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Fire Risk Assessment

CFAD Bedford

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Canada

EXECUTIVE SUMMARY

At the request of the CFB Halifax Commander, the Canadian Forces Fire Marshal (CFFM) conducted an assessment to ensure that CFAD Bedford has an appropriate level of fire protection given the many changes to infrastructure have occurred since the last Fire Risk Assessment in 2003.

1. This report identifies the findings of the Fire Risk Assessment and provides possible courses of action (COA) associated with the level of Fire protection at CFAD Bedford.

2. The Assessment Team concluded that the probability of a fire occurring at CFAD Bedford is *Occasional: "a fire will likely occur sometime"* and that the severity of a fire was determined to be *Catastrophic: "may cause death of personnel, severe loss of operational capability, destruction of property or severe environmental damage"*. The overall risk is therefore assessed as *HIGH* and consequently requires mitigating measures. The main factors contributing to the assumed risk are as follows:

   i. The fire break and vegetation control associated with the explosives area is not maintained as required by C-09-005-002/TS-000, Ammunition and Explosives Safety Manual, Volume 2 – Storage and Facility Operations.

   ii. The lightning protection system is not maintained as required by C-09-005-002/TS-000, Ammunition and Explosives Safety Manual;

   iii. The water supply system for fire protection is inadequate and not maintained in accordance with the National Fire Code of Canada.

3. Several of the above deficiencies identified by the Assessment Team are all considered non-compliant to the National Fire Code of Canada (NFCC) or Safety Manuals and consequently contravene the Canada Labour Code (CLC) and Canada Occupational Health and Safety Regulations (COSHR).

4. Priority shall be given to rectify the non-compliances to the Ammunition and Explosives Safety Manual regulation and National Fire Code of Canada.

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Introduction

1. The Canadian Forces Fire Marshal (CFFM) has conducted a Fire Risk Assessment at the Canadian Forces Ammunition Depot (CAFD) Bedford. To meet this request, a team was formed consisting of Mr. Martin Gravel and Benoit Gagnon, CFFM Compliance Review Officers, and Major Rick Dunning, Royal Canadian Navy (RCN) Command Fire Marshal, herein identified as the Assessment Team. The on-site assessment was conducted from 25-26 June 2015.

2. CFAD Bedford frequently referred to as the "Bedford Magazine", is a major Canadian Armed Forces property occupying the entire northern shore of Bedford Basin. It houses all of the weaponry for MARLANT vessels and East Coast bases with the exception of CFB Gagetown. The location also has a Missile Maintenance Facility and a loading jetty.

Background

3. The Fire Risk Assessment was requested by the CFB Halifax Commander to ensure that CFAD Bedford has an appropriate level of fire protection given the many changes to infrastructure since the last Fire Risk Assessment in 2003. The aim of the assessment is to review the level of fire risk in terms of severity and probability and to develop suitable options and recommendations, as needed.

4. CFB Halifax Fire Department (FD) currently operates a 24/7 staffed fire station at CFAD Bedford with minimum staffing of five firefighters. A dedicated Fire Inspector works day shift and oversees all fire prevention activities at CFAD Bedford and eight remote locations, totalling 34 buildings.

Approach & Methodology

5. This assessment utilizes the risk-based approach as detailed in the Realty Asset Management Manual (RAMM) Chapter 10. This approach provides a consistent means of evaluating identified hazards, with the aim of eliminating them or reducing the associated risk to an acceptable level. This is achieved through the evaluation of the four fields that comprise the CFFM Fire Risk Management Model. These fields include Fire Prevention, Risks Analysis, Intervention, and Assumed Risk.

6. A brief description of these four fields can be found in the sub-section entitled Observations & Analysis.. Complete and detailed reference of this risk management model is available in the Fire Marshal Directive (FMD) 1007.

OBSERVATIONS & ANALYSIS

Fire Prevention

7. Prevention brings together factors intended to ensure that a fire does not occur. These factors are:

i. **Incident Analysis:** By acquiring sound knowledge of the conditions responsible for fires, the most effective measures for eliminating those conditions can be developed. Incident evaluation and analysis thus incorporate all actions needed for determining the locations, causes, and circumstances of fires. This involves utilising the main dimensions of the fire risks management model.

ii. **Public Education:** Making the public (i.e. the DND/CAF personnel) aware of the main causes of fire, including human activity, as an important means of prevention.

iii. **Orders/Policies/Regulations**: Regulatory action is another aspect of fire prevention. The application of proven safety standards is one of the most effective ways to reduce the deaths, injuries, and property loss caused by fire.

iv. **Periodic Inspection of Risks:** Periodic risk inspection is an essential complement to the regulatory work. An appropriate inspection program is also a required counterpart to some public awareness measures.

INCIDENT ANALYSIS

8. The assessment team studied the records of incidents from 2004 to 2014. Over that period, the fire department responded to 213 emergencies and 1205 non-emergency events (i.e. hot works, hazardous operation stand by). Closer look revealed that 18 % (38) of the emergencies were responded during silent hours. Annex C details all incidents for the aforementioned period.

9. It is worth noting that no major fires have occurred at CFAD Bedford during the aforementioned period. Consequently, it is fair to state that the CFAD Bedford has maintained a low fire occurrence during that period. It is well known that National Defence has an excellent fire prevention program overall, resulting in low fire occurrences. However, major fires resulting in loss of life and significant material losses do occur.

PUBLIC EDUCATION

10. The CFB Halifax FD provides fire prevention and emergency equipment training to the regular DND/CAF employees. Making the work force aware of the main causes of fire, including human activity, is an important means of prevention. Also, as emergency equipment is the first line of defence against fire, DND/CAF personnel must be trained in their proper use. This is amongst the highest priorities of a fire prevention program. During normal daytime operation, a total of approximately 50 full time person work at CFAD Bedford. Approximately eight of the full time workers are CAF military members with the remainder being DND civilian employees.

11. The CFAD Fire Inspector oversees this requirement and records showed that the Public Education program meets all the requirements.

ORDERS/POLICIES/REGULATION

12. CFAD Bedford is regulated under Ammunition and Explosives Safety Manual and the Realty Asset Management Manual (RAMM) Chapter 10. Emergency fire response for the infrastructure at CFAD Bedford is required to be provided in accordance with DAOD 4007-2, Structural Fire Response, and a number of Fire Marshal Directive (FMD) for operational and training requirements. As an employer of civilian members, the CFAD Bedford is also required to comply with the requirements of the Treasury Board Secretariat and Canada Labour Code.

13. Personnel are also subject to Fire Orders that details action in the event of a fire or other emergency. The Fire Orders also contain emergency response procedures specific to each hazard present.

14. The Assessment Team noted that according to the Fire Orders, during a fire emergency event at CFAD Bedford, the Senior Fire Officer acts as the Incident Commander and all other support personnel of the CFAD Command Team is to report to the Command Post. However there is no recall procedure for either the Command Team staff or any ammunition SME (Ammunition Technician) for after-hours emergencies. Further discussions with CFAD Personnel confirmed that only one person can be recall and that there is no Ammo tech on-call in case of an emergency during silent hours.

15. Furthermore, no standard operating procedure (SOP) was provided to the Assessment Team regarding the response to an alarm or fire in a Magazine Storage Building (Mag). The current practice is that the Firefighters respond directly to the scene without first gathering any information on the type and quantity of explosives present. The FD response vehicle carries a binder containing the Net Explosive Quantities (NEQ) for each Magazine which was not up-to-date at the time of the visit.

16. Consideration should be given to create or review procedures to ensure the safety of emergency personnel. Similar locations within DND have established procedure that can be adapted to CFAD Bedford.

Periodic Inspection of Hazards

17. The DAOD 4007-0, Fire Protection Services and the RAMM, Chapter 10 both define the requirement to provide the fire prevention and life safety services, including inspections of infrastructures. As stated before, CFAD Bedford is supported by a Fire Inspector.

18. Twenty building files were examined by the Assessment Team to assess the state of the fire inspections and outstanding deficiencies that may impact the overall fire risk. The RAMM requires that all High and Medium hazard industrial occupancy building (including; ammunition storage buildings, ammunition maintenance facilities, ammunition transit facilities, torpedo fueling facilities, and vehicle maintenance facilities) be inspected on a quarterly basis (four inspections per year). Of the twenty building files examined, the following was noted:

i. The CF 81's (inspection report) were completed and filed adequately;
ii. Four files had CF 80's (Initial Fire Prevention Inspection Report) outdated by over a year;
iii. Fire Warden (FW) Reports are not completed for Magazines; and
iv. Fire Warden Reports are not sent to fire inspector by building FWs.

19. Although the filing system was very well done and easily accessible, some files still contain buildings that have been demolished. It is also noted that the dual filing system (electronic/hard copy) creates some confusion as inspections are not always filed in both systems.

20. CFB Halifax has a program that ensures that the fire protection systems in place are inspected, tested and maintained. All major ITM activities (annuals, semi-annuals, quarterlies) are conducted under the Atlantic Inspection, Testing and Maintenance (ITM) contract by a third party contractor while monthly tests are conducted by FD personnel.

21. Based on a cursory review of the ITM reports, all activities carried out by the third party contractor are properly carried out and documented as required by the applicable Codes and Standards. However the monthly test reports are not adequately detailed to confirm that all mandated activities are conducted. Furthermore the manual pull stations on the magazines are not tested on a monthly basis.

Intervention

22. The concept of Intervention usually combines the commonly best-known elements of fire safety or, at the very least, the most visible and factual aspects. These elements are as follows:

Elapsed Time: The elapsed time is defined as the duration between ignition and the moment when firefighters apply the extinguishing agent. DAOD 4007-2, Structural Fire Response requires that *''under normal circumstances, emergency operations should commence within 10 minutes of receiving an alarm to a structural fire. Emergency operations are all functions performed at the scene including rescue, fire suppression, emergency medical care and special operations.''*

Response Personnel: Response personnel refer to the number, preparedness, and organization of the firefighters and members of the Fire Department on the fire scene. DAOD 4007-2, Structural Fire Response requires that one supervisor and four firefighters shall be available.

Fire Fighting Equipment: The level of effectiveness of firefighting interventions depends on the type and condition of the different equipment used by firefighters. DAOD 4007-2, Structural Fire Response requires at least one fire apparatus designed to combat infrastructure fire.

Water Supply: Water availability and the reliability of supply have a direct influence on the effectiveness of the intervention. The water flow required to extinguish a fire depends on the type of building. It is also essential for the Wing/Base to have a maintenance and verification program for its network.

23. The actual provision of service at CFAD Bedford has been present at this location following the last Fire Risk Assessment conducted in 2003.

Elapsed Time

24. The current emergency response at CFAD Bedford is provided by CFB Halifax firefighters stationed at Bedford on a 24/7 basis. The CFAD Bedford fire station is located in the Service Area. This provision of service meets the requirements of DAOD 4007-2.

Response Personnel

25. Four separate platoons with six firefighters per platoon are assigned to CFAD Bedford. The minimum staffing currently being maintained is five firefighters on a 24/7 basis. The minimum staffing at CFAD meets the requirement of DAOD 4007-2.

26. Additional firefighting resources for major incidents are dispatched from the main CFB Halifax Dockyard Fire Station. Furthermore, there is a mutual aid agreement in place with Halifax Regional Municipality Fire Service (HRMFS).

27. HRMFS is the municipal fire department serving the entire Halifax region. A meeting between the Assessment Team and the Fire Chief was arranged as part of the Fire Risk Assessment visit:

i. The HRM is a composite fire department employing 467 full-time and 550 part-time (volunteer) firefighters working out of 52 fire stations. The immediate surroundings of CFAD Bedford are protected by three stations staffed with full-time personnel. First due station to CFAD Bedford is Station 12 located 6 km for the main gate. Station 12 is staffed with six firefighters and is a designated Hazmat response team. Two other stations are within 10 km of CFAD Bedford , both staffed with four full time firefighters supplemented by volunteer firefighters. In 2014, the three HRMFS stations closest to CFAD Bedford responded respectively to 464 (station 8), 356 (station 9) and 711 (station 12) incidents per year, including medical calls.

ii. HRMFS personnel have received some site familiarization at CFAD Bedford and participated in a few exercises. They are however not fully aware of the operations nor the specific layout of the Depot. Protocols for HRMFS when responding to CFAD Bedford is that they must at all time work under the supervision and direction of CFAD Bedford FD staff.

Fire Fighting Equipment

28. The Fire Station houses one triple combination pump and one support vehicle. The equipment meets the minimal requirement for structural firefighting under DAOD 4007-2.

Water Supply

29. The underground water distribution system at CFAD Bedford is fed by three independent supplies:

i. feed from the Municipality of Burnside;

ii. feed from the Municipality of Bedford; and

iii. feed from the on-site pump house and 400,000L underground reservoir.

30. There is a significant issue with the water storage reservoir and fire pumps. Beyond the fact that it is not automated meaning that the system requires to be activated manually at the pump house. This system, when manually activated by the team, never increased the water pressure or the flow in the water distribution system.

31. After multiple verifications of section valves on the site, the issue was left to the Fire department to be resolved. Follow up verification were to be conducted by the FD to identify the source of the problem and take corrective action.

Risk Analysis

32. Risk analysis contributes to the objective decisions that are made to determine the level of acceptability of some risks and to the establishment of the measures to be taken to reduce the occurrence or impact of certain types of fires. More specifically, risk analysis involves considerations such as:

i. Specific characteristics of certain risks and the measures taken to alleviate them,
ii. Self-protection measures and systems,
iii. Measures and systems for early fire detection and notification of fire protection services, and
iv. Classification of risks.

Specific characteristics and measures to alleviate them

33. Fire risk planning involves classifying fire risks and hazards according to the main uses and characteristics of buildings or any other hazard to assess. It also depends on the comprehensive understanding of the environment in which hazards are found. The analysis therefore must account for the specific characteristics of certain hazard and the effects of measures taken by the various authorities to alleviate them.

34. There are two main types of structure on this site, ammunition storage magazines and working facilities such as maintenance shops and administrative offices.

- There are various types of ammunition storage magazines located within the explosives area. The newer style magazines are earth covered bunker like facilities constructed of heavy reinforced concrete with an upward blast walls. The older style magazines still used are concrete/brick buildings with blast wall surrounding. All electrical appliances

and devices are designed and installed for hazardous locations. The older magazines are not provided with any automatic suppression or detection systems. A single fire alarm manual station is provided outside each storage magazine.

- The newest generation of magazines (seven units) to be commissioned by the end of the year, as per Mr. Cooke from the Directorate Construction Project Delivery (East) (DCPD-E) are equipped with automatic sprinkler protection and automatic fire alarm detection systems.

- Workshops and Administration offices are located in the service area, with the exception of the Missile Maintenance Facility and the Ammunition Transfer Building which are located in the restricted area.

- CFAD Bedford also has vacant buildings that are still energized. Some presents issues such as structural integrity or health hazards.

35. The lightning protection system required by C-09-005-002/TS-000, Ammunition and Explosives Safety Manual, Volume 2, is tested annually by CFB Halifax Construction Engineering section.. Thirty three buildings are equipped with lightning protection. The 2014 test results show deterioration over the years and a significant increase of failures. The table below depicts the percentage of failure per building of the lightning protection equipment.

Percentage of failures per building	Number of buildings
75-100 %	14
50-74 %	12
1-49 %	2
No issue	5

36. Canadian Joint Operations Command "Ammunition and Explosives Safety Inspection CFAD Bedford" report dated October 2013 provided to the Assessment Team shows that the issue has been well documented over the years and still has not been addressed.

37. In order to prevent a lightning strike from inadvertently initiating explosives, it is imperative that the lightning protection system be maintained in optimal condition.

38. Given the sensitive nature of the commodity (ammunition) being stored and handled at Bedford, the condition of the exterior grounds plays an important role in the probability and severity of a fire occurrences.

39. The majority of the Depot and surroundings is heavily forested. Forest type is defined as a mixture of hardwood and coniferous type trees. There is a significant amount of dead trees and broken branches lying on the ground within the forested section of the depot which increases the fire index and potential for fire spread.

40. According to the Forest Protection Division of the Nova Scotia Department of Natural Resources, the Bedford Ammunitions Depot is mostly deciduous and mixed wood with some areas of coniferous trees. Section containing conifers has limbs very close to the ground. There are also some dead trees that have fallen.

41. In general, the area is largely made up of a deciduous forest type. During times of normal Fire Hazard, deciduous stands are at the lower end of exhibited fire behaviour when compared to other forest types. Wildfires in these stands are limited to surface fire. Spring fires are the main concern as rates of spread and fire intensity decrease greatly once green-up occurs (the trees leaf out).

42. There are areas of coniferous stands on the depot. These stands often burn very hot and can transition into the crowns of trees easily when there are low branches or other ladder fuels present. Fires in these forest types can burn as surface fire, intermittent crown fire, and continuous crown fire. Fires in this forest type can also spread very fast. Because of the associated fire behavior in this stand type wildfires can be difficult to control. These stands appear to be surrounded by deciduous or mixed wood stands which mean that fire behavior (intensity and rate of spread) will decrease once it spreads to another stand.

43. The area also contains mixed wood stands. Mixed wood exhibits fire behavior between what is expected in the deciduous and coniferous stand types. Fire behavior will increase as the percent of conifers increase.

44. Protection against the above described exposures is provided through policy driven specific requirements associated with the provision of fire breaks around the Explosive Area and strict requirements for controlling vegetation. The C-09-005-002/TS-000, Ammunition and Explosives Safety Manual, Volume 2, Section 5, requires:

> ***VEGETATION CONTROL***
>
> *10. Undergrowth and flammable vegetation is to be cleared and kept shorter than 10 cm within a 30 m radius of any building containing A&E. Ground ivy or similar vegetation used to bind soil on barricades and earth-covered structures is not to be permitted to grow in excess of 15 cm, or to a point more than50 cm beyond the line at which the inclined earth meets the normal ground plane.*
>
> *11. Herbicides may be used for the control of vegetation within the perimeter of an A&E facility, but is to be of a chlorate-free, biodegradable type.*

12. Fire breaks are to be established and maintained within the explosives area and around the entire perimeter of an A&E facility. The following minimum fire break widths are to be observed:

*a. **Perimeter:** 30 m (this distance may be partially be inside and outside facility fences).*

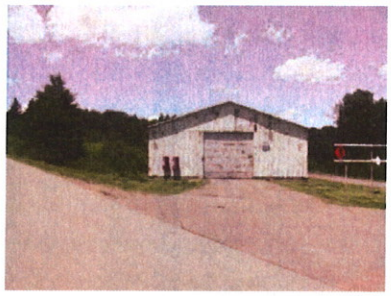
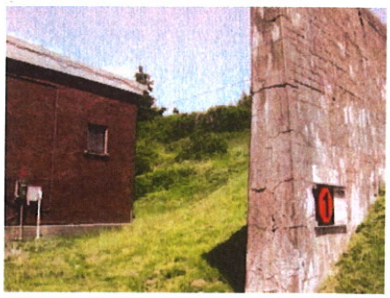
*b. **Internal roads:** 5 m either side.*

*c. **Internal sections:** 30 m.*

13. Leaves, grass and brush cuttings are to be removed from the explosives area. The burning of vegetation for any reason within the perimeter of an A&E facility is prohibited.

45. The current state of maintenance is limited to grass cutting of some areas. Vegetation control and fire break maintenance is non-existent. CFAD Bedford does not meet the requirements of the C-09-005-002/TS-000, Ammunition and Explosives Safety Manual. This issue was also reported in the 2003 Fire Risk Assessment. Pictures below show some of the areas of concern:

- Vegetation within 30m of building containing Ammunitions and Explosives (A&E) in excess of the height limit.

- Vegetation within the 30m perimeter and the 5m road clearance requirement and into power lines.

- Vegetation covering the firebreak.

46. The risk associated with Brush or Forest fires is present in and around CFAD Bedford. Between 2004 and 2014, the CFAD FD responded to five wildland fires. Furthermore, based on the information provided by the HRM FS, 20 brush/grass or wildland fires were reported in 2014 in the area directly adjacent to the CFAD Bedford.

Self-Protection Measures

47. An accurate assessment of risk levels must take into account the presence automatic fire protection systems, particularly in buildings that present the highest level of risks. It must also take account of the measures taken, such as those involving the organization of fire protection brigades or the running of awareness programs for building occupants. Fixed fire-extinguishing systems, which include automatic sprinkler systems, commence fire suppression prior to the arrival of firefighters.

48. Fixed automated fire suppression systems can be linked directly to fire departments, thereby giving immediate notification upon activation and allow the emergency response service to respond quickly to the fire scene. The effectiveness with which these systems reduce the impact of a fire on a building and thus the building's risks level is fully acknowledged.

49. There are 10 buildings at CFAD Bedford that are protected with automatic sprinklers, including the seven new magazines that will be commissioned by the end of the year.

50. The addition of automated fire suppression systems in the main buildings, would positively impact the overall "Fire Effect Severity".

Early Fire Detection and Notification Systems

51. Smoke and fire detection systems complement the work of automatic fire prevention systems by warning building occupants to immediately evacuate. These systems can be linked directly to municipal fire departments, thereby allowing the emergency response service to respond quickly

to the fire scene. For this reason, DND standards and other safety codes now require that they be installed in most new buildings. The fire risk analysis must, however, take full account of the data on the functioning and effectiveness of early detection and notification systems to assess their impact on the level of risks. It is also necessary to be certain of the positive impact these systems have on fire departments' response time. Without such knowledge, it is impossible to determine the effectiveness of these systems to minimise the consequences of a fire.

52. Nine (9) buildings on site are equipped with a fire alarm system but very few have automatic detection. The majority of the fire alarm systems, mainly within the Explosives Area, are limited to a single manual station with no detection or signalling devices.

Classification of Risks

53. Fire risk is defined as the expected loss from a fire and is discussed under the following two components: the **probability** for fire to occur, and the **severity** of the fire. The probability for fire is considered under such factors as the quantity and type of materials and sources of ignition. The severity of a fire is determined by factors such as the risk to life, the value of material in the fire area, the likelihood of the fire spreading, and the loss to operations. A high severity is not a high risk if it is unlikely to happen. Conversely, fires that could readily occur will not be a high risk if little or no damage is caused.

54. Probability Estimations, Fire Effect Severity categories are detailed in Annex A - Classification of Risks section.

55. The Assessment Team also reviewed the 2003 Fire Risk Assessment to compare deficiencies, improvements and decision or action taken from this report.

56. The review conducted in 2003 presented options to reduce the risks based on the premises that *"fire must not be allowed to develop beyond its initial stage and must be controlled and suppressed in its early stage"* and recommended that the following action be implemented :

i. *Maintain an aggressive fire prevention program;*
ii. *Provide a dedicated fire department uniquely assigned to the depot whenever ammunition is being handled or when special activities such as construction, hot work, loading/unloading ships, are performed at the depot... (or) The other option is to provide a 24/7 fire department dedicated response. This option entails having the CFAD Bedford fire department working 24/7 at the depot seven days a week;*
iii. *Install state of the art fire detection and suppression systems in all buildings; and*
iv. *Establish and maintain vegetation control and firebreaks throughout the depot.*

57. Four options presented in the 2003 FRA in order to reduce the risk index to a 'Low or Medium". The option to: *"Provide a 24/7 fire department dedicated response. This option entails having the CFAD Bedford Fire Department work 24 hours per day 7 days a week. Establish and maintain vegetation control and firebreaks throughout the depot. Continue delivering an aggressive fire prevention program."* was selected to reduce the risk index.

58. Actions taken from the FRA option are reflected in the fire protection and prevention side. However the vegetation issue was not addressed or not kept in line, hence not achieving the reduction of the risk related to this important issue.

59. Taking into consideration the CFAD Bedford fire statistics, the DND/CAF fire statistics, and the above hazard assessments, the overall probability of a fire occurring at the Depot is set at *Occasional*. Based on the historical fire statistics, a fire will likely occur "some time".

60. Considering the potential for loss of millions of dollars in ammunition, the potential net explosive quantity present, and the probability of loss of life, the fire effect severity is set at *Catastrophic*.

61. Combining the Probability being ***Occasional*** and Severity at ***Catastrophic*** the Risk level identify in the table below is set at High:

SEVERITY / PROBABILITY	Catastrophic Level – 1	Critical Level - 2	Significant Level - 3	Negligible Level – 4
Frequent Level – A	1A = Extremely High	2A = Extremely High	3A = High	4A = Medium
Probable Level – B	1B =Extremely High	2B = High	3B = Medium	4B = Low
Occasional Level – C	1C = High	2C = High	3C = Medium	4C = Low
Remote/Seldom Level – D	1D = Medium	2D = Medium	3D = Medium	4D = Low
Improbable/Unlikely Level – E	1E = Low	2E = Low	3E = Low	4E = Low

62. This high-risk level is mainly influenced by the following:

i. The absence of fire break and adequate vegetation control;

ii. The absence of fire detection systems in the older storage magazines;

iii. The limited presence of automated fire suppression systems;

iv. The major impairment of the lightning protection system;

v. The major impairment of the water supply system;

Gap

Assumed Risk

63. The purpose of the model is to reduce the fire risk for a given situation in terms of severity and probability, leaving a protection gap deemed acceptable to Commanders regarding the occurrence of fires and their impacts. The gap between prevention and the actual outbreak of fire can vary in size and is determined on the basis of a consideration of all the factors. This gap is represented in the model as the level of fire risk that remains after the discrepancy between the estimated risks and the concrete or anticipated effects of all the measures deployed to deal with those risks is taken into account.

64. The Gap in this present Risk Assessment is widely linked to preventive maintenance on buildings, vegetation control and the water supply system, all of which are issues that can feasibly be corrected.

65. Some other minor issues with regard to fire inspection requirements, SOP's and access to resources (SMEs) can be corrected at little or no cost.

66. It is also noted that the Assessment team acknowledges the 7 new Magazines and their increased fire protection over the older "100" series. However at this time, the new Magazines are not commissioned and there is no specific plan for the future of the older Mags since the demolition or decommissioning was not part of the construction project.

67. Creating an action plan for the outdated structures including decommissioning, de-energizing and demolition strategy would alleviate the risk and issues related to these buildings (i.e. Vegetation control and Fire Protection improvements).

CONCLUSION AND OPTIONS

68. The risk of a fire for the Ammunition Depot at Bedford is defined as the combination of the severity impact of a fire and the overall probability occurrence of a fire.

69. The CFFM's Assessment Team establishes the probability of a fire occurring at CFAD Bedford at *Occasional* (fire is likely to occur sometime) and the severity of a fire at *Catastrophic.* Therefore the overall fire risk is set at *High.* Consequently, the risk must be reduced to an *acceptable level.*

70. The primary recommendation is to reduce the overall fire risk to M*edium.* Immediate actions must be taken to address the following deficiencies, which will impact both the *Severity* and *Probability* of a fire:

i. Implement and maintain the vegetation control IAW C-09-005-002/TS-000, Ammunition and Explosives Safety Manual;

ii. Repair and maintain in optimal condition the lightning protection system IAW C-09-005-002/TS-000, Ammunition and Explosives Safety Manual;

iii. Implement a Fire Warden Program for all the Magazines and ensure the reporting of the inspection to the Fire Prevention Bureau IAW RAMM Chap. 10 and Canada Occupational Health and Safety Regulation, Chapter 17.

iv. Repair and maintain the water supply system to ensure that the required water is provided;

71. It is also recommended to ensure constant availability of a Subject Matter Expert in Ammunition and Explosives to ensure safety of Emergency Responder in case of fire IAW C-09-005-002/TS-000, Chap 5 section 4 of the Ammunition and Explosives Safety Manual:

> *"The standing orders are to contain specific procedures and instructions to be followed during both working and silent hours for the prevention and fighting of fires within the perimeter or in the vicinity of the facility."*

72. Upon implementation of the corrective actions. Results will not only eliminate the non-compliances to the codes and regulations but will also reduce the risk level up to a probability of *Remote/Seldom* and the severity of *Critical* therefore setting the overall fire risk level to *Medium.*

Potential impact on the Fire Risk Level by addressing the issues

SEVERITY / PROBABILITY	Catastrophic Level – 1	Critical Level - 2	Significant Level - 3	Negligible Level – 4
Frequent Level – A	1A = Extremely High	2A = Extremely High	3A = High	4A = Medium
Probable Level – B	1B =Extremely High	2B = High	3B = Medium	4B = Low
Occasional Level – C	1C = High	2C = High	3C = Medium	4C = Low
Remote/Seldom Level – D	1D =	2D = Medium	3D = Medium	4D = Low
Improbable/Unlikely Level – E	1E = Low	2E = Low	3E = Low	4E = Low

73. As stated in the Introduction, the main objective of the fire risk assessment was to ensure that CFAD Bedford has an appropriate level of fire protection given the many changes to infrastructure have occurred since the last Fire Risk Assessment in 2003. As described above, the current minimum response strength of the fire department at Bedford is five firefighters on a 24/7 basis.

74. Prior to considering any modification in fire department response, all above noted deficiencies must be addressed. Some options listed below will entail having the nearby municipal fire department, HRMFD, respond to CFAD Bedford.

Option 1 – No Dedicated Response (Risk Index Medium)

75. No dedicated fire department response from CFAD Bedford. HRMFD would provide primary response to all emergencies during both operational hours and silent hours. Under this option, additional risk would be assumed as a dedicated response would not be provided, even during high risk periods when ammunition is handled/loaded/unloaded.

76. All deficiencies listed at para 70 shall be addressed and corrected.

77. The elimination of all dedicated fire department response capability would require the following mitigating measures:

i. Automatic sprinkler protection shall be provided in all buildings at CFAD Bedford. Automatic suppression would be the only means of ensuring that a fire could be quickly detected and controlled.

ii. Conduct regular training and familiarization with the HRMFD. A good working relationship and practiced response procedures with HRMFD would alleviate the increased risk of a delayed response. Even with regular training, the HRMFD cannot be expected to sustainably maintain a high level of familiarization with the specific hazards associated with fighting a fire at an Ammunition facility. The HRMFD will be relying heavily on the availability of an ammunition safety technician to advise on the content of each building and Ammunition Safety related issues. A 24/7 on-site Duty Ammo Safety Officer Program should be implemented.

iii. Maintain the dedicated Fire Inspector position at CFAD.

iv. Increase the frequency of fire protection and life safety inspections in all buildings at CFAD Bedford that contain ammunition to bi-monthly. CF81 inspection reports shall be produced and submitted for every inspection.

v. Implement a Close-Up Inspection Program for all operational buildings. A close-up inspection of all buildings is to be carried out at the end of each workday to ensure building occupants are eliminating common fire hazards and performing a proper close-up before departing. The inspections should be done after the building occupants have secured the building for the day. The close-up inspections should be carried out by designated building occupants that are familiar with the various operations and hazardous areas.

vi. HRMFD response would require a robust support plan to be created and implemented at all levels. From procedure in case of emergency to an overall review of the hazardous operation conducted at CFAD.

Option 2 – Working Hours Dedicated Response (Risk Index Medium)

78. Reduce the current full time 24/7 FD presence to five days a week during regular working hours, with minimum duty strength of five fire fighters. This level of presence would also be required whenever ammunition is being handled or special activities are taking place outside the normal working hours. Maintaining a dedicated response during operational hours would provide immediate and quick response and facilitate the ability to continue providing FD standby response for loading and unloading of ammunition at the jetty and other hazardous operations. The primary response during week nights and weekends (silent hours) would be provided by the HRMFD along with the Dockyard DND firefighters.

79. All deficiencies listed at para 70 shall be addressed and corrected.

80. The delayed response from HRMFD during silent hours would necessitate the following mitigating measures:

i. Install automatic fire detection in all ammunition storage buildings (magazines). The automatic fire detection would initiate a quicker response from both the on-site FD during operational hours and the HRMFD during silent hours.

ii. Conduct regular training and familiarization with the HRMFD. A good working relationship and practiced response procedures with HRMFD would alleviate the increased risk of a delayed response during silent hours. Even with regular training, the HRMFD cannot be expected to sustainably maintain a high level of familiarization with the specific hazards associated with fighting a fire at an Ammunition facility.

iii. The HRMFD will be relying heavily on the availability of an ammunition safety technician to advise on the content of each building and Ammunition Safety related issues. A 24/7 on-site Duty Ammo Safety Officer Program should be implemented.

iv. Maintain the dedicated Fire Inspector position at CFAD.

v. Increase the frequency of fire protection and life safety inspections of all buildings that contain ammunition to bi-monthly. CF81 inspection reports shall be produced and submitted for every inspection.

vi. Implement a Close-Up Inspection Program for all operational buildings. A close-up inspection of all buildings is to be carried out at the end of each workday to ensure building occupants are eliminating common fire hazards and performing a proper close-up before departing. The inspections should be done after the building occupants have secured the building for the day. The close-up inspections should be carried out by designated building occupants that are familiar with the various operations and hazardous areas.

vii. HRMFD response during silent hours would require a robust support plan to be created and implemented at all levels. From procedure in case of emergency to an overall review of the hazardous operation conducted at CFAD.

Option 3 – 24/7 Response (Risk index Medium)

81. Maintain status quo with a 24/7 on-site fire department response dedicated to Bedford.

82. All deficiencies listed at para 70 shall be addressed and corrected.

CONCLUSION

83. The probability of a fire occurring at CFAD Bedford is set at *Occasional* (fire is likely to occur sometime) and the effected severity of a fire is set at *Catastrophic.* Failure to control and extinguish a fire in its early stage would have severe consequences on the CFAD's mission with high likelihood that DND/CAF personnel would suffer injury or death. Therefore the overall fire risk is set at *High*. Consequently, the risk must be reduced to an *acceptable level.*

84. To reduce the overall fire risk to an acceptable level (Medium) one of the options presented must be implemented. Though all three options are acceptable from a fire protection standpoint, it is highly recommended that a comparative cost/benefit analysis be performed on the options before selecting one.

ANNEX A – CLASSIFICATION OF RISKS

1. Fire risk is defined as the expected loss from a fire and is discussed under the following two components: the **probability** for fire to occur, and the **severity** of the fire. The probability for fire is considered under such factors as the quantity and type of materials and sources of ignition. Probability Estimations are found at Table A-1. The severity of a fire is determined by factors such as the risk to life, the value of material in the fire area, the likelihood of the fire spreading, and the loss to operations. A high severity is not a high risk if it is unlikely to happen. Conversely, fires that could readily occur will not be a high risk if little or no damage is caused. Fire Effect Severity categories are listed in Table A-2.

2. A fire risk assessment will identify both the probability and the severity allowing specific action to be taken to reduce one or both factors. These hazards are collated and complied in a matrix in order assign a risk index using Table A-3 that provides a qualitative ranking of effect probability and if possible, expresses the effect probability as potential occurrences based on historical records for the Base/Wing, or on national records. Table A-4 then displays the acceptability of this risk and determines the need for remedial action.

3. According to DAOD 4007-1: Fire Reporting and Investigating, fire is defined as: any instance of destructive or uncontrolled burning, including explosion of combustible solids, liquids or gases. Whenever there is an injury, loss of life, or monetary loss of property or equipment, fire includes the following situations:

- an electrical discharge;
- a pressure vessel or ammunition explosion;
- an overheat condition; and
- a wildland fire including harvestable products.

4. The probabilities of a fire occurrence are estimated using the qualitative terms shown in Table A-1.

Probability Estimation		
A	Frequent	Fire will likely occur frequently.
B	Probable	Fire will occur several times.
C	Occasional	Fire will likely occur some time.
D	Remote	Fire unlikely but possible to occur.
E	Improbable	Fire very unlikely to occur. It can be assumed that it may not occur.

Table A-1: Probability Estimation

5. Table A-2 lists the categories of effect severity and their defining criteria used for the assessment.

Fire Effect Severity		
Category	**Classification**	**Defining Criteria**
1	Catastrophic	May cause death of personnel, severe loss of operational capability, destruction of property or severe environmental damage.
2	Critical	May cause serious injury or illness, serious loss of operational capability, serious damage to property or environment.
3	Significant	May cause minor injury or illness, substantial loss of operational capability, substantial damage to property or the environment.
4	Negligible	May cause less than minor injury requiring first aid, or less than minor damage to property or environment.

Table A-2: Fire Effect Severity

6. The level of risk for each hazard is evaluated by combining the fire hazard severity and the probability of occurrence using categories in Table A-3.

SEVERITY / PROBABILITY	**Catastrophic** Level – 1	**Critical** Level - 2	**Significant** Level - 3	**Negligible** Level – 4
Frequent Level – A	**1A = Extremely High**	**2A = Extremely High**	**3A = High**	**4A = Medium**
Probable Level – B	**1B = Extremely High**	**2B = High**	**3B = Medium**	**4B = Low**
Occasional Level – C	**1C = High**	**2C = High**	**3C = Medium**	**4C = Low**
Remote/Seldom Level – D	**1D = Medium**	**2D = Medium**	**3D = Medium**	**4D = Low**
Improbable/Unlikely Level – E	**1E = Low**	**2E = Low**	**3E = Low**	**4E = Low**

Table A-3: Risk Categories

7. The acceptability of the risk is evaluated using the criteria shown in Table A-4.

Risk Index	Acceptance Criteria
Extremely high	Unacceptable - risk reduction must occur immediately
High	normally unacceptable - risk reduction should occur
Medium	may be acceptable - risk reduction may be necessary
Low	Acceptable - risk reduction may be desirable

Table A-4: Risk Acceptance Criteria

ANNEX B – REFERENCES

A. Canada Labour Code (CLC).
B. Canada Occupational Health and Safety Regulations (COHS), Part XVII.
C. Realty Asset Management Manual (RAMM), Chapter 10.
D. DAOD 4007-0, Fire Protection Services.
E. DAOD 4007-1, Fire Reporting and Investigating.
F. DAOD 4007-2, Structural Fire Response.
G. National Fire Code of Canada (NFCC), 2010 Edition.
H. C-98-15F-MIS/FP-005, Fire-fighting Involving Ammunition and Explosives.
I. C-09-005-002/TS-000, Ammunition and Explosives Safety Manual, Volume 2 – Storage and Facility Operations.

ANNEX C – CFAD BEDFORD STATISTICS 2004-2014

2005

2004				
AMMO & HOT WORK STAND BYS: 84				
DATE	**INCIDENT**	**BUILDING**	**IFSMR #**	**AFTER HRS.**
03-FEB-04	BLOWN TRANSFORMER	NEAR BM153		*
17-FEB-04	HAZMAT SPILL	BM142		
26-FEB-04	ELECTRICAL SHORT, WIRING	BM153		
09-MARCH-04	HAZMAT SPILL	X-AREA		
12-MARCH-04	MEDICAL	BM144		
15-MARCH-04	ELECTRICAL SHORT	BM212		
23-MAR-04	FALSE ALARM	BM169		
30-MARCH-04	FALSE ALARM	BM83		
08-APRIL-04	FALSE ALARM	BM83		
19-APRIL-04	SPRINKLER ALARM	BM239		
07-MAY-04	MEDICAL	BM200		
20-JUNE-04	FUEL SPILL	X-AREA		
07-JULY-04	MEDICAL	ADMIN		
08-JULY-04	SPRINKLER ALARM	BM239		
AMMO & HOT WORK STAND BYS: 104				
DATE	**INCIDENT**	**LOCATION**	**IFSMR#**	**AFTER HRS.**
06-JAN-05	FLOOD	SEWER SYS.		*
24-FEB-05	UXO	X-AREA		
02-MARCH-05	UXO	X-AREA		
03-MARCH-05	UXO BIP	RENT POINT		
07-MARCH-05	UXO	X-AREA		
07-MARCH-05	UXO BIP	X-AREA		
10-MARCH-05	UXO BIP	X-AREA		
14-MARCH-05	UXO BIP	X-AREA		
22-MARCH-05	HAZMAT	BM130		
29-MARCH-05	FALSE	RENT POINT		
18-APRIL-05	GRASS FIRE	OLD RAIL SIDING		*
29-APRIL-05	FALSE	BM81		
04-MAY-05	FALSE	BM212		
11-MAY-05	SMELL OF FUMES	BM190		
18-MAY-05	FALSE	BM174		

12-SEPT-05	FALSE	BM212		
28-SEPT-05	HAZMAT	BM212		
04-OCT-05	UXO	OLD RAIL SIDING		
15-NOV-05	UXO	RENT POINT		
22-NOV-05	UXO	RENT POINT		
28-NOV-05	UXO	SIDING		
08-DEC-05	UXO	RENT POINT		
08-DEC-05	UXO BIP	RENT POINT		
09-DEC-05	HAZMAT HYD. LEAK	BM190		
09-DEC-05	HAXMAT	BM100		
12-DEC -05	UXO	X-AREA		
14-DEC-05	UXO	RENT POINT		
15-DEC-05	UXO	RENT POINT		*
2006				
AMMO & HOT WORK STAND BYS: 149				
DATE	**INCIDENT**	**LOCATION**	**IFSMR**	**AFTER HRS.**
09-JAN-06	UXO	X-AREA		
20-FEB-06	HAZMAT	BM190		
20-APRIL-06	FALSE	BM81		
03-MAY-06	UXO	X-AREA		
09-MAY-06	MEDICAL	ADMIN		
06-SEPT-06	HAZMAT	BM212		
30-OCT-06	MEDICAL	BM212		
01-NOV06	POLE ARCHING	BM153		*
11-DEC-06	HAZMAT	BM241		
2007				
AMMO & HOT WORK STAND BY: 144				
02-JAN-07	POWER POLE FIRE	BM203		*
17-FEB-07	WATER PIPE BREAK	BM100		*
17-APRIL07	MEDICAL	BM155		
18-APRIL-07	ALARM	SHIP AT JETTY		
30-APRIL-07	OVERTURNED BACKHOE	CFAD AREA		
01-MAY-07	UXO	X-AREA		
09-MAY-07	FIRE EX.	BM239		
11-MAY-07	MEDICAL	CFAD		
16-MAY-07	UXO	CFAD	2007-3330	
16-MAY-07	MEDICAL	ADMIN	2007-3331	
25-MAY-07	UXO	ANDERSON LAKE		
19-JUNE-07	POWER POLE	X-AREA		*
01-JULY-07	UXO	X-AREA		
04-JULY-07	UXO	X-AREA		*
27-JULY-07	FALSE ALARM	BM80		
14-AUG-07	POWER POLE ARCING	BM155		*

07-SEPT-07	MEDICAL	BM200		
17-SEPT-07	FALSE	BM183		
14-NOV-07	UXO	BM212		
14-NOV-07	MEDICAL	BM200		*
19-NOV-07	UXO	X-AREA		
24-NOV-07	FALSE	BM127		
27-NOV-07	MEDICAL	BM200	2007-8306	
28-NOV-07	HYD. SPILL	BM73		
19-JAN-07	UXO	X-AREA		
19-JAN-07	INVESTIGATION OF ODOR	BM154		*
26-DEC-07	POWER POLE ARCH	BM155		*
22-NOV-O7	UXO	X-AREA		
2008				
AMMO & HOT WORK STAND BYS: 105				
DATE	**INCIDENT**	**LOCATION**	**IFSMAR**	**AFTER HRS.**
17-JAN-08	UXO	X-AREA		
05-MAR-08	MEDICAL	BM159		
12-APRIL-08	FALSE	BM162		
23-APRIL-08	PULL STATION FALSE	BM49		*
28-MAY-08	UXO	X-AREA		*
28-MAY-08	HYDRALIC LEAK	BM247		
29-MAY-08	WIRE ARCING ON POLE	X-AREA	2008-3504	*
30-MAY-08	ALARM BOX	NEAR BM190		
16-JUNE-08	REPORT OF BRUSH FIRE	AREA		
10-JULY-08	MUTUAL AID BOAT OVERTURNED	BASIN		*
21-JULY-08	EVAC ALARM	X-AREA		
30-JULY-08	HAZMAT OIL SPILL	BM169		
08-SEPT-08	SPRINKLER ALARM	BM239		
22-DEC-08	POWER POLE ARCH	X-AREA		
27-DEC-08	SPRINKLER ALARM	BM203		
27-DEC-08	PULL STATION	BM212		
2009				
AMMO & HOT WORK STAND BYS…….106				
01-JAN-08	BLDG ALARM	BM227		
01-JAN-08	BLDG ALARM	BM203		
02-JAN-09	SPRINKLER ALARM	BM203		
16-JAN-09	STEAM LEAK	BM200		*
11-FEB-09	FORKLIFT SMOKE	JETTY NN		
18-FEB-09	MEDICAL	JETTY NN		
18-MARCH-09	TRUCK WIRES ARCING	BM207		
15-APRIL-09	HAZMAT SPILL	JETTY		*
09-MAY-09	UXO	RENT POINT		
02-JULY-09	UNKNOWN CONTAINER	ADMIN	2009-4523	

10-JULY-09	BRUSH FIRE	ANDERSON LAKE		
13-AUG-09	FALSE	BM153		
30-AUG-09	SMELL OF SMOKE	BM169		
30-AUG-09	POWER POLE TRANSFORMER	BM158		*
30-AUG-09	POWER POLE TRANSFORMER	BM155		*
21-OCT-09	ELECTRICAL SWITCH	BM156		
10-DEC-09	BLDG ALARM	BM159		
10-DEC-09	OIL SPILL	X-AREA		
14-DEC-09	UXO	X-AREA		
19-DEC-09	WFE ALARM	BM159	2009-8713	
19-DEC-09	WFE ALARM	BM159	2009-8712	*
21-DEC-09	HAZMAT	JETTY	2009-9689	
22-DEC-09	POWER POLE ARCING	X-AREA		*
2010				
AMMO & HOT WORK STAND BYS…….93				
11-JAN-10	POLE TRANSFORMER	JETTY AREA		*
24-FEB-10	FALSE	BM84		
28-FEB-10	FALSE	BM24		
08-MAR-10	GRASS FIRE	BM84		*
29-MAR-10	BLDG ALARM	BM212		
21-MAY-10	UXO	X-AREA		
27-MAY-10	HIGH TEMP ALARM	BM153		
20-JUNE-10	POWER POLE ARCHING	BM153	2010-7443	*
12-AUG-10	MEDICAL	RENT PT.		
18-AUG-10	UXO	X-AREA		
05-OCT-10	FIRE EX	BM154	2010-6009	
07-OCT-10	FIRE EX MVA	BM178	2010-7201	
21-DEC-10	MVA	BM178	2010-7201	
2011				
AMMO & HOT WORK STAND BYS…….53				
12-JAN-11	MEDICAL	ADMIN		
	SMELL OF SMOKE	BM212		
06-FEB-11	SPRINKLER ALARM	BM212		
19-FEB-11	FUEL TRUCK FIRE MUTUAL	#7 HWY		*
	FIRE EX	BM102	2011-6622	
		BM247	2011-6867	
	WATER FLOW	BM239	2011-7975	
31-MAR-11	SMELL OF SMOKE	BM212		
12-MAY-11	FALSE	BM212		
13-JUNE-11	FALSE	BM100	2011-3650	
11-AUG-11	FUEL LEAK	BM203		
12-AUG-11	FALSE	BM203		
08-JULY-11	OVERTURNED BOAT	BASIN	2011-4228	*
07-SEPT-11	MVA	BM155	2011-5678	

27-SEPT-11	TRUCK FIRE MUTUAL AID	#7 HWY	2011-6241	*
23-NOV-11	HAZMAT	BM155	2011-7740.	
13-DEC-11	HAZMAT	BM247	2011-7956	
2012				
AMMO & HOT WORK STAND BYS…….140				
17-JAN-12	POWER POLE ARCHING	BM119	2012-293	*
26-JAN-12	ACID LEAK	BM239	2012-495	
17-FEB-12	MEDICAL	BM159	2012-936	
	UXO	X-AREA	2012-1405	
9-MAR-12	FUEL SPILL	X-AREA	2012-1406	
17-MAR-12	CAR FIRE (MUTUAL AID)	#7 HY		*
27-MAR-12	MEDICAL	ADMIN	2012-1750	
01-APRIL-12	BRUSH FIRE	SIDING		*
		BM40	2012-2367	
01-MAY-12	FALSE	BM239	2012-2794	
18-MAY-12	MEDICAL	BM120	2012-3280	*
	FIRE EX	BM164	2012-3783	
	FIRE EX	BM233	2012-3832	
1-JUNE-12	UXO	X-AREA		
30-JUN-12	FALSE ALARM	BM203	2012-4606	*
25-JULY-12	UXO	X-AREA	2012-5224	
26-JULY-12	UXO FALSE	X-AREA	2012-5369	
21-AUG-12	MEDICAL	ADMIN	2012-5913	
07-SEPT-12	FUEL SPILL	X-AREA	2012-6481	
	JETTY NN	CFAD JETTY	2012-7256	
	BLDG ALARM	BM154	2012-7407	
2013				
AMMO & HOT WORK STAND BYS…….103				
23-JAN-13	MVA MUTUAL AID	#7 HWY		
27-JAN-13	STEAM LEAK	BM203		*
29-JAN-13	FALSE	BM203	2013-505	
	FALSE	BM239	2103-524	
	FALSE	BM203	2013-525	
19-FEB-13	INVESTIGATION	JETTY	2013-1108	
	FUEL LEAK	X-AREA	2013-1818	
10-APRIL-13	GLYCOL LEAK	BM239	2013-1867	
23-MAY-13	MEDICAL	BM247	2013-2834	
27-JUNE-13	FIRST AID	BM200	2013-3683	
4-JULY-13	MUTUAL AID, FIRE	BURNSIDE		
7-JULY-13	HIGH TEMP ALARM	BM153	2013-3916	*
	JETTY NN	CFAD JETTY	2013-4000	
1-Sept-2013	FALSE	BM212	2013-5252	
23-SEPT-13	MEDICAL	BM156	2013-5677	
10-OCT-13	FALSE	BM239	2113-6043	

11-OCT-13	DIESEL FUMES	BM239	2013-6067	
31-OCT-13	MEDICAL	BM200	2013-6417	
2- NONV-13	FALSE	BM239	2013-7002	
2014				
AMMAO & HOTWORK STAND BYS…..124				
01-JAN-14	ALARM	CFAD JETTY		
08-JAN-14	ALARM PANEL	BM203		
11-JAN-14			2014-253	
13-JAN-14	FIRE PANEL	X-AREA	2014-252	
18-FEB-14			2014-936	
15-MAR-14	FIRE PANEL	BM212		
18-MAR-14			2014-1427	
05-JUNE-14	SHIP FIRE	BASIN	2014-2903	*
05-JULY-14	SPRINKLER	BM212	2014-3500	
10-JULY-14	PUMP HOUSE F/P	BM192		*
13-AUG-14	FIRE PANEL	BM212	2014-4306	
18-AUG-14	LIGHTING STRIKES	X-AREA		*
05-SEPT-14	SPRINKLER	BM212		
19-SEPT-14	SPRINKLER	BM212		
21-SEPT-14	FIRE PANEL	BM102		
23-SEPT-14	UXO	BASIN	2014-5094	
23-SEPT-14	FIRE PANEL	BM114		
24-SEPT-14	FIRE PANEL	BM183		
25-SEPT-14	SHIPBOARD	CFAD JETTY		
04-OCT-14	FIRE ALARM	NEW BUNKERS	2014-	
10-OCT-14	FIRE EX	BM239	2014-5410	
10-OCT-14	FIRE EX	BM154	2014-5413	
29-OCT-14	FIRE PANEL	BM144		
26-NOV-14	FIRE PANEL	BM156		
27-DEC-14	SPRINKLER	BM212		