. He did not remember exactly when they visited the shop, but stated it was within 2 or 3 days after the REI was submitted. He said:

The artisans asked if they could use the alternate method of testing by using the oil squirt can approach instead of the oil flow tester. The oil squirt can method was considered by the artisans to be easier and faster to complete the test. Engineering verbal direction to the artisans was to use the oil flow tester method identified in the maintenance publication. The engineers explained why it was better to use the oil flow tester instead of the oil squirt can. Use of the oil squirt can may be a poor test and provide inconsistent results by missing possible problems, like cracks and incorrect assembly, as well as possibly introducing contaminants into the MRA. The artisans did not identify that the oil flow tester was inoperable. The artisans did not identify to the engineers that they had already been using the oil squirt can method.

68. Supervisor-1 stated that based on his experience as the F402 Engine Sub team Leader, the intent of the oil flow check is to verify that the exhaust diffuser MRA main bearing oil feed tubes are not blocked. If they are blocked, oil flow to the No. 3 and No. 4 main engine bearings would be affected. Although using the oil squirt can is not an approved maintenance procedure in the manual, it would verify the tubes were not blocked. Additionally, the subsequent engine test cell run would identify any discrepancies related to improper oil feed to the No. 3 and No. 4 bearings.

69. Supervisor-1 said he was never informed that Complainant was having any problem with QA writing the oil squirt can test CAR. If there was a problem with getting a CAR written,

Complainant had an obligation to elevate the issue to higher levels of management within his chain of command. Additionally, the issue could have been elevated through the QA Chain of Command, but was not because the QA Specialists did not take any action or brief their Branch Head. Departments are assigned separate duties and this separation of depot functions acts as a check and balance system for management.¹³

70. NAVINSGEN Counsel provided SME-3 written questions in early December. Although SME-3 thinks the questions are hypothetical because they were not presented to Engineering in March 2004, his responses demonstrate that if the engineers had known an oil squirt can was used to perform the functional test on some exhaust diffuser MRAs, they would have recommended those units that had not already gone through the engine test cell be retested using the lube supply flow tester. If the engineers had known the lube supply flow tester was not available, they would not have authorized using the oil squirt can to perform the functional test as a temporary measure. Instead, they would have recommended that exhaust diffuser MRAs be set aside until the flow tester became available again, or, if the schedule required, they would have recommended obtaining another flow tester to perform the functional test. SME-3 also stated, however, that the Engineering Department knows of no instance where an engine failure has been traced to insufficient oil flow through an exhaust diffuser MRA.

Complainant's Emails

71. Complainant's 8 March 2004 email to Supervisor-1, who was then his supervisor, forwarded a list of processes, including the exhaust diffuser MRA functional test, that were not in conformance with the requirements of the Manual. The list indicated Complainant thought the status of REI L1084 was for "action" by Engineer-3. By way of comment, Complainant said the "Manual calls for using Flow Tester to check oil passages to oil jet. Past practice was to use (oil can) to check oil passages. Currently using Flow Tester to check oil passages. REI was submitted for (oil can) as alternate method."

72. Complainant's email to Supervisor-1 dated 28 March 2004 stated, in part "... When I first came into this shop as the supervisor, artisans were flow checking oil passages and oil jets using an oil squirt can, instead of using the oil flow machine that the book called for, because they have always done it that way, because it was the common sense thing to do. I put a stop to that the first week that I was in this shop and the artisans are now using the oil flow machine."

73. Although Complainant was communicating with Supervisor-1 in his capacity as Complainant's supervisor, these two emails effectively put the Engineering Department on notice of the non-conforming work, because Supervisor-1 was an Engineering Department Branch Head. It should be noted, however, as stated earlier, that the REI Engineer-3 saw did not indicate the oil squirt can had ever been used to perform the exhaust diffuser MRA functional test.

¹³ Although Supervisor-1 asserted Complainant should have elevated the issue, NADEP Instruction 4855.8A appears to place the responsibility on QA, as discussed in Allegation 2.

Results of a Second Round of Interviews

74. The NAVINSGEN review of the initial investigative effort revealed that only three engine shop mechanics were interviewed. Although this allegation may be substantiated based on the finding that one person used the oil squirt can to perform the functional test, this very small sample of mechanics was troubling, given the large number of people assigned to Engine Shop 96556 over the years. In addition, NAVINSGEN reviewers were concerned by Supervisor-4's admission that this had been the practice during his tenure as shop supervisor between 1996 and the end of 2003, even though other testimony indicated the substitution only occurred for a few months in late 2003 and early 2004. Finally, the NAVINSGEN reviewers wanted to know what people would say when asked about Complainant's assertion that when he went back to some of the mechanics and QA Specialists in March 2004, they denied using the oil squirt can or seeing others using it to perform the functional test and said that he must have misunderstood what they had originally told him.

75. Consequently, at NAVINSGEN's request between 23 November and 6 December, the Command Evaluator interviewed 5 more mechanics (Artisan-1, Artisan-2, Artisan-4, Artisan-7 and Artisan-9). He also reinterviewed mechanics Artisan-3, Artisan-8 and Artisan-6, and QA Specialists QA-3 and QA-4.

76. When interviewed on 30 November 2005, Artisan-7 said he worked in the engine shop from 1995 to 2003 under Supervisor-3 and Supervisor-4. He did not work on MRAs, but worked close by and observed artisans working on the MRAs. He stated that he observed artisans using both the oil squirt can and oil flow tester before 2003.

77. When interviewed on 29 November 2005, Artisan-4 said he worked in the engine shop from 1992 to 2003 under Supervisor-3, Supervisor-4, Artisan-5 and others. Artisan-4 worked in various shop locations, including the exhaust diffuser MRA area. He said he had not used the oil squirt can to perform the functional test. He stated the common practice was to "...test the diffuser with a oil flow test machine and it was/is a common practice to spray oil on exposed bearings prior to installing a protective cover. [Complainant] may have misunderstood the use of the oil squirt can as a lubricator or its use to spray on for bearing protection."

78. Artisan-1 worked in the shop, but was not involved with the exhaust diffuser MRA and had no pertinent information.

79. Artisan-9 was interviewed on 30 November 2005. Artisan-9 has worked in the engine shop from October 2004 to present and his Supervisor is Supervisor-3. He has worked on exhaust diffuser MRAs and always used the oil flow tester. He said he has not used the oil squirt can and added, "...I am the one who builds the exhaust diffuser and every step is in strict accordance with the Technical Manuals." Artisan-9 testimony, while not helpful for the period before March 2004, does help substantiate a finding that the oil squirt can has not been used to perform the functional test after September 2004.

80. Artisan-2 was interviewed on 29 November 2005. Artisan-2 has worked in the engine shop from 2001 to 2005 and his Supervisors were Supervisor-3, Complainant and Supervisor-4. He worked on-and-off in the diffuser MRA area and stated the "[O]il can test was a Pre test only

(sic) then we used the test machine for final test." He added that the oil squirt can had been "around [since] 2002 only as a Pre test! We always used the machine. I used the oil can to check for FOD [Foreign Object Damage] only." He said that he had told Complainant over and over again that the oil squirt can was used for a pre-test or flush. Artisan-2 said although Complainant and Artisan-3 knew the oil squirt can was never used in place of the flow tester, they disputed its use because the manual did not specify using the oil squirt can for a pre-test or anything else. Artisan-2 said he stopped using the oil squirt can to ensure debris was not present in the exhaust diffuser MRA oil passages and lubricating tubes in 2004 when Complainant told him to stop using it.

81. In a reinterview on 2 December 2005, Artisan-2 stated that the diffuser MRA production line was shut down about a week because the adapter on the flow tester did not have a part number engraved on it. When asked where the adapter was during the shut down, he responded, "I believe it was in the top drawer of [the] cabinet." When asked about the REI, Artisan-2 recounted he thought the Complainant "...put in a request to have the oil can method used as a pre test (sic)." He stated Complainant must have been confused when he wrote the REI as the artisans did not want the oil can to be an alternative for the flow tester. The artisans only wanted to have engineering approval for the oil can pre-test. Artisan-2 said he never used the oil squirt can as a final test instead of the flow tester and he had never seen anyone else use the squirt can as the final test. To his knowledge, the flow test was always used to perform the final test.

82. Artisan-6 was reinterviewed on 6 December 2005. He amended his earlier testimony, indicating he meant to say he only worked on exhaust diffuser MRAs for a short period of time in 2002. Artisan-6 said he used the oil flow tester to perform the functional test on the MRA in August 2002 and never saw anyone using the oil squirt can.

83. When first interviewed on 5 October 2005, Artisan-3 said he was trained to use the oil squirt can to perform the functional test of the MRA "...sometime in 03-04" when Supervisor-4 was the Supervisor. He also stated he told Complainant the artisans were using an oil squirt can instead of the lube supply flow tester because some fittings were missing from the flow tester. On 30 November 2005, we asked Artisan-3 to respond to Complainant's statement that following his meeting with the QA specialists, Complainant spoke with Artisan-3, who then told him the shop had always used the oil flow tester and not the oil squirt can, contrary to what he had told Complainant on 24 February 2004. Artisan-3 said he did not recall such a conversation.

84. When first interviewed on 5 October 2005, Artisan-8 said he and Artisan-3 told Complainant they had been using the oil squirt can for about three to four months because an adapter fitting was missing from the flow tester; that he trained Artisan-6 to use the oil squirt can to perform the test, and Artisan-6 had used it. When reinterviewed on 30 November 2005, Artisan-8 stated that the shop artisans used the oil squirt can as a pre-test to clean metal filings from the tube before installing the tube into the internal fitting. If there was an oil flow problem, it would be detected early and the artisans would not have to go back and disassemble the diffuser to clean the tube. Artisan-8 said the adapter for the flow tester was never missing; rather, Complainant did not allow the artisans to use the adapter because it did not have a part number engraved on it. Subsequently, Complainant shut down the diffuser production line for about a week because there was no part number on the adapter. During this time, no exhaust diffusers were produced.

85. On 2 December 2005, Artisan-8 identified the Flow Adapter from a schematic and stated it was the part that had no number on it. He added that the adapter was never missing because it was in the file cabinet drawer the whole time and the artisans had used it for years.

86. Artisan-8 added that the oil squirt can was never used in place of the flow tester. When he was shown his previous statement dated 5 October 2005, he said he used the "...oil can method because [I] did not have [an] Adapter." Artisan-8 then commented that he was. "...thoroughly confused with the question because the artisans had used both the oil squirt can and the Flow Tester on every Exhaust diffuser."

87. QA-3, a QA Specialist, was reinterviewed on 23 November 2005 in order to determine whether he had said anything to Complainant to indicate he had not seen the mechanics using the oil squirt can to perform the functional test. QA-3 stated he had no knowledge of such a conversation with Complainant and had nothing to add to what he had said during his previous interviews.

88. QA-4, the other QA Specialist Complainant spoke to, was reinterviewed on 23 November 2005 to see what he would say about Complainant's statement that the QA Specialists had changed their story about observing mechanics using the oil squirt can instead of the flow tester. QA-4 said Complainant, "...and I have had a discussion addressing a Quality C.A.R. as mentioned in my previous statements," and "...the oil can process was used on a limited basis and [the discrepancy was] corrected once [it was] identified by Quality Assurance."

Discussion and Analysis

89. The weight of the credible evidence developed during this investigation leads us to find that some mechanics did use the oil squirt can instead of the lube supply flow tester to perform the functional test of the exhaust diffuser MRA from time to time beginning as early as 1996 and continuing through January or February 2004.

90. We also find the QA Specialists knew the oil squirt can was being used instead of the lube supply flow tester in late 2003 and early 2004, and perhaps earlier.

91. We find a mechanic's assertion that he did not use the oil squirt can to perform the functional test probative of his own conduct absent a reason to question that mechanic's credibility. It is quite possible that some mechanics used the oil squirt can while others did not. And when a mechanic's statements do not vary from one interview to the next and are not contradicted by other testimony, we accept it at face value. However, a mechanic's assertion that he did not see anyone else use the oil squirt can to perform the functional test does not establish others did not use the oil squirt can when the mechanic was not in a position to observe them.

92. We carefully weighed Artisan-8's initial statement that he and other mechanics used the oil squirt can in lieu of the lube oil flow tester against his subsequent assertion that the oil squirt can was merely a form of "pre-test" used before conducting the functional test using the lube supply flow tester. We found his subsequent testimony less credible than his original statements for several reasons we discuss below. We also find Artisan-6's testimony that he never used the oil squirt can less credible than Artisan-8's original testimony that Artisan-6 did use it, and that Artisan-8 trained Artisan-6 to use the oil squirt can. We reach this conclusion because when

confronted with record evidence establishing he worked there for most of 2003 and 2004, Artisan-6 changed his statement that he only worked in the engine shop for a few months in 2002, thus providing a basis for questioning Artisan-6's self-serving statement on the basis of lapses in memory and credibility.

93. Even at the outset of this inquiry, the investigators observed that some mechanics in the shop expressed concern about subsequent discipline following the investigation for not complying with the manual. Despite this concern, mechanics who acknowledged using the oil squirt can instead of the flow tester were making statements to the investigators that were against their interest. When the Command Evaluator sought clarifying information from them later, he again noted several comments about fear of some form of adverse action. Artisan-8's revised statement, along with the statements of new witnesses who denied using the oil squirt can are self-serving. Consequently, for that reason alone, we find his first statement more credible than his second statement. In addition, a mechanic's statement that he did not see anyone using the oil squirt can instead of the flow tester is of little value when offered to prove that this never happened. The mechanic simply may not have seen it being used from time to time.

94. Moreover, when the on-site investigation started, Complainant told the investigators he was worried that the mechanics who admitted using the oil squirt can to perform the functional test would be disciplined. He told the investigators he would like to withdraw his complaint and asked them to terminate the investigation. Given that concern, his testimony that the mechanics told him he was mistaken lacks credibility, especially when he failed to disclose that information to OSC and SECNAV earlier in 2005, despite his otherwise detailed and well documented written presentations to them.

95. The proposition that Complainant (in the Spring of 2004) and the investigators (in the Fall of 2005) "misunderstood" what the mechanics were saying is not the least bit credible. Supervisor-4 testified, also against interest, that he allowed the mechanics to do this for a number of years beginning in 1996. The Command Evaluator gave Supervisor-4 an opportunity to revise his statement, but he simply offered additional information to explain why it might be reasonable for him not to realize it was improper to use oil squirt can in the functional test. The QA Specialists also testified they knew the mechanics used the oil squirt can when the lube supply flow tester was not available. The questions asked of the mechanics, in writing, at the outset of the investigation, were quite specific with regard to substituting the oil squirt can for the flow tester to perform the functional test, and one of the investigators showed the mechanics a diagram of the test during the interviews. It is unreasonable to find that so many people "misunderstood" what the mechanics wanted to do.

96. We accord great weight to the conversation the two engineers, Engineer-3 and Engineer-2, had with one of the mechanics on the shop floor in the Spring of 2004. If the mechanics wanted to use the oil squirt can to clear out oil tubes and internal oil passages before performing the functional test with the flow tester, this conversation gave them the perfect opportunity to make their position clear. Yet the engineers walked away from that meeting understanding the mechanics wanted to substitute the oil squirt can for the flow tester during the functional test and refused to give them permission to do that. We find the artisans were not requesting to use the oil squirt can in conjunction with the lube oil flow tester. Rather, they wanted to use it instead of the flow tester. Engineer-3's recollection that the mechanic said he wanted to use the squirt can

because it was easier and faster to perform the functional test has the ring of truth to it. It certainly makes more sense than the suggestion that the mechanics wanted to use the oil squirt can just because an adaptor necessary to fit the lube supply flow tester to the exhaust diffuser MRA was temporarily missing, particularly in view of the artisans' statements that the adapter was in the top drawer of a cabinet during this time.

97. In addition, the mechanics' exculpatory statements are internally inconsistent because they criticize Complainant for forbidding them to perform the functional test when the adaptor for the flow tester was "missing." If the mechanics wanted to use the oil squirt can before performing the functional test to clear oil tubes or internal oil passages, but intended to use only the flow tester during the functional test itself, then they should not have objected to Complainant's insistence that they stop work until the functional test could be performed using the lube supply flow tester.

98. It is unclear exactly how long the shop artisans were using the oil squirt can to perform the functional test of the exhaust diffuser MRA. Supervisor-4 says it started as early as 1996. The mechanics indicated it started more recently, perhaps as late as the Fall of 2003. We do not think it necessary to make a finding on this, but we do note that Supervisor-4's testimony, which is an admission that he did not carefully supervise the work of his subordinates, is against interest and should be accorded great weight.

99. Finally, we must note that the Command Evaluator considered Artisan-2 a most intelligent, sincere and articulate witness. Consequently, although we did not find Artisan-2's testimony that the oil squirt can was never used to perform the functional test persuasive, we could not ignore the possibility that mechanics also may have used it to squirt oil to clear internal tubing or passages in or near the exhaust diffuser MRA filter housing during assembly to ensure no debris remained in that tubing before conducting the functional test. Such action appeared reasonable and we asked our engineering expert, SME-3, to consider whether an REI should be issued to consider whether mechanics should resume using the oil squirt can for that limited purpose. An REI is the proper mechanism for exploring this matter. SME-3 examined this proposal and said Engineering would not approve an REI suggesting this additional procedure. He said debris in the exhaust diffuser MRA would be grounds for disassembling the MRA and re-cleaning the individual components to remove contaminants. SME-3 said that if artisans find debris in the MRA on a regular basis, they should contact the production department or a QA Specialist and request engineering investigate the root cause of the problem.

100. The following illustration shows the oil passages we understand Artisan-2 is referring to in his discussion of using the oil squirt can to perform a pre-test.

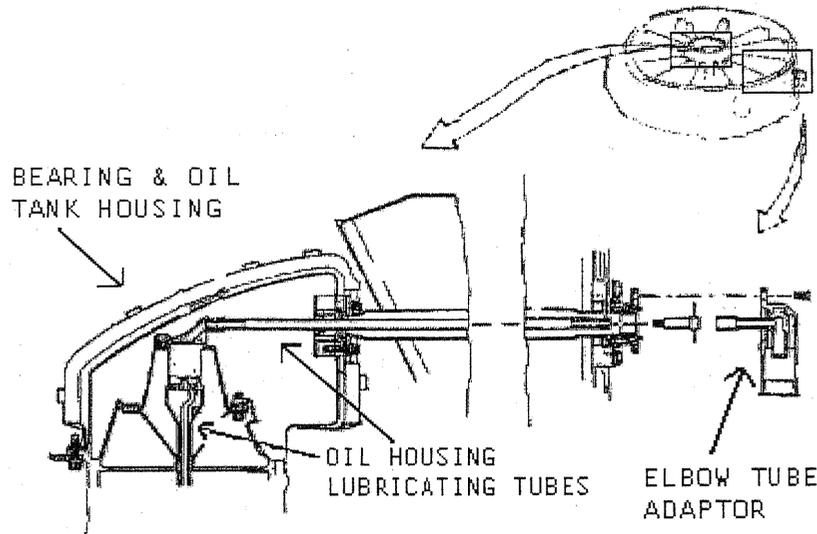


FIGURE 3: ENLARGED CUT-AWAY VIEW OF MRA

Conclusion

101. The allegation is substantiated.

Listing of Actual/Apparent Violations

102. Maintenance Manual A1-F402B-MMI-220.

Actions Planned or Taken

103. On 30 August 2005, after receiving Complainant's letter to SECNAV, the NADEP CP Command Evaluator asked the Engineering Department to determine the current status of REI L1084. The Engineering Department found that REI L1084 was entered into the manual tracking system on 24 February 2004, and closed on 29 April 2004 with a note indicating it had been transferred to REI Fast Forward (FF), a new electronic system NADEP CP was in the process of implementing. However, an exhaustive search of REI FF, by subject matter, part number and time period, did not reveal a record of the REI. So that no confusion about the status of REI L1084 would remain, the Engineering Department issued Temporary Engineering Instruction M3084 on 30 August 2005 to document the question asked and the response given for REI L1084.

104. The Engineering Department considered, and rejected, a proposal to add use the oil squirt can to perform a "pre-test" to check for debris in the oil passages.

Allegation Two

105. That NADEP CP Quality Assurance Specialists improperly failed to issue a Corrective Action Request in order to determine if a recall of the AV-8 Harrier jet engines containing the exhaust diffuser MRAs tested with the oil squirt can is necessary, in violation of NAVAVNDEPOTINST 4855.8A, Quality Assurance Procedures. (This allegation is substantiated but a product recall is not necessary)

Findings

Introduction

106. The findings for Allegation 1 are incorporated here by reference. Those facts demonstrate the artisans had been using the oil squirt can since 1996, and thought the oil squirt can could be substituted for the lube supply flow tester all of the time, while the QA Specialists believed the oil squirt can could be used from time to time when the flow tester was not available. Although the engineers who spoke to the artisans rejected their proposal to use the oil squirt can at all times, they did not comment on the QA Specialists' position because they didn't know the oil squirt can was used from time to time (although in March 2004 Complainant told Supervisor-1 about this in an email, there is no evidence indicating Supervisor-1 passed this information to AV8FST.3).

107. A careful analysis of the material Complainant submitted to OSC and SECNAV indicates Complainant does not assert, unequivocally, that F402 engines containing exhaust diffuser MRAs tested with an oil squirt can rather than the lube supply flow tester must be recalled. Rather, he asserts that NADEP CP should go through a process to determine whether a recall is necessary. This process begins with a QA Specialist writing a CAR. It includes an engineering analysis that, in this case, would determine whether a product recall is necessary.

108. The form used to document a CAR requires a statement of the problem and a plan to resolve the problem. The plan includes a discussion of: (1) the immediate action to stop the problem; (2) a root cause analysis; (3) a solution to prevent reoccurrence; (4) any interim measures required; and (5) the analysis of the effect on product/process before problem identification (is there a need for product recall?)

109. As discussed in Allegation 1, the QA Specialists did not believe a CAR should be issued, took no action to stop the use of the oil squirt can, and did not ask why the oil squirt can, a non-conforming test procedure, had been used since 1996. Their supervisor and others in production agreed no CAR was required when reviewing the matter in September 2005. Our findings for Allegation 2 begin with the presentation of evidence related to the propriety of issuing a CAR.

110. Because we find a CAR should have been issued in March 2004, we then turn to an examination of the need for a product recall. Fortunately, when Commander, NAVAIR, a three star flag officer, received Complainant's letter to SECNAV in August 2005, he directed an inquiry to determine whether any F402 engines should be recalled. That analysis was prepared in early September 2005 by SME-3 in the NADEP CP Engineering Department, and reviewed by his superiors at NADEP CP and NAVAIR. Although SME-3 considers it important to use the lube supply flow tester for the reasons set forth below, his key finding is that any defects

resulting from using the oil squirt can instead of the flow tester will be discovered during the tests of the assembled F402 engine that are performed in the engine test cell. Engines successfully completing these tests are considered safe for flight. SME-3 asserts, and our other subject matter experts confirm, that NAVAIR Intermediate Maintenance manual A1-F402B-MMI-230, Volume 4B, Vectored Thrust Turbofan Engine, is used at the Marine Aviation Logistics Squadron (MALS), as well as the depot, for testing all F402-RR-408A/B engines. The manual requires all exhaust diffuser MRAs to go through an engine test cell, including those that are attached to an engine at an intermediate level maintenance facility.

The Applicable Standard

111. COMNAVAIRFORINST 4790.2 establishes the Quality System requirements and operation procedures for all of the NADEPs. NAVAVNDEPOTINST 4855.8A, Quality Assurance Procedures, dated 19 Dec 2000 (hereafter 4855.8A), establishes the local Quality System requirements and operational procedures for NADEP CP. It directs the Quality Management Department (Code 6.4) to coordinate and monitor the depot-wide Quality Program, serve as the focal point for quality matters and requirements, and maintain a proactive customer liaison program.

112. Chapter 1, Introduction, contains the following paragraphs that are pertinent to this inquiry:

5. Responsibilities.

c. All employees shall:

(1) Identify problems relating to products, processes and the quality system, and notify appropriate personnel when a deficiency or nonconformance is detected.

(2) Initiate action to prevent the occurrence of nonconformances, and for identifying corrective and preventive solutions through designated levels of management.

d. All Departments shall:

(4) Advise Research and Engineering Group (AIR-4.0) of items concerning reliability, and refrain from introducing unauthorized depot tasks into products or processes that may jeopardize product reliability.

i. Quality Management Department:

(1) Coordinate and monitor the depot-wide Quality Program. Serve as the focal point for quality matters and requirements, and for maintaining a proactive customer liaison program. This responsibility includes, but is not limited to the following:

(q) Document workmanship type discrepancies using the Internal Defect Reporting System (IDRS), and procedural discrepancies using a Corrective Action Request (CAR).

113. Several witnesses cited specific paragraphs in Chapter 11, Corrective and Preventive Action. Although the material is somewhat lengthy, we believe it appropriate to reproduce most of the paragraphs that comprise Chapter 11:

1. Purpose. Corrective and preventive action is initiated to resolve identified deficiencies and to preclude recurrence. Preventive action is initiated to prevent occurrence of potential nonconformances. Analysis of quality data resulting from both corrective and preventive action is an important function in the process of determining effectiveness of actions taken. Identification and elimination of root cause will inhibit recurrence of cited deficiencies.

2. Scope. Corrective and preventive action shall be required when a deficiency is detected in a process, product, or system. Although the major focus of attention in a quality program is on "hardware" or the output of production, other areas, which require close attention are processes, procedures, techniques, and facilities that may be substandard and inefficient. Diagnosis of the causes of defects and removal of the causes by corrective action is essential. Preventive action shall be an inherent part of the quality system to alleviate potential problems prior to the occurrence of an actual defect.

a. Corrective Action. Corrective action is taken to eliminate the causes of existing nonconformances, defects, or other undesirable situations to prevent recurrence.

b. Preventive Action. Preventive action is taken to eliminate the causes of potential nonconformances, defects, or other undesirable situations to prevent occurrence.

3. Requirements.

a. A continuous and vigorous corrective and preventive action program includes the analysis of internal and external data. Prompt detection and correction of assignable conditions that are adverse to quality must be identified and changed. Corrective and preventive action is required when a deficiency or a potential deficiency is detected in the product, process, or system.

b. Prompt and thorough corrective and preventive action must be enacted without compromising quality whenever deficient conditions are reported. Corrective and preventive action shall extend to the performance of all suppliers and vendors, and must be responsive to user data. Corrective and preventive action shall include as a minimum:

(1) Analysis of data and examination of products scrapped or reworked to determine extent and causes.

(2) Analysis of trends in processes or performance of work to prevent nonconforming products.

(3) Introduction of required improvements and corrections, an initial review of the adequacy of such measures, and monitoring of the effectiveness of corrective action taken.

c. Deficiencies shall be elevated to higher levels of management until positive action is taken to eliminate the root cause.

d. A Corrective Action Request (CAR) NAVAVNDEPOT CP 4855/57 will be used to identify deficient conditions that could affect products produced and processes performed. The CAR is primarily used to document procedural deficiencies. Examples include deficiencies in technical data, equipment, facilities, material handling, calibration, shelf-life material, work documents, and production certification. (emphasis added - see discussion)

e. An electronically generated Discrepancy Work Order (DWO) will be used to document product/process workmanship type discrepancies. Procedures for initiation of DWOs is established and defined in the Internal Defect Reporting System (IDRS) chapter of this instruction.

f. Preventive action will be accomplished and documented through effective implementation of the Beneficial Suggestion Program, NAVAVNDEPOTINST 12000.4; the Process Improvement Criteria (PIC) Program, NAVAVNDEPOINST 5305.1; and the Process and Productivity Enhancement Program, NAVAVNDEPOTINST 5220.8.

g. Reported deficiencies will be classified according to their degree of severity and will be numerically coded to indicate the deficiency classification,

(1) Defect Classifications.

(a) Critical. A deficiency whose failure could cause loss of aircraft or one of its major components; loss of control, unintentional release of or inability to release any armament store, failure of weapon installation components, or which may cause significant injury to occupants of the aircraft.

(b) Major. A deficiency other than critical that is likely to result in failure or to reduce materially the usability of the unit or product for its intended purpose.

(c) Minor. A deficiency that is not likely to reduce materially the usability of the unit or product for its intended purpose, or is a departure from established standards, having little bearing on the effective use or operation of the unit.

(2) Classification codes and required response/follow-up timeframes will be determined as follows:

<u>Code</u>	<u>Classification</u>	<u>Response Time</u>	<u>Follow-up</u>
1	Critical	24 Hours	24 Hours
2	Major	10 Calendar Days	10 Calendar Days
3	Minor	10 Calendar Days	N/A

h. Defects, regardless of classification, shall be corrected. Repetitive defects shall be elevated to increasingly higher levels of management until positive constructive action is taken to eliminate the cause of the defect.

i. Corrective action to correct the reported problem and to prevent recurrence of the same or similar discrepancy shall be documented on the CAR and forward[ed] to the Quality Systems Management Division (Code 6.4.1). (emphasis added - see discussion)

(1) Provide an explanation of the conditions creating the discrepancy and the action taken to correct and prevent recurrence. The explanation shall be constructive and positive, and shall exhibit a rational decision process directed toward the correction and prevention of the reported problem.

(2) Specify a measurable timeframe for completion of the corrective/preventive action when immediate corrective/preventive action cannot be accomplished. Projected timeframes shall be reasonable and realistic.

4. Responsibilities.

a. All Departments.

(1) Initiate action to promptly and effectively correct/prevent each reported deficiency.

(2) Identify and document the cause of deficiencies and conditions that allowed and/or contributed to the reported deficiency.

(3) Document and return the CAR to the Quality Systems Management Division (Code 6.4.1) by the indicated response date in accordance with paragraph 3.e (2).

(4) Initiate immediate action to resolve CAR follow-up issues.

(5) Ensure immediate corrective/preventive action is taken that will preclude the recurrence of the reported deficiency.

(6) Actively pursue preventive action and continuous process improvement in accordance with paragraph 3.f above.

b. Quality Management Department (Code 6.4).

(1) Initiate a CAR when documenting procedural deficiencies that adversely impact depot products, processes, or systems. (emphasis added - see discussion)

(2) Initiate a DWO when documenting product/process deficiencies attributable to unsatisfactory workmanship.

(3) Initiate a CAR to the action activity for all product/process type discrepancies that are coded critical. In addition, generate a DWO for reprocessing the product/process. Annotate the parent link number of the DWO on the CAR.(emphasis added - see discussion)

114. NAVAVNDEPOTINST 4855.8A is subordinate to COMNAVAIRFORINST 4790.2¹⁴, which was established by CNO and pertains to all maintenance of Navy and Marine Corps

¹⁴ OPNAV INSTRUCTION 4790.2J dated 1 Feb 2005 established COMNAVAIRFORINST 4790.2, The Naval Aviation Maintenance Program (NAMP), and authorized Commander, Naval Air Forces (COMNAVAIRFOR), to set maintenance policies, procedures, and responsibilities for the conduct of the NAMP at all levels of maintenance throughout naval aviation for operation and support of Navy and Marine Corps aircraft.

aircraft. The defect classifications definitions in paragraph 3.g(1) of 4855.8A are a variation of the definitions in 4790.2, paragraph 4.11.c(3). The definitions in 4855.8A state:

3. Reported deficiencies are classified as critical, major, or minor.

(a) A critical deficiency is a defect that judgment and experience indicate is likely to result in hazardous or unsafe conditions for individuals using or maintaining it. Depending upon the product, the defect may prevent functional performance of an aircraft, missile, space vehicle, or major component.

(b) A major deficiency is a defect that is likely to result in the failure or reduced material utility of a unit or product.

(c) A minor deficiency is a defect that is not likely to materially reduce the utility of a unit or product or is a departure from established standards having little bearing on the use or operations of a unit.

What the QA Specialists Said

115. QA-3, a QA Specialist, stated that the Manual does not state that the exhaust diffuser MRA functional test is a QA Call Point or a Flight Critical Process. The investigators' review of the Manual confirmed his assertion.

116. QA-3 confirmed that he and QA-4, another Quality Assurance Specialist, spoke with Complainant about the use of the oil squirt can for the functional test and informed him that neither of them felt a CAR was justified and that Complainant could speak to their Supervisor, QA-2, if he wished to pursue the issue. Neither QA-3 nor QA-4 reported or discussed this issue with their QA Supervisor, QA-2.

117. QA-3 explained that he did not feel a CAR was justified at the time because, "... both internal and external data did not show any problem with the diffuser MRA and this unit did not have any past history of quality deficiency reporting." He said that he thought the oil squirt can was used on only a few diffusers because only a few MRAs were in production at the time. He explained that, "[w]hen the problem was identified, the corrective action was initiated at that time. The problem was corrected at the same time. I did not feel a CAR was justified because the problem was immediately fixed." He stated that if he had written a CAR, "I would have classified it as Minor. I do not feel this discrepancy should have [been] rated Critical. The test for the diffuser was basically to see if oil was flowing from the oil jet. The test does not specify any pressure, flow rate or time for the oil flow test. If the test was to determine flow rate of the nozzle, I would have generated a CAR on the fact that nozzle flow rate was not being monitored."

118. QA-3 explained that, "[t]he classification of discrepancies is left up to the [QA Specialist] at the time of the identified discrepancy" and he would check to see if any past data or trends were present. He said 4855.8A is not clear as to, "...me reporting or generating a CAR on all discrepancies." On page 11-2, paragraph (g) states that reported discrepancies will be classified

according to their degree of severity and will be numerically coded to indicate the discrepancy classification. I take this as the originating [QA Specialist] would determine this. The 4855.8A instruction does not tell me what to do if a conflict does arise like this one. Complainant was informed that if he did not agree with us that he could talk to our Supervisor at that time. In my opinion, the instruction is not clear." He added that to his knowledge, the 4855.8A instruction does not require him to notify his Supervisor that a discrepancy exists.

119. QA-4, a QA Specialist, stated that he spoke to the Complainant one time about whether to submit a CAR to address the use of the oil squirt can. He said that he did not generate a CAR because corrective action was already initiated at the time, e.g., the missing adapter was placed on order and the technical directives were to be adhered to. He informed Complainant that there was no problem with the exhaust diffuser MRA oil flow during shop tests, no reported oil flow problems during the engine test cell run-ups and no reports of problems from the fleet.

120. QA-4 believed he and Complainant agreed a CAR was not warranted, but says he told Complainant that if he was not satisfied, Complainant could discuss the issue with the QA chain of command. QA-4 asserted Complainant did not do this. QA-4 thought he had mentioned to his Supervisor, QA-2, that the exhaust diffuser matter was handled and correct procedures were in place. He added that just because a Shop Supervisor, in this case the Complainant, wants a recall, does not necessarily mean that there should be one.

121. QA-4 stated that Quality Assurance generates CARs when corrective action is required for a process or procedure. In this specific situation, corrective action had been implemented and the shop artisans were instructed to perform the oil flow check per the manual.

122. QA-4 explained that "[Complainant] and I had discussed whether a CAR and product recall was required. Upon discussing the need for a quality [CAR] and possible recall of the exhaust diffuser, I believed [Complainant] and I agreed that because corrective action was already in place, and the two process final results were similar, and no adverse results to the process and exhaust diffuser were evident, that no recall or quality [CAR] was required. To the best of my knowledge, this was the one and only time [Complainant] brought this discussion up." He added that he did not feel that a CAR was justified at the time, "...because a Quality [CAR] is generated when there is a need for corrective action. In this case, corrective action was already in place and the artisan and procedure did not have an adverse effect on the oil flow process of the exhaust diffuser."

123. With respect to the guidelines in 4855.8A, Chapter 11, Corrective and Preventive Action, QA-4 stated that if a CAR was warranted, he would classify the oil squirt can issue as Minor. He did not feel that a CAR was necessary though because the corrective action has already been implemented. He said, "Only when corrective action needs to be implemented within a specified time frame, and the deficiency adversely impacts depot products," is a CAR required. He stated that in 2004 he did not have to notify his supervisor if he decided to submit a CAR because 4855.8A did "...not reflect supervisor notification unless a corrective action does not get resolved in a designated time frame." He said he would have "...notified my supervisor on all deficiencies that have been classified as Critical, and depending on the severity of a deficiency classified as Major, I would have discussed the matter with my supervisor in order to get his/her feedback on the issue."

What the QA Branch and Department Heads Said About Issuing a CAR

124. QA-2 stated on 12 October 2005 that under the Defect Classification on page 11-2 of 4855.8A, he would classify using the oil squirt can instead of the lube supply tester as a Minor Discrepancy.

125. QA-2 does not believe the procedures in paragraph 4.b.(3), page 11-4, in the instruction would apply to the use of the oil squirt can in this situation. That paragraph says to "Initiate a CAR ... for all product/process type discrepancies that are coded critical." QA-2 stated "Information that has been given to me during the investigation has indicated that the intent of the instruction was being followed as backed-up by subsequent engineering decision. At the time of the incident, I was not aware of the process discrepancies."

126. When asked if the instruction requires a CAR for Major or Minor discrepancy, QA-2 said, "No." He said that the instruction authorized QA Specialists QA-3 and QA-4 to make a decision whether they would submit a CAR without discussing it with him. QA-2 stated that the instruction requires him to be notified when "... discrepancies are not corrected. It is required that resolution is elevated up the management chain."

127. SME-1 explained that when a discrepancy or non-conformance is found, there are two internal reporting formats that can be used to document and ensure proper action is taken. One is the Internal Defect Reporting System (IDRS), used primarily for specific discrepancies found in a specific unit. Immediate action from an IDRS report may include reworking the unit, which would require creation of a Discrepancy Work Order (DWO) providing the steps to rework that unit. Consequently, in March 2004, if a specific exhaust diffuser MRA was found to have been tested using an oil squirt can, creation of an IDRS and a DWO for that unit would have been appropriate.

128. SME-1 also stated that an accumulation of individual IDRS discrepancy reports, if indicating a trend or systemic issue related to individual units, can also be reported as a CAR, which is the other internal reporting format. CARs are generally used, in this way, to elevate issues for which the root cause has not been eliminated. Consequently, given evidence of repeated use of the oil squirt can instead of the lube supply flow tester as far back as 1996, at some point it would have become appropriate to issue a CAR for this reason alone.

129. SME-1 explained that while 4855.8A discusses the use of CARs in connection with the IDRS reporting system, the primary purpose of a CAR is to address procedural discrepancies. CARs may be written on processes that are unrelated to specific units and therefore an IDRS entry is not required. Consequently, said SME-1, not every non-conformance results in an IDRS entry nor does every non-conformance result in a CAR. An example of a discrepancy reported in IDRS that would not result in a CAR would be something of a minor nature that based on the assessment of the QAS was not likely to recur. However, every non-conformance that is not trivial needs to be documented in some manner, and using a testing tool for an aviation product other than that specified in the Manual is not a trivial matter.

130. SME-1 also stated that it is appropriate for someone other than the QA Specialist to write a CAR, including Shop Superintendents. SME-1 said internal auditors in the Command

Monitoring Team routinely write CARs, and that environmental and safety specialists, managers, and engineers have written CARs. In addition, because NADEP CP is an International Organization of Standardization (ISO) 9000/AS9100/ISO 14000/OSHAS 18001 registered organization, anyone in the organization is encouraged to document corrective and preventive actions.

131. SME-1 noted that changes are being incorporated into the QA system, with corresponding revisions in 4855.8A, to facilitate change and continual improvement under the ISO program. Over the past year, NADEP CP has developed a web enabled workflow system and business rules that provide a depot wide environment for all corrective and preventive action processing and tracking, called eCAM. The eCAM system will facilitate change making clear to all employees that everyone may create a corrective action request.

132. In December 2005, SME-1 told NAVINSGEN that the eCAM system had been tested and minor corrections were being made for release in late January. Many of the QASs and several depot managers have been trained. More training is planned. SME-1 observed that the web aspect of the system provides a clear mechanism for anyone in the organization to submit a problem/issue/concern/suggestion for evaluation through an Evaluation Request. These Evaluation Request will be assigned to a subject matter expert to investigate and evaluate.

133. Turning to the issue of criticality, SME-1 explained that when a CAR is written, the deficiencies are classified in accordance with COMNAVAIRFORINST 4790.2 Volume II Chapter 4 Quality Programs paragraph 4.11.c(3). The definitions of hazard criticality are predicated on probability of the defect resulting in the failure, based on severity and probability. The ability to make an assessment of the hazard criticality is based on experience and judgment. The Engineering Department is a resource used in determining criticality level through their risk assessment process.

134. SME-1 observed that QA Specialists are selected from the ranks of the most experienced artisans, and those QA Specialists who are assigned to the shop floor have trade specific knowledge and experience that assists them in determining what criticality level to assign to a defect or nonconformance. The QA Specialists are expected to use judgment based on their knowledge and experience in determining the appropriate course of action in a given situation, including the criticality determination.

135. SME-1 noted that 4855.8A, the NAVAVNDEPOT Cherry Point QA instruction, provides a definition of "critical deficiency" that is more specific than 4790.2. Reading 4790.2 and 4855.8A in concert, and based on her recent reading of the engineering documentation concerning this matter, SME-1 believes it would have been reasonable to assign a criticality classification of "Minor," based on a low probability the exhaust diffuser MRA would cause any operational issue, since oil blockages would be detected in the engine test cell. Therefore a CAR written on this issue as a Minor would have provided appropriate documentation of the reported discrepancy.

136. In response to specific NAVINSGEN questions, SME-1 stated that:

a. based on all the information available to her at this time, it would have been appropriate to write a CAR in March 2004, and assign a criticality level of "minor."

b. it also would have been appropriate for a QA Specialist to write a DWO, in addition to a CAR, for any specific exhaust diffuser MRAs still in house that had not already been through the engine test cell in March 2004. This would ensure the functional test was accomplished using the proper equipment for that specific unit.

c. NADEP CP is aware of the fact that while some people may read paragraph 4b1 to require a CAR for major and minor discrepancies, as well as critical discrepancies, others point to paragraph 4b3 (which says to initiate a CAR for all discrepancies that are coded critical) for the proposition that if the deficiency is not critical, a CAR is not required. SME-1 believes paragraphs 4b1 and 4b3 are contradictory in the current version of 4855.8A, and thinks paragraph 4b3 should be a subordinate paragraph to 4b2 – in that if a Critical DWO is written, a Critical CAR should be written. SME-1 said these paragraphs will be clarified in the next revision of the 4855.8A.

d. A reading of 4790.2 and the current version of 4855.8A indicates the main purpose of coding deficiencies as critical, major, or minor is to establish response times. The next revision of 4855.8A will include specific instructions for notification and routing of critical CARs to include Quality Department management to the department level and the cognizant engineer for the specific purpose of assistance with recall considerations. With this change, Critical CARs will get higher and broader visibility.

137. SME-1 observed that while 4855.8A does not include the phrase "judgment and experience indicate is likely to result" in the definition of a critical deficiency, it is implied because 4855.8A is subordinate to, and supplementary of, 4790.2. SME-1 also noted that "likelihood" or "likely" appears in all three definitions in 4790.2, and judgment and experience applies to, and is needed to make, the assessments of probability in all three definitions, particularly if there is little or no actual failure data.

What the Engineering Subteam Leader Said About A Product Recall

138. SME-3, AV8FST.3 Subteam Leader, is responsible for the day-to-day maintenance engineering management of the F402 engine program and is the leader of the CFA engineering team that provides technical support for F402 engine maintenance issues.

139. In early September 2005, after learning that an oil squirt can had been used to perform the functional test on some exhaust diffuser MRAs, SME-3 reviewed the matter using a "failure mode and effects analysis" (FMEA), concluded that a recall was not necessary, and prepared an undated memo for NAVAIR, which states, in part:

A review of the potential failure modes and effects [analysis] of the affected systems and parts has not identified any safety concerns if the alternate procedure has been used. Also, a review of the complete history of main engine bearing failures in the –402 engine does not support that assembly or functional test of the exhaust diffuser has ever been a contributing factor. Since July 2000, only one in-service –402 main engine bearing failure has occurred. Investigation of this particular bearing failure determined that a

maintenance induced error resulted in loss of a magnetic chip detector, in flight, which depleted the oil system subsequently resulting in No. 2 bearing distress and ultimate failure. AV8FST.3 believes that any discrepancies that could be caused by using the requested alternate procedure would be identified on the engine test cell during initial engine testing or by the recurring oil system monitoring and/or engine health monitoring inspections. Therefore, no safety issues exist and no immediate fleet actions are considered necessary.

140. In October and November 2005, the investigators used SME-3 and his supervisor as subject matter experts to expand upon the memo. These engineers explained that an improperly performed exhaust diffuser MRA oil flow check (functional test) might fail to reveal leaks and blocked passages in the components. However, WP 206 00 in maintenance publication A1-F402B-MMI-230 requires an engine test following replacement of the exhaust diffuser MRA that also will reveal leaks and blocked passages. If the test in the engine test cell is successful, the engine is considered safe for flight whether or not the oil flow check was properly performed.

141. Oil leaks occur because of a breach in the oil system, assembly induced or otherwise. Oil leakage checks and oil consumption monitoring are part of the engine test cell syllabus. Thus, leaks in the exhaust diffuser MRA would be discovered in the engine test cell. An oil leak would be the basis for rejection of the engine and return to the shop for additional rework.

142. Blockages in oil tubes or internal oil passages also may be discovered in the engine test cell. The metering plugs and sediment filters that feed oil to the No. 3 and the No. 4 engine bearings may be partially clogged and, in an extreme case, result in oil starvation to the No. 3 and No. 4 main engine bearings. This could result from sediment, filter blockage, or improper assembly of internal oil supply passages by the artisan. If, for some reason, the artisan does not detect sediment, blocked filters, or inadequate flow through the oil passage apertures during the exhaust diffuser MRA functional test, oil starvation to either the No. 3 or the No. 4 engine bearings would be readily apparent during engine testing as excessive vibration, elevated oil system monitoring contaminant levels or adverse rotor system run down times, all of which are monitored and must meet stringent acceptance limits. A test reject would require a complete engine teardown and rebuild, causing the depot unscheduled rework and extra cost. It could also cause the depot to miss a scheduled engine delivery.

143. SME-3 and his supervisor acknowledged that the artisan performing the exhaust diffuser MRA functional test should be able to discover blocked oil passages using either the oil squirt can or the lube supply flow tester. However, they supported the March 2004 decision to reject use of an oil squirt can during the functional test because the oil flow tester provides pressurized, heated, and filtered oil to the exhaust diffuser MRA under controlled conditions while the oil squirt can does not. Thus the lube supply flow tester provides a more consistent test method that removes some variability due to artisan technique and environmental effects. This is exemplified by the following comparisons they offered:

a. Varying degrees of pressure can be applied by hand to a squirt can. The oil flow tester applies consistent oil pressure.

b. Temperature of the oil will vary for the oil squirt can as it will depend on the ambient temperature in the immediate area around the oil squirt can. The oil flow tester heats the oil to a consistent 140 degrees F prior to each test. Cracks and improper MRA assembly are more likely to be evident with oil that is applied under controlled pressure and temperature conditions.

c. Debris or contaminants may be present in oil and cause denting in the bearing's roller elements if not filtered out before reaching the bearings. The flow tester has a filter to prevent injection of contaminants into the oil passages, but the oil squirt can does not.

144. Despite these reasons for using the lube supply flow tester, SME-3 and his supervisor also point out that the functional test is not considered one of the more critical elements of engine maintenance performed at NADEP CP. Very critical processes that are directly associated with a flight safety failure mode are labeled "Flight Critical" or "FC" in the Manual and require inspection in accordance with the QA program. Critical tasks not directly related to flight safety are labeled "QA" in the Manual and also require a mandatory inspection. The Manual does not require a QA or FC inspection for the exhaust diffuser MRA functional test.

145. The FMEA Analysis did not identify a catastrophic failure mode for this assembly if the functional test of the exhaust diffuser MRA was performed using the oil squirt can instead of the lube supply flow tester. If the engine is going to fail because of an improper exhaust diffuser MRA functional test, the failure will happen in the engine test cell and not during flight. Empirical evidence specific to the Number 3 and 4 main engine bearings collected from years of investigations into engine failures and periodic engine oil system monitoring in the fleet for debris in the oil system has not identified any safety concern for debris in the oil system causing main engine bearing failure in the fleet. Minor damage, like denting of the bearing's roller elements, has been observed but those problems are rectified when the engine is disassembled for rework every 1000 flight hours.

Independent Technical Experts Confirm No Need for Product Recall

146. SME-6 is the Deputy for Aviation Plans and Programs in the Department of Aviation, Headquarters, US Marine Corps (HQMC). He has served with the Harrier community for more than 17 years, and is a former AV-8B Harrier Squadron Commanding Officer. We asked SME-6 to read a draft of this report and provide an expert opinion on the risk to the fleet. He concurred with the findings and conclusions of the report. In his opinion, the improper use of the oil squirt can instead of the lube supply flow tester does not pose any risk to the fleet, and he sees no need to take further action to protect the fleet in connection with this matter.

147. SME-6 explained that every engine must go through an engine test cell during intermediate level (I-Level) maintenance performed at a Marine Aviation Logistics Squadron (MALS). Therefore, exhaust diffuser MRAs that go through NADEP CP as stand-alone items and are later installed on engines at the MALS are run through the full range of tests in the engine test cell before being sent (as complete engine, ready to install) in a container to a Fleet Squadron for installation in an aircraft. That is done without exception. Exhaust Diffuser MRAs are not attached to engines at the squadron level.

148. SME-6 also referred a copy of the report to SME-4, who is the AV-8B Harrier Aircraft Coordinator in the Aviation Weapons Requirements Office at HQMC. SME-4 agreed with SME-6's opinion. SME-4 also consulted others who has direct experience working on engine test cells at a MALS. They confirmed that every exhaust diffuser MRA will go through an engine test cell before it is installed on an aircraft.

149. SME-2 is at NAVAIRSYSCOM. We asked SME-2 to read a draft of this report and provide an expert opinion on the risk to the fleet. He focused his attention on the technical aspects associated with the second allegation, more specifically, safety concerns associated with the "alternate" oil squirt can procedure for performing the exhaust diffuser oil flow check, in lieu of the published procedure per NAVAIR A1-F402B-MMI-220.

150. SME-2 said for the purpose of his analysis he assumed that regardless of the testing method the artisans used (oil squirt can or lube supply flow tester), their intent was always to verify free flow of oil from filter housing locations on the MRA. He also assumed that if they did not observe oil flowing freely, they would have disassembled the exhaust diffuser MRA and repaired the item that prevented oil flow, noting that he saw no evidence in the numerous interviews in the draft report that would suggest they did not correct insufficient oil flow anomalies.

151. SME-2 stated that his review of the failure modes and effects analysis for both the #3 and #4 bearing assemblies, which are lubricated by the subject oil feed tube in the exhaust diffuser MRA, indicates that failure modes associated with inadequate oil supply to these assemblies would be detectable during the final acceptance test procedure of the full engine configuration (performed whenever the exhaust diffuser module is installed or replaced), and/or while operating in-service (via oil system monitoring, performance or vibration trending and assessment). These failure modes based on wear of either the inner/outer tracks/races, rolling elements, cages and retaining tangs, would surface as progressive failures in either of these bearing assemblies under circumstances of limited oil supply flow or by system debris generated through application of the "alternate" flow check process. The potential initial effects would include:

- Generation of debris in the oil system, which would be detectable by oil system monitoring. Beyond the Joint Oil Analysis Program (JOAP) regular sampling and analysis per the JOAP standard from each engine, the F402 engine program incorporates a JetScan oil debris monitoring (measurement and trending) system, which exposes any debris collected from the engine chip collectors (located in the scavenge flow from the bearing compartments) to a scanning electron microscope evaluation for material elemental make-up and subsequent corrective action (including up to removal from service and rework) based on historical fleet and specific engine serial number trends.

- Loss of radial location of the rotor system, which would result in compressor or turbine blade tip and/or inner rotor shaft seal rubs which would be detected as performance loss and/or elevated vibration, and/or abnormal rotor spool down times, potentially driving removal from service and rework, if severe enough. The F402 engine maintenance plan requires a recurring 60-hour vibration survey, which is conducted by operating the engine installed in the aircraft (tied down). This survey produces a vibration signature for the engine, which is used to identify any shifts in frequency or

amplitude that would act as leading indicators. The test has limit criteria, that when exceeded, require engine removal for maintenance action.

- Rub on bearing oil/air seals, detectable by high oil system breather flow/discharge, and high oil consumption, or low oil pressure, or a combination thereof. Probably resulting in early removal from service and rework for lube system related causes, in either case.

152. SME-2 also stated that, in the case of a cracked or leaking aft bearing oil feed tube, the oil consumption rate/trends for the engine, measured during the acceptance test run and/or during service operations would lead to engine removal from service and rework for lube system related maintenance.

153. SME-2's additional consultation with propulsion engineering rolling element bearing experts confirmed that test cell oil leakage/consumption checks should find any breach in the system; and that, severe oil starvation to the #3 and/or #4 bearings would likely be detectable early in the test cell run if 100% starved, or later in the operational life of the engine if partially starved. Detection would likely be by rotor system freedom of rotation checks, high vibration and oil debris monitoring (as was postulated by the Fleet Support Team). The F402 #3 bearing has been found to be particularly sensitive to installation damage and rotor imbalance, as is typical with all intershaft bearing designs. The #4 bearing, a conventional shaft-to-ground design, should be much less so.

154. SME-2 said the experts concurred with the statement [in SME-3's FMEA memo] that any additional debris damage introduced due to procedural errors should be detectable using the mitigation techniques identified during previous corrective actions, but commented that an accurate determination of bearing life under starved conditions would be difficult to calculate, and is very much a function of how much oil actually makes it to the bearing to form an elastohydrodynamic oil film, and how much is required for cooling the bearing to establish stable thermal conditions. Less efficient transport of debris to the detection/monitoring systems (chip collectors, etc.) due to a partial blockage of oil flow to the #3 and/or #4 bearing could make the detection of deterioration more challenging, however, in the case of the F402 engine, the JetScan debris monitoring system provides a significant improvement over the JOAP methods, in the detection and mitigation of oil system related anomalies.

155. SME-2 stated he concurred with the recommendations proposed in the draft report, which now appear at paragraphs 193 and 194.

156. With respect to an opinion on "critical" deficiency determination, SME-2 referred to the Naval Aviation Maintenance Program CNAF 4790 Volume II, Para 4.11 Corrective & Preventive Action, subparagraph c(3)(a), which provides the following:

"A critical deficiency is a defect that judgment and experience indicate is likely to result in hazardous or unsafe conditions for individuals using or maintaining it. Depending on the product, the defect may prevent functional performance of aircraft, missile, space vehicle, or major component."

157. Referring back to the assumption he made concerning the artisan's attempt to verify free oil flow during the functional test, SME-2 said he does not believe using the oil squirt can would result in a defect leading to a hazard consistent with the 4790.2 definition of a critical deficiency. In SME-2's opinion, the rationale for requiring a lube supply flow tester is to provide a consistent, repeatable method/process for evaluating the integrity of the oil supply tubes, not to prevent the possibility of damaging the bearings in the engine test cell; if the artisan does verify oil flow using the oil squirt can, there is little chance of bearing failure.

Discussion and Analysis

Why A CAR Should Have Been Issued

158. The reader who has not tried to write a technical specification or manual does not realize how difficult it is to create a document that is simple, direct and clear. We commend NADEP CP for continuously working to improve documents such as 4855.8A; our finding of ambiguity below should not be construed as criticism, but as an effort to assist NADEP CP in improving the product.

159. At least six paragraphs in 4855.8A Chapter 11, "Corrective and Preventive Action," discuss issuing a CAR:

160. Paragraph 3d states:

A Corrective Action Request (CAR) NAVAVNDEPOT CP 4855/57 will be used to identify deficient conditions that could affect products produced and processes performed. The CAR is primarily used to document procedural deficiencies, Examples include deficiencies in technical data, equipment, facilities, material handling, calibration, shelf-life material, work documents, and production certification.

161. Paragraph 3i states:

Corrective action to correct the reported problem and to prevent recurrence of the same or similar discrepancy shall be documented on the CAR and forward[ed] to the Quality Systems Management Division (Code 6.4.1)

162. Paragraph 4a discusses the responsibilities of all departments. Subparagraph (1) states:

Initiate action to promptly and effectively correct/prevent each reported deficiency.

163. Subparagraph (2) states:

Identify and document the cause of deficiencies and conditions that allowed and/or contributed to the reported deficiency.

164. Subparagraph (3) states:

Document and return the CAR to the Quality Systems Management Division (Code 6.4.1) by the indicated response date in accordance with paragraph 3.e (2).

165. Paragraph 4b discusses the responsibilities of the Quality Management Department (Code 6.4). Subparagraph (1) states:

Initiate a CAR when documenting procedural deficiencies that adversely impact depot products, processes, or systems.

166. Subparagraph (3) states:

Initiate a CAR to the action activity for all product/process type discrepancies that are coded critical. In addition, generate a DWO for reprocessing the product/process. Annotate the parent link number of the DWO on the CAR.

167. Paragraphs 3i and 4a lend support to the proposition, stated by the QA Specialists, that people outside the Quality Management Department, including a shop superintendent such as Complainant, may prepare a CAR. But initiating "action" is not the same thing as initiating a CAR.

168. Consequently, paragraph 4a(1), read in conjunction with subparagraph 4b(1), suggests that while a shop superintendent or someone else outside the Quality Management Department may ask a QA Specialist to "initiate" or create a CAR, only the QA Specialist may create the CAR itself. Paragraph 4a(3) also supports this interpretation, since it says to "return" the CAR to the Quality Management Department.

169. Consequently, the confusion in the testimony over who may issue a CAR is understandable. SME-1 stated that NADEP CP is taking steps to clarify this issue, and we commend NADEP CP for that.

170. Likewise, we think the QA Specialists' belief that a CAR is not required for minor deficiencies stems from the ambiguity created by paragraphs 4b(1) and 4b(3). When their supervisor, QA-2, states that a CAR is not required for deficiencies that are not classified Critical, he can find support in paragraph 4b(3), because it only refers to critical deficiencies.

171. Yet SME-1 looks to paragraph 4b(1) for the proposition that a CAR should be issued without regard to the deficiency classification. SME-1 stated that paragraph 4b(3) is really referring to CARS issued in support of DWOs, and therefore should be subordinate to paragraph 4b(3), which tells the QA Specialists when to initiate a DWO. As SME-1 points out, while the primary purpose of a CAR is to document procedural deficiencies, there are times when a CAR also should be used in connection with workmanship problems. Given her position at NADEP CP and the logic of her analysis, we conclude that A CAR should have been issued to address the use of the oil squirt can to perform the functional test instead of the specified lube supply flow tester.

172. It appears that SME-1, and perhaps others, identified the ambiguity in 4855.8A concerning the issuance of a CAR before this investigation started. Again, we commend NADEP CP for recognizing and addressing these issues proactively.

173. The foregoing analysis of these conflicting paragraphs, SME-1's testimony, and our own reading of other provisions of 4855.8A lead to the conclusion the defect classification analysis is

the red herring in this case. Other than paragraph 4b(3), there is absolutely nothing in 4855.8A that links the decision to issue a CAR to the defect classification. Indeed, everything else suggests that the defect classification level is assigned after the CAR is initiated¹⁵. As SME-1 stated, and our analysis confirms, it appears that the only purpose of the defect classification structure contained in 4855.8A is to determine response and follow-up time.

174. We conclude that a QA Specialist should have "initiated" or created a CAR in March 2004 after talking to Complainant. We also conclude that Complainant could, and should, have initiated a CAR when the QA Specialists told him they would not. We also think Complainant should have used the REI to tell the engineers that artisans had been using the oil squirt can to perform the functional test when he asked them to approve changing the test procedure.

Why a Product Recall is not Required

175. SME-3 and the experts we interviewed agreed that all F402 engines are required by instruction to go through an engine test cell before they are installed and flown in an aircraft and, in fact, do so. We also confirmed that exhaust diffuser MRAs that enter and leave the NADEP CP as individual units installed on engines at a MALS and then go through an engine test cell. Our experts confirm that any blockages or other defects in the exhaust diffuser MRA that could cause immediate engine bearing failure would be revealed in the engine test cell. Lesser defects that could cause damage, but not failure, in operation over a period of time also are likely to be discovered, but if they are not, routine monitoring during operation will reveal them before they can affect flight safety. There is, therefore, no need for a product recall.

176. Given the importance of using the lube supply flow tester to help detect leaks in the system, as explained by SME-3 and SME-2, we asked SME-3 whether the functional test procedure should include a specific range of oil pressure and a minimum volume of oil to push through the exhaust diffuser MRA during the functional test. He told us that the minimum oil pressure automatically created by the lube supply flow tester is sufficient to ensure the necessary volume of oil will flow through the system during the functional test.

Conclusion

177. The allegation is substantiated. However, a product recall is not required.

Listing of Actual/Apparent Violations

178. NAVAVNDEPOTINST 4855.8A, Quality Assurance Procedures.

Actions Planned or Taken

179. As previously discussed, Commander NAVAIR directed an inquiry to determine whether any F402 engines should be recalled. That analysis, which concluded a recall was not necessary, has been thoroughly discussed in this report.

¹⁵ SME-1 stated that the criticality code for a CAR is entered in block 8 (QCI - Quality Criticality Index) of the CAR.

180. SME-3 reviewed our question about specifying a minimum oil pressure and volume for the functional test and determined it was not necessary. He also concluded the use of the oil squirt can to perform a "pre-test" would be inappropriate.

181. SME-1, the Quality Department Head is making changes to NAVAIRDEPOTINST 4855.8A, which will clarify the use and purpose of the CAR. These changes will outline the relationship between Discrepancy Work Orders, CARs, REIs, and their role in the evaluation for potential recall of product.

182. In addition to the Commanding Officer's all-hands meeting in March 2004 that emphasized the importance of complying with the procedures, additional actions were taken, including the development of Shop Floor Integrated Quality Teams (IQTs). IQTs were established in 36 production shops. Each team is comprised of a QA Specialist, an engineer, the shop supervisor, examination and evaluation (E&E) personnel, an industrial engineering technician, a Production Controller (PC), a planner and estimator (P&E), and an equipment specialist assigned specifically to the particular shop. The IQT members work as a team to proactively detect, prevent, and correct conditions that adversely affect quality or efficiency. The teams have increased their effectiveness over the past two years and are empowered to take actions necessary to solve problems at the shop level. The IQT, with the help of the shop artisans, identifies and resolves any shop issue by determining the root cause of the problem and implementing improvements designed to prevent the problem from recurring.

183. Over the past year, NADEP-CP has developed a depot-wide web-enabled eCAM workflow system. The eCAM system will provide an avenue where all employees can begin the process of a corrective or preventive action request. The web aspect of the system provides a clear mechanism for anyone to submit a problem/issue/concern/suggestion for evaluation through an Evaluation Request. This Evaluation Request is then assigned to a subject matter expert to investigate and evaluate. The eCam system automatically notifies the supervisor of the originator of an Evaluation or Action Request (formerly a CAR). Lack of response to the eCAM Evaluation or Action Request will automatically be elevated to supervision. The eCAM system provides status and resolution feedback to the originator of the Evaluation Request.

184. Ongoing training will continue to stress that established maintenance procedures must be followed at all times. Following the release of the revision to NAVAIRDEPOTINST 4855.8A, training will be provided for artisans, QAS, engineering, supervisors/managers, engineers, PCs, E&E, and Equipment Specialists. This training will make it clear that all personnel are required to comply with the policies, instructions, standards, and specifications for the processes, products, and services NADEP-CP provides. This is important to the foundation of a quality program that relies on artisan certification of their work in accordance with written technical specifications. This also precludes introduction of unauthorized depot tasks into products or processes without prior written engineering approval. It will promptly identify problems or deficiencies relating to aviation products or quality processes using the corrective and preventive action system eCAM. Finally, it will serve to actively pursue preventive action and continuous process improvements.

Personnel Actions Taken

185. NADEP CP has addressed the matters raised in this investigation through individual and shop training and has determined that no disciplinary action against anyone associated with this incident would be appropriate. This decision is consistent with the table of penalties for first offenses and the fact that none of the personnel involved have a record of prior misconduct, poor performance, or performance based actions. Disciplinary action at this time would not serve any purpose or promote the efficiency of the service, but would be punitive in nature.

186. When the investigation commenced, corrective action had already been taken to address the use of unauthorized test equipment discussed in the first allegation. The lengthy passage of time makes it difficult to gather definitive evidence to support any conclusion other than the fact that several people confirmed the unauthorized test equipment was used on occasion. There was no evidence of malice on the part of the individuals involved, and when proper procedures were reinforced with the artisans, there were no further infractions.

187. In making this decision, NADEP CP found it significant that no engine failure has been traced to insufficient oil flow through the exhaust diffuser MRA. Additionally, no problems have occurred with exhaust diffuser MRA oil flow during shop tests and there have been no reports of oil flow problems during the engine test cell run-ups. Finally, there have been no reports of problems from the Fleet and independent technical experts, including members of the Harrier Action Desk at HQMC, have confirmed there is no need for a product recall because the unauthorized maintenance procedure used does not pose any risk to the Fleet.

188. The ambiguity in the language of the NAVAIRDEPOTINST 4855.8A discussed in the second allegation supports the conclusion that there could have been confusion over the action required in response to the use of unauthorized test equipment, leading reasonable people to conclude it was not necessary to initiate a CAR.

189. In sum, the decision not to pursue disciplinary action is based on the lengthy passage of time since the infractions occurred; correcting the procedures implemented in early 2004; no more infractions; candor by the witnesses; no failures; no individuals or aircraft put at risk; consistency with the table of penalties, no history of poor performance or prior discipline, and the ambiguous language in NAVAIRDEPOTINST 4855.8A. After carefully considering the foregoing, NADEP CP concluded that the only purpose to be served by disciplinary action against specific people at this time would be punitive in nature, and therefore improper.

Observations and Recommendations

General

190. QA Specialists and Shop personnel are confused and in disagreement over the guidelines for issuing a CAR. We attribute this to a lack of clarity in the language of 4855.8A and training that is not focused on the kind of issues that came up during this investigation. After reviewing Chapter 11, paragraphs 3 and 4 several times and interviewing the QA Specialists, we still found it difficult to determine when a CAR is required and who should issue it, who ultimately has authority to decide what definition/category (Critical, Major or Minor) is appropriate for any discrepancy and what specific action is required by QA and shop personnel. That is precisely

why Complainant reasonably might say his responsibility was complete when he notified the QA Specialists, at the same time that the QA Specialists could opine that if Complainant wanted to, he could have pursued the matter despite their belief that a CAR was not necessary. Because of this lack of clarity, when Complainant left the shop it was a simple matter for this issue to fall between the cracks and remain unaddressed for some 18 months.

191. Similarly, the instruction does not clearly indicate which definition/category deficiencies need to be forwarded to a QA Supervisor for review and which do not. The QA Specialists feel they can assign a definition/category to a discrepancy (other than Critical) and make a determination of what to do without consulting their supervisor. QA-2 stated that no discrepancy had to be reported to him, other than a Critical discrepancy or one where the deficiency was not corrected. These procedures should be reviewed and clarified.

192. Likewise, we found equal confusion about the difference between and purpose of the CAR and the REI. The testimony revealed that personnel are not entirely clear about their intended use. Both of these procedures, the CAR and the REI, should be thoroughly documented and discussed with the shop supervisors and artisans. A lot of confusion could have been avoided if Complainant had written on the REI that the artisans were already using the proposed "alternate method" but it is not clear that he had any obligation or sufficient information to do this.

193. We recommend that NADEP CP review 4855.8A for clarity and consistency with 4790.2 and make appropriate changes. This document, or a related document, should address the difference between a CAR and an REI, and their relationship (for example, should the REI have stated that the oil squirt can had been used to perform the functional test even though its primary purpose was simply to request a change in procedures?). Moreover, it should clearly describe who may submit and who is responsible for issuing a CAR and taking appropriate action to ensure that the matters raised in it are thoroughly addressed.

194. We recommend that NADEP CP conduct appropriate training for artisans, QA personnel, engineers, and their respective supervisors, following the review and any changes to definitions, practices, policy, and/or procedures in these areas.

Language Discrepancies Between 4790.2 and 4855.8A

195. We are troubled by the proposition that the language of 4855.8A must be read in light of the language of 4790.2 to understand what 4855.8A means. While it is true that the subordinate instruction may not contradict the superior, it should not be necessary to read 4790.2 to understand what 4855.8A means, and most people we interviewed never referred to 4790.2. Moreover, a subordinate instruction often may impose stricter or more detailed requirements than the superior without contradicting it.

196. There are several significant differences in the language of these instructions that relate to this investigation. For example, 4790.2 (at paragraph 4.11c(3)) speaks to "reported deficiencies" while 4855.8A talks in terms of "defect classifications" (at paragraph 3g(1)), although the two terms usually do not have the same meaning.

197. Likewise, the definition of "critical deficiency" in 4790.2 is not the same as that in 4855.8A. The definition in 4790.2 states:

A critical deficiency is a defect that judgment and experience indicate is likely to result in hazardous or unsafe conditions for individuals using or maintaining it [emphasis added]. Depending upon the product, the defect may prevent functional performance of an aircraft, missile, space vehicle, or major component.

198. But 4855.8A states:

A deficiency whose failure could cause loss of aircraft or one of its major components, loss of control, unintentional release of or inability to release any armament store, failure of weapon installation components, or which may cause significant injury to occupants of the aircraft [emphasis added].

199. The first problem we see is that while 4790.2 says the deficiency must be "likely to result" in an event, 4855.8A does not. This is critical to this case because everyone agrees that bearing failure in the MRA or other damage resulting from improper performance of the functional test has never been observed in the fleet. Under 4790.2, that leads directly to the conclusion that the improper performance of the functional test is "not likely" to create a hazardous condition and, therefore, is not a critical deficiency. The result is not the same under 4855.8A, because the language "likely to result" does not appear there. The argument that "likely to result" is implied because it appears in 4790.2 is not persuasive. Since the only thing that turns on the classification level is response and follow-up time, NADEP CP is free to require faster response and follow-up times for some deficiencies than would be required by 4790.2. If NADEP CP wants likelihood to play a role in this determination, it should say that plainly in 4855.8A. Without that language, one reasonably may argue that the possibility of bearing failure in a test cell, no matter how unlikely, may lead a person to interpret this as a Critical deficiency.

200. Conversely, while 4790.2 includes consideration of "hazardous or unsafe conditions for individuals using or maintaining it," which reasonably includes ground personnel, 4855.8A does not. Indeed, the 4855.8A language referring "to loss of aircraft or one of its major components" appears to be limited to in-flight conditions. If that is the intent, this would be an unacceptable limitation of the requirements of 4790.2, because it removes the safety of ground personnel from consideration. NADEP CP should add language to cover personnel "maintaining" the aircraft or simply incorporate the language of 4790.2 into 4855.8A.

201. We agree that the use of the oil squirt can does not rise to the level of a Critical deficiency because we accept the testimony of SME-1 and SME-2 that the "likely to result" language in 4790.2 should be "read into" 4855.8A. However, we believe the better course would be to include the language expressly (as is the case for the definitions of "Major" and "Minor" deficiencies in both instructions) in order to avoid any confusion and we recommend that NADEP CP consider making this change.

Systemic Issues

202. In one email to us, SME-1 observed that NADEP CP policies and instructions make it clear that all personnel are required to comply with the standards and specifications for the processes, products, and services NADEP CP provides (citing 4855.8A Chapter 1, paragraphs 4c, 5f(4)). Thus, SME-1 said, conformance to applicable specifications and requirements is paramount

(citing Chap 4, pars 2, 3(a)), and artisan certification of their work is the foundation of the quality program. In that case, we think the paramount systemic issue raised by this case is understanding and explaining why the artisans would substitute the oil squirt can for the lube supply flow tester at all, let alone for as much as eight years. The task of ensuring routine compliance with procedures and specifications in all cases, a primary goal of Quality Assurance, is a much greater challenge than most people realize. We admit having no ready solution to offer.

203. We do think one reason for the failure to adhere to standards over time in this particular case may be the general misunderstanding of the complete purpose of the functional test. Everyone except engineering thought the only reason for the functional test was to ensure oil flowed out of the designated holes (and indeed, that's all the procedure requires by way of observation). Consequently, if an artisan squirted oil through the elbow tube adaptor and oil came out of the holes at the bottom of the MRA everything appeared to be ok. But another important part of the test is to help detect leaks, cracks, and other anomalies in the oil tubes and other passages within the exhaust diffuser MRA that carry the oil from the elbow tube adaptor to the designated holes. While these conditions may not cause bearing failure in the engine test cell, they may cause the engine to fail the tests, requiring disassembly or rework, and if the engine goes to the field, they may result in engine degradation over time and subsequent premature removal or failure. Only the engineering personnel understood this was a purpose of the test and the role the lube supply flow tester played in meeting that objective.

204. Our greatest concern is that NADEP CP went 18 months between March 2004 and September 2005 without documenting this procedural deficiency and going through an appropriate analysis, by answering the questions set forth in CAR form or by means of some other procedure. Although the artisan currently performing this work has been using the lube supply flow tester only, we developed no evidence to indicate that he was ever told not to use the oil squirt can and until September 2005 there was no documentation that would tell another shop supervisor or artisan entering the engine shop that engineering had considered, and rejected, use of the oil squirt can. NADEP CP should develop an appropriate mechanism that will minimize the risk this will happen in the future.

205. Finally, we believe it important that NADEP CP make the artisans and QA Specialists aware of the findings of this report that relate to their well-intentioned, but improper, use of the oil squirt can, whether as a substitute for the lube supply flow tester or as a "pre-test" before performing the functional test with the lube supply flow tester. This investigation could serve as a teaching point for the meaning of strict adherence to specified procedures. It illustrates that adding a step to a procedure without appropriate review and approval may be just as inappropriate as omitting or changing a step in the procedure.

Appendix A - Reference Documents

- a. QA-1 Statement
- b. QA-2 Statement of 12 October 2005 and 8 December 2006
- c. Artisan-1 Statement of 5 October 2005 and 23 November 2005
- d. Artisan-2 Statement of 29 November 2005 and 2, 5 & 6 December 2005
- e. Artisan-3 Statement of 5 October 2005 and 30 November 2005
- f. Supervisor-1 Statement
- g. Supervisor-2 Statement
- h. QA-3 Statement of 6 October 2005 and 15 & 23 November 2006
- i. Engineer-2 Statement
- j. Artisan-4 Statement
- k. Artisan-5 Statement
- l. Engineer-2 Statement
- m. Engineer-3 Statement of 30 August 2005 and 6 October 2005
- n. Artisan-6 Statement 5 October 2005, 30 November 2005, 6 & 14 December 2005 and 5 January 2006
- o. Artisan-7 Statement
- p. Artisan-8 Statement 5 October 2005, 30 November 2005 and 2 December 2005
- q. Supervisor-3 Statement of 5 & 26 October 2005
- r. Supervisor-4 Statement of 5 October 2005 and 12 December 2005
- s. Artisan-9 Statement of 5 & 30 November 2005
- t. Engineer-4 Statement
- u. SME-1 Statement of 23 December 2005 and 11 January 2006
- v. SME-2 Statement

- w. SME-3 Statement of 30 August 2005, 9 & 26 September 2005, 13 October 2005, 29 November 2005, and 19 & 20 December 2005
- x. Statement¹⁶
- y. SSME-5 Statement
- z. SME-6 Statement of 23, 24 & 25 December 2005
- aa. Complainant Statement 1 & 17 November 2005
- bb. QA-4 Statement 12 October 2005 and 16 & 23 November 2005
- cc. Disclosure from Complainant to OSC dated 1 March 05
- dd. Letter from OSC to Complainant dated 7 March 2005
- ee. Request for Engineering Instruction submitted by Complainant dated February 24, 2004
- ff. Letter from Office Special Council to SECNAV dated August 5, 2005
- gg. Tasking Letter from Navy IG to NAVAIR IG dated 14 September 2005
- hh. Letter from NADEP CP Commanding Officer to OCHR dated 24 August 2005
- ii. OPNAV INSTRUCTION 4790.2, The Naval Aviation Maintenance Program (NAMP) dated 1 February 2005
- jj. COMNAVAIRFORINST 4790.2, The Naval Aviation Maintenance Program (NAMP) dated 1 February 2005
- kk. NAVAVNDEPOT 4855.8A, NADEP CP, Quality Assurance Procedures Instruction dated 19 December 2000
- ll. Naval Air Systems Command Intermediate Maintenance Assembly Manual A1-F402B-MMI-220 dated 1 September 2004
- mm. Naval Air Systems Command Intermediate Maintenance Manual, A1-F402B-MMI-220, Work Package 145 00, 146 00, 148 00
- nn. Naval Air Systems Command Intermediate Maintenance publication A1-F402B-MMI-230, Work Packages 185 00, 197 00 & 206 00
- oo. Illustration, F402 Engine
- pp. Illustration, F402 Engine & Lube Oil System

¹⁶ Witness did not provide any relevant testimony.

- qq. Portable Lube Flow Tester Manual, NAVAIR 17-15AE-9, Pages 1-1, 2-1, and 3-1/4-1
- rr. Organization chart of NADEP CP Personnel Assigned to Engine Shop from February 2003 to February 2004
- ss. Organization chart of NADEP CP Engineering Division
- tt. E-mail discussing the number of MRAs produced at NADEP CP dated 25 & 28 November 2005
- uu. E-mail from SME-3 regarding MRA testing dated 29 November 2005
- vv. E-mail from SME-1 discussing the term 'Critical' dated 23 December 2005
- ww. E-mail from OCHR to HRO Cherry Point dated 4 August 2005
- xx. E-mail from Command Evaluator regarding Artisan-5 dated 15 December 2005
- yy. E-mail from Complainant to Supervisor-1 dated 8 & 28 March 2004
- zz. E-mail from Command Evaluator regarding Artisan-3 and Artisan-8 testimony dated 23 December 2005
- aaa. Memorandum from Command Evaluator regarding various issues dated 2 December 2005
- bbb. Memorandum in response to NAVIG concerning MRA questions dated 9 November 2005
- ccc. Memorandum concerning F402 Exhaust Diffuser Safety Assessment dated 5 October 2005

Appendix B - Witness List

Not included in this version of the report

Ms. Tracy L. Biggs
U.S. Office of Special Counsel
1730 M Street, N.W., Suite 218
Washington, D.C. 20036-4505

OFFICE OF SPECIAL COUNSEL
WASHINGTON, D.C.
2006 MAY -1 PM 2:34

Subject: Report from U.S. Dept. of Navy dated 3/14/2006

Dear Ms. Biggs,

I would like to submit the following comments in response to the report from the U.S. Department of the Navy in reference to my disclosure, OSC File No. DI-05-1175:

1. Subject report addresses two questions: (1) whether artisans in the engine shop used unauthorized test equipment and (2) whether QA should have issued a Corrective Action Request.

In my disclosure letter to the Office of Special Counsel dated 3/1/2005 I alleged that (1) Mr. Germroth was guilty of Gross Mismanagement, Abuse of Authority, and Substantial and Specific Danger to Public Safety and that (2) Mr. McCabe was guilty of Gross Mismanagement, Abuse of Authority, and Substantial and Specific Danger to Public Safety. Neither one of my allegations was addressed in subject report. In my opinion the problem still exist and nothing has been done to correct the problem. In my opinion subject report only confirms the facts that I used in support of my allegations.

2. As for the Whistleblower Program in general the process has not been a pleasant experience. When I was questioned on 10/26/2005 by the IG investigators and the NADEP investigators it was more like an interrogation than an interview. I was in the video conference room with four investigators for (2) hours. The IG investigators were professional and courteous and ask unbiased questions. The NADEP investigators were hostile and inconsiderate and ask biased questions. Ms. Kirkland's questions were leading and biased towards finding quilt with my actions. At one point Ms. Kirkland ask me what were my responsibilities according to the Corrective Action Report instruction. I answered that I would have to look at the instruction. Ms. Kirkland laughed and smirked and said "You mean to tell me that as long as you've been a supervisor that you don't know what the instruction says". Mr. Harry the IG investigator politely ask if I would send him a copy of the instruction. I later gave Mr. Swigart a copy of NAVAVNDEPOTINST 4855.8A, Chapter 11, Corrective and Preventive Action to give to Mr. Harry. During my questioning Mr. Swigart resorted to theatrics and yelling. At one point Mr. Swigart ask me why I didn't take my concerns to Col Gumbel if I were concerned about safety and quality. Mr. Swigart ask me this question over and over again until I was finally so confused that I said "I don't know". When Mr. Swigart called me over to his office to sign my statement on 11/01/2005 he said, and I quote, " This statement was written by using the notes from all four investigators at the previous meeting. And then all four investigators read the statement and made changes. And this statement is pretty much exactly how it is going to be." To me Mr. Swigart was implying that he didn't want me to make any changes to the statement they had written. I personally don't know why they didn't sign it themselves since they wrote it themselves. In my opinion I should have been afforded the opportunity to write my own statement in my words. Mr. Swigart later agreed to let me make changes only after I challenged him on it.

3. As for the Office of Special Counsel Ms. Biggs was professional and courteous and I appreciate the help that she gave me.

anks,

 4-26-06
Anthony W. Yoder (IJN)