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

28 Aug 08

Mr. Scott J. Bloch
Special Counsel
U.S. Office of Special Counsel
1730 M Street, NW, Suite 300
Washington, DC 20036-4505

Dear Mr. Bloch,

Thank you for your letter requesting an investigation of alleged improper repair and cleaning of aircraft jet engine parts, and improper disposal of engine cleaning by-products, at Fleet Readiness Center Southeast (FRCSE), Jacksonville, Florida (Office of Special Counsel (OSC) File No. DI-08-0177).

The inquiry led by the Naval Inspector General (NAVINSGEN) determined these allegations to be unsubstantiated. The inquiry did reveal some sections of the applicable repair and cleaning procedures manual incorrectly identified afterburner variable exhaust nozzle rollers as if they were bearings. This error may have contributed to Complainant's belief that artisans were not following authorized procedures. The manual was revised during the course of the inquiry to avoid any confusion in the future.

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

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

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

Sincerely,

Donald C. Winter

28AUG08

AASN
RELEASE

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Enclosures:
As stated

Office of the Naval Inspector General

OSC Case Number DI-08-0177
NAVINSGEN Case Number 20070925
NAVAIR Case Number H2007-170
FRCSE Case Number H2007-096

Report of Investigation

11 August 2008

Subj: ALLEGED SYSTEMATIC ABUSE OF MAINTENANCE AND CERTIFICATION PROCEDURES, INCLUDING THE UNLAWFUL DISPOSAL OF HAZARDOUS MATERIAL AND IMPROPER CLEANING AND REPAIR OF JET ENGINES AT FLEET READINESS CENTER SOUTHEAST (FRCSE), JACKSONVILLE, FLORIDA.

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Suitable for Public Release
(names removed)

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Preliminary Statement

1. This report is issued pursuant to a 12 December 2007 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 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. FRCSE, Jacksonville, Florida, formerly known as Naval Air Depot (NADEP), is a large industrial complex with approximately 2,937 skilled aircraft and marine tradesmen, planners and engineers experienced in depot-level maintenance, repair and

fabrication of naval aircraft. FRCSE is responsible for repair of engines F404 (FA-18 A-D), F414 (F/A-18 E-F), TF34 (USAF A-10), J52 (USN EA-6B), T56 (USN P-3, I Level) and T700 (USN H-60, I Level), including maintenance, engineering and logistic support. FRCSE is a subordinate command of and reports to Commander, Naval Air Systems Command (COMNAVAIRSYSCOM).

5. OSC identified Mr. David Lubbers, a WG-8602-10, Jet Engine Mechanic assigned to FRCSE onboard Naval Air Station, Jacksonville, FL as the person who provided OSC information that led it to task this investigation. OSC reported that Mr. Lubbers, hereinafter referred to as Complainant, consented to the release of his name.

6. The OSC tasking letter states:

> Mr. Lubbers alleges that Navy employees do not properly maintain, clean and repair Navy aircraft and fail to dispose of hazardous material in accordance with Navy regulations. Specifically, Navy employees are instructed to clean aircraft using equipment that could damage aircraft parts; to remove jet engine bearings without proper certification and training; and to dispose of hazardous material improperly. When managers fail to understand or follow proper hazardous material disposal and aircraft maintenance procedures, such ignorance or inaction places the public and Navy pilots and crew in peril.

7. In an attachment to the tasking letter, OSC provided the following general summary of Complainant's allegation:

> Mr. David R. Lubbers, who consented to the release of his name, is a Jet Engine Mechanic at the Department of the Navy (NAVY), Naval Air Station, Jacksonville, Florida. Mr. Lubbers alleges that Navy employees do not properly maintain, clean, and repair Navy aircraft and fail to dispose of hazardous material in accordance with Navy regulations, which create a danger to public health and safety. In addition, Mr. Lubbers stated, as a Navy Jet Engine Mechanic, he must certify that maintenance and environmental regulations were followed properly. His concern is that not only were regulations not being followed, his supervisors lacked knowledge or understanding of what the regulations required them to do. Such inaction and ignorance of health, safety and environmental requirements place the public and Navy pilots and crew in peril.

8. The attachment then provides more details of the complaints:

> Mr. Lubbers contends that Navy employees' failure to repair aircraft safely and to dispose of hazardous material properly create a danger to public health and safety. In August 2007, Mr. Lubbers informed Navy General Forman Supervisor One and Jet Engine Mechanic Supervisor Two that, given the aircraft maintenance requirements under Navy Manual LPS 260A, Aircraft and Jet Engine Cleaning, the Navy's Clean Shop was equipped to clean the jet engines properly. He emphasized that the Clean Shop, which is located in the adjacent building from where Mr. Lubbers works, has the required containers for cleaning that would prevent damage to machine parts during the cleaning process and it has the necessary plumbing to handle the dumping of hazardous material. Mr. Lubbers specifically provided Supervisor Two several specific examples of improper maintenance and cleaning procedures, including that Navy employees: (1) fail to properly store Titanium vanes in an appropriate container to prevent them from being damaged during the steam cleaning process; (2) lack proper immersion tanks filled with necessary dry cleaning solvent to immerse jet engine parts; and (3) lack proper pressure rinse machines to adequately and safely clean the engine parts.[1]
>
> Mr. Lubbers added that compliance with maintenance regulations and procedures could be achieved by simply taxiing aircraft to the adjacent building which is properly equipped for these specific tasks. He added that if the engine parts are not cleaned properly, the integrity of the entire aircraft might be placed in jeopardy.
>
> Secondly, Mr. Lubbers disclosed that Navy aircraft bearings are being removed by uncertified workers instead of by certified employees who are assigned to the Navy Bearing Shop. According to Mr. Lubbers, bearings removed from any part of the aircraft must be routed to the Bearing Shop and cannot be processed in any other shop. Mr. Lubbers reported that his shop does not possess the proper equipment and training to repair bearings safely, even though bearings are routinely removed from aircraft by his shop.

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[1] Supervisor One has authority over all shops discussed in this report; Supervisor Two supervises Shop 62616, the Engine Shop, located in building 797. The bearing shop is located in building 794, directly adjacent to building 797. Mr. Lubbers works under Supervisor Two in the Engine Shop.

Next, Mr. Lubbers alleges that the Navy is not properly disposing of pollutants and byproducts of the aircraft cleaning process in violation of LPS 260A Part 4 (Disposal of Waste and Spent Solutions). According to Mr. Lubbers, the Navy must follow environmental management codes for the proper disposal of pollutants and hazardous material. See NAVAIRDEPOTJAXINST 5090 Hazardous Waste Publication. He explained that his shop routinely and improperly dumps contaminants down the deep well sinks located on pillars 10K and 8-N of the F414 Shop located at the Naval Air Station. He also stated that the Navy previously removed one deep well sink, located at 8-J in the J-52 Shop, four years ago due to concerns about violations of environmental codes and cleaning procedures. However, he added that the same types of violations that prompted the removal of the deep well sink in the J-52 Shop were occurring in his building. Mr. Lubbers alleges that Navy employees fail to properly dispose of chemicals and spent solutions in his building because, according to Supervisor Two, it is too time-consuming and the delivery of the hazardous material to the Clean Shop located in the building next door would add costs to maintenance operations.

On August 27, 2007, in response to Mr. Lubbers' concerns, Supervisor Two informed Mr. Lubbers via email that he had discussions with engineering personnel. He said the Navy was unable to pay to route the cleaning tasks to the Clean Shop. Supervisor Two added that the cleaning process was 'good enough until we get the budget problems fix (sic)…' Supervisor Two also said that after the budget problem was solved, he could then purchase new baskets and new tubs to clean the aircraft parts. However, Mr. Lubbers is concerned that he is being asked to certify that maintenance and cleaning procedures were in compliance with Navy regulations, when in fact, they were not in compliance. Consequently, he refused to certify that aircraft maintenance was performed properly.

Description of Conduct of Investigation

9. On 12 December 2007, OSC sent the complaint to the Secretary of the Navy, who forwarded it to the Naval Inspector General (NAVINSGEN) for action. NAVINSGEN, in turn, tasked the Naval Air Systems Command Inspector General (NAVAIR IG) to conduct an investigation on 13 December 2007.

10. On 17 December 2007, the NAVAIR IG sent an email to FRCSE notifying the command it was being assigned the investigation.

The NAVAIR IG attached the case summary it had received from NAVINSGEN to the email.

11. FRCSE assembled a three-person team (the investigators) to conduct an on-site investigation, consisting of:

a. Investigator One, FRCSE Command Evaluation Office.

b. Investigator Two, FRCSE Command Evaluation Office.

c. Investigator Three, FRCSE Command Evaluation Office.

d. Complainant met with the investigators after working hours on 7 January 2008. The investigators questioned Complainant about the information contained in the OSC tasking letter to ensure they understood his allegations, but Complainant did not want to discuss specifics of his allegations without having his collection of emails and regulations present.

12. The investigators requested that Complainant provide them documentation pertinent to his allegations and further clarifications. They also asked that he provide a written statement to clarify his complaints. Complainant provided a 31-page written statement on 16 January 2008.[2]

13. The investigators then formulated three allegations:

Allegation 1: That Supervisor One and Supervisor Two authorized or allowed Navy aircraft (engine) bearings to be improperly removed by uncertified workers instead of by certified employees assigned to the Navy Bearing Shop at FRCSE, and that their shop does not possess the proper equipment to repair the bearings, in violation of A1-F414A-MMI-240, Intermediate Maintenance Cleaning, Inspection, and Repair of Variable Exhaust Nozzle (VEN) Actuating Ring.

Allegation 2: That unnamed FRCSE artisans in Shop No. 62616 were authorized or allowed by Supervisor One and Supervisor Two, to use an improper cleaning method on the jet engines or aircraft parts in August 2007 and the aircraft could be taxied to the clean shop which would avoid damage to the engine parts in violation of requirements set forth in A1-F414A-MMI-210 Military Maintenance Instruction dated 1 Nov 07, LPS-260A Aircraft and Jet Engine Cleaning and Local Process Specification dated 28 March 2005, NAVAIR 02-1-20 dated 1 Sep 05, NAVAIRDEPOT Jacksonville Instruction 5090.1D

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[2] See item # 12 Appendix A page A-1

Environmental Management System dated 3 Apr 2007, and Repair Engineering Instruction F414-14370R05 dated 8 Aug 07.

Allegation 3: That Supervisor One and Supervisor Two authorized or allowed improper disposal of aircraft cleaning pollutants and by-products of jet engines or aircraft parts by dumping the contaminants down the deep well sinks located on pillars 10-K and 8-N of the F414 shops located at the Naval Air Station Jacksonville in violation of NAVAIRDEPOT Jacksonville Instruction 5090.1D, Environmental Management Systems dated 03 Apr 07.

14. For the reasons set forth in the findings, discussion and analysis of each allegation, the investigators concluded the allegations are not substantiated and there is no danger to public health or safety. NAVINSGEN agrees.

Summary of Evidence Obtained During Investigation

Allegation One

That Supervisor One and Supervisor Two authorized or allowed Navy aircraft (engine) bearings to be improperly removed by uncertified workers instead of by certified employees assigned to the Navy Bearing Shop at FRCSE, and that their shop does not possess the proper equipment to repair the bearings, in violation of A1-F414A-MMI-240, Intermediate Maintenance Cleaning, Inspection, and Repair of Variable Exhaust Nozzle (VEN) Actuating Ring.

Findings

VEN Description and Principles of Operation

15. A jet engine afterburner is an extended exhaust section of the engine containing extra fuel injectors. The Variable Exhaust Nozzle (VEN) is located in the jet engine afterburner. The VEN controls the pressure and flow through the afterburner, and therefore the resultant thrust of the engine, by changing the size of the exit opening. When the afterburner is turned on, fuel is injected, which ignites. The resulting combustion process increases the afterburner exit temperature significantly, resulting in a steep increase in engine net thrust. The higher the thrust, the further the VEN opens. The VEN actuating ring is a part of the VEN assembly and is moved by actuators. Rollers attached to the ring aid the movement of the VEN actuating ring.

The purpose of the rollers is to smooth the movement of the ring.[3]

16. Figure 1 shows the breakdown of a VEN.[4] Item 5 is a side roller; item 7 is a cam roller; item 13 is a compression roller.

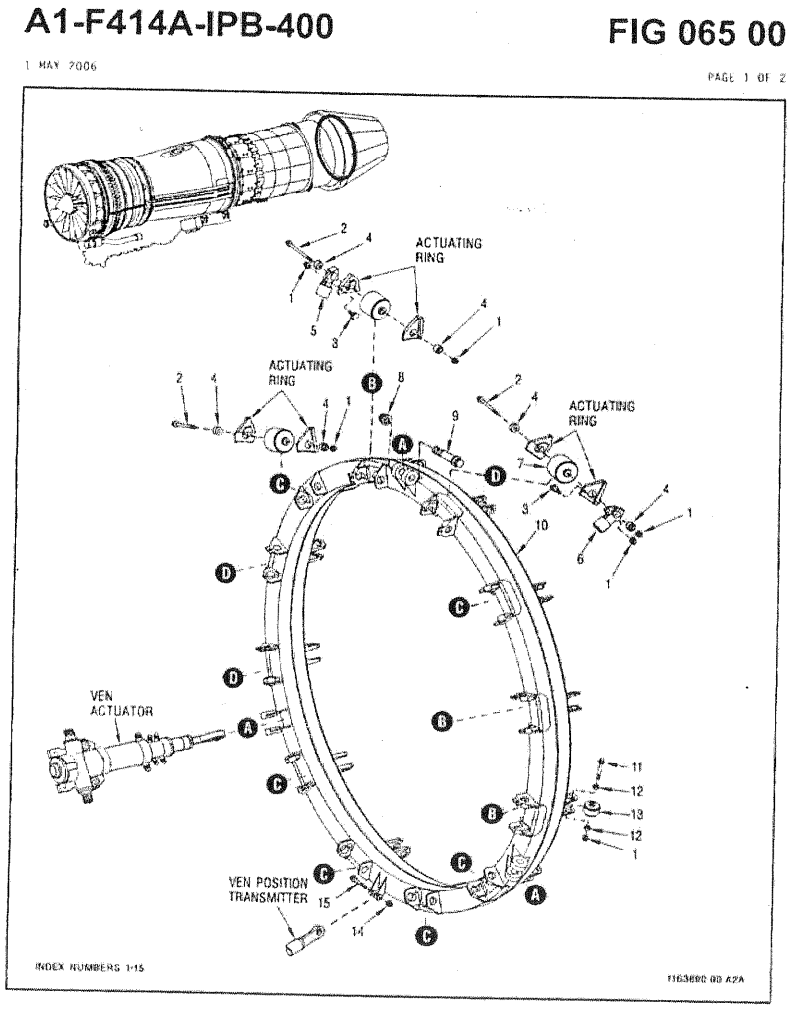

Figure 1 Breakdown of VEN

[3] This explanation was provided AS Engineer, an Aerospace Engineer the investigators consulted as a witness and subject matter expert.
[4] Item # 5, Appendix A

17. Figure # 2 is a photograph of a VEN showing the rollers.[5]

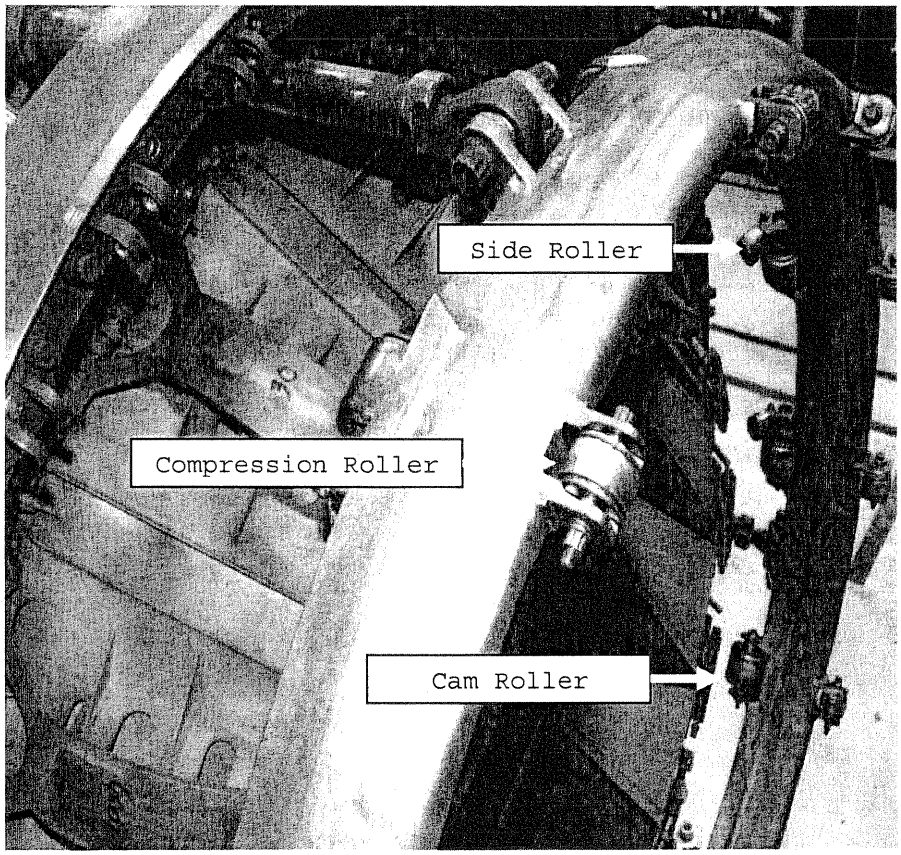

Figure 2 Illustrates Rollers on VEN of F414 Engine

Maintenance Requirements

18. FRCSE performs intermediate and depot-level maintenance on a variety of aircraft and engines, including the F414 engine used on the F/A-18 E-F model aircraft. The F414 engines, like all engines received by FRC for maintenance or overhaul, arrive in a protective case called a can. FRCSE overhauled 15 F414 engines during FY07. FRSCE also processed 919 F414 modules.[6] The F414 engine is composed of six different modules. The overhauled engines are tested and then returned to the Fleet in a can.

19. The F414 engines overhauled at FRCSE are processed as required by a set of NAVAIR maintenance publications that are approved and maintained by the F414 Fleet Support Team. There are a series of five volumes in this publication consisting of:

a. A1-F414A-MMI-210(Volume I)

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[5] Item # 6, Appendix A
[6] Item # 7, Appendix A

b. A1-F414A-MMI-220 (Volume II)
c. A1-F414A-MMI-230 (Volume III)
d. A1-F414A-MMI-240 (Volume IV)
e. A1-F414A-MMI-250 (Volume V)

20. Each volume consists of a series of work packages and subordinate work packages containing procedures to be used for the repair/inspection of each F414 engine component. The instructions govern all disassembly, cleaning, inspection, repair, reassembly and functional testing of the F414 engine.

21. FRCSE also utilizes NA 02-1-20, Technical Manual Standard Maintenance Practices Manual General Electric Aircraft Engines. Section II of this manual addresses the various cleaning methods.[7] Section II, Para 2-1 states:

> Generally, the following points should be considered in choice of an appropriate cleaning method:
>
> 1. Types of contaminants to be removed.
> 2. Types of material(s) composing part.
> 3. Surface finish and surface coating requirements.
> 4. Degree of cleanliness required.
> 5. Type and availability of cleaning materials and equipment.
> 6. Complexity of part (geometric complications)

22. No special equipment is specified for cleaning VEN rollers in A1-F414A-MMI-240, Work Package 217 (hereafter Work Package 217). It does indicate a vise with locally manufactured adapter plates should be used when lubricating VEN rollers. The investigators observed that the vise and plates were physically present in the shop.

23. Pages 6 through 9 of Work Package 217 establish that rollers are not to be repaired. If a roller is found to be defective, it is to be replaced.

24. Mechanic One, an artisan who has been removing and cleaning actuator rollers on F404 and F414 engines for seven years, told the investigators he removes corrosion from the actuator rollers by brushing them lightly with a wire brush. He then cleans and wipes the rollers with high-temperature grease and ensures the rollers rotate.

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[7] Item # 9, Appendix A

Complainant's Testimony

25. During Complainant's initial interview on January 7, 2008 the investigators addressed the allegation of FRCSE using uncertified workers to remove bearings that Complainant (per the OSC Report of Disclosures) alleged should be removed by certified employees of the Navy Bearing Shop (Shop 62315) rather than by employees in the Engine Shop (shop 62616). Complainant told the investigators the matter of "uncertified employees removing the bearings" was not an issue. Complainant confirmed this in a written statement he provided on 16 January 2008. Responding to a specific request to "[p]rovide the regulation which requires the training/certification for bearing removal, the persons you notified about this action and any detail that you can provide relating to this issue," Complainant stated "62616 shop certification is not a concern or problem."[8]

26. Complainant (per the OSC Report of Disclosure) also alleged bearings removed from aircraft must be routed to the Bearing Shop and cannot be processed in any other shop; that the shop does not possess the proper equipment and training required to repair bearings safely; and that the shop uses a wire brush to clean the bearings in violation of Work Package 217 requirements.

27. Complainant questioned the removal of "bearings" installed on the VEN located on the engine afterburner. On 11 September 2007, Complainant sent an email to the Aerospace Engineer (AS Engineer), a Subject Matter Expert on the F414 engine, containing four different Requests for Engineering Information (REIs). The first REI addressed Roller, VEN Cam/SIN 2580A P/N 4055T39P01 (Bearing). The second REI addressed Roller, side/SIN 2580C P/N 5033T16G02 (Bearing). The third REI addressed Roller, side/SIN 2580B P/N 5033T16G01 (Bearing). The fourth REI addressed Roller, VEN Compr-Rod/SIN 2580D P/N 4062T47P01 (Bearing).

28. The REIs addressed four different part numbers, but the requests for information were the same on each:

> Requesting information on process for disposition of subject Roller (Bearing) that would supersede the current procedures found in ref (a) [A1-F414A-MMI 240] W/P 217 00 Page 12 and 13 and ref. (b) [NA 01-1A-503] Paragraphs 1-58, 3-34, 3-35 and 5-29.

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[8] See item # 12 Appendix A page A-1

The Engineer's Testimony

29. AS Engineer is an aerospace engineer assigned to the F414 engine shop at FRCSE. Her job is to resolve a wide variety of technical tasks in support of naval aircraft systems. When artisans submit REIs she responds to the information request in writing. Protocol requires her to submit her response to the shop supervisor. Complainant submitted the REIs concerning the VEN rollers on 11 September 0207. AS Engineer responded to Complainant's email on 12 September 2007 saying "Since the four documents provided all have the same discrepancy and should have the same response, I will likely be providing one document for response listing the four affected serial numbers."

30. AS Engineer gave Temporary Engineering Instruction (TEI) F414-0053-2007, containing her response to Complainant's four REIs, to his supervisor on 14 September 2007. It said:

> A1-F414A-MRC-200 Care 1.7 instructs artisan to 'lubricate rollers on VEN actuating ring at every engine induction (refer to Intermediate Maintenance Manual, A1-F414A-MMI-230 (Volume 3), WP 105).' A1-F414A-MMI-230 WP 105 paragraph 18 provides the instruction for lubrication of rollers. The WP states to 'Inspect, clean, and grease lubricate VEN actuating rollers (A1-F414AS-MMI-240, WP 217).' These instructions apply to VEN parts: Cam Roller (4055T39P01), Compression-Rod Roller (4062T47P01), and Side Rollers (5033T16G01/01). These are not centerline/gas path engine bearings and loss of roller operation has no critical or catastrophic affect on engine operation. WP 217 Ashore lubrication of rollers per paragraph 17 can be complied with here at FRC Jacksonville as an I-level procedure performed by a general mechanic. General purpose vibrating machines are readily available in the F414 shop along with Type II Plastic Media. The high temperature grease, known as 'Pyrolube' required for the procedure has been evaluated by the Materials Division (2007JX01536) and approved for use at FRCSE. The procedure has been validated and verified by FST [Fleet Support Team] Engineering at Fleet Readiness Center South West and publication in Ref (a) [A1-F414A-MMI 240] is authorization to perform the task as described. Ref (a) calls out for a locally manufactured vise grip. The information to manufacture a similar vise grip has been provided to the F414 supervisor. Finally, WP 217 also states in the corrective action for the rollers to 'Replace roller if disassembly is not possible'. This provides an alternative corrective action for cases such as roller

unable to open. If tooling or grease lubricant is unavailable to perform Ashore lubrication than Afloat corrective action shall be complied with during maintenance and can be performed with the rollers installed on the afterburner.

31. AS Engineer stated that she, Supervisor Two, and the General Electric Engineer met with Complainant shortly after preparing TEI F414-0053-2007 to try to make him understand that what he was calling "bearings" were actually rollers. She explained in detail, both in writing, and verbally, the procedures for cleaning the VEN actuating rollers. In TEI F414-0053-2007, AS Engineer had explained, in response to Complainant's REIs "These are not centerline/gas path engine bearings and loss of roller operation has no critical or catastrophic affect on engine operation." Complainant refused to accept her assessment of the cleaning processes.

32. AS Engineer stated that the inspection, cleaning and grease lubricating of the VEN actuating rollers was a manual operation, and that Complainant objected to performing this task.

33. AS Engineer explained the difference between roller/bearings on the VEN as follows:

> The VEN (Variable Exhaust Nozzle) rollers aid the movement of the VEN actuating ring. The ring constrains the opening of the afterburner VEN to meet parameters based on numerous flying conditions. The ring assembly position is moved by actuators. Since the VEN system is controlled by the actuators, the ring would still move into position to maintain engine parameters regardless of the rollers. Therefore, bearings are precise components held to specific stringent inspection and maintenance requirements; whereas, the roller is a movement guide which is allowed grosser deviations.

34. AS Engineer said that in Work Package 217 the rollers are referred to in several places as "bearings", even though they are not bearings. The investigators found that there were several places in Work Package 217 that did refer to a part as a "bearing." When questioned concerning this verbiage, AS Engineer explained that while the part may be referred to as a bearing, it was not, in fact, a bearing. AS Engineer explained that a bearing maintains position and that a roller aids in movement of the afterburner. AS Engineer provided documentation to the investigators showing that she had submitted a publication change request to Work Package so that all uses of the word "bearing" in

it were changed to read "roller". Her changes were approved by the F414 FST Logistics Lead and incorporated into Change 19 of A1-F414A-MMI-240, published on 1 May 2008, as part of the semi-annual update of Work Package 217 pursuant to Publication Change Request (PCR) 305489.

35. AS Engineer stated that since the information she provided in the TEI was taken from A1-F414A-MMI-240 and did not in anyway conflict with the instruction, there was no need for any further action (the expiration date of her TEI would not be a factor).

36. In an email dated 11 Feb 08 11:56 AM, AS Engineer wrote:

> All bearings we removed in the F414 shop are properly routed to the bearing shop, except bearings deemed scrap by examiners or directed as scrap by Fleet Support Team. If [Complainant] is still referring to the parts in the afterburner, the components are all rollers. I did notice that in several locations of the lubrication procedure (A1-F414A-MMI-240, WP 217) the word "bearing" is used when in fact it should not be. I will create a publication change to remove those errors. Furthermore, the rollers are only removed if they did not meet usable condition and the disposition has been to scrap them and replace with new. They have been scrapping the unusable hardware since one or multiple portions of the pyrolube process were not in place for the shop.

37. In an email dated 25 January 2008 to one of the investigators, AS Engineer provided the following information concerning the use of wire brushes to clean rollers:

> I have attached the standard practices as requested along with another manual that may be of use. WP 217 has the inspection criteria for the Afterburner VEN rollers. *Wire brushes are authorized material per the [NAVAIR] 02-1-20 [italics added for emphasis]* and are used during cleaning and for surface condition throughout. The only restriction can be in ensuring the type of metal wire is not a dissimilar/poor match for the use because galvanic reactions can occur. The artisan in the Afterburner area said that while training Dave [Lubbers], he explained which brush was proper if needed.

38. In an email dated 21 July 2008 to the investigators, AS Engineer stated:

Wire brushes are a common use item for corrosion removal in numerous shops. *Use of a wire brush creates no technical risk for failure of the F414 VEN Rollers or VEN system. [italics added for emphasis]*

The Supervisor's Testimony

39. Supervisor Two has worked for the Unites States government since 1981. Supervisor Two went through an aircraft engine repairer apprentice program; he became an aircraft engine mechanic supervisor over eighteen years ago.

40. Supervisor Two told the investigators that Complainant was previously assigned to the J52 Engine Shop at FRCSE. He was transferred to the F414 Engine Shop, under Supervisor Two's direction, on 24 Jun 07. Complainant was transferred out of the F414 Engine Shop on 6 Jan 08, at his own request.

41. When Complainant was assigned to the F414 Engine Shop at FRCSE, he told his new supervisor, Supervisor Two, that he wanted to build engines. He was tasked with the steam cleaning of the engines upon arrival at the FRCSE facility. Supervisor Two stated that Complainant did not like that tasking. Supervisor Two explained to Complainant that in order to build aircraft engines, one had to first become certified in a multitude of tasks. Although Complainant is classified as a WG-8602-10 aircraft engine mechanic, he does not hold the certifications required to perform the complex work involved in repairing a jet engine. There are nine training modules on the F414 aircraft engine that an aircraft engine mechanic must complete to become certified to perform maintenance on the F414 engine. The Individual Qualification Records for Complainant[9] show that he began on-the-job training in Task Number 109-4A, F-414 Disassembly of Engine, on 21 Jun 07. Complainant did not complete the training required to become certified in this specific task. Complainant began on-the-job training in Task Number 109-4B, F-414 Fan Mods, on 25 Jun 07, and became certified in this module on 1 Aug 07. The only qualification that Complainant holds allows him to perform low-level tasks such as the manual cleaning of fan stator vanes/blades.

42. Supervisor Two stated that he assigned Complainant to work side-by-side, receiving on-the-job training from experienced and certified artisans. One of the tasks he was assigned involved the cleaning and lubrication of the rollers (referred by

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[9] Item # 31, Appendix A

Complainant as bearings) located on the VEN. Complainant questioned the maintenance procedures for the VEN rollers in four separate REIs. The aerospace engineer assigned to support the F414 engine, AS Engineer responded in writing; Supervisor Two, AS Engineer and the General Electric Production Engineer gave AS Engineer' written response to Complainant and all three met with Complainant to clarify any questions he had.

43. Supervisor Two stated that the "bearings" Complainant refers to are rollers, not bearings. He said the rollers are not centerline/gas path engine bearings and loss of operation has no critical or catastrophic affect on engine operations.

44. Supervisor Two received a number of emails from Complainant questioning F414 shop maintenance. Complainant addressed the emails to both Supervisor Two, his supervisor, and the general foreman, Supervisor One. During a telephone conversation with one of the investigators, Supervisor One said he read the emails, but allowed Supervisor Two, as supervisor, to handle the issue.

45. Supervisor Two stated that Mechanic One, who was certified to train personnel, provided Complainant on-the-job training in this particular task of cleaning and lubricating the VEN compression rollers. Supervisor Two provided documentation showing that Mechanic One was certified to perform this task in 2003.[10]

46. Supervisor Two tasked Complainant with several different assignments, but according to Supervisor Two, Complainant did not want to perform the tasks assigned because "he didn't want to get his hands dirty."

47. Supervisor Two told the investigators there are a variety of alternative and equivalent methods for cleaning engine parts. Due to the high volume of engines repaired at FRCSE, the most cost-effective and time-efficient methods are used.

48. Supervisor Two told investigators that the F414 Engine Shop does not use a wire brush to clean the compression rollers, but uses a scotch brite scrubbing pad as directed by NA 02-1-20.[11] Supervisor Two's testimony is contradicted by Mechanic One, who testified that he uses a wire brush to clean rollers and trained Complainant to use one also. As noted, however, AS Engineer, the subject matter expert, testified that NA 02-1-20 does authorize

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[10] Item # 21, Appendix A
[11] Item # 9, Appendix A

the use of wire brushes, which do not pose a risk to rollers and are commonly used in numerous shops.

The Quality Assurance Specialists' Testimony

49. The investigators contacted the quality assurance specialist assigned to the F414 engine program, QAS-1.[12] QAS-1 stated that Complainant never came to her questioning the cleaning or maintenance procedures used on the F414 engine. QAS-1 did state, however, that Complainant did speak several times to QAS-2, another engine quality assurance specialist (but not concerning the F414 engine).

50. QAS-2 told the investigators that Complainant had come to him on several occasions requesting copies of various manuals, but that he never approached him about any particular concerns in regards to the F414 engine.[13]

Discussion and Analysis

51. Work package 217 in A1-F414A-MMI-240 provides instructions for the cleaning, inspection and repair of the VEN actuating ring. Complainant was assigned the task of cleaning and lubricating the VEN rollers located on the afterburner of the F414 engine. Complainant questioned this assignment by submitting four REIs. Complainant identified rollers in the VEN actuating ring as bearings, and questioned whether the "bearings" should be removed by personnel certified by the Bearing Shop at FRCSE. AS Engineer, aerospace engineer, responded to his request, stating that the "bearings" were in fact rollers, not bearings, and that the correct cleaning procedure was listed in the F414A-MMI-240, work package 217. AS Engineer cited several places in the subject manual where the word "bearing" was misused. AS Engineer submitted the required paperwork to remove the word "bearing" from the work package, and the work package has been revised.

52. A review of Work Package 217 revealed that Supervisor Two, the shop supervisor, and AS Engineer, the aerospace engineer, were correct in determining that the "bearings" Complainant referred to were in fact compression rollers, not bearings. While Work Package 217 did refer to the compression rollers as "bearings" in several places in the manual, this was incorrect.

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[12] See item # 22 Appendix A page A-2
[13] See item # 22 Appendix A page A-2

53. Although Supervisor Two believed wire brushes were not approved for use in cleaning rollers, they are authorized and commonly used for that purpose. Complainant was trained to use them when cleaning rollers.

Conclusion

54. The allegation is not substantiated.

Listing of Actual/Apparent Violations

55. The investigators found no actual or apparent violations. Cleaning and maintenance procedures adhere to the regulations set forth by NAVAIR and the engine manufacturer, General Electric.

Actions Planned or Taken

56. AS Engineer prepared a change to the F414A-MMI-240, work package 217 that removed the word "bearing" from the manual. Her changes were approved and incorporated in the newest edition of the manual, published on 1 May 2008. Action is complete.

Allegation Two

> That unnamed FRCSE artisans in Shop No. 62616 were authorized or allowed by Supervisor One and Supervisor Two to use an improper cleaning method on the jet engines or aircraft parts in August 2007 and the aircraft could be taxied to the clean shop which would avoid damage to the engine parts in violation of requirements set forth in A1-F414A-MMI-210 Military Maintenance Instruction dated 1 Nov 07, LPS-260A Aircraft and Jet Engine Cleaning and Local Process Specification dated 28 March 2005, NAVAIR 02-1-20 dated 1 Sep 05, NAVAIRDEPOT Jacksonville Instruction 5090.1D Environmental Management System dated 3 Apr 2007, and Repair Engineering Instruction F414-14370R05 dated 8 Aug 07.

Findings

Description and Principles of Operation of the Fan Stator Vanes/Blades

57. The following information is taken from the A1-F414A MMI-210 Work Package 013:[14]

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[14] See item # 23 Appendix A page A-2

13. PURPOSE.

14. The fan stator case houses three stages of vanes, which direct the air flow to the rotor blades, completing each stage of compression.

15. CONSTRUCTION.

16. The fan stator assembly consists of the following components:

a. Fan Stator Case: Two-piece case splits along the horizontal plane. Removal of the top half case allows access to the fan rotor for airfoil benching. Bottom half of case contains two bolting pads at the 5:30 and 8 o'clock positions for the fan speed transmitters and two borescope ports.

b. Stage 1 Vanes: There are 68 stage 1 vanes. The stage 1 vanes are variable angle with a total travel of 50 degrees. The inner spindles of the vanes are housed in a split shroud which is axially bolted together. During engine operation, the stage 1 vane shrouds mate with the seal teeth on the forward side of the stage 2/3 blisk, preventing the recirculation of air (figure 3).

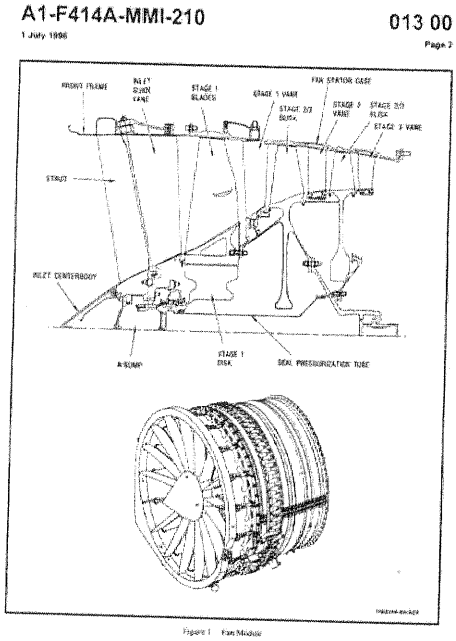

Figure 3 Fan Stator Assembly Containing Vanes/Blades

Cleaning Requirements for F414 Fan Stator Vanes/Blades

58. There are numerous Cleaning Methods (CM) depicted in the various maintenance instructions. In order to standardize and simplify them, they are listed as CM1, CM2, CM3, etc.

59. CM1 and CM3 are the Cleaning Methods authorized for use on the F414 engine by NAVAIR 02-1-20 Standards Maintenance Practice Manual General Electric Aircraft Engines. The F414 shop had used CM3 in the past. CM3 uses vapor degreasers, known as Ozone Depletors. When the Ozone Depletors were replaced with a more environmentally friendly detergent, NAVAIR 02-1-20, 2-10 authorized CM1 as an alternate cleaning method. The following provisions pertain:

Method 1; CM1 (water soak with detergent)

NAVAIR 02-1-20
T.O. 2J-1-32

2-1

SECTION II

CLEANING

2-1. CLEANING METHODS.

2-2. GENERAL. Cleaning of engine parts is necessary to permit adequate detailed inspection and subsequent repair of material defects. The cleaner the parts, the more reliable the inspection. Completeness of weld repairing is directly dependent upon degree of cleanliness attained before inspection; however, cleaning that is adequate for inspection may not be adequate to permit satisfactory repair-welding. Chemical solutions must be limited to use on parts that will not be subject to surface corrosion, intergranular attack, or loss of dimension. Abrasive blasting, either wet or dry, must be done so that dimensions and surface finishes are not affected and so that cracks and flaws in metal parts are not hidden. Generally, the following points should be considered in choice of an appropriate cleaning method:

1. Types of contaminants to be removed.
2. Types of material(s) composing part.
3. Surface finish and surface coating requirements.
4. Degree of cleanliness required.
5. Type and availability of cleaning materials and equipment.
6. Complexity of part (geometric complications).

NOTE: Processes described in various cleaning methods specify use of compounds supplied by particular vendors. Materials available from

other vendors may be equally satisfactory; however, it is recommended that approval be obtained from GE Aircraft Engines, if other materials, processes, or parameters are to be used.

2-10. CLEANING TITANIUM PARTS. Titanium requires special care in processing to avoid contamination by agents containing halogen (fluorine, chlorine, bromine, or iodine). Initial cleaning shall be done in accordance with CM No. 3. **If stubborn surface coatings remain after steam cleaning, use dry cleaning Detergent CM No. 1.**[15]

2-11. REFERENCE PUBLICATIONS. Refer to NAVAIR 07-1-504/T.O. 2J-113, Turbine Engine Cleaning Instructions, for general cleaning methods applicable to aircraft turbine engines.

2-12. DETERGENT CLEANING (CM NO. 1).

CAUTION

Some plastic and rubber base materials are attacked by hydrocarbon Detergent. Parts made of these materials, or parts containing components made from these materials, shall not be cleaned with hydrocarbon Detergents.

2-13. GENERAL. Superficial accumulations of grease, oil, dirt, gum, and varnish may be removed by hydrocarbon Detergent cleaning. This method is not effective in removing baked-on oil deposits or most surface coatings. This method can also be used to clean outside surfaces of external air, oil and fuel tubes, hoses and related engine components. It can also be used to flush and clean contaminants from all engine lubricating systems and subassemblies. Since some plastic and rubber base materials are attacked by hydrocarbon Detergents, removal of contaminants is best accomplished by steam cleaning. For materials other than titanium, trichloroethane, a chlorinated hydrocarbon, is preferred. Titanium accessories that would be harmed by use of organic Detergents should be cleaned using dry cleaning Detergent CM No. 1.

2-14. MATERIAL AND EQUIPMENT. Dry cleaning Detergent, P-D-680, P-D-680 Type II and Type III is recommended cleaner. Cleaning tank should have a hinged, counterweighted cover so tank can be covered when not in use. A perforated drain shelf, and one or more perforated, long handled dip racks are suggested for convenience. Cleaning Detergent should be discarded or distilled when percentage of oil in Detergent exceeds 10 percent.

Method 2; CM3 [Steam Cleaning]

NAVAIR 02-1-20

T.O. 2J-1-32

2-4

2-20. STEAM CLEANING (CM No. 3).

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[15] This is the authority for using CM 1.

2-21. GENERAL. Steam cleaning is a superficial cleaning process that is used primarily when it is not desirable to remove paint and surface coatings from ferrous and nonferrous jet engine parts. To properly clean with steam, it is necessary to add cleaning compound. Do not steam-clean oil impregnated parts.

2-22. MATERIAL AND EQUIPMENT. Steam cleaning compounds obtainable in either liquid or dry form, should conform to MIL-C-22542 (Liquid) or Fed Spec PC-437 (Powder). Any of the following compounds can be used:

1. Steam cleaning compound, PC-437.
2. Sprex AC-3 or equivalent (CAGE 72008).
3. Delchem 789 Detergent, or equivalent (CAGE 27245).
4. Cleaning compound, C1102 (liquid).
5. Steamrite M. D. (CAGE 91608)

2-23. PREPARATION OF COMPOUNDS.

1. When using powder, fill drum with water to a level slightly below overflow drain. Add 2 pounds of cleaning compound to 55-gallon drum of water. Stir if necessary to dissolve compound.

2. When using liquid steam cleaning compound, insert a flexible plastic hose directly into drum of product. Use a No. 73 portioner tip orifice (0.073-inch diameter) to meter product for correct ratio.

60. The immersion tank for cleaning) fan vanes/blades (see Figure 4 below, item # 24 Appendix A) is an authorized cleaning process (CM3) and has been used in the past at FRCSE. However, the fan vanes/blades are small parts and when they were put in the baskets in the immersion tank for cleaning the fan vanes/blades fell through the basket, to the bottom of the tank during the cleaning process. The tank had to be drained and the fan vanes/blades had to be removed from the bottom of the tank. This was time consuming and required excessive water consumption.

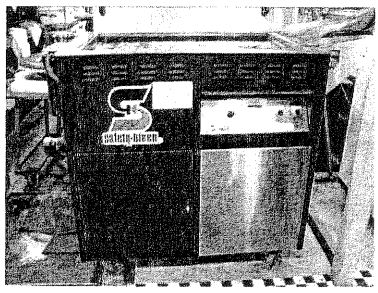

Figure 4 Steam Cleaning Immersion Tank

61. An alternate cleaning process is to route the fan blades/blades to the FRCSE Clean Shop. The Clean Shop has available the smaller baskets which could be used to hold the blades/vanes during the steam cleaning process. While the steam cleaning of the titanium fan vanes/blades referred to by Complainant is an acceptable cleaning practice, FRCSE does not use this method for cleaning the titanium vanes/blades due to increased cost and excessive turn-around-time. To use the steam cleaning method identified by Complainant, the vanes/blades would have to be placed in a special tray and routed to another building for the cleaning. Turn-around-time for sending the titanium vanes/blades to another shop for this steam cleaning process is estimated at three weeks. In order to use the baskets referred to by the complainant in the steam cleaning process, the immersion tank would be required to undergo an expensive modification process and would require the purchase of smaller costly baskets (crates).

62. Cleaning titanium fan vanes/blades using CM1 is an established practice under NAVAIR 02-1-20 as an alternate acceptable method for cleaning fan vanes/blades.[16] FRCSE chose to use an equivalent alternative cleaning method, identified in Repair Engineering Instruction No. F414-14370R05, which allows an activity to clean titanium fan vanes/blades by soaking in a solution of water and MIL-PRF-680, Type II Detergent. Blue Gold Detergent is an alternate equivalent of MIL-PRF-680, Type II. Using CM1 to clean the fan stator vanes/blades, the mechanic disassembles the fan vanes/blades from the case and soaks them in a small plastic tub, similar to a domestic dish pan, filled with water and detergent, for approximately 15-20 minutes. The artisan may be required to manually rub the parts to remove dirt or residue not dissolved while soaking. The artisan can safely do this task bare-handed, or can wear personnel protective equipment (rubber gloves) if desired. The fan stator module in Figure 5 below[17] comes into the 414 Engine shop to be cleaned:

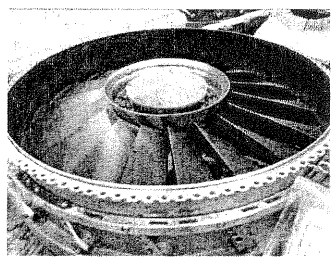

Figure 5 Fan Stator Module Vanes/Blades

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[16] See Item # 9 Appendix A
[17] See item # 26 Appendix A

63. The fan stator module as displayed in Figure 6[18] is then broken down and cleaned manually in the Blue Gold Detergent.

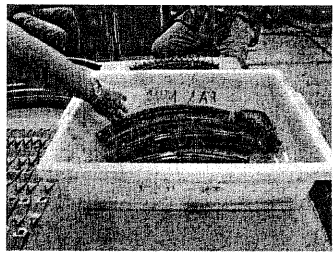

Figure 6 CM1 Cleaning Process in Small Plastic Tub

64. This cleaning method requires the artisan to mix 4-6 oz Blue Gold Detergent per gallon of tap water at room temperature in a tub container approved by shop 62626. Then the artisan places the blades (as shown above) and is required to clean as follows:

a. Soak parts in the cleaning solution.
b. Scrub parts manually using scrub brush or green scotch brite pad.
c. Rinse in clean tap water.
d. Repeat steps a and b if necessary.

65. The fan vanes are laid out to dry as shown in Figure 7.[19]

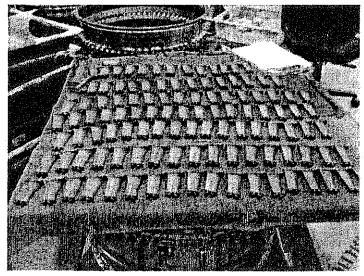

Figure 7 Drying of Fan Stator Vanes

66. The fan vanes/blades are reassembled and prepared for installation as illustrated in Figure 8.[20]

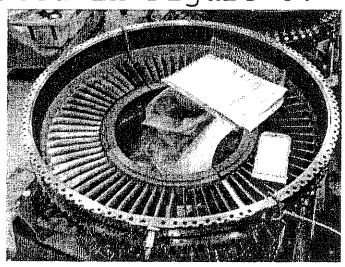

Figure 8 Reassembled Fan Stator Vanes/Blades Module

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[18] See item # 27 Appendix; Picture by Command Evaluation FRCSE
[19] See item # 28 Appendix A
[20] See item # 29 Appendix A

Complainant's Testimony

67. Complainant was initially interviewed on 7 January 2008. He did not provide documentation and did not wish to discuss specific issues of his allegations without his documentation. On 15 January 2008, Complainant provided the investigators with copies of correspondence he had sent to his supervisor, Supervisor Two, questioning the maintenance procedures. Complainant did not elaborate either verbally, or in his subsequent written statement, on the allegations.

68. According to Complainant's emails, he received work order 17150321 directing him to "clean fan stator assy" and to "C/W [comply with] LPS 260." LPS 260 Rev A supersedes LPS 260. LPS 260A is a local process specification titled "Processes for cleaning parts, components and assemblies for aircraft and jet engines." This document is a process operation manual that provides thorough procedures for preparation, maintenance and upkeep of chemical cleaning solutions, safety requirements for materials handling and process operation; and equipment requirements for process operations. Complainant addressed NAVAIRDEPOT Jacksonville Instruction 5090.1D as part of his allegation, however this instruction defines only reporting requirements of the Environmental Management System.[21]

69. Complainant alleges that Navy employees lack proper immersion tanks filled with necessary dry cleaning detergent to immerse jet engine parts. He also alleges Navy employees lack proper pressure rinse machines to adequately and safely clean the engine parts.

The F414 Shop Supervisor's Testimony

70. Supervisor Two, Supervisor of the F414 Engine Shop was interviewed in building 101-W in the Command Evaluation Office, on January 25, 2008. Supervisor Two told the investigators that the steam cleaning process (CM3) was a process used at FRCSE. This process does not use dry cleaning detergent as alleged by the complainant. This process uses the MIL-PRF-680, Type II detergent or an appropriate equivalent compound. The F414 Engine shop had previously tried cleaning the parts in a steam cleaning process but the baskets for the steam cleaner were too large and the fan vanes/blades fell through the basket to the bottom of the tank.

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[21] See item # 30 Appendix A

71. Supervisor Two stated that Complainant was trained to clean the titanium vanes/blades using CM#1 (soaking in water with the Blue Gold detergent), however he objected. Supervisor Two stated that Complainant objected to this manual cleaning procedure and that he didn't want to get his hands dirty.

72. Supervisor Two stated that Complainant was previously assigned to the J-52 Engine Shop at FRCSE. He was transferred to the F414 Engine Shop, under his direction on 24 Jun 07. Complainant was transferred out of the F414 Engine Shop on 6 Jan 08, at his own request. Supervisor Two stated that although Complainant is classified as a WG-8602 aircraft engine mechanic, he does not hold the certifications required to perform the complex work involved in repairing a jet engine. There are nine training modules that an aircraft engine mechanic must complete to become certified to perform maintenance on the F414 engine. The Individual Qualification Records for Complainant[22] show that he began on-the-job training in Task Number 109-4A, F-414 Disassembly of Engine, on 21 Jun 07. He did not complete the training required to become certified in this specific task. Complainant began on-the-job training in Task Number 109-4B, F-414 Fan Mods, on 25 Jun 07, and became certified in this module on 1 Aug 07. The only qualification that Complainant holds allows him to perform low-level tasks such as the manual cleaning of fan stator vanes/blades.

The Materials Engineering Technician's Testimony

73. The Materials Engineering Technician, (Engineering Tech), FRCSE Materials Laboratory, (Subject Matter Expert), stated that Complainant initially questioned the cleaning method of the titanium vanes/blades and wrote a Request for Engineering Information (REI) 2007JX01807 on 12 Sep 07, requesting instructions for the proper engine component cleaning process for in-shop cleaning. Engineering Tech, the author of LPS 260 Rev A, responded on 20 Sep 07, stating:

1. "Code 4345 investigated the in-shop cleaning of vanes/blades in Shop 62616.
2. The shop can clean vanes/blades as per NAVAIR 02-1-20 CM 20 or A1F414A-MMI-240 Work Package 162 00 page 2.
3. The cleaning detergent that's recommended: Mil-PRF-85570 Type 2 or Blue Gold Liquid Detergent."

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[22] See item # 31 Appendix A page A-2

74. Engineering Tech stated that REI No. F414-14370R05[23] allows an activity to clean the titanium fan vanes/blades by soaking the vanes/blades in a solution of water and MIL-PRF-680, Type II Detergent. Engineering Tech identified a product called Blue Gold Detergent that is equivalent to MIL-PRF-680 Type II Detergent, but is more environmentally friendly than MIL-PRF-680.

75. In addition to the written instructions that Engineering Tech provided to Mr. Lubbers, Engineering Tech, Supervisor Two and AS Engineer, also verbally instructed Mr. Lubbers on the available cleaning processes. The General Electric engineer also confirmed to Supervisor Two and Complainant that the soaking of the vanes/blades in a solution of water and Blue Gold detergent was an appropriate method for cleaning the titanium fan stator vanes/blades.

The Clean Shop Supervisor's Testimony

76. Supervisor Three, the Supervisor of FRCSE 6.2.5.2.2, Clean Shop, verbally told the investigators that the F414 fan stator vanes/blades are not cleaned in her shop as a normal operation. However, quarterly General Electric performs tests on four blades and vanes for the Leading Indicator Program. This program is used by General Electric to take measurements of specific components for statistical analysis. There are two separate processes for cleaning the vanes and the blades in the Clean Shop. The cleaning process used by the Clean Shop on the vanes is CM9; the process used on the blades is CM3. The cleaning processes listed below are taken from the LPS 260A.[24]

CM# 9 Light Duty Alkaline Cleaning (Dilute A-A-59260):

5.1 Soak in alkaline rust removing solution for 30 minutes, (12-15% per vol, 160-170F)

5.2 Pressure rinse over alkaline rust remover tank.

5.3 Immerse in cold-water rinse tank for 5 minutes.

5.4 Pressure rinse with hand held unit for 15-30 minutes.

5.5 Immerse in hot water rinse tank for 5 minutes and blow dry.

CM# 3 Steam cleaning process:

3.1 Operating parameters 6% by vol. as per SAE/AMS-C-22541, 160-210 F, pressure 40-125 psi.

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[23] See item # 25 Appendix A
[24] See item # 34 Appendix A

3.2 Steam clean parts with cleaning solution until all oils, greases and waxes are completely removed.

3.3 Cold water rinse for 5 minutes.

3.4 Air dry or Blow dry.

Taxiing of Aircraft

77. The F414 Engine Shop is located in Building #797. The building next door is Building #794, where the Clean Shop is located. The distance between the two buildings is approximately 25 feet. The F414 aircraft engines are delivered on tractor trailers in protective metal cans.[25] The engines are removed from the metal cans, disassembled and overhauled. Upon completion the engines are reassembled, tested, preserved and placed back in the metal cans for shipment to the Fleet. F414 engines are not installed in aircraft when they arrive at FRCSE, making it impossible to taxi the engines between buildings. Therefore the process of taxiing aircraft is not used at FRCSE.

Discussion and Analysis

78. The cleaning process described by Complainant in his complaint is one of many valid cleaning processes that may be used for the F414 engine fan stator vanes/blades. However, FRCSE has chosen to use an alternative equivalent method. The current process, CM1, is an approved, cost-effective, appropriate, and equivalent method that saves the government money by using Blue Gold Detergent and manual labor, vice sending the fan stator vanes/blades to the Clean Shop for processing. The Clean Shop process would dramatically increase the turn-around-time for the processing of the vanes/blades, raising the cost to the customer.

Conclusion

79. The allegation is not substantiated. CM1 and CM3 are both authorized methods to clean the fan stator vanes/blades on the F414 engine. FRCSE uses CM1 because Blue Gold Detergent (CM1) is more environmentally friendly than MIL-PRF-680 Type II and CM1 can be performed within the F414 shop while CM3 would require routing and scheduling to another shop in another building, which would increase valuable turn-around-time and costs.

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[25] See item # 8 Appendix A

Listing of Actual/Apparent Violations

80. The investigators found no actual or apparent violations. Cleaning and maintenance procedures adhere to the regulations set forth by NAVAIR and the builders of the F414 Engine, General Electric.

Actions Planned or Taken

81. There are no corrective actions needed.

Allegation Three

That Supervisor One and Supervisor Two authorized or allowed improper disposal of aircraft cleaning pollutants and by-products of jet engines or aircraft parts by dumping the contaminants down the deep well sinks located on pillars 10-K and 8-N of the F414 shops located at the Naval Air Station Jacksonville in violation of NAVAIRDEPOT Jacksonville Instruction 5090.1D, Environmental Management Systems dated 03 Apr 07.

Findings

Why FRCSE Started Using Blue Gold Detergent

82. In 1992, Engineering Tech was tasked by the Materials and Engineering Division Director, referencing the 1990 Clean Air Act, with replacing vapor degreasers, known as Ozone Depletors with another equitable compound.[26] Engineering Tech conducted extensive research and chose Blue Gold Detergent because of its less abrasive compound and more environmentally friendly characteristics.

83. Engineering Tech determined that the Blue Gold Detergent could be used to clean the fan stator vanes/blades with less affect on the employee and contained no hazardous waste by-products.[27] Blue Gold Detergent and the by-product, water (the residue cleaned from the fan stator vanes/blades) can be disposed into the drains at shop 62616 and into the industrial waste treatment plant at FRCSE. It is then released into the domestic sewer system at Naval Air Station Jacksonville, Florida.

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[26] See item # 38 Appendix A page A-3
[27] See item # 32 Appendix A page A-2

Description and Use of Blue Gold Detergent

84. The Modern Chemical, Inc., web page for Blue Gold Detergent is http://www.bluegoldcleaners.com/cleaner.aspx. It states:

> Blue Gold meets all OSHA requirements and conforms to the most rigid safety and performance standards set by leading industries, hence our slogan: if it's safe with water....it's safe with Blue Gold.
>
> Blue Gold is not corrosive, flammable or toxic (either through vapor inhalation, skin contact or ingestion). All ingredients in Blue Gold are on the Toxic Substance Control Act (TSCA) inventory list and Blue Gold has no B.O.D. (biological oxygen demand) and no V.O.C. (volatile organic compound).
>
> **Economy**
>
> Blue Gold is highly concentrated and can be used at various dilution ratios based on the amount of contamination, saving you from unnecessary waste. Blue Gold has an indefinite shelf life and at the recommended dilution ratio of 5% is about 44 cents per use gallon. In performance tests Blue Gold's tank life was four times greater than the products it was tested against.
>
> Blue Gold helps to keep the equipment clean and corrosion free, eliminating lime and particle build-up on heating coils. Since Blue Gold does not react with the oils it removes, the product can be recycled again and again through filtration systems with little or no loss in efficiency. Blue Gold disperses oils so there is no sludge build-up. When the agitation system is turned off, oils rise to the surface and can be easily removed, while particulate matter settles to the bottom leaving the solution clean and virtually new.
>
> **Quality**
>
> The manufacturers of Blue Gold, who have been making it for over 25 years, have an excellent quality control program to insure each batch made meets the highest quality standards. Blue Gold has been tested to many AMS [Aerospace Materials Standards], ARP [Aerospace Recommend Practice], ASTM [Aerospace Material Standards] and company specs. Blue Gold outperforms most caustics, chemicals and solvents, even at reduced operating temperatures, as proven by the Federal Standard Cleaning Test.

Versatility

Blue Gold can be used in a variety of application methods and is safe for both ferrous and non-ferrous metals, does not harm painted surfaces, natural rubber, electric wiring insulation, leather, carpet, silicon rubber, neoprene or polypropylene.

85. The Material Safety Data Sheet (MSDS), reproduced in Appendix C, states "there are; 1) no hazardous ingredients, 2) no health hazards when used according to instructions, and 3) can be disposed in the sanitary sewer."[28]

Cleaning Requirements

86. NAVAIRDEPJAX (LPS) 260A Aircraft and Jet engine Cleaning and Local Processes, Specification, Section II, Material Requirement lists the acceptable materials that may be used to clean parts for aircraft and jet engines; gives an overview of products hazards; and outlines safety precautions to be taken while using the materials. LPS 260A recommends the use of MIL-PRF-680 Type II or alternate. Blue Gold Detergent is listed as an acceptable equivalent cleaner to MIL-PRF-680 Type II.[29]

87. Repair Engineering Instruction F414-14370R05[30] requires an activity to clean the titanium fan vanes/blades by:

a. CM3 (steam cleaning) or
b. CM1 (detergent/water soak)

88. FRCSE contracts with Advanced Environmental Laboratories Inc. to perform various tests for possible hazardous waste bi-products. This Lab tested waste water with MIL-PRF-680, Type II detergent in September 2005, and reported that test results demonstrated that no hazardous waste by-products were produced from the use of this detergent. The Lab test Blue Gold Detergent in August 2007 and reported it to be an industrial waste by-product that is similar to dirty dish water.[31]

89. An Intra-Agency Support Agreement (ISA) of 17 Oct 05[32] between Navy Public Works Center Jacksonville (now Naval Facilities Engineering Command Southeast [NAVFACSE]) and Naval

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[28] See item # 37 Appendix A
[29] See item # 34 Appendix A
[30] See item # 25 Appendix A
[31] See item # 39 Appendix A
[32] See item # 40 Appendix A

Air Depot Jacksonville (now FRCSE) allows for discharge of various untreated, non-regulated, industrial wastewaters into the NAS Jacksonville domestic sewer system. Since the end by-product of cleaning the fan stator vanes/blades with Blue Gold Detergent is equivalent to dirty dish water, it poses no threat or contamination concerns when released into the drains as authorized by the ISA.

Complainant's Testimony

90. Complainant was interviewed on 7 January 2008. He did not provide documentation and did not wish to discuss specific issues of his allegations without his documentation. On 15 January 2008, Complainant provided the investigators copies of his correspondences with his supervisor. He indicated that contaminants from the cleaning of parts were going down the sinks located at pillars 10-K and 8-N.

The Shop Supervisors' Testimony

91. Supervisor Two, Complainant's supervisor, was interviewed in building 101-W in the Command Evaluation Office on 25 January 2008. Supervisor Two told the investigators the Blue Gold Detergent was approved for use in his shop and produced no harmful by-products. He also said artisans are offered personal protective gear (rubber gloves) when using Blue Gold Detergent to wash the fan stator vanes/blades. Some artisans wear the gloves and others choose not to wear them. Although there is no need or requirement for gloves in this situation, protective equipment is available for all employees to use if they have any concerns, or simply desire to avoid dried or wrinkled hands. Supervisor Two also said deep well sinks 10-K and 8-N are authorized to use when disposing of Blue Gold Detergent bi-products.

92. The investigators spoke to the supervisor of the J-52 Engine Shop where the deep well sink located at 8-J was removed four years ago as part of the engine shop Lean event. Lean is an operational strategy to achieve continuous improvements in performance through the systematic elimination of all waste of resources. The sink was removed because it was not large enough to accommodate the items that were being cleaned and the shop was reconfiguring its production in accordance with Lean standards. The supervisor said the deep well sink was not removed "because of the improper disposal of hazardous waste products" alleged by Complainant. This person was the supervisor in the J-52 engine shop in 2004, when the sinks were removed. He told the investigators "At no time prior to or after the event was I ever

made aware of or had knowledge of unauthorized waste being disposed/dumped in that sink."

The Environmental Engineer's Testimony

93. Environmental Engineer (Subject Matter Expert), FRCSE Shop 6.5, is responsible for testing waste water produced at FRCSE.[33] In an email dated 17 March 2008, Environmental Engineer stated:

> Wastewater discharges at Building 797
>
> Concerning the washing of engine parts (blades) in the deep sinks at building 797, the following information has been gathered to determine that the waste water produced from the post cleaning operation was determined to be a non hazardous waste stream and allowed to be sent to the Public Works Center (PWC) Federally Owned Treatment Works (FOTW).
>
> It was first determined through process knowledge that the only contaminates of concern which would make the waste water hazardous were metals. Since the blades were pre-cleaned prior to delivery to the shop and the Material Safety Data Sheet (MSDS) of the detergent being used showed no hazardous constituents based on a 3% solution which was to be used, the only hazardous waste concern was the presence of metal due to leaching from the part itself.
>
> Since the wastewater was being sent to the FOTW, coordination with the PWC representative for the FOTW was required to ensure that his concerns with the wastewater make up were met. The PWC concerns were PH, Oil and Grease (O&G), and Chemical Oxygen Demand (COD) of the waste.
>
> Because the sink was being used as a cleaning location, the only way to obtain a representative sample of the waste water was to set up a pan in the sink and a drum next to the sink to allow the artisan to capture the water in the pan and following the cleaning operation, dump the pan which was put over the sink drain into the drum provided. The waste drum was allowed to accumulate this waste water for approximately 1 month and after one month, a third party laboratory was hired to draw a sample of the wastewater from the drum and analyze the wastewater for Toxicity Characteristic Leachate Procedure (TCLP) metals, Total metals, COD, O&G, and PH.

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[33] See item # 42 Appendix A page A-3

The results of the laboratory analysis[34] determined that the wastewater was a non hazardous waste stream, so based on the volume of the waste stream and the analytical results; PWC was able to accept the waste stream into the FOTW.

94. Environmental Engineer said Complainant never came to him or any of the environmental technicians in FRCSE Shop 6.5 with concerns about the disposal of hazardous material in FRCSE drains.

The Materials Engineering Technician's Testimony

95. Engineering Tech, Shop 4.4.3.2, Materials Engineering Division, FRCSE, told the investigators that Fred Thomas, Division Director of the Materials Engineering Division, had tasked him with replacing the Ozone Depletor compounds in 1992 to comply with Title 6 of the 1990 Clean Air Act Amendment (CAAA-90) and subsequent implementing regulations, Class I Stratospheric Ozone Depleting Substances.[35] Engineering Tech determined that Blue Gold detergent would be most cost effective and environmentally efficient in the cleaning of the fan stator vanes/blades.

Discussion and Analysis

96. Blue Gold detergent was selected in 1992 as an alternate equivalent cleaning compound that could be used by FRCSE Engine shops to clean the engines. The materials engineering technician determined the only potential pollutants from the cleaning process would be the detergent used and the metals that leached from the parts cleaned. The Materials Safety Data Sheet for Blue Gold Detergent showed it to contain no hazard. The leaching of metals from the parts cleaned is minimized by pre-cleaning before arriving at the shop. The bi-products that results from cleaning engine parts are equivalent to dirty dish water.

97. The waste water is processed through the industrial waste water treatment plant at FRCSE and discharged into the NAS Jacksonville domestic sewer system pursuant to an Intra-Agency Support Agreement (ISA) with NAVFACSE that permits this discharge. To make absolutely sure the by-products were safe, an independent laboratory tested a one-month accumulation of the waste water and determined it to be non-hazardous.

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[34] See item # 39 Appendix A page A-3
[35] Located in Appendix A item #38

Conclusion

98. The allegation is not substantiated. The F414 Engine Shop at FRCSE is using an environmentally safe detergent to clean the Fan Stator Vanes/Blades. The waste water and the by-products from this process have been cleared for discharge into the NAS Jacksonville, domestic sewer system.

Listing of Actual/Apparent Violations

99. These investigators found no actual or apparent violation. Pollutants are not being discharged into the shop sinks in accordance with the regulations set forth by NAVAIR and Naval Air Station Jacksonville.

Actions Planned or Taken

100. There are no corrective actions needed.

Subject Matter Expert Review

101. At NAVINSGEN's request, the NAVAIR IG identified AIR-4.4.4 as a subject matter expert for the matters addressed in allegations one and two. AIR-4.4.4 is a Licensed Professional Engineer and the Director of NAVAIR's Turboprop & Turboshaft Engines Division.

102. AIR-4.4.4 met with the NAVAIR IG staff and reviewed the draft report and references. He then provided an email opinion in which he stated:

> After review of all the documentation provided to me that relates to the subject case I provide the following conclusions with respect to allegations one and two contained in the related IG investigation report:
>
> Allegation One: Unsubstantiated. Handling of F414 VEN components was/is in accordance with authorized maintenance procedures and practices.
>
> Allegation Two: Unsubstantiated. Cleaning methods used on F414 engine parts were/are in accordance with authorized maintenance procedures and practices.

103. The NAVINSGEN mission includes environmental oversight inspections of Navy installations. The senior environmental inspection team leader for NAVINSGEN is a Registered Professional Engineer in the State of Virginia and a Certified Environmental

Auditor (CEA 710)) through the National Registry of Environmental Professionals. The NAVINSGEN team leader reviewed the report and information pertaining to allegation three. He agreed the allegation should not be substantiated. In his opinion, there is no environmental regulatory violation or any other form of inappropriate discharge.

Appendix A - Reference Documents

1. Office of Special Counsel Letter dated 12 Dec 2007

2. Report of Disclosures Referred for Investigation OSC File # DI-08-0177

3. NAVAIR IG email dated 17 Dec 2007 to FRCSE

4. A1-F414A-MMI-210 Intermediate Maintenance General Information Variable Exhaust Nozzle System Description Technical Manual Work Package 025 00 pages 1-4

5. A1-F414A-IPB-400 Illustrated Parts Breakdown Turbofan Engine Model F414-GE-400 page 1

6. Photo of VEN taken 4 Apr 2008

7. Report of Interview - Email - Team Lead, Industrial Engiine Repair and Modifications Division, providing statistical information on engine production at FRCSE, dated 20 Mar 2008

8. Photo of Truck arriving with Crated Engines taken 20 Mar 2008

9. NAVAIR 02-1-20, Standards Maintenance Practice Manual, General Electric Aircraft Engines dated 01 Sep 2005 pages 2-2 to 2-4, pages 2-13 to 2-14

10. Report of Interview-Email-from David P. Lubbers, Jet Engine Mechanic FRCSE dated 09 Jan 2008

11. Report of Interview-Email-from Investigator One, Command Evaluation FRCSE dated 10 Jan 2008

12. Statement of Mr. David P. Lubbers, Jet Engine Mechanic, FRCSE dated 15 Jan 2008

13. Requests for Engineering Information (REIs) on VEN rollers submitted by Mr. Lubbers to AS Engineer by email dated 11 Sep 2007:

    A. REI dated 11 Sep 2007 (bearing part) # 5033T16G01

    B. REI dated 11 Sep 2007 (bearing part) # 4055T39P01

    C. REI dated 11 Sep 2007 (bearing part) # 5033T16G02

    D. REI dated 11 Sep 2007 (bearing part) # 4062T47P01.

E. REI dated 11 Sep 2007 (bearing part) # 5033T16G01, 4055T39P01, 5033T16G02 and 4062T47P01 Temporary Engineering Response TEI F414-0053-2007.

14. Report of Interview - E-mail - Supervisor Two, F414 Shop Supervisor, FRCSE, dated 12 Sep 07

15. Report of Interview - E-mail - AS Engineer, FRCSE, dated 11 Mar 2008

16. Proposed Changes to A1-F414A-MMI-240 Intermediate Maintenance Cleaning, Inspection, and Repair of Fan Stator Case Technical Manual Work Package 217

17. Report of Interview - E-mail - AS Engineer, FRCSE, dated 11 Feb 2008

18. Memorandum for Record conversation with Supervisor Two dated 30 Jan 2008

19. Supervisor Two, F414 Shop Supervisor FRCSE statement dated 8 Feb 2008

20. Memorandum for Record conversation with Supervisor One dated 30 Jan 08

21. Individual Qualifications Mechanic One

22. Memorandum for Record conversation with Quality Assurance Personnel QAS-1 and QAS-2 dated 20 Mar 08

23. A1-F414A-MMI-210 Intermediate Maintenance, General Information- Fan Module Work Package 0013 pages 2-4

24. Photo of Steam Cleaning Immersion Tank taken 20 Mar 2008

25. Repair Engineering Instruction F414-14370R05 dated 6 Aug 2007

26. Photo of Fan Stator Module taken 20 Mar 2008

27. Photo of CM1 Cleaning Process in Small Plastic Tub taken 20 Mar 2008

28. Photo of Drying of Fan Stator Vanes taken 20 Mar 2008

29. Photo of Fan Stator Module Reassembled taken 20 Mar 2008

30. NAVAIRDEPOT Jacksonville Instruction 5090.1D dated 3 Apr 2007

31. Individual Qualification Record for David P. Lubbers

32. Request for Engineering Information serial # 2007JX01807- In shop cleaning process dated 12 Sep 2007

33. Memorandum for Record conversation with Supervisor Three, Clean Shop Supervisor dated 20 Mar 08

34. LPS 260 A Local Process Specification Section IX dated 27 Oct 2005

35. Photograph of Buildings 794 and 797 taken 20 Mar 2008

36. Modern Chemical Inc, website- http://www.bluegoldcleaners.com/cleaner.aspx

37. Report of Interview - E-mail Environmental Protection Specialist, FRCSE dated 18 Mar 2008, Material Safety Data Sheet (MSDS) Blue Gold dated 18 Feb 2008

38. Naval Air Station Ozone- Depleting Substances Substitution Process Specification LPS-130 dated 25 Mar 96

39. Waste Stream Identification Document- Profile Number 797WW01 dated 15 Aug 2007

40. Intra-Agency Support Agreement between Navy Public Works Center Jacksonville, FL and Naval Air Depot Jacksonville, Fl. dated 2 Nov 2007

41. Report of Interview - E-mail from J-52 Shop Supervisor FRCSE dated 04 Mar 2008

42. Report of Interview - Written explanation from Environmental Engineer FRCSE hand delivered 20 Mar 2008

43. Memorandum for Record: General Electric Engineer, referred to in report was unavailable during this investigation

Statement of Mechanic One, Aircraft Engine Mechanic, FRCSE dated 18 Jul 2008.

Appendix B - Witness List

Mechanic One, Aircraft Engine Mechanic, FRCSE

Aerospace Engineer, (Subject Matter Expert) FRCSE

QAS-2, Quality Assurance Specialist FRCSE

QAS-1, Quality Assurance Specialist FRCSE

Engineering Tech, GS-0802-12, Materials Engineering Technician, (Subject Matter Expert) FRCSE

Mr. David Lubbers, WG-8602-10, Aircraft Mechanic, FRCSE (Complainant)

Environmental Engineer, Environmental Engineer, (Subject Matter Expert) FRCSE

Supervisor One, Aircraft Operations and Repair Supervisor II, Shop 62610, FRCSE

Supervisor Two, F414 Shop Supervisor, (Subject Matter Expert), FRCSE

Supervisor Three, Supervisor, Clean Shop, FRCSE

Environmental Specialist, Environmental Protection Specialist, FRCSE

Engineering Technician and supervisor of Shop 63130, FRCSE

NAVAIR Senior Engineer, Subject Matter Expert

NAVINSGEN Senior Environmental Engineer, Subject Matter Expert

Appendix C - Blue Gold Detergent Material Safety Data Sheet

MATERIAL SAFETY DATA SHEET

Revised 02/18/2008 Prepared 02/18/2008

DISTRIBUTED BY: Modern Chemical & Authorized Distributors, 1-501-988-1311

MANUFACTURED BY: Carroll Company, 2900 W. Kingsley Rd., Garland, TX 75041 1-972-278-1304

SECTION 1 - PRODUCT

NAME: Blue Gold Spray Wash

Product Code 102

Product Type Hard Surface Cleaner / Degreaser

Health	Flammability	Reactivity	PPE
1	0	0	1
Health Haz 0=minimal 1=slightly haz 2=hazardous 3=serious haz 4=servere haz	Fire Haz 0=will not burn 1=FP>141F 2=FP=>73F=<141F 3=FP<73F 4=BP<95F FP by PMCC	Reactivity 0=none 1=mild 2=strong	Personal Protection 0=not necessary 1=goggles 2=goggles, gloves 3=goggles, gloves, protective clothes 4=goggles, gloves, & respirator

*DGIS

SECTION 2 - HAZARDOUS INGREDIENTS

NONE

SECTION 3 - HEALTH HAZARD & FIRST AID

1. Acute Health Effect — None
2. Chronic Health Effect — None
3. Carcinogen — No
4. Primary Entry Routes:
   a) Skin & Eyes: Repeated contact with the skin may be irritating. Eye contact slightly irritating.
   b) Ingestion: May be harmful.
   c) Inhalation: Inhalation of vapor or mist may be irritating.
5. First Aid:
   a) Skin: Remove contaminated clothing-wash skin with soap and water. If irritation persists get medical attention.
   b) Eyes: Wash eyes with large volumes of water for at least 15 minutes while lifting the upper and lower eyelids and rotating the eyeball. Get medical attention if irritation persists.
   c) Ingestion: Give large volumes of water. Do not induce vomiting. Get medical attention.
   d) Inhalation: Move to fresh air. If symptoms persist seek medical attention.

SECTION 4 - PHYSICAL & CHEMICAL CHARACTERISTICS

1. Physical State	Liquid
2. Color	Blue
3. Odor	Bland
4. Solubility in water	Complete
5. Specific Gravity (H_20=1.0)	1.07
6. pH	13.0
7. Freezing Point	N/A
8. Flash Point	None (Will Not Burn)
9. Vapor Pressure	N/A
10. VOC	0.5% at 5% use dilution rate 5 grams per liter of VOC in 5% dilution

Suitable for Public Release
(names removed)

SECTION 5 - FIRE AND EXPLOSION HAZARD

1. Flash Point	None (Will Not Burn)
2. Extinguishing Media	N/A
3. Special Fire Fighting Procedures	None
4. Unusual Fire & Explosion Hazard	Fire fighters should observe all precautions that apply to any fire where chemicals are stored.

SECTION 6 - REACTIVITY DATA

1. Stability	Stable
2. Conditions to Avoid	None Known

SECTION 7 - SPILL OR LEAK PROCEDURES

1. If product leaks or spills - Flood area with water - mop up dispose to sanitary sewer.
2. Abide by Federal, State, and Local regulations.

SECTION 8 - PERSONAL PROTECTION

1. Wear goggles.

SECTION 9 - SPECIAL PRECAUTIONS

1. Store containers tightly closed and in an upright position.
2. Do not destroy or deface the label.

SECTION 10 - SECTION 313 SUPPLIER NOTIFICATION (SARA)

This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372:

2-(2-butoxyethoxy) ethanol	CAS # 112 -34-5	Wt%=9.00

SECTION 11 - TOXICOLOGICAL INFORMATION

None

SECTION 12 - ECOLOGICAL INFORMATION

Results of Aerobic Aquatic Biodegradation conducted according to 40 CFR 796.3100 shows Blue Gold Spray Wash to be 90.5% biodegradable in 28 days.

SECTION 13 - DISPOSAL CONSIDERATIONS

1. See section 7 above

SECTION 14 - DOT TRANSPORT INFORMATION

1. This product is Not Regulated

SECTION 15 - OTHER REGULATORY INFORMATION

All ingredients appear on the TSCA Inventory List

SECTION 16 - OTHER INFORMATION

1. N/A = Not Applicable
2. *Dangerous Goods Identification System (DGIS)
3. PMCC = Pensky Martin Closed Cup
4. Manufacturer believes that the information given here is accurate. The suggested procedures are based on experience and common sense and are not necessarily all-inclusive of every conceivable circumstance.

Suitable for Public Release
(names removed)

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