CHIEF OF THE DEFENCE FORCE

COMMISSION OF INQUIRY REPORT

INTO THE FIRE AT MARRANGAROO TRAINING AREA

ON 16 OCTOBER 2013
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REPORT
EXECUTIVE SUMMARY

Introduction

1. Defence Explosive Ordnance Training School (DEOTS) staff and students attended Marrangaroo Training Area (MTA) between 27 September and 20 October 2013 as part of an Explosive Ordnance Disposal (EOD) course.

2. On 16 October 2013, a demolition serial was conducted on MTA Internal Range to dispose of eight surplus 84mm High Explosive Anti Tank (84mm HEAT) rounds. The demolition serial consisted of two separate stacks each of four 84mm HEAT rounds and stored in aid (plastic explosive, primer sheet, detonating cord and detonators) and were initiated just before midday. Shortly after, a DEOTS staff member who was conducting a safety clearance of the demolition site on Internal Range noticed a small fire some 25 metres to the east of the point of demolition.

3. The member commenced fighting the fire by stomping on it using his boots and called forward other assets to assist in suppressing the fire. Eventually, five members and a ‘Stryker’ unit (a utility vehicle with a tank, pump and hose reel that also carried some shovels, beaters and a knapsack) were in attendance at the Internal Range. Despite their efforts, the fire continued to grow in intensity and size in the heavily wooded area surrounding the point of demolition.

4. Efforts to extinguish the fire by DEOTS staff were terminated when previously unexploded ordnance (UXO) present on and around the Internal Range began exploding. It was deemed too dangerous for these personnel to remain in the vicinity of the fire. The fire spread rapidly within and beyond MTA, causing destruction of bushland and property.

5. The Rural Fire Service (RFS) was alerted to the fire and attended MTA. However, they rightly did not deploy any firefighting assets because of a risk of injury from exploding UXO.

6. A Commission of Inquiry (COI) to enquire into and report on the causes and circumstances of the fire was appointed by the Acting Chief of the Defence Force (A/CF). Terms of Reference (TOR) were issued by A/CF on 8 November 2013. During the evidence gathering phase of the COI it became obvious that in order fully to understand the activities on 16 October 2013, the COI should also consider the activities of DEOTS at MTA on 14 October 2013. Amended TOR were issued on 16 December 2013.
7. Subsequent to the fire on 16 October 2013, an unexpended 105 mm Howitzer (HOW) cartridge case was discovered on the Internal Range. This cartridge case was found to be one of eight issued to DEOTS staff on 14 October 2013 at the commencement of the explosive ordnance (EO) training course. On further investigation into the accounting and acquittal of EO at the completion of the EOD course, records indicated that all eight cartridge cases had been expended. This was not the case.

8. 16 October 2013 was a day of HIGH Fire Danger Rating (FDR). MTA Range Standing Orders (RSO) preclude live-firing activities at FDR of HIGH or above. However, before the commencement of the EOD course at MTA, DEOTS staff had enquired of the Range Control Officer (RCO) on the status of MTA RSO with respect to live-firing and FDR. His advice was that the current guidance was “obsolete” and that live-fire activities could be conducted at a FDR of HIGH and above. Accordingly, the demolition serial on 16 October 2013 went ahead on a day when the FDR at MTA was HIGH. The MTA RCO did not have the authority or delegation to amend RSO, neither to authorise this serial.

9. The COI also examined documents that provided guidance to activities on MTA. These included the GHD (a consultant engaged by Defence) MTA Bushfire Management Plan 2011-2014 (BMP) and the Defence Training Area Management Manual (DTAMM). The BMP contained guidance on bushfire mitigation strategies that involved hazard reduction and upgrades to existing fire trails. None of these strategies had been carried out, other than some work on a fire trail, not in the vicinity of the Internal Range.

10. DTAMM is binding policy on all Defence Training Areas and thus, a superior document in relation to the MTA RSO. There are some seeming inconsistencies and ambiguities between documents.

**Key conclusions of the Inquiry**

11. The key conclusions of the Inquiry are:

   a. The demolition serial disposing of eight surplus 84mm HEAT rounds, as conducted by DEOTS staff, was generally in accordance with recognised practice.

   b. A 105mm HOW cartridge case was brought onto the Internal Range. This was an unauthorised act. It was not part of the demolition serial and played no part in igniting the fire.

   c. The resulting fire resulted was ignited by “kickout” from the detonation.

   d. The efforts of the DEOTS staff to suppress the fire were to their credit and the decision to withdraw when UXO began exploding was correct.

   e. The Stryker vehicle was not an adequate firefighting asset.
f. The RFS response was timely and its decision not to fight the fire on MTA was sound.

g. Accounting and acquittal of EO by DEOTS staff was poor and could constitute a security breach.

h. Approval had been given by the RCO for DEOTS to conduct live-firing activities on MTA on a day of HIGH FDR without proper authority.

i. The demolition serial was conducted on a day of HIGH FDR.

j. MTA RCO did not have authority to amend RSO.

k. RSO prohibit live-firing activities on days of HIGH FDR and above.

l. BMP mitigation strategies had not been considered, actioned or resourced to any significant extent.

m. Current Defence Training Area documents (DTAMM and RSO) seem to be inconsistent and contain ambiguities.

Findings and recommendations of the Inquiry

12. The findings and recommendations arising from the COI of the report are contained in the following tables: Table 1, Findings of COI into MTA Fire on 16 October 2013 and Table 2, Recommendations of COI into MTA Fire on 16 October 2013.

Tables:

1. Findings of COI into MTA Fire on 16 October 2013

2. Recommendations of COI into MTA Fire on 16 October 2013.
Table 1: Findings of COI into MTA Fire on 16 October 2013

<table>
<thead>
<tr>
<th>Serial</th>
<th>Para</th>
<th>Finding</th>
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<tbody>
<tr>
<td>1</td>
<td>37</td>
<td>The purpose of the serials conducted by Defence Explosive Ordnance Training School on the 0029 Australian Defence Force Explosive Ordnance Disposal Course on 14 October 2013 is not clear. Neither is the method used to record student performance and assessment.</td>
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<td>2</td>
<td>56</td>
<td>While not itself of profound significance, the presence of the 105mm Howitzer cartridge case on Internal Range on 16 October 2013 gives ground to consider that there was a systemic issue relating to range and explosive ordnance management and control by Defence Explosive Ordnance Training School staff.</td>
</tr>
<tr>
<td>3</td>
<td>57</td>
<td>The presence of a 105mm Howitzer cartridge case on the Internal Range on 16 October 2013 was not authorised. Its presence played no part in the fire.</td>
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<td>4</td>
<td>77</td>
<td>The absence of a reliable log of explosive ordnance expended during the training serials at Marrangaroo Training Area on 14 October 2013 had a number of adverse consequences, including seriously flawed post-serial accounting, in that there is no document in existence that could be said accurately to account for explosive ordnance issued to, and expended on, the course.</td>
</tr>
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<td>5</td>
<td>77</td>
<td><strong>SO/01C1</strong> signed for the explosive ordnance on 14 October 2013 and was Officer in Charge Exercise, appointed by CO. Range Instruction of 02 September 2013. He was responsible for securing and controlling the explosive ordnance and he did not adequately do so.</td>
</tr>
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<td>6</td>
<td>83</td>
<td>The purpose of the serial on 16 October 2013 was to dispose of surplus 8 x 84mm High Explosive Anti-Tank rounds by demolition. The decision to dispose of these items in this way was reasonable in the circumstances, noting that the rounds had passed their operational use and significant cost would have been involved in returning them to the depot.</td>
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<td>7</td>
<td>103</td>
<td>During a phone conversation on or about 14 October 2013, there was miscommunication between <strong>SO/01C1</strong> and <strong>W2</strong> about the number of 84mm High Explosive Anti-Tank rounds to be included in the demolition serial on 16 October 2013. Range Control was not given the correct number of 84mm rounds to be expended. This had no effect on whether approval would have been granted and played no part in the fire.</td>
</tr>
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</table>
| 8      | 119  | The demolition serial on 16 October 2013 consisted of 8 x 84mm High Explosive Anti-Tank rounds together with:  
   a. 612mm x 1mm sheet explosive (2 x 1m x 30cm) (Primasheet)  
   b. 8 x Plastic Explosive Number 4  
   c. 4m Detonating Cord  
   d. 2 x Detonator Demolition Electrical  
The 84mm rounds were placed nose to tail within two existing craters, covered by Primasheet and with a Plastic Explosive Number
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<td>9</td>
<td>119</td>
<td>4 charge placed on each 84mm round at the break in the diameter of the rounds. This generally complies with Standard Operating Procedures.</td>
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<td>10</td>
<td>126</td>
<td>While the use of Primasheet in the disposal of 84mm High Explosive Anti-Tank rounds was not consistent with extant doctrine, its use did not exceed the Net Explosive Quantity for Internal Range.</td>
</tr>
<tr>
<td>11</td>
<td>128</td>
<td>The Stryker unit was not capable of providing an effective response because of limited ability to gain access to the fireground, limited ability to project a large volume of water, and limited ability to transport a large quantity of water.</td>
</tr>
<tr>
<td>12</td>
<td>134</td>
<td>Unexploded ordnance was, and probably remains, present in the immediate vicinity of the Internal Range and was susceptible to ignition by the heat of the fire. Exploding unexploded ordnance caused the Australian Defence Force members fighting the fire to withdraw to the administration area of Marrangaroo Training Area. This was entirely appropriate. The presence of unexploded ordnance in the immediate vicinity of the Internal Range, and its susceptibility to ignition by a bushfire, even at its early stages, rendered it unsafe for traditional firefighting methods to be employed in close proximity to any fire in the vicinity of either range on Marrangaroo Training Area. While the commitment of the five members of the Australian Defence Force in attempting to extinguish the fire was individually and collectively commendable, the presence of the fire in ground known to contain unexploded ordnance presented an unacceptable risk.</td>
</tr>
<tr>
<td>13</td>
<td>137</td>
<td>The Rural Fire Service attended the administration area of Marrangaroo Training Area, and Rural Fire Service firefighters went to the eastern boundary of Marrangaroo Training Area. Aerial assets of the Rural Fire Service were deployed. No Rural Fire Service asset took part in firefighting on Marrangaroo Training Area during the fire. Bearing in mind Defence personnel had withdrawn from the range area because of exploding ordnance, and because there was no means of predicting where unexploded ordnance might be, it was entirely reasonable that the Rural Fire Service declined to fight the fire within Marrangaroo Training Area.</td>
</tr>
<tr>
<td>14</td>
<td>142</td>
<td>The fire commenced about 25m to the east of the Internal Range shortly before midday on 16 October 2013 as a result of ignition by debris from the demolition serial. It progressed to the south-east of the Internal Range. At about 1355h on 16 October 2013 it crossed the boundary of Marrangaroo Training Area to the east.</td>
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<td></td>
<td></td>
<td>The Rural Fire Service and Defence have not agreed on a protocol for fighting fires within Marrangaroo Training Area. There is no basis upon which Defence could assume such an arrangement existed. Bearing in mind the presence of unexploded ordnance within Marrangaroo Training Area, Defence should not have relied upon the Rural Fire Service to provide anything more than advice on fighting fires, hazard reduction and fire trail management within Marrangaroo Training Area. There is no agreement with the Rural Fire service to provide a firefighting response within Marrangaroo Training Area.</td>
</tr>
<tr>
<td>15</td>
<td>142</td>
<td>Subject to weather conditions, there is no means to prevent a fire from escaping from Marrangaroo Training Area once Defence resources have failed to contain it.</td>
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<td>16</td>
<td>147</td>
<td>Hazard reduction had not occurred in Marrangaroo Training Area in at least 20 years. In particular, hazard reduction in accordance with the <em>Bushfire Management Plan 2011-2014</em> also had not occurred. Water tanks recommended in the <em>Bushfire Management Plan 2011-2014</em> had been delivered but not installed. Upgrading of a single fire trial had occurred in accordance with the <em>Bushfire Management Plan 2011-2014</em>, but it was not a fire trial that had any direct relationship with either range on Marrangaroo Training Area. It was not relevant to fire fighting efforts on 16 October 2013.</td>
</tr>
<tr>
<td>17</td>
<td>148</td>
<td>There is a history of poor communication between the local authorities, being the Bushfire Management Committee and the local Rural Fire Service Brigade on the one hand, and on the other, Defence, represented by the Regional Environmental Officer, the Range Control Officer and Marrangaroo Training Area management generally.</td>
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<tr>
<td>18</td>
<td>152</td>
<td>The fire at Marrangaroo Training Area on 16 October 2013 did not cause injury to any person.</td>
</tr>
<tr>
<td>19</td>
<td>153</td>
<td>The fire at Marrangaroo Training Area on 16 October 2013 did not cause damage to any property at Marrangaroo Training Area other than bushland.</td>
</tr>
<tr>
<td>20</td>
<td>155</td>
<td>Each of the Defence personnel was qualified and experienced in carrying out activities relevant to the fire. So far as we can determine their qualifications were current.</td>
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<td>21</td>
<td>156</td>
<td>Actions of Defence personnel were not affected by drugs or alcohol.</td>
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<tr>
<td>22</td>
<td>168</td>
<td>The weather conditions prevailing on Marrangaroo Training Area on 16 October 2013, and the higher winds occurring in the Blue Mountains the following day, were accurately predicted by the Bureau of Meteorology in the week prior to the fire. These predictions were readily available on the Bureau’s website. Conditions in the months leading up to 16 October 2013 were drier and hotter than usual. These conditions were also predicted. There is no mandated consideration of such factors present in the Range Standing Orders, or in any other known Defence document which takes climate variation into account when determining the appropriateness of Defence activities.</td>
</tr>
<tr>
<td>23</td>
<td>175</td>
<td>Fire Danger Ratings are not a suitable mechanism for determining whether live-firing should or should not proceed on the ranges within Marrangaroo Training Area. Forest Fire Danger Index is a more appropriate mechanism, but it is not possible for the Commission of Inquiry to determine what the exact threshold should be for such practice, nor to recommend how such information should be gathered. The selection of Fire Danger Rating for the Central Ranges District as the sole criterion for determining whether live-firing may occur on demolitions ranges on Marrangaroo Training Area is a crude and inexact method.</td>
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Table 2: Recommendations of COI into MTA Fire on 16 October 2013

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<thead>
<tr>
<th>Serial</th>
<th>Para</th>
<th>Recommendation</th>
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<tbody>
<tr>
<td>1</td>
<td>37</td>
<td>The Australian Defence Force Explosive Ordnance Disposal course be reviewed by Manager Joint Training – Air Force, to ensure the assessments meet the learning outcomes specified in the relevant Training Management Package.</td>
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<tr>
<td>2</td>
<td>56</td>
<td>Commanding Officer Defence Explosive Ordnance Training School review and enforce Standard Operating Procedures to ensure that appropriate explosive ordnance accounting and handling practices, in accordance with Defence doctrine, are adhered to during all training activities.</td>
</tr>
<tr>
<td>3</td>
<td>77</td>
<td>Commanding Officer Defence Explosive Ordnance Training School amend relevant instructions, both generally and specifically, so as to ensure that explosive ordnance used in training serials is logged in real time, in accordance with extant doctrine.</td>
</tr>
<tr>
<td>4</td>
<td>77</td>
<td>Defence Security Authority conduct an investigation into the whereabouts of items of unaccounted explosive ordnance issued to Defence Explosive Ordnance Training School Exercise Marrangaroo.</td>
</tr>
<tr>
<td>5</td>
<td>77</td>
<td>Commanding Officer Defence Explosive Ordnance Training School, assisted by Joint Logistics Command Regional Explosive Ordnance Services staff, conduct explosive ordnance accounting training for all instructional staff as a matter of priority and that such training be conducted for Defence Explosive Ordnance Training School staff on an annual basis.</td>
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<tr>
<td>6</td>
<td>126</td>
<td>A Stryker unit, or an upgraded firefighting unit, be present at the range sentry point, remain manned and ready to deploy during range activities, with its driver in direct radio contact with the Range Safety Officer. Upon the range being declared clear by the Safety Officer inspecting the range after a demolition serial, the firefighting unit must proceed forward to the range while the periphery of the range continues to be inspected by the Safety Officer, and remain on the range until the Safety Officer declares that the area is clear of fire or that it is otherwise appropriate for the firefighting unit to leave the range area.</td>
</tr>
<tr>
<td>7</td>
<td>131</td>
<td>Firefighting capability at Marrangaroo Training Area be upgraded so that Australian Defence Force members are not placed in situations of unacceptable risk. Specifically, those participating in range practices must have access to a firefighting vehicle close by and easily deployed, and capable of throwing a large quantity of water an appreciable distance into areas adjacent to the ranges, should a fire occur.</td>
</tr>
<tr>
<td>8</td>
<td>131</td>
<td>Range Standing Orders be amended to include a direction that no Defence vehicle is to leave the administration area of Marrangaroo Training Area during a bushfire, except to leave Marrangaroo Training Area itself through the main gate, unless it is a properly equipped bushfire fighting vehicle having a least four wheel drive capability and self-protection equipment.</td>
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<tr>
<td>9</td>
<td>131</td>
<td>Defence should not procure any firefighting vehicle for Marrangaroo Training Area without first consulting relevant personnel within the Rural Fire Service on an appropriate type of vehicle, and obtaining training for the personnel proposed to use it. Alternatively, Defence should explore contracted firefighting support during periods of live-fire on Marrangaroo Training Area.</td>
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<tr>
<td>10</td>
<td>135</td>
<td>Range Control Officer Marrangaroo Training Area liaise with the local Rural Fire Service units to develop a map indicating the areas of the range likely to contain unexploded ordnance.</td>
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<tr>
<td>11</td>
<td>142</td>
<td>Defence undertake a review of its ability to respond to a fire within Marrangaroo Training Area, whether bushfire or structural. The underlying assumption should be that the only response available to fight a fire within Marrangaroo Training Area will be provided by Defence. Further, such response must occur while a fire is in its initial stages. A review must either acknowledge the risk of fire occurring in the future, or upgrade Defence’s firefighting capability at Marrangaroo Training Area.</td>
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<tr>
<td>12</td>
<td>145</td>
<td>The Marrangaroo Training Area Regional Environmental Officer confer with the local Rural Fire Service at least annually and determine a hazard reduction regime capable of implementation. It is further recommended all ranges be reviewed in relation to the same issue, that is, that personnel involved in the management of each range under Defence control be directed to confer with local firefighting authorities on at least an annual basis to assess hazard reduction responses to be pursued for that range in subsequent years.</td>
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<tr>
<td>13</td>
<td>148</td>
<td>The Regional Director-Defence Support-Northern NSW, make contact with Deputy Commissioner RFSI Director of Operational Services Rural Fire Service, to arrange a headquarters driven bipartite review of the events of 16 October 2013 with a view to mitigation of future fire events generally, and with specific reference to: a. hazard reduction programming and site works on Marrangaroo Training Area; b. bushfire response within Marrangaroo Training Area, with specific reference to equipment to be kept on or present on site and operated by Defence personnel and the circumstances in which the Rural Fire Service will respond to a report of bushfire within Marrangaroo Training Area; and c. the development and implementation of a Memorandum of Understanding between Defence and the Rural Fire Service in relation to these matters.</td>
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<tr>
<td>14</td>
<td>162</td>
<td>Marrangaroo Training Area Range Standing Orders should be reviewed to impose a requirement that the Officer in Charge of any live-firing practice ascertain and consider current weather parameters, temperature, humidity, wind strength and direction, registered at Mt Boyce immediately prior to any demolition serial. The setting of those parameters and their limits should be decided in consultation with the Bureau of Meteorology and Rural Fire Service and inserted into Range Standing Orders.</td>
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<tr>
<td>15</td>
<td>175</td>
<td>Defence engage with both the Bureau of Meteorology and the Rural Fire Service to determine a more suitable index system. In the interim, Range Standing Orders be amended so that live-firing on the ranges on Marrangaroo Training Area not be permitted where the Forest Fire Danger Index for either the Central Ranges District or Greater Sydney Region is 12, it being the threshold for HIGH Fire Danger Rating, or above. Put another way, and in a practical sense, Range Standing Orders should, as an interim measure, require the Officer in Charge Practice and the Range Control Officer to consider the Forest Fire Danger Index for both Central Ranges District AND Greater Sydney Region on the day of any given serial. If either index is at 12 or above, live-firing should not be permitted. Any indication in Range Standing Orders or elsewhere that live-firing is permitted on Marrangaroo Training Area when the Fire Danger Rating is HIGH should be rescinded.</td>
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<tr>
<td>16</td>
<td>183</td>
<td>The use of Internal and External ranges at MTA for patrolling activities be prohibited.</td>
</tr>
<tr>
<td>17</td>
<td>192</td>
<td>Authority be given to the Regional Environmental Officer to close a range or impose live-firing restrictions in addition to any set out in Range Standing Orders if circumstances so warrant.</td>
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<tr>
<td>18</td>
<td>217</td>
<td>On matters relating directly to safety or risk, or when live-firing may occur, where there is ambiguity or apparent inconsistency, the most conservative or restrictive order should be followed until formal clarification has been provided.</td>
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<tr>
<td>19</td>
<td>255</td>
<td>All documents be reviewed to remove ambiguity and perceived inconsistencies. Marrangaroo Training Area Range Standing Orders be subject to further examination, with particular consideration of the bushfire mitigation strategies referred to in the Bushfire Management Plan 2011 – 2014 before amendments to Chapter 10 are made. The basis upon which Range Standing Orders might fix a cut-off point for live-firing exercises should depend on continued bushfire strategies. Range Standing Orders and Marrangaroo Training Area Bushfire Management Plan be reviewed annually. If hazard reduction has not occurred or the fire trails remain degraded, Range Standing Orders should take account of heightened risk.</td>
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<tr>
<td>20</td>
<td>267</td>
<td>The lines of responsibility be made clearer and some individual, perhaps the Regional Environmental Officer, or agency be given overarching responsibility to ensure recommended works related to bushfire mitigation on Defence Estate are carried out in accordance with the Bushfire Management Plan which the Manual for Fire Protection Engineering directs be prepared.</td>
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INTRODUCTION

1. This report is presented in two parts. Part I deals with the Terms of Reference (TOR) given to us by Acting Chief of the Defence Force (A/CDF).

2. For ease of reading all ordinance, documents, appointments and places are given in full in findings and recommendations. After first mention in our report, acronyms are used. The abbreviated forms of military rank are used.

A list of acronyms and abbreviations (annex A).

General

3. Between 27 September and 20 October 2013 a component of an Australian Defence Force (ADF) explosive ordnance training course was to be conducted at Marrangaroo Training Area (MTA) near Lithgow NSW. On 16 October 2013 following detonation of eight surplus 84mm High Explosive Anti-Tank (84mm HEAT) rounds on the Internal Range a fire occurred. It will become clear that the fire resulted from a “kickout” from the detonation.

4. Efforts to extinguish the fire ceased when previously unexploded ordnance (UXO) present on, and around, the range began exploding and the fire spread rapidly causing destruction of bushland and property.

5. We were appointed to constitute a Commission of Inquiry (COI) to enquire into and report on the causes and circumstances of the fire, more particularly recited in the TOR attached to this report [redacted]. The Instrument of Appointment [redacted] The original TOR issued by A/CDF on 08 November 2013 limited the Inquiry to activities at MTA on 16 October 2013. In gathering evidence it became obvious that in order to understand the activities on 16 October 2013 one should also understand the activities of a detachment of the Defence Explosive Ordnance Training School (DEOTS) at MTA on 14 October 2013. As a result, on 14 December 2013 the COI requested an amendment to the TOR to include the activities at MTA during the period 14 to 16 October 2013. This extension to the TOR was given by Chief of the Defence Force (CDF) on 16 December 2013 [redacted].

6. The Commission visited MTA on 02 December 2013 and inspected the administration area and both the External and Internal Ranges. On 08 January 2014, together with one of the
Counsel Assisting the Commission of Inquiry (CACOI) and the COI Manager we visited Defence Establishment Orchard Hills (DEOH) and were shown various items of ordnance referred to in evidence given to the Inquiry.

7. It should be recorded that during the Hearing phase a member of the COI, received an email from a retired Army officer, who had served in the Army Fire Service, offering assistance to the Inquiry. He was contacted by CACOI, but nothing further was heard from him.

8. It should also be recorded that after all evidence had been given to the Inquiry, one of CACOI forwarded an email attaching a Record of Conversation he had had with one of the students present on External Range on 14 October 2013. That conversation was recorded as follows:

On 14 Oct, on the external range, one of the serials we conducted involved a low order technique, being the cutting open of 105mm Howitzer High Explosive Projectiles. My understanding is that, when one undertakes such a serial, one cannot approach the pit for 12 hours for safety reasons. Whilst I am not sure of the exact requirement in relation to this, my experience on other courses is that you wait 12 hours due to the chance of detonation of the store from residual heat. On the occasion of 14 Oct, we only waited 30 mins after last smoke was seen.

was not called as a witness, nor was he interviewed by CACOI. Accordingly, no consideration has been given to his observations, other than to say they may disclose a safety breach which warrants investigation.

9. Here we express our thanks to CACOI for their assistance in marshalling and presenting evidence. We also thank them for their submissions, noting that they have made our task easier, and allowed us to present this report within the time prescribed by the TOR. Where we agree with their submissions, we have, in general, adopted them.

History and topography of MTA

10. The MTA, also known as the Marrangaroo Range, consists of about 1,700 hectares of land (1,520 hectares of Defence owned land, and 177 hectares of Newnes State Forest leased under occupation permit from Forests NSW). It is located about 3km to the north-west of the township of Lithgow, which itself abuts the foothills on the western side of the Blue Mountains, being part of the Great Dividing Range west of the Sydney basin. Marrangaroo is about 150km west of the Sydney CBD/Sydney airport. It takes about 2 hours to drive there from Sydney.

11. To the east of MTA lies, essentially uninterrupted, the northern half of the Blue Mountains area. About 50km to the east lies the beginning of the Sydney Basin, at Kurrajong and the Hawkesbury River. shows the majority of this area of the Blue Mountains was affected by bushfire. It is beyond our TOR to map the path of the fire in the Blue Mountains outside MTA. It is, however, clear that there was a fire which emanated from MTA on 16 October 2013. Once the fire, which arose from a “kick-out” from the demolition
serial at the Internal Range on 16 October 2013 took hold, there was no impediment to the fire’s expanding to the perimeter of MTA to the east, about 1km away and then onwards.

12. It appears that the site for MTA was first purchased and then utilised by the ADF during World War II. During that war, and in subsequent years, the site was used for explosive storage as well as for the destruction of explosive ordnance (EO) for disposal, and for training purposes.

13. Historically, the site housed resident ADF units until, probably, sometime in the 1980s or 1990s. Visiting units and Cadets now use the site as a training area. There is now no resident ADF unit. Activities include field craft as well as demolition training. Demolition training occurs on the two extant ranges on site. These ranges are both quite small ranges by Defence standards. The External Range is located in the northwest of the site. Given its proximity to the boundary of MTA the External Range has a Range Danger Area (RDA), sometimes referred to as a safety trace, of 750m. The Internal Range is in the eastern part of MTA and, being more centrally located within MTA, has a slightly larger RDA of 800m. The External Range was not certified for the disposal of 84mm ammunition, whereas the Internal Range, with a slightly larger RDA, was.

14. The land itself visibly consists of broadly two types of terrain; cleared areas that are generally flat or undulating small hills and heavily wooded areas. There are some thin transition areas of grassy woodlands and dry sclerophyll grassy areas. The ranges themselves are located within areas of dry sclerophyll forest.

15. The NSW Government Office of Environment and Heritage (OEH) opines that one quarter of the vegetation classes mapped in New South Wales are types of dry sclerophyll forests, reflecting the variable topography, geology, climate and geographic range of these communities. It is said that sclerophyll forests are a typically Australian vegetation type having plants, eucalypts, wattles and banksias with hard, short and often spiky leaves, which are closely associated with low soil fertility, rather than low rainfall or soil moisture. Low fertility also makes soils undesirable for agriculture and native vegetation has, therefore, remained relatively intact.

16. According to the OEH, bushfires play a vital role in regeneration of dry sclerophyll forests. Many species are able to re-grow from buds protected beneath soils or within the trunk or branches. Other species have seeds that are protected by a hard seed coat or woody fruit, which are stimulated to open or germinate by fire. The frequency, intensity and season of occurrence of fire has an enormous effect on the composition and structure of these forests.

17. There are two sub-formations of dry sclerophyll forests; shrub/grass and shrubby. Shrub/grass dry sclerophyll forests have a conspicuous grassy (Poaceae) understorey, with intermittent shrubs. They represent the transition between grassy woodlands and the shrubby classes of dry sclerophyll forest.

18. Much of the heavily wooded areas in MTA are contained within numerous ravines, which complicate the management of the site in terms of access, communication and bushfires.
19. The External Range is a crescent-shaped clearing of about 80 to 100m long and 20 to 30m wide. The Internal Range is triangular in shape, with sides of about 30 to 40m. Single dirt/gravel roads give access to each. Both are located immediately adjacent to dry sclerophyll forest.

20. The site is completely contained within a perimeter cyclone fence, inspected weekly by the resident caretaker. Access to the site is by the main entrance road, Reserve Road. Reserve Road is a right turn from the Great Western Highway approximately 4km west of the Lithgow turn off, and consists of, at first tarmac, then a graded gravel road about 1.4km long. The gate is manned only during specified periods by arrangement with the visiting unit. Otherwise the gate is locked with access arranged through the resident caretaker.

21. It is possible to gain access to the site through 10 other gates located on the perimeter of MTA that lie on the perimeter road and are largely associated with fire trails. It became apparent during the Hearing phase of the COI that these gates are never used by the local authorities because of the danger of UXO.

22. The caretaker is currently Caretaker who has held the position since December 2003. He is employed by SERCO Sodexo Defence Services (SERCO) and is supervised by C-OIC also an employee of SERCO. C-OIC based at the Holsworthy Army Barracks, answers to the Defence Support and Reform Group (DSRG). SERCO is contracted to DSRG to provide facility management services.

23. The Range Control Officer (RCO) manages the ranges on MTA.

24. There is a number of buildings remaining on the site, although many of the buildings, once on the site, have been removed and their former use, as an explosive storage and maintenance facility, diminished. There remains the central cantonment or administration area which includes a commercial sized kitchen, and accommodation lines, along with offices and several warehouse-type buildings within the cleared area of MTA. There is also a four bay magazine for storage of EO on the periphery of the cleared area, but well within MTA itself. The magazine requires picqueting when it holds EO. When there is no resident unit, by operation of this rule, there should be no EO contained within the magazine.

25. Because of the use of MTA as an EO training, storage and maintenance area, UXO is present throughout the range areas, and perhaps in other areas within MTA. The location of the vast majority, if not all of the UXO is unmarked. While it might be possible to provide some level of assurance that there is no UXO on well-used parts of the cleared areas in MTA, it would not be possible to survey and make safe the range areas because of the history of the site, its topography and its continued use as a range.

26. The COI heard that mobile telephone reception varies from reasonable, near the administration area, to patchy or non-existent on the ranges themselves. While there might be internet access in the headquarters office available to visiting units, the COI heard evidence that staff on the course, involved in the fire emanating from MTA on 16 October 2013, was
using mobile telephone 4G/3G networks for internet access. There is no Defence Restricted Network (DRN) available. Visiting units bring radios with them for communication within MTA. This radio network is Defence specific and not shared with local authorities such as the Rural Fire Service (RFS) or NSW Police.

27. While access to MTA administration area is possible by standard 2WD vehicles, access to all other access roads, including those to the ranges, is by use of 4WD vehicles. Such vehicles allow sufficient ground clearance, and at times necessary traction, to traverse the roads and fire trails around MTA. While the nature of those roads and the standard of vehicles used during the relevant period were inadequate, it is sufficient to observe at this stage that the access roads and fire trails within MTA are largely dirt/gravel based, and have a tendency to be rough.

Terms of Reference

28. The TOR require us to consider several matters recited in TOR para 2. Those in paras 2 (a) to (j) and (o) and (p) can conveniently be considered together, but so as to provide a narrative which will aid understanding, they are not always dealt with in the sequence recited in the TOR. Those in paras 2 (k) to (n) are separately considered. Para 3 is considered separately. Para 4 does not arise.

THE COURSE

Purpose and personnel

29. On 02 September 2013, [CO] in his capacity as Commanding Officer (CO) DEOTS, issued a Range Instruction for Exercise Marrangaroo (EX MROO), which, as noted, was scheduled to run between 27 September and 20 October 2013 [EX MROO] was a component of 205712 ADF Explosive Ordnance Disposal (EOD) course session 0029 (the EOD course) conducted by DEOTS. The stated intent of the EOD course was to “confirm theoretical knowledge of Improvised Explosive Device (IED), Conventional Munitions Disposal (CMD), Render Safe Procedure (RSP) methods and UXO disposal methods (High and Low Order techniques)” [EX MROO]. It was envisaged that EX MROO would include live-fire training on the ranges at MTA.

30. ADF members who successfully complete the suite of EO courses, of which the EOD course is but one module, are qualified to conduct a range of EOD, IED disposal, CMD, RSP and UXO disposal in domestic and deployed situations.

31. The EOD training component of the course commenced at MTA on 27 September 2013. This coincided with the end of another DEOTS course, the Explosive Ordnance Reconnaissance (EOR) course, which was conducted at MTA [CO] evidence was that the EO used on the EOR course was all expended. There was none left for the EOD course.

32. The Range Instruction directed that the Officer in Charge (OIC) of EX MROO was to be [SO/OIC1] He acted in this capacity during the course until 16 October 2013, when [OIC2] became OIC and [SO/OIC1] the Safety Officer. Annex E to
the Range Instruction was a Range Detail that specified what was proposed to be done on the ranges in MTA over a three day period during the course.

33. As it transpired, because of an unplanned late delivery of EO, the three days of live-fire specified in the Range Detail were collapsed into a single day. No written amended Range Detail was produced or approved. On 13 August 2013, the course manager, OIC2, issued an AD 665 EO Demand Request. The Point of Contact for the request was SO/OIC1 who had prepared the EO Demand Request in his capacity as OIC EX MROO. This EO Demand Request was not fulfilled due to procedural irregularities. We make no comment on this, save for the fact that the failure of the initial request to be actioned resulted in a later than planned delivery of EO at MTA and created a need for the course staff to adjust the conduct of practical assessments of the students from the planned three days to one day.

34. A further EO Demand Request was raised on 02 October 2013 under the hand of OIC2, but again apparently prepared by SO/OIC1. The Request was for the same material. Thales delivered the EO on the morning of 14 October 2013, apparently to the MTA magazine. It was checked in and formally received by SO/OIC1 (COMSARM Issue Voucher) and SO/OIC1 at EO required for the training activities on 14 October 2013 was then moved to the External Range.

35. The Range Instruction at para 9 listed the “key appointments” for the course as OIC and “Exercise Coordinator/Course Leader”; KA1 “Safety Officer”; and KA2 “Ammunition Non Commissioned Officer” (NCO). It became apparent during the Hearing that there was a floating group of instructors on the course, as various members came on from, and went off on, leave. No record was kept which indicates who was performing what role, or of the “key appointments”. This played a part, we believe, in some of the shortcomings identified later in our report.

The serials on 14 October 2013

36. Throughout the day on 14 October 2013, a number of serials was conducted by DEOTS for instructional or assessment purposes at MTA External Range. It is difficult to understand the purpose of those serials and impossible to know what EO had been expended by the end of the range practice on 14 October 2013. It was said in evidence that the purpose of the serials was both to instruct and assess the students. Yet it was also stated that the assessment process involved only a test whether the relevant activity was conducted without “a safety breach...” There appears to have been no attempt to assess, relevant to a pass or fail, whether the student competently achieved the desired outcome.

37. As to the conduct of the serials, OIC EX MROO, did not draw up any new serial detail after the three day plan previously promulgated in the EX MROO Range Instruction, issued by CO DEOTS on 02 September 2013, had effectively been abandoned.

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1 Thales Australia provide EO storage and distribution to the ADF through the EO Services Contract.
2 Computer Systems Armaments (COMSARM) is the Information System used by the Australian Defence Organisation to manage EO.
At least some of the serials actually conducted appeared to be assessment of students' methods of treatment of EO scenarios. There is, however, no document disclosing what those scenarios were or what EO was used in them. Just how an assessment of a student's performance could be achieved, or reviewed if necessary, in the absence of documentation revealing what the serial involved and how the student dealt with it, remains unanswered.

Finding

The purpose of the serials conducted by Defence Explosive Ordnance Training School on the 0029 Australian Defence Force Explosive Ordnance Disposal Course on 14 October 2013 is not clear. Neither is the method used to record student performance and assessment.

Recommendation

The Australian Defence Force Explosive Ordnance Disposal course be reviewed by Manager Joint Training – Air Force, to ensure the assessments meet the learning outcomes specified in the relevant Training Management Package.

38. Notwithstanding the absence of any extant planning document, it is apparent that it was intended that the students would draw on the stores of EO in order to render the scenario safe by explosive means. The stores were kept in a storage bunker near the External Range under the supervision of SO/OCI. SO was appointed to that role by the OIC Exercise, only that morning, and kept very rough notes on what was expended on each serial. None was kept for the last “clean up disposal”.

39. What was expended and what record, if any, was made of that expenditure is discussed later. However, it is necessary to consider what became of the 105mm Howitzer High Explosive (105mm HOW) rounds, and the 84mm High Explosive Anti-Tank (84mm HEAT) rounds which appear to have been receipted by DEOTS at MTA on 14 October 2013. This consideration is complicated because of inadequate record keeping for the EO used.

EO security and control

40. The Defence Security Manual (DSM) Part 2 para 67.23 states:

> 67.23 Commanders, managers and external service providers are responsible for securing and controlling EO for which they are responsible to prevent its loss, theft, and misuse.

41. Here consideration is given to the security and control of EO which appears to have been delivered to the EOD course at MTA on 14 October 2013 and receipted by the COMSARM Issue Voucher signed by SO/OCI.
42. The EO comprised stores in aid. These included Cord Detonating Redcord (Det Cord), Detonators, Fuse Blasting Time, Charge Demolition Primasheet (Primasheet), plus donor charges such as Charge Demolition Plastic Explosive Number 4 (PE4) and larger target items, being 6 x 105mm High Explosive Squash Head (HESH) rounds, 8 x 105mm HOW HE rounds, 15 x Grenade Hand Smoke Green and the 8 x 84mm HEAT rounds, the last-mentioned being the ordnance which was the subject of the demolition serial on 16 October 2013.

43. In respect of storage, thought that, on the morning of 14 October 2013, after the delivery of the EO by Thales to the MTA storage facility near the External Range, the students, under the supervision of the staff, brought the EO to the External Range.

44. During the course of the Inquiry, it became apparent that no instructor on EX MROO kept a log of EO as it was expended. While made notes in a notebook of four serials conducted on the External Range on 14 October 2013, he omitted reference to a fifth, or clean up, serial. These notes were by no means a comprehensive record of EO expended and were more intended to record the ordnance than the EO involved.

45. The, at best, poor, recordkeeping of the EO used led the COI closely to consider what specifically became of the 8 x 105mm HOW rounds, and the 8 x 84mm HEAT rounds.

46. It should be noted that 105mm HOW rounds are semi-fixed rounds. Like most such rounds they comprise a projectile, fuse, cartridge case and propellant contained in several propellant bags (also known as charge bags). However, in the case of a semi-fixed round, the projectile is detachable from the cartridge case.

47. In respect of the 105mm HOW rounds, we are satisfied that the projectile and fuse components of all 8 x 105mm HOW rounds and propellant bags were expended on the External Range on 14 October 2013. This view is based on the common evidence of all witnesses in that regard and the fact that both SO/OIC1 and KAI gave evidence that the serial on 16 October 2013 involved only the 8 x 84mm HEAT rounds, plus stores in aid, and specifically not any part of a 105mm HOW round.

48. The position of KAI and SO/OIC1 is, however, not assisted by the lack of contemporaneous notes on storage, issue and expenditure of EO at MTA during the period of 14 to 16 October 2013.

49. There is evidence that towards the end of the serials on 14 October 2013 at the External Range, there was an attempt to initiate all eight 105mm HOW cartridge cases. It seems that the projectiles for those rounds had already been expended and that those instructing on the range were of the view that the cartridge cases should be rendered inert prior to being returned to DEOH. An attempt to initiate all eight cartridge cases was

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Footnote: 3 Stores in aid are explosive and non-explosive items, in addition to the target item, used in the conduct of demolition and explosive ordnance disposal tasks.
conducted by lining the cartridge cases up and fixing Det Cord to the base of each case, running across the primer. Upon the demolition, however, it was noticed by OIC2 that one of the cartridge cases had not initiated. This cartridge case was removed from External Range and probably returned to the magazine, although it might have been left outside the magazine in a "live" state. It was later discovered to be present on the Internal Range.

50. It appears to us that both OIC2 and KA1 were genuinely surprised by the discovery of the 105mm HOW cartridge case on the Internal Range. This surprise was not confined to its being found, but extended to the fact that the casing serial number identified it as one issued to the course on 14 October 2013 and

51. However, SO/OIC1 was not surprised when presented with evidence of the presence of the cartridge case on the Internal Range. He readily admitted taking it there on 16 October 2013, and acknowledged he had done so without seeking approval from the OIC Practice, OIC2 or Range Control.

52. However in some areas the evidence is difficult to reconcile:

a. How the cartridge case was stored overnight, whether left outside the magazine on the ground, as suggested by KA1 or outside the magazine, on the ground in front of the verandah, as suggested by OIC2 or in the magazine in a wooden box, as suggested by SO/OIC1

b. How the cartridge case was transported to the range on 16 October 2013 without its being seen by KA1

c. Why it was there at all, when no member other than SO/OIC1 knew about it. Even KA1 who had helped load and unload the vehicle carrying the EO was unaware of its presence. There was no active plan on the part of anyone including, SO/OIC1 to include it in the serial on 16 October 2013

d. The sizes of the craters left by the two stacks were noticeably different in that the left hand crater was larger, bearing in mind that the stacks were approximately equivalent in Net Explosive Quantity (NEQ) and were only three or four metres apart and likely to have been in similarly compacted ground.

53. This last fact, however, is the only evidence suggesting a possibility of a difference in NEQ between the two stacks constructed by KA1 on 16 October 2013 on the Internal Range. Given there was no formal analysis of the craters, and the possibility that the ground was otherwise imperceptibly different between the sites, including the possibility that the left hand stack had UXO beneath it, we accept that the stacks constructed by KA1 contained only those materials said to have been used by him.

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4 Net Explosive Quantity is the quantity (in kilograms) of the explosive substances present in a store, container, stack, building, or the like.
54. Further, there was some time when attention was drawn elsewhere after completing the setup of the stacks, while re-loading the vehicle. When was performing the duties of Safety Officer, there was not sufficient time for him to alter the stacks to allow further EO to be added without becoming aware. We accept that did not alter the stacks constructed by who inspected the stacks during construction, is also accepted in relation to the EO expended on the Internal Range on 16 October 2013.

55. As to the apparent discrepancies in crater size, we believe that the observations are either unreliable, or discrepancies of the type normally found in the evidence of several witnesses to one event. Nothing, however, turns upon these discrepancies.

56. It is clear that had no plan to incorporate the cartridge case into his demolition serial that day. It is entirely plausible that as the only member who knew of its presence on the Internal Range on 16 October 2013, completely forgot about it when confronted by the fire which resulted from the detonation of the serial

Finding

While not itself of profound significance, the presence of the 105mm Howitzer cartridge case on Internal Range on 16 October 2013 gives ground to consider that there was a systemic issue relating to range and explosive ordnance management and control by Defence Explosive Ordnance Training School staff.

Recommendation

Commanding Officer Defence Explosive Ordnance Training School review and enforce Standard Operating Procedures to ensure that appropriate explosive ordnance accounting and handling practices, in accordance with Defence doctrine, are adhered to during all training activities.

57. That admitted that he took unauthorised EO to the range is to his credit. It is sufficient to note that he admitted having taken unauthorised EO to the range, the 105mm HOW cartridge case, but denied that he intended to use it in the same serial as the 84mm HEAT rounds. We accept evidence about this. This accounts for the presence of the live 105mm HOW cartridge case after the serial, which was photographed by NSW Police and shown in. His evidence was not contradicted by other evidence. Although appeared initially to testify that all of the 105mm HOW cartridge cases were initiated on 14 October 2013, overall he gave evidence that we accept to be credible.

Finding

The presence of a 105mm Howitzer cartridge case on the Internal Range on 16 October 2013 was not authorised. Its presence played no part in the fire.
58. The 8 x 84mm HEAT rounds issued to the course were not expended on the External Range on 14 October 2013. This was because the instructors recognised that such rounds could not be the subject of any demolition serial on the External Range. This in itself gives rise to the question why the rounds were ordered in the first place. Both the initial, failed, AD 665 EO Demand Request and the second, successful, AD 665 EO Demand Request sought 8 x 84mm HEAT rounds. Yet, OIC2's evidence was that, on the morning of 14 October 2013, he and his colleagues “weren’t expecting [the 84mm HEAT rounds] to turn up.” SO/OIC1 had told Thales that they no longer required the 84mm HEAT rounds and so only the External Range was booked for that day.

59. However, SO/OIC1's evidence differs.

   So I'm correct in assuming there was always an intention to conduct a serial using those 84mm rounds on 14 October?---Yes, ma'am.

   You mentioned the other day that circumstances on the day, that day being 14 October, meant that you couldn't conduct those serials that afternoon on internal range?---Yes, ma'am, moving from external where the other ammunition was fired to internal wasn't possible on the day.

   Could you just elaborate on what the circumstances were?---Basically, being a compressed timeframe, I was basically running the field training and to get those serials done, plus the misfire, didn't allow us sufficient time to move to internal, ma'am.

60. The most likely explanation for the delivery of 8 x 84mm HEAT rounds to MTA on 14 October 2013 is that no thought was given to the construct of the serials at the time of writing the Range Instruction, and what began as a disorganised plan became worse as foreseeable events but regrettably not foreseen at the time occurred. These were the failed first demand, the late arrival of the EO, the consequent compaction of the serials from three days into just one day, and the absence from the course of senior personnel with responsibilities specified in the Range Instruction.

The failure accurately to record the expenditure of EO: 14 to 16 October 2013

61. As OIC2 explained, the role of the Ammunition NCO is to control the receipt and issue of all live ammunition and other produce on ranges. Put another way, the Ammunition NCO runs the EO Quartermaster's Store (Q Store). KA2 was detailed in the Range Instruction to be the Ammunition NCO but, because of his absence, no one person was designated as the Ammunition NCO on the Exercise. OIC2 accepted that this was a “problem” because it meant, “there's no one key person that's been designated to maintain a list and record.”

   In evidence, OIC2 said that he thought SO/OIC1 and WI were maintaining some form of log in a notebook on 14 October 2013, but then indicated that he thought SO may have been doing this, as he was physically in control of the ammunition, and was taking direction from SO/OIC1 and...
The following evidence of OIC2 shows that the allocation of record keeping duties had not been made clear:

Is it the case that you hoped that, between the three of them, they'd be able to come up with a dems log? — I guess so, sir. Yes.

Were they able to come up with a dems log? — I'm not sure, sir.

Did you ever ask them? — No, sir.

63. OIC2 explained that, in preparation for this Inquiry, he had experienced difficulty tracking down the relevant EO accounting documents. It only became apparent during the Inquiry to those who participated in the course that there was a serious error in an AE 396 Explosive Ordnance Stock Management Summary dated 06 November 2013. This document was prepared and signed by SO/OIC1 and signed also by OIC2 on 06 November 2013 and indicated that all items of EO had been expended during the course when in fact they had not.

64. However, an email of CO CO DOTS, detailing the returned EO said to have been expended shows the EO Stock Management Summary to be merely a transposition of the COMSARM Issue Voucher rather than an accurate account of expended, returned or retained EO.

65. SO/OIC1 was asked who kept a demolition log (dems log) and responded by saying he ran a "task matrix". This was a reference to Annex E to the Range Instruction issued on 02 September 2013 which listed the proposed serials. As discussed earlier, the serials actually conducted did not comply with this Range Detail. This illustrates that this document provided no reliable record of what EO was used on 14 October 2013. There was no satisfactory explanation why the "task matrix" (Annex E to the Range Instruction) was relied upon as providing a record of use of EO on 14 October 2013, when it was known at the time there had been no compliance with it.

66. OIC2 in effect agreed that keeping a dems log would prevent errors. He also agreed that to wait until the end of a serial and "see what you've got left" could result in a very dangerous assumption. The danger in making such an assumption is that unexpended but unaccounted EO could be taken from the range and be sold or given away, or otherwise used for purposes that are unlawful or endanger national security. While there is no evidence that illicit acts occurred in this case, the lack of accounting for EO is in itself a security issue.

67. SO was in charge of the ammunition point at the External Range on 14 October 2013 and made a single page of notes of the EO used in some of the serials. When shown these notes, OIC2 agreed that they were inadequate and were at best rough notes. These notes refer only to four serials whereas in fact a fifth seemingly occurred. This was, he said, a "clean up disposal" at the end of the practice.
There's a final serial, which was the remainder of any of the 105s, and that was HESH, or the Howitzer rounds, which had had low-order techniques attempted on them or had burnt out or partially burnt out. It was basically a clean-up disposal at the end of that day, and that's not on that paperwork, sir.

68. The lack of a dems log for the activity on 14 October 2013 had a number of consequences.

69. The first consequence concerns 8 x 105mm HOW rounds, all of which were intended to be expended in the serials on that day. OIC2 gave evidence that the projectile from each of these was separated from its cartridge case and consumed in the serials. The cartridge cases were put to one side and then initiated together by way of a piece of Det Cord taped across the bottom of the primer OIC2 believed that the inert cartridge cases were then "packed up and brought back to Orchard Hills".

70. However, it is clear from SO/OIC1 evidence that at least one of the 105mm HOW cartridge cases was not initiated on 14 October 2013. No record was made of how these cartridge cases were dealt with on 14 October 2013 nor of the fact that one was not initiated.

71. A second consequence of the lack of a dems log produced confusion among the instructors about what EO was actually expended on 14 October 2013. While such confusion did not manifest itself until after instructors gave evidence, it confirms that relying on memory is to invite accounting error. By way of example, the evidence of OIC2 was that four out of the five remaining boxes of PE4 (that is, 80 cartridges in total) were used in the "clean-up" serial at the end of the range activity on 14 October 2013. However, SO recollection was "four and some" and "potentially two full boxes...and a part-used box" of PE4 were returned, together with "some Comp B" to the magazine at MTA after the practice at the External Range on 14 October 2013. The only explanation for this inconsistency is that at least one of the witnesses gave evidence that was mistaken.

72. A third consequence of the lack of a dems log was that the required EO accounting, routinely required post-serial, was completed on the assumption, incorrect as it transpired, that all EO issued for the Exercise was expended. Also, an Explosive Ordnance Stock Management Summary was raised to that effect. We believe this was what did on 06 November 2013. While OIC2 countersigned the document, SO/OIC1 was responsible for its accuracy because he was OIC Exercise.

73. The Explosive Ordnance Stock Management Summary of 06 November 2013 contained serious errors in at least two respects. First, it lists as expended 15 x Grenade Hand Smoke A120 Green. However, the GI 051 Explosive Ordnance Stock Record for the DEOTS magazine, produced by CO records that 14 of these items were returned to the DEOTS magazine on 21 October 2013. Secondly, the Explosive Ordnance Stock Management Summary records 50 x Igniter Time Blasting Fuse M81 were expended but the DEOTS magazine records these items were returned to the DEOTS magazine on 21 October 2013.
74. SO/OIC1 conceded that he was guilty of an oversight when he completed the Explosive Ordnance Stock Management Summary on 06 November 2013. He called it "professional oversight", explaining that he works 20 hours a day on an EOD course. It is noted that the document was dated almost three weeks after the course finished.

75. CO accepted that, had one of the instructors involved in the serials on 14 October 2013 kept a reliable log, many of the accounting errors and confusion, as referred to above, would not have occurred. To use his words, "perfect recordkeeping would have solved a lot of the grief". When asked about the anomaly in the number of Smoke Grenades expended at MTA, CO accepted that the inability to account for all of the items constituted a security incident.

Would you accept that at the moment that probably constitutes – the inability to account for that smoke grenade probably constitutes a security incident? -- I would, ma'am.

76. Because of the joint nature of DEOTS, a number of instructors do not have EO accounting training. CO conceded that this has caused problems within DEOTS and that "continuation training for next year" and "a full-time senior NCO logistics sergeant starting" will assist in rectifying a number of EO accounting issues experienced during EX MROO.

77. Notwithstanding, DSM Part 2 para 67.23 provides:

67.23 Commanders, managers and external service providers are responsible for securing and controlling EO for which they are responsible to prevent its loss, theft and misuse.

Finding

The absence of a reliable log of explosive ordnance expended during the training serials at Marrangaroo Training Area on 14 October 2013 had a number of adverse consequences, including seriously flawed post-serial accounting, in that there is no document in existence that could be said accurately to account for explosive ordnance issued to, and expended on, the course.

Recommendation

Commanding Officer Defence Explosive Ordnance Training School amend relevant instructions, both generally and specifically, so as to ensure that explosive ordnance used in training serials is logged in real time, in accordance with extant doctrine.

Finding

SO/OIC1 signed for the explosive ordnance on 14 October 2013 and was Officer in Charge Exercise, appointed by CO Range Instruction of 02 September 2013. He was responsible for securing and controlling the explosive ordnance and he did not adequately do so.
Recommendation

Commanding Officer Defence Explosive Ordnance Training School, assisted by Joint Logistics Command Regional Explosive Ordnance Services staff, conduct explosive ordnance accounting training for all instructional staff as a matter of priority and that such training be conducted for Defence Explosive Ordnance Training School staff on an annual basis.

Purpose of the demolition serial on 16 October 2013

78. OIC Practice, on 16 October 2013, said in his statement to NSW Police that on 14 October 2013, at the conclusion of the training serials conducted at the External Range, there was a number of explosive items remaining that required disposal. We are unable to determine why the demolition serial did not take place on 15 October 2013. There is evidence from SO/OIC1 and W2 to indicate that SO/OIC1 was still exploring options in relation to the return of the 84mm HEAT rounds to DEOH. Accordingly, the instructors planned to dispose of these items on Wednesday, 16 October 2013.

79. This evidence was consistent with the evidence of KAI, the other instructor involved in the serial on 16 October 2013. As SO/OIC1 said in his police statement, the purpose of the activity was to dispose of live ammunition that was no longer required for training purposes.

80. SO/OIC1 inquired of both DEOTS, and Thales, who manage the EO Storage Depot at Orchard Hills on behalf of Defence, the possible return of the 8 x 84mm HEAT rounds to the Depot by one of those organisations. Those conversations are recorded in Based on the responses, SO/OIC1 concluded that return of these items was not reasonably practicable.

81. The evidence was that it is recognised within Defence it is acceptable, in certain circumstances, for surplus EO to be expended, rather than returned to the Depot. In respect of the decision to dispose of the 84mm HEAT rounds by demolition on 16 October, CO DEOTS, said

I understand that SO/OIC1 as a result of not being able to have THALES or DEOTS Support staff collect the excess EO in a timely manner (i.e. before the weekend and course departing MTA) in consultation with the other instructors and Range Control, decided to dispose of the 8 x 84mm HEAT rounds by way of a demolition serial on 16 Oct 13. They requested approval for the additional serial from Range Control which they received and I authorised the activity via telecom and email to W2 on AM hrs 16 Oct 13. I therefore have no issue with choosing
this manner of dealing with this EO as this is standard practice for EO activities where excess DISP EO stock must be disposed of in lieu of having collected by THALES at extra cost or later date when not suitable and where impost to guard and secure becomes an issue.

82. It is noted that the 84mm HEAT rounds were "Disposal" stock, referred to as DISPT stock, rather than stock in operational condition, as described in the COMSARM Issue Voucher and so were of limited value.

83. There was no evidence gainsaying view that decision to dispose of the 8 x 84mm HEAT rounds by demolition serial on 16 October 2013 was reasonable in the circumstances.

Finding

The purpose of the serial on 16 October 2013 was to dispose of surplus 8 x 84mm High Explosive Anti-Tank rounds by demolition. The decision to dispose of these items in this way was reasonable in the circumstances, noting that the rounds had passed their operational use and significant cost would have been involved in returning them to the depot.

Authorisation of the serial by Range Control

84. Having decided to dispose of the 84mm HEAT rounds in a demolition serial, telephoned Range Control at Holsworthy on 15 October 2013 and spoke to the Assistant Range Control Officer (ARCO). He asked what were the "possibilities" of standing up the Internal Range in order to dispose of these items. was not available to give evidence to the COI because of a prebooked holiday, though he was interviewed by CACOI and his Record of Interview became saying it was "several" He said that said he would speak to the Range Control Officer (RCO), and requested a booking form be sent to him.

85. confirmed that on 15 October 2013, spoke to him about proposal to conduct the serial on the Internal Range at MTA on 16 October 2013. said that he advised on the process needed to follow. This was to pen amend the Permanent Range Demolitions Detail (PRDD) that earlier had been raised for 14 October 2013.

86. said that, from the initial discussions with his understanding was that "they were only going to dispose of two rounds" also thought that had mentioned two rounds, but qualified his evidence by saying that he could not be sure, given the volume of phone calls and emails he received.
87. DTARPI evidence was that, had he been told that eight rounds were proposed to be fired, he would have "asked for more detail as to why there was eight rounds when five was only indicated for the only practice that was approved on the time". He also said that he "wouldn't have considered allowing them to blow away eight rounds because I would have thought it was a waste of money". These contentions on the part of DTARPI were not raised by him when interviewed by CACOI. Asked whether he would have approved the proposed serial had he been told the proposal was to detonate eight, as opposed to two, 84mm HEAT rounds, DTARPI did not mention that he would have asked questions about the approval for the five rounds on 14 October 2013, nor did he mention that he thought eight rounds would be a waste of money, when provided with the opportunity to do so. Rather, he said he would have questioned whether eight rounds would have exceeded the NEQ limit, but otherwise says that he did not know what he would have decided.

88. We believe it possible that DTARPI has reconstructed these events. His evidence that he was told by ARCO earlier in the week that the proposal was to dispose of two 84mm HEAT rounds, which conflicts with SO/OIC evidence, is not reliable.

89. It is clear, however, from the evidence of DTARPI that, after the initial contact by SO/OIC he spoke to the Range Manager, C-OIC, about Fire Danger Ratings (FDR) and what it was likely to be on 16 October 2013. The consensus was that the likely HIGH FDR on 16 October 2013, as opposed to the forecast Total Fire Ban on 17 October 2013, led DTARPI to favour the proposed serial on 16 October 2013.

90. SO/OIC said that after his phone call to ARCO he rang and spoke to W2 OIC Operations Training, DEOTS SO/OIC said he had surplus 84mm rounds, that he had not been able to secure Thales or DEOTS support for return of the rounds, that it was possible to fire the rounds and that Range Control suggested a booking form be sent. SO/OIC said that he did not mention the number of rounds involved.

91. W2 recollection is that this conversation occurred on 14 October 2013. When interviewed by CACOI, W2 said he recalled being called by SO/OIC and told the course had items of EO to be either returned or disposed of. Asked whether he could recall how many 84mm rounds, he said, "...my understanding at the time was that it was two rounds. I'm not sure whether that was a miscommunication or misunderstanding on my part or it was a miscommunication on the part of SO/OIC". Pressed on his recollection, W2 said, "I think he said two rounds".

92. In evidence W2 said, "From my recollection, SO/OIC said, 'I have two 84mm rounds left over..." This evidence, while more emphatic than in his interview with CACOI, was still somewhat qualified.
93. While there is no basis upon which to doubt [W2] candour, the qualified nature of his evidence, coupled with [SO/IOC1] evidence that he did not state the number of 84mm rounds involved, suggests that [SO/IOC1] may not have mentioned the number of rounds involved while [W2] thought he did.

94. [W2] recollection is that there was a further conversation, on 15 October 2013, in which [SO/IOC1] said that he had found that Thales and DEOTS could not pick up the EO and had managed to get a range booking.

95. On the morning of 16 October 2013, [SO/IOC1] forwarded a range booking form, known as a PRDD, to [W2] which had been pen-amended by [OIC2]. [W2] cannot recall how this was transmitted to him. At 0926h, [W2] sent this email to [CO]

_Boss,

EOD course was unable to dispose of two 84mm rounds during their range practice the other day. It’s going to be impractical to transport and store the items, so [SO/IOC1] has arranged with Holsworthy ARCO to get rid of the remaining items today.

I’ve got an amended booking and range detail and am seeking your approval to sign the detail in the absence of yourself and the XO (not sure where he is and not answering mobile). [OIC2] will be OIC, [SO/IOC1] Safety Supervisor and [ ] are listed as Demolition Operators.

_Cheers

96. [W2] did not attach the PRDD to this email. At 0933h, [CO] replied, “Approved” and [W2] forwarded this email to [ARCO]. He attached the PRDD and drew attention to the fact that [CO] had authorised him to sign the PRDD on his behalf.


98. The PRDD attached to this email was signed by [OIC2] on 15 October 2013 and signed by [W2] on 16 October 2013. This email refers to a target of “5” 84mm HEAT rounds. While on the face of it, this appears to be a discrepancy, [DTARP1] evidence does not support this view. [DTARP1] said that when the proposed serial was first raised with him, he advised that DEOTS did not have to amend the detail, other than to have it “re-signed”. So, while he says he was aware of the anomaly between “two” and “five” in this form, he “didn’t think anything of it because I had the email that said they were firing two…”
99. Of some concern is the reference in W2 email to “two 84mm rounds” clearly, the email chain forwarded to ARCO represented to Range Control that permission was being sought for demolition of two 84mm HEAT rounds, when the intention was to expend eight.

100. It was not suggested that SO/OIC1 definitely told W2 that the proposal was to expend two rounds. Rather, it appears there was a miscommunication between SO/OIC1 and W2 which led Range Control to be given an incorrect number of 84mm rounds to be expended. While communication by email would have been preferable to a phone call, MTA does not have DRN access. One thing is clear; at no stage was Range Control advised that the proposal was to expend eight rounds.

101. There is no firm evidence upon which it could be found that this miscommunication influenced whether approval would have been granted. As noted earlier, DTARPI answer when interviewed by CACOI was that he could not say whether or not he would have made a different decision, had he been told that the proposal was to dispose of eight rounds as opposed to two. His oral testimony, to the effect that he would have asked questions and considered the proposal wasteful, may have had an element of reconstruction.

102. CO indicated that he would have had no issue with approving eight rounds as long as the NEQ limit for the range was not exceeded

103. In these circumstances, we believe that the miscommunication between SO/OIC1 and W2 did not affect the approval granted and if it had been communicated that eight rounds were to be expended, approval would have been granted to proceed. This miscommunication did not play any part in the fire.

**Finding**

During a phone conversation on or about 14 October 2013, there was a miscommunication between SO/OIC1 and W2 about the number of 84mm High Explosive Anti-Tank rounds to be included in the demolition serial on 16 October 2013. Range Control was not given the correct number of 84mm rounds to be expended. This had no effect on whether approval would have been granted and played no part in the fire.

**The execution of the serial on 16 October 2013**

104. The evidence shows that the bushfire that escaped from MTA on 16 October 2013 was started during a demolition serial shortly before midday on the Internal Range at MTA. The evidence has that serial occurred came from the three instructors involved in the detonation, OIC2, SO/OIC1 and KA1. For the serial on 16 October 2013, OIC2 was OIC Practice, SO/OIC1 was Safety Officer and KA1 was tasked with the actual construction of the serial.

105. All three gave a detailed account of the demolition serial for the 84mm HEAT rounds to both NSW Police and to the Inquiry. However, their accounts required more than the usual
level of scrutiny, because of the discovery of unexplained and undocumented live ordnance, an unexpended 105mm HOW cartridge case, on the Internal Range. None of the accounts of the serial provided by these three [Headed], to NSW Police or in the interviews by CACOI made any reference to this cartridge case.

106. [Headed] involvement in the serial and, in particular, his actions in respect of the 105mm HOW cartridge case, is discussed below. However, it is appropriate first to consider the evidence of the other two participants, [Headed] and [Headed]. Both were closely examined on the events of 16 October 2013. Neither was shown to be an unreliable witness. Their oral evidence was consistent with their earlier accounts to NSW Police and the interviews by CACOI. Further, their evidence that they knew nothing about the 105mm HOW cartridge case that [Headed] says he took to the Internal Range that morning, was not contradicted and was given in a frank and candid manner.

107. [Headed] was the instructor who constructed the two stacks of EO consumed in the serial. [Headed] said that the EO was drawn from the storage point at MTA at about 1100h on 16 October 2013 [Headed]

108. In his statement to NSW Police [Headed] said:

*The following ordnance was drawn from the storage point*

- c. 612mm x 1mm sheet explosive (2 x 1meter x 30centimetres)
- f. 8 x PE4
- g. 4m detonating cord
- h. 2 electrical detonators

109. He said he then proceeded with [Headed] and [Headed] to the Internal Range and selected two existing craters for the detonation site. He then set the ordnance by placing the 84mm rounds nose to tail with the sheet explosive (Primashout) laying on top. The PE4 charges were placed on the major break on the diameter of the rounds, in accordance with Standard Operating Procedures (SOPs). He described and then placed two sand bags on each stack, in order to minimise fragments. He said that when the detonators were placed he made his way back to the sentry point. At this stage, [Headed] returned to the Control Centre, that is, the administration area within MTA, to complete a head count of students and staff. It appears also at this stage [Headed] moved to the sentry point.

110. [Headed] said that neither he nor [Headed] was involved in the preparation of the stacks, as their roles were to “merely observe the activity to ensure it is completed safely and in accordance with protocols”.

111. Both [Headed] said in their statements to NSW Police that [Headed] detonated the first stack by transmitter at 1156h and the second at 1157h on 16 October 2013.
112. The presence of the 105mm HOW cartridge case on the range, not mentioned in the statements of these three key NCOs, gave rise to a question whether the EO used in the serial was actually as the three testified. The presence of the cartridge case invited the question whether the projectile and/or propellant associated with that round had been added to one of the stacks. Further, the unequal size of the two craters post-serial also aroused concern whether each stack contained the identically configured EO as asserted.

113. In relation to the disparity in crater size, we are unable to make any definitive finding. While a possible explanation is that more EO was placed on one stack, other possible explanations exist. There may have been a difference in the ground or there may have been UXO underneath the left pit. Further, no scientific analysis of the craters was undertaken. Thus, although the disparity in crater size might give rise to a suspicion that different amounts of EO were used in the two pits, and a possibility that some unauthorised and undocumented amount of EO was placed in one of the pits, the evidence does not permit such a finding to be made.

114. We accept that KA1 truthfully described the serial he constructed and that it consisted only of the EO he listed in his NSW Police statement, referred to above. OIC2 was not shaken despite close questioning, and he corroborated KA1 evidence. KA1 evidence of two explosions, of equal intensity, was corroborated by MTA Caretaker. Caretaker

115. KA1, OIC2 and SO/OIC1 all contend that the disposal method was in accordance with SOPs. Having regard to the doctrine concerning the disposal of multiple HEAT rounds set out in LWP-CA (ENGR) 2-7-1, Explosive Ordnance Disposal, 2007 at para 29.13 their evidence in this regard should be accepted, but with one qualification. The doctrine provides for P64 to be placed on the vulnerable points of these rounds and that they be stacked head to toe. The doctrine does not contemplate the use of sheet explosive (Primasheet).

116. In respect of the use of sheet explosive, OIC2 gave this evidence: Can you tell me this: on the view of your disposal diagram here, what was the purpose of the sheet explosive? --Basically two-fold. An amount of sheet explosive across there was only going to aid in the consumption of the items but the other part was that we had an amount of sheet ex left and, by using all of it on this demolition, that would consume everything and mean there was nothing to hand back to Thales.

Because the driver here was to not require a pickup by Thales? --Correct, sir.

And you couldn’t carry a sheet in the back of a truck? --We had too much to be able to --well, not we had too much; it required more work afterwards to be able to transport that amount of sheet ex, correct, sir.

In fact, you had the vast majority of the sheet with which you’d been issued? --Correct, sir.

Because you’d only used 10 to 20 centimetres [on 14 October]? --That’s right, sir.
The sheet was unnecessary, really, in this practice, wasn't it?---By doctrine, correct, sir.

That is, each of these pits would have gone without the assistance of the sheet?---They would have, sir, yes.

But the sheet made sure of it?---Absolutely, sir.

There was the same amount of EO in each pit on your understanding?---Yes, sir.

117. OIC2 gave his evidence frankly and candidly and we accept him to be a reliable witness. His evidence that he and his two colleagues applied their experience and training in deciding to use the sheet explosive (Primasheet) would serve two purposes: first, to increase the likelihood that all EO would be consumed in the serial and, secondly, to dispose of the surplus sheet explosive. There is no evidence to counter the suggestion that these were the reasons for the use of the EO.

118. However, JLC Manager EOD, JLC, gave evidence that the use of Primasheet in a disposal task such as the one undertaken at Internal Range on 16 October 2013 was not consistent with disposal practice for 84mm HEAT rounds KA1 also conceded that “it was additional to what was required”.

119. Notwithstanding, there is no evidence that such a method was otherwise prohibited, nor that the inclusion of the sheet explosive exceeded the NEQ limit for the Internal Range.

Finding

The demolition serial on 16 October 2013 consisted of 8 x 84mm High Explosive Anti-Tank rounds together with:

a. 612mm x 1mm sheet explosive (2 x 1m x 30cm) (Primasheet)

b. 8 x Plastic Explosive Number 4

c. 4m Detonating Cord

d. 2 x Detonator Demolition Electrical

The 84mm rounds were placed nose to tail within two existing craters, covered by Primasheet and with a Plastic Explosive Number 4 charge placed on each 84mm round at the break in the diameter of the rounds. This generally complies with Standard Operating Procedures.
Finding

While the use of Primasheet in the disposal of 84mm High Explosive Anti-Tank rounds was not consistent with extant doctrine, its use did not exceed the Net Explosive Quantity for Internal Range.

120. SO/OIC1 said that prior to the demolition, he moved to the sentry point with KA1 and OIC2. The stacks were detonated at 1156h and 1157h and he heard an explosion after each, indicating successful detonation. As the Safety Officer, he says, it was his job to move forward to and clear the range. After waiting the 2 minute 30 seconds “soak time”, he proceeded on foot down range. Also at he said:

I proceeded to clear the area by visual observation for any dangerous items. I observed that the range was clear. After about 2 to 3 minutes of conducting clearance observations, I heard a crackling sound and looked towards the edge of the range. I saw smoke coming from thick vegetation about 15-20 metres outside the range boundary. I approached the vegetation and observed a small fire within the vegetation.

THE FIRE

Its cause and efforts to extinguish it

121. From midnight on 15 October 2013 and up until about 1500h on 16 October 2013, the Bureau of Meteorology (the Bureau) data from its Mt Boyce station indicated that the wind had been blowing essentially from the west at an average speed of 25kmh, gusting to about 40kmh. During this time, the temperature had risen from 9 degrees at midnight to 19.5 degrees at the time of the demolition serial at noon. While this temperature was not high, of significance is the fact that relative humidity had dropped from 45 percent at midnight to 20 percent at the time of the serial. This meant that the chance of controlling a fire within MTA, if one were to occur, was reduced.

122. It should also be noted that the observations of OIC2 OIC Practice, when he went outside to ascertain the weather conditions prior to conducting the serial, were only partially correct; he thought the temperature was mid-20s and the wind light. While he was correct in relation to temperature, he was not correct in relation to wind strength. He made no observation as to humidity, nor would it be expected that he could. While wind strength was probably not a factor at the Internal Range itself, bearing in mind that the range is deep within a ravine, the wind strength meant that a fire escaping from that range would be fanned out to the extremities of MTA and into the bushland to the east, and more difficult to control.

123. SO/OIC1 gave evidence that when he first saw the fire it was about 1m in diameter. He was, however, not equipped with any firefighting equipment or Personal Protective Equipment (PPE). This notwithstanding, after he contacted KA1 by radio advising of the fire and asking him to call for the Stryker unit, he proceeded to try to kick and stomp the fire out using his boots. In this case a Stryker unit
consists of “a Hilux ute with a pump and hose on the back” or “a Toyota Hilux with a 600 litre water tank and pump” It is important to note that SO/OIC1 was not equipped with firefighting equipment at the time, nor protective clothing. Because of the topography of the area he was not able to contact the administration area directly, but had to relay his request through KA1. The Stryker vehicle had been taken back to the administration area by OIC2 and was not at the checkpoint, which resulted in a longer response time.

124. It was five or 10 minutes before the Stryker vehicle arrived, by which time the fire was about the size of a backyard swimming pool, according to KA1. While the hose from the unit was not of sufficient length to deal with the fire, bearing in mind that the vehicle was unable to get closer than the edge of the cleared area of the range, and the water pump was not of sufficient pressure to deposit much water on the fire, it is possible that a quicker response would have produced a different result in fighting the fire. It is also important to note that the Stryker unit was the best firefighting equipment available in MTA.

125. By the time the Stryker unit arrived, the fire was of a size and intensity beyond its capacity. It is probable, the fire had been burning for 10 to 15 minutes before the Stryker unit arrived. Bearing in mind the seriousness of a finding that the presence of the Stryker unit at the checkpoint and the quicker response time would have permitted the fire to be extinguished before spreading, CACOI submitted that the COI should not find this to be the case. Accordingly, we make no such finding. However, it could be the case that if there were any chance of controlling the fire at an early stage, it was lost prior to the Stryker unit arriving at the range after the radio call from SO/OIC1.

126. SO/OIC1 was the member clearing the range on foot after the serial, communicated with the administration area by radio relay through his colleague at the range sentry point, KA1. The assigned fire response unit, the Stryker unit, was not at the sentry point but had been returned to the administration area by OIC2. As a result, up to 10 minutes elapsed between the time at which SO/OIC1 noticed the fire and the time at which the water hose on the Stryker unit was deployed. In that period, the fire grew to a size, and in a location, such that it could not be extinguished using the resources then available.

RFS2, RFS District Manager Lithgow, described the Stryker unit as “a map up appliance”.

Finding

The Stryker unit was not capable of providing an effective response because of limited ability to gain access to the fireground, limited ability to project a large volume of water, and limited ability to transport a large quantity of water.

Recommendation

A Stryker unit, or an upgraded firefighting unit, be present at the range sentry point, remain manned and ready to deploy during range activities, with its driver in direct radio contact with the Range Safety Officer. Upon the range being declared clear by the Safety Officer inspecting the range after a demolition serial, the firefighting unit must
proceed forward to the range while the periphery of the range continues to be inspected by the Safety Officer, and remain on the range until the Safety Officer declares that the area is clear of fire or that it is otherwise appropriate for the firefighting unit to leave the range area.

127. [KAI] joined [SO/OIC1] at the range, and was shortly followed by [OIC2] and two Visiting Assessors. Those five ADF members were joined by the caretaker, [Caretaker], shortly later. [Caretaker] had contacted the RFS, although it appears that the RFS had already been informed about the presence of smoke by a non-military caller. The ADF members sought to extinguish the fire using the materials available including the Stryker unit, shovels, a knapsack and their booted feet.

128. After a short time, and while the ADF members were in the vicinity of the fire just off the cleared range area, UXO was heard to explode. [OIC2] thought it was as close as 10m away, with a piece of shrapnel moving past his head and striking a tree about two or three metres away from him. It was at this point, or soon after, that [OIC2] decided that the area was too dangerous to remain and all members should withdraw to the administration area. The CO1 believes that was an appropriate course to follow noting that [RFS2] said that it is RFS policy not to go onto MTA to fight fires, because of the presence of UXO.

Finding

Unexploded ordnance was, and probably remains, present in the immediate vicinity of the Internal Range and was susceptible to ignition by the heat of the fire. Exploding unexploded ordnance caused the Australian Defence Force members fighting the fire to withdraw to the administration area of Marrangaroo Training Area. This was entirely appropriate.

The presence of unexploded ordnance in the immediate vicinity of the Internal Range, and its susceptibility to ignition by a bushfire, even at its early stages, rendered it unsafe for traditional firefighting methods to be employed in close proximity to any fire in the vicinity of either range on Marrangaroo Training Area. While the commitment of the five members of the Australian Defence Force in attempting to extinguish the fire was individually and collectively commendable, the presence of the fire in ground known to contain unexploded ordnance presented an unacceptable risk.

129. The prospect of an upgraded firefighting vehicle was discussed in documents before the CO1, and the evidence of [RFS2] is that a category 7 vehicle, being a 4WD medium truck carrying 2,000 litres of water, would be a minimum standard.

130. It was also suggested by [DTARP2] that a trailer containing another version of the water tank/Davey pump set-up would assist. We believe this proposal would not achieve its purpose, and carries with it a prospect of further risk. An unwieldy piece of apparatus would slow down any vehicle, make an emergency U-turn on a fire trail impossible, and constitute a risk of stranding its crew.
131. Further, we believe that no vehicle should be permitted to travel any of the fire trails within MTA during times of bushfire unless properly equipped. Deputy Commissioner RFS Director of Operational Services RFS, described RFS vehicles as having the ability to provide some shelter and to self-spray the appliance with water while crew took shelter inside if caught in an advancing fire. While even such a course of action must be perilous, it would provide some protection for the occupants of the vehicle, and certainly more than would be afforded by the Stryker vehicle.

Recommendation

Firefighting capability at Marrangaroo Training Area be upgraded so that Australian Defence Force members are not placed in situations of unacceptable risk. Specifically, those participating in range practices must have access to a firefighting vehicle close by and easily deployed, and capable of throwing a large quantity of water an appreciable distance into areas adjacent to the ranges, should a fire occur.

Recommendation

Range Standing Orders be amended to include a direction that no Defence vehicle is to leave the administration area of Marrangaroo Training Area during a bushfire, except to leave Marrangaroo Training Area itself through the main gate, unless it is a properly equipped bushfire fighting vehicle having a least four wheel drive capability and self-protection equipment.

Recommendation

Defence should not procure any firefighting vehicle for Marrangaroo Training Area without first consulting relevant personnel within the Rural Fire Service on an appropriate type of vehicle, and obtaining training for the personnel proposed to use it. Alternatively, Defence should explore contracted firefighting support during periods of live-fire on Marrangaroo Training Area.

RFS response

132. Returning to the fire on 16 October 2013, the RFS was called out to the site soon after midday. It seems clear that very early on the RFS had decided, in accordance with its policy, that RFS members would not go onto the fireground within MTA. This was because of the risk created by exploding UXO. This decision, although made by RFS command at some distance from the fireground, was consistent with the decision made by OIC2 and his fellow instructors to leave the fireground because of exploding UXO. On subsequent days exploding UXO was heard coming from the fireground.

133. RFS units attended the administration area of MTA, and also the eastern boundary. No RFS personnel engaged in active firefighting within MTA because of instructions from RFS command. Such instructions arose from the knowledge that the fireground would be unduly hazardous because of UXO. Indeed, explosions are known to have taken place by the time the RFS attended, necessitating the evacuation of the Internal
Range by DEOTS staff, and the RFS had received reports of exploding ordnance as at 1220h that day.

Although it is not certain, it appears that RFS aerial firefighting assets were deployed to the area while the fire was still contained within MTA, but did not engage in firefighting until the fire had moved beyond MTA perimeter because of the same concern in relation to UXO. Bearing in mind the normal flight exclusion zone above MTA, and the fact that it was known that UXO was exploding within the fireground, any delay by the RFS in responding to the fire by air was understandable, appropriate and reasonable.

Finding

The Rural Fire Service attended the administration area of Marrangaroo Training Area, and Rural Fire Service firefighters went to the eastern boundary of Marrangaroo Training Area. Aerial assets of the Rural Fire Service were deployed. No Rural Fire Service asset took part in firefighting on Marrangaroo Training Area during the fire. Bearing in mind Defence personnel had withdrawn from the range area because of exploding ordnance, and because there was no means of predicting where unexploded ordnance might be, it was entirely reasonable that the Rural Fire Service declined to fight the fire within Marrangaroo Training Area.

UXO mapping

In relation to the presence of UXO on MTA and the direction that RFS assets not fight fires on the site, Deputy Commissioner RFS1 said: "...there may be an assumption of “Everything’s dangerous.” Maybe that’s, you know, correct or incorrect, I don’t really know but maybe there needs to be a little bit more engagement to make sure we clearly identify those areas where it is safe to fire-fight.

Recommendation

Range Control Officer Marrangaroo Training Area liaise with the local Rural Fire Service units to develop a map indicating the areas of the range likely to contain unexploded ordnance.

Comparison of the first infrared linescan by the RFS at 1355h on 16 October 2013 with the map of MTA contained in Figure 1 to the GHD, a consultant engaged by Defence, Bushfire Management Plan 2011 – 2014 (BMP) shows that the fire had crossed the boundary fence of MTA by the time that imagery was taken. That said, the fire line appears to have crossed just where the boundary road would appear to pass, and consequently it should be concluded that the fire had only just passed out of Defence land.

Noting the TOR for this Inquiry, it is not open to us to make any finding on the progress of the fire beyond that point.
Finding

The fire commenced about 25m to the east of the Internal Range shortly before midday on 16 October 2013 as a result of ignition by debris from the demolition serial. It progressed to the south-east of the Internal Range. At about 1355h on 16 October 2013 it crossed the boundary of Marrangaroo Training Area to the east.

138. During the Hearing phase of the COI, it became clear that there was a difference in understanding between Defence and the RFS as to what responsibility rested with the RFS in terms of hazard reduction, and what responsibility would rest with the RFS if a fire were to occur within MTA beyond the firefighting capability of Defence. In relation to the latter, bushfire fighting, the BMP produced by GHD suggests that once the firefighting resources of the relevant ADF unit using the site had reached its limits, acknowledged to be “small-scale suppression”, Defence would rely on external agencies, principally the RFS, to fight any fire. There is no justification for that belief.

139. Reference was made to a draft Memorandum of Understanding (MOU) between the Commonwealth and the RFS (Lithgow Rural Fire Service). It is clear that this MOU was never finalised, let alone signed. It appears from later documents that the RFS opposed fighting any fire on MTA. On 16 October 2013 the RFS Command instructed its firefighters not to cross into MTA.

140. This intent on the part of the RFS was apparently communicated to Defence at a meeting on 07 June 2000 at MTA at which time “Army” was said to have been represented by a consultant. On 01 April 2008, the RFS issued a Standard Operating Procedure (SOP) in relation to MTA stating that RFS units responding to a call would proceed no further than the administration area until some form of clearance took place, to be advised by the “on scene OIC”, a member of the RFS.

141. Whatever the RFS intent on call out to a fire within MTA, it is clear that Defence had no basis on which to assume that the RFS would provide the primary bushfire fighting response. The absence of an agreement, or MOU, on RFS response is sufficient reason to believe that Defence should not have thought that the RFS would fulfil this role.

142. As to what response might be possible, it appears to be a problem incapable of resolution. Put simply, the position of the RFS is that it will not subject its firefighters to danger from exploding ordnance by fighting bushfires on or near the range areas. While Defence does not expect its members to remain in the area of danger, it cannot be expected that the RFS would fight fires in those areas. RFS2 agreed that the problem is “intractable”.

Finding

The Rural Fire Service and Defence have not agreed on a protocol for fighting fires within Marrangaroo Training Area. There is no basis upon which Defence could assume such an arrangement existed. Bearing in mind the presence of unexploded
ordinance within Marrangaroo Training Area, Defence should not have relied upon the Rural Fire Service to provide anything more than advice on fighting fires, hazard reduction and fire trail management within Marrangaroo Training Area. There is no agreement with the Rural Fire service to provide a firefighting response within Marrangaroo Training Area.

Finding

Subject to weather conditions, there is no means to prevent a fire from escaping from Marrangaroo Training Area once Defence resources have failed to contain it.

Recommendation

Defence undertake a review of its ability to respond to a fire within Marrangaroo Training Area, whether bushfire or structural. The underlying assumption should be that the only response available to fight a fire within Marrangaroo Training Area will be provided by Defence. Further, such response must occur while a fire is in its initial stages. A review must either acknowledge the risk of fire occurring in the future, or upgrade Defence’s firefighting capability at Marrangaroo Training Area.

Bushfire mitigation

143. Plainly an important area in the control of bushfires is the implementation of hazard reduction schemes and, in the case of MTA, maintenance of fire trails and other resources. In the MTA BMP there is considerable discussion on the steps involved in hazard reduction. The BMP does not, however, discuss which agency should be responsible for implementing such a plan. The RFS was of the opinion that it was Defence's responsibility However, at some time in 2013 there was a hazard reduction plan by the RFS in relation to MTA. This plan was never implemented, and on the evidence it is not possible to say why. What is clear is that whereas the RFS has coercive powers in relation to hazard reduction on State Crown and privately owned land, on land owned by the Commonwealth it has no power to enforce hazard reduction.

144. No hazard reduction had occurred on MTA for about 20 years. There appears to have been no willpower on the part of Defence, or on the part of the RFS, to take the necessary initiative in this regard. Indeed, the Lithgow Bush Fire Management Committee’s (BFMC) Bush Fire Risk Management Plan (BFRMP), approved by the current Commissioner on 19 August 2010, assessed the likelihood of a fire within MTA as “almost certain” with “major consequences” and having “extreme risk”. Yet, having charted such an extreme risk (no other asset in the register appears to have the same characteristics), no treatment for the area was suggested by the RFS. Similarly, such an assessment, if known to Defence, and it is noted that Defence should have been aware of the assessment by reason of its representation on the Lithgow BFMC, appears to have excited no particular interest within Defence.

145. In short, the issue of hazard reduction was present in the corporate minds of both Defence and the RFS, but neither acted to treat the problem, a problem which did not belong
with the RFS. It appears that Defence attended only two of the last 16 BFMC meetings.

**Recommendation**

The Marrangaroo Training Area Regional Environmental Officer confer with the local Rural Fire Service at least annually and determine a hazard reduction regime capable of implementation.

It is further recommended all ranges be reviewed in relation to the same issue, that is, that personnel involved in the management of each range under Defence control be directed to confer with local firefighting authorities on at least an annual basis to assess hazard reduction responses to be pursued for that range in subsequent years.

146. The MTA BMP also noted that fire trail maintenance was crucial to the implementation of the plan. It appears that Fire Trail 30 was upgraded in the past year or two by grading and laying a bitumen surface on a gravel base, but this was the only improvement made in recent years. Indeed, to the knowledge of Caretaker, no other roads, particularly those to the ranges, had been the subject of work in at least 15 years. There was also a plan to place three concrete water tanks at strategic points. While the tanks were delivered, they have not been put into position. Whatever the reason, and it appears that it was a question of feasibility and budget, it is another example of a plan relating to fire prevention and control within MTA not being carried through to completion.

147. Further, the fire trail that was improved, Fire Trail 30, had no relevance to fighting fires in the areas of MTA most likely to be vulnerable to fire. That trail is at the opposite end of MTA to the two ranges.

**Finding**

Hazard reduction had not occurred in Marrangaroo Training Area in at least 20 years. In particular, hazard reduction in accordance with the Bushfire Management Plan 2011-2014 also had not occurred. Water tanks recommended in the Bushfire Management Plan 2011 - 2014 had been delivered but not installed. Upgrading of a single fire trial had occurred in accordance with the Bushfire Management Plan 2011 - 2014, but it was not a fire trail that had any direct relationship with either range on Marrangaroo Training Area. It was not relevant to fire fighting efforts on 16 October 2013.

148. RFS3, State Coordinator for Fire Investigation RFS, said it is up to Defence and the RFS to make arrangements to review the conclusions in relation to firefighting efforts for this fire. This process could be driven by both local and headquarters personnel.

**Finding**

There is a history of poor communication between the local authorities, being the Bushfire Management Committee and the local Rural Fire Service Brigade on the one
hand, and on the other, Defence, represented by the Regional Environmental Officer, the Range Control Officer and Marrangaroo Training Area management generally.

Recommendation

The Regional Director-Defence Support-Northern NSW, make contact with Deputy Commissioner [REDACTED] Director of Operational Services Rural Fire Service, to arrange a headquarters driven bipartite review of the events of 16 October 2013 with a view to mitigation of future fire events generally, and with specific reference to:

a. hazard reduction programming and she works on Marrangaroo Training Area;

b. bushfire response within Marrangaroo Training Area, with specific reference to equipment to be kept on or present on site and operated by Defence personnel and the circumstances in which the Rural Fire Service will respond to a report of bushfire within Marrangaroo Training Area; and

c. the development and implementation of a Memorandum of Understanding between Defence and the Rural Fire Service in relation to these matters.

PERSONNEL AND PROPERTY

149. The TOR require the COI to seek evidence and report on personnel and property as follows:

k. Whether the fire caused injury to any person at Marrangaroo Training Area on 16 October 2013.

l. Whether the fire caused injury to any property at Marrangaroo Training Area on 16 October 2013.

m. The qualifications (including their currency) and experience of the persons directly involved in Defence activities relevant to the fire.

n. Whether relevant actions of Defence personnel were affected to any extent by the use of drugs or alcohol.

150. These can conveniently be dealt with simply and together.

151. There is evidence that those members who attended the Internal Range and attempted to extinguish the fire had to retreat following the explosion of UXO [REDACTED] Shrapnel from exploding UXO flew close to some or all of those members. However, there is no evidence that the fire caused physical injury to any person at MTA on 16 October 2013. That no injury or fatality occurred was a matter of good fortune.
152. Each of those members was interviewed by members of the NSW Police and by CACOI. None indicated that he experienced any psychological issues or believed he had sustained psychological injury as a result of the fire on 16 October 2013.

Finding

The fire at Marrangaroo Training Area on 16 October 2013 did not cause injury to any person.

153. On 02 December 2013 the COI and CACOI attended a view of MTA. The MTA Caretaker, Caretaker was in attendance and indicated that to his knowledge no property at MTA, other than the areas of bush burnt by the fire, had been damaged in the fire of 16 October 2013.

Finding

The fire at Marrangaroo Training Area on 16 October 2013 did not cause damage to any property at Marrangaroo Training Area other than bushland.

154. OIC2, KA1 and SO/OIC1 are qualified DEOTS explosive demolition technicians. In interviews with NSW Police each member recited facts that lead us to conclude that their qualifications were current as at 16 October 2013. indicate that these members each held current authorisations in respect of the issuing and return of EO.

155. OIC2, KA1 and SO/OIC1 are experienced EO technicians who were undertaking instructor duties with DEOTS on 16 October 2013. No issue arises concerning the qualifications, including their currency, or experience of Defence personnel directly involved in activities relevant to the fire.

Finding

Each of the Defence personnel was qualified and experienced in carrying out activities relevant to the fire. So far as we can determine their qualifications were current.

156. There is no evidence to suggest that the actions of any Defence personnel was to any extent affected by the use of drugs or alcohol. This position was stated on the record by CACOI on 12 December 2013.

Finding

Actions of Defence personnel were not affected by drugs or alcohol.

PREVAILING CONDITIONS

157. The weather conditions on the day of the fire have already been considered in relation to temperature, humidity, wind strength and direction. Of equal relevance to the fire are the
weather conditions leading up to 16 October 2013. The findings in the Bureau report and the evidence given by two Bureau experts show the conditions leading up to 16 October 2013 were drier and warmer than average. This contributed to a higher risk of bushfire on MTA.

158. There is no 24 hour reporting Bureau weather station near MTA. The closest is the Mt Boyce station within the Blue Mountains. This station is at a similar altitude to MTA, and, in the absence of any automated station at MTA, the Mt Boyce station should be taken as providing the most accurate, detailed and regular weather information for the MTA site.

159. There was discussion in the evidence of the Bureau experts on whether an automated station could and should be provided at the MTA site. This would have to be at Defence expense, including maintenance. We do not believe that this is necessary. While it could not be expected to be otherwise, the observations of OIC previously discussed, were inadequate in terms of wind strength and direction, such observations may be obtained from the existing Mt Boyce station, on the western side of the Blue Mountains, and are sufficient to assess weather conditions on the escarpment above MTA.

160. We believe such observations should be taken into account by staff at MTA when seeking to ascertain weather conditions in the local area, and the suitability of those conditions for conducting demolition serials. This is particularly so in circumstances where the relevant weather parameters probably vary between the administration area and the range areas within MTA.

161. While the Bureau weather station for Lithgow is the closest to MTA, it is not a fully automated system and reports only at 0900h and 1500h daily. The nearest fully automated weather station is at Mt Boyce. As earlier noted Mt Boyce is at a similar altitude to MTA and provides a sufficiently similar set of data to render the installation and maintenance of a fully automated station within MTA an unnecessary expense. The Mt Boyce station provides sufficient weather data online to assist understanding of the weather at MTA.

162. Para 10.5 and 10.6 of the current RSO seek to have weather conditions taken into account in determining whether to proceed with a live-fire serial, but we believe they are inadequate to achieve that aim.

**Recommendation**

Marrangaroo Training Area Range Standing Orders should be reviewed to impose a requirement that the Officer in Charge of any live-firing practice ascertain and consider current weather parameters, temperature, humidity, wind strength and direction, registered at Mt Boyce immediately prior to any demolition serial. The setting of those parameters and their limits should be decided in consultation with the Bureau of Meteorology and Rural Fire Service and inserted into Range Standing Orders.

163. Bureau of Meteorology Submission to the Chief of Defence Force Commission of Inquiry into the NSW Marrangaroo (State Mine) Fire, 12 December 2013.
makes it clear that there was a “clear indication of dry conditions leading up to the incident on 16 October 2013…” and “daily maximum air temperatures were between 2 and 3 degrees above average across large parts of eastern New South Wales during this same period, while minimum temperatures were 1 to 2 degrees above average”. This led to “above the long term mean” Keetch-Byram Drought Index (KBDI) figures for the area in October 2013, although not the “highest values on record”.

164. These observations were predicted in the months leading up to October 2013.

165. Further, the weather conditions actually present on MTA on 16 October 2013, and the stronger winds of 17 October 2013, were predicted in the week leading up to those days. Indeed, the Bureau’s prediction for 16 October 2013 made in the week leading up to that day was accurate. The predicted weather outlook was available to the public on the Bureau’s website.

166. There is no indication that these predictions were taken into account by anyone directly involved in the serials on 16 October 2013, or by any Defence member, employee or contractor. Also, there is no indication that anyone connected with the management of MTA or with the EOD course had any reference to the longer term seasonal weather prediction for MTA.

167. While it may not be necessary to consider “climate change”, there is a need for Defence, at least in the area of range management in the context of live-firing exercises, to know and seek to understand the effects of hotter and drier conditions in relation to those matters. Such considerations do not require a belief in the science of climate change, but do require a recognition that climatic variations mean that rules that assume a constant background of climate conditions are not valid. The current rules in relation to range use do not take climate variations into account.

168. There is no indication that Defence makes provision for such variations in planning live-fire exercises on this, or on any range. Indeed, we have found no evidence that Defence considers climate variations generally in planning any activity.

Finding

The weather conditions prevailing on Marrangaroo Training Area on 16 October 2013, and the higher winds occurring in the Blue Mountains the following day, were accurately predicted by the Bureau of Meteorology in the week prior to the fire. These predictions were readily available on the Bureau’s website. Conditions in the months leading up to 16 October 2013 were drier and hotter than usual. These conditions were also predicted. There is no mandated consideration of such factors present in the Range Standing Orders, or in any other known Defence document which takes climate variation into account when determining the appropriateness of Defence activities.

169. The parameters that inform the KBDI (drought) figures are also relevant to the determination of Fire Danger Ratings (FDR). The problem with FDR, which is the
publicly available fire danger rating system issued daily by the Bureau after consultation with the RFS, is that it involves a broad brush and generally crude method of determining fire risk within MTA, particularly in determining the risk of bushfire resulting from live-fire serials on the ranges within MTA.

170. The COI received evidence that FDR is determined ultimately by the RFS, but is based on information supplied by the Bureau. The components immediately behind the FDR determination, but in front of the weather parameters previously discussed, are Forest Fire Danger Index (FFDI) and Grass Fire Danger Index (GFDI). The FDR for a particular region is determined by a combination of FFDI and GFDI, based on an assessment of the relative preponderance of vegetation types within that region. There is also a discretionary component to the ultimate assessment of FDR by the RFS prior to that agency’s issuing daily FDR figures. The criteria to set that component are more “organic” in nature, in that other less tangible factors are taken into account, known risks such as school holidays are considered. Such discretionary factors operate to increase FDR, rather than decrease it.

Fire Danger Ratings (FDR)

171. FDR is an assessment of the potential fire behaviour, the difficulty of suppressing a fire, and the potential impact on the community should a bushfire occur on a given day. The FDR is determined by the Fire Danger Index (FDI). The FDI is a combination of air temperature, relative humidity, wind speed and drought. FDI contains numerals which are used with other factors to determine FDR.

172. The means of assessing FDR leads to natural aberrations within regions, and it is the case that the range areas of MTA exemplify such an aberration. The Fire Weather Forecast issued for Central Ranges District, which includes MTA, at 0600h on 16 October 2013 indicated a HIGH FDR, based on a FFDI of 26, which on its own would be in the VERY HIGH range, and a GFDI of 2. Immediately adjacent to the Central Ranges District is the Greater Sydney Region, which at the same time had a FDR of VERY HIGH, with a FFDI of 33 and a GFDI of 3.

173. The Central Ranges District includes local government areas at Bathurst, Blayney, Cabonne, Cowra, Lithgow, Mid Western Regional, Oberon and Orange. MTA is in the far east of that district. Much of that district is cleared farming land, which “skews” the overall regional assessment of FDR toward greater weighting of GFDI.

174. The Greater Sydney Region includes all Sydney metropolitan council areas and the Blue Mountains, Gosford, Hawkesbury and Wyong council areas. It also includes Mount Victoria and Bell at the top of the western extremity of the Blue Mountains.

175. Bearing in mind that MTA ranges are deep within the ravines on the western side of the Blue Mountains, there are two factors which give rise to FDR being a crude, and perhaps misleading, indication of the true bushfire risk on MTA. First, the ranges in MTA are, as previously noted, clearly well within forests. An assessment of FDR which assumes a large component of grasslands, as is the case in the Central Ranges District, has the potential to
underestimate the fire danger on MTA ranges. Secondly, the location of MTA is at the border of the Central Ranges District and the Greater Sydney Region.

Finding

Fire Danger Ratings are not a suitable mechanism for determining whether live-firing should or should not proceed on the ranges within Marrangaroo Training Area. Forest Fire Danger Index is a more appropriate mechanism, but it is not possible for the Commission of Inquiry to determine what the exact threshold should be for such practice, nor to recommend how such information should be gathered.

The selection of Fire Danger Rating for the Central Ranges District as the sole criterion for determining whether live-firing may occur on demolitions ranges on Marrangaroo Training Area is a crude and inexact method.

Recommendation

Defence engage with both the Bureau of Meteorology and the Rural Fire Service to determine a more suitable index system. In the interim, Range Standing Orders be amended so that live-firing on the ranges on Marrangaroo Training Area not be permitted where the Forest Fire Danger Index for either the Central Ranges District or Greater Sydney Region is 12, it being the threshold for HIGH Fire Danger Rating, or above. Put another way, and in a practical sense, Range Standing Orders should, as an interim measure, require the Officer in Charge Practice and the Range Control Officer to consider the Forest Fire Danger Index for both Central Ranges District AND Greater Sydney Region on the day of any given serial. If either index is at 12 or above, live-firing should not be permitted.

Any indication in Range Standing Orders or elsewhere that live-firing is permitted on Marrangaroo Training Area when the Fire Danger Rating is HIGH should be rescinded.

MANAGEMENT OF MTA

176. For the Inquiry to respond to various of the TOR it is necessary to understand the management arrangements at MTA as at 16 October 2013. The evidence has revealed a rather convoluted and complex set of administrative, environmental, certification, maintenance and other management arrangements, including orders and arrangements relating to its use by ADF units as a training facility.

177. MTA is a Defence Training Area and, as such, DI (G) ADMIN 59-1 – Management of Defence Training Areas, is the principal Defence doctrine governing its management (Exh B.6). It is appropriate to set out in full para 1 and 2 of DI(G) ADMIN 59-1:

1. The Australian Defence Force (ADF) must be able to conduct realistic training to ensure that it can deliver specified levels of capability to Government for the defence of Australia and its interests. Training is conducted in a variety of locations and environments. These include at sea, on land and in the skies. Training is to be conducted in a safe manner with minimal risk to all Defence Personnel and the general
public, and continued effective stewardship and sustainability of the natural environment. Accordingly training areas and ranges (TA) are recognised as a Fundamental Input into Capability (FIC) in the Facilities and Training Area FIC. The Defence training area management policy is designed to deliver a safe and sustainable training environment. The Defence Training Area Management Manual (DTAMM) has been developed to describe the responsibilities and framework for corporate planning and management of Defence TA.

2. This Instruction authorises the DTAMM as the primary source of policy relating to the management of Defence training areas.

178. Para 5b of DI(G) ADMIN 59-1 notes that the policies and processes detailed in Defence Training Area Management Manual (DTAMM) do not address the siting and operation on training areas of demolition and burning grounds for which procedures are detailed in electronic Defence Explosive Ordnance Publication 101 (eDEOP 101).

179. No issue has arisen in the Inquiry concerning the procedures governing the siting and operation of the Internal and External Ranges at MTA although issues do arise for consideration of the prevailing condition and appropriateness of the Internal Range for the activities undertaken on 16 October 2013.

180. Para 8 of DI(G) ADMIN 59-1 provides that “All personnel must adhere to the requirements and processes detailed in the DTAMM with regard to management of TA.”

181. DTARP3 Technical Adviser within Directorate of Training Area Regulation and Policy (DTARP) said in his interview: “The DTAMM is a Defence-wide overarching policy document that is implemented by training area operational authorities as determined, of which there are numerous ones, DOTAM [Directorate Operations and Training Area Management] being one.”

182. The COI also heard that MTA is used by a number of Defence units to conduct training other than demolition or live-fire training. In his evidence, Caretaker said:

When we visited the range, when the members of the Commission visited the range a couple of weeks ago, we talked about what the range was used for and were told at the time that it’s used by a number of Defence units to undertake training?—Yes.

Would any of that training involve patrolling on internal or external range?—To use the external and internal?

Yes?—If they book that range, yes.

I’ll clarify that. Internal and external range are licensed to conduct demolition tasks?—Yes.

Would it be likely that range users who came to conduct activities other than demolition would enter internal or external range?—They could, yes.
183. The use of areas known to contain UXO for patrolling activities seems to represent a risk.

Recommendation

The use of Internal and External ranges at MTA for patrolling activities be prohibited.

Management functions and responsibilities

184. Chapter 2 of DTAMM sets out the various management functions and responsibilities for training areas and provides that the Deputy Secretary Defence Support and Reform Group (DSRG) is the sole Training Area Management Authority for Defence.

185. Two divisions within DSRG have responsibilities with respect to Defence training areas, namely Defence Support Operations (DSO) and Infrastructure. DTARP lies within Estate Planning Branch within Infrastructure Division and is the technical regulatory authority for Defence policy on training area management. One of the primary functions of DTARP is to develop, update and promulgate DTAMM, which, as CACOI submitted, is effectively “the Bible” for training area management. The DTAMM is published under the authority of both the Secretary of the Department of Defence and CDF.

186. Another function of DTARP is to certify live-fire training ranges as fit for use. A Certificate of Range Safety Compliance (RSC) lasts two years. The certification process is directed towards declaring the range to be safe to use as a live-firing facility, setting NEQ limits, use restrictions and RDA. The DTARP Range Inspector does not assess such things as bushfire risk or fuel loads. The NEQ limit is set by reference to the RDA and does not take into account fuel loads or bushfire risk.

187. In 2011 DTARP National Range Inspector DTARP, visited MTA and issued RSC for the Internal and External Ranges. The NEQ limit for each range was set at 12kg following that inspection and a Safety Board process. DTARP indicated in his evidence these limits were based on the available RDA and did not take account of bushfire risk or fuel loads.

188. The extant RSC issued by DTARP is dated 19 August 2013. However, DTARP stated that he issued this Certificate without actually inspecting the Internal Range in 2013. He explained that the Certificate issued in August 2011 was an extension certificate issued during what was, in effect, a transition period in which DTARP was attempting to arrange its ongoing range inspection schedule in a more efficient manner. Given that DTARP certification inspections are directed only to the safety of the range for live-fire activities, the failure of DTARP physically to inspect the Internal Range in 2013 did not impact on the events of 16 October 2013.

189. There is nothing to suggest that had a physical DTARP inspection taken place in August 2013 it would have resulted in further restrictions on the use of the Internal Range. DTARP indicated in both his interview and oral evidence that, in his opinion, MTA live-firing ranges are still appropriate training areas for Defence to utilise.
190. It should be noted, however, that these opinions were not based on a consideration of the prevailing fuel loads, bushfire mitigation measures or available firefighting resources, but on the physical layout of the ranges.

191. If use of MTA live-firing ranges is to continue for explosive demolition and disposal training purposes, there needs to be a more rigorous inspection regime that takes account of such things as existing fuel loads, bushfire mitigation strategies and the firefighting resources available to deal with any ignition.

192. The evidence establishes that despite the bushfire risk for MTA having been assessed in 2010 as extreme and warranting priority action for hazard reduction, nothing was done between then and 2013. Other fire protection and mitigation strategies, recommended in the BMP, including improved fire trails and the installation of water tanks, had not been undertaken. In such circumstances, we believe the REO is in the best position to assess whether the prevailing conditions, in terms of fire risk, are such that existing live-firing restrictions should be amended or tightened. REO said in evidence that as REO she had no involvement in such decision making, but that the REO should have that capacity.

**Recommendation**

Authority be given to the Regional Environmental Officer to close a range or impose live-firing restrictions in addition to any set out in Range Standing Orders if circumstances so warrant.

193. Another branch within Infrastructure Division, the Environment and Engineering Branch, provides technical input to DTARP in respect of Chapter 6 of DTAMM, which deals with environmental management.

194. With respect to the responsibilities of DSO, para 2.7 of DTAMM states:

> 2.7 Defence Support Organisation (DSO) (through Director General Base and Customer Support Services (BCSS), Directorate of Operations and Training Area Management (DOTAM) and DSO Regions) is responsible for:

a. ...

b. ...

c. estate management of training areas, including:

   1. property management;
   2. environment and heritage management...

195. DOTAM is the branch within Base and Customer Support Services (BCSS) responsible for developing, implementing and monitoring compliance with RSO. DOTAM is also responsible for engaging civilian contractors to undertake non-core management functions, such as caretakers, ground maintenance and minor repairs, and the Training Area Safety and
Management Information System (TASMIS) range booking system. An RCO and ARCO manage each DOTAM training area. Because MTA is a relatively small training area without a permanent unit presence, the RCO/ARCO at Holsworthy also perform the duties of RCO/ARCO at MTA.

196. Responsibility for explosive licensing, including designated explosives storage and disposal sites within training areas rests with the Director Explosive Ordnance Safety (DEOS) through Commander Joint Logistics Command (CJLOG). Evidence was received \[************\] that licenses and approvals are provided for the Internal and External Ranges and the EO magazine on MTA. These detail much greater NEQ limits than the 12kg limit applied to the DEOTS serials of 14 and 16 October 2013.

197. It appears that the differences in these NEQ limits are related to the different purposes of the two licences. DTARP4 explained that the certificate DTARP issues is for training activities while the DEOS licence relates to the use of the range as a demolition ground. The differences in these licences did not impact on the activities on 16 October 2013.

198. There was a change of the NEQ limit for training purposes in 2011. RSO 33.5b limits the NEQ for demolition training practices on Internal Range to 18kg. There is no issue that in October 2013 the NEQ limit for training purposes was only 12kg. DTARP4 described how the amendment was made during the Safety Board review in 2011 and how Deputy DOTAM (DDOTAM) and DOTAM were involved in effecting a change to RSO notwithstanding the published orders did not reflect the change \[************\]

199. The new NEQ limit is brought to the attention of potential users of the training area by way of a clear notification on the TASMIS range booking system. DTARP4 suggested that this was an appropriate and effective way of bringing the change to the attention of all range users \[************\]. In any event there is no evidence to suggest either DEOTS staff or any other user of MTA was unaware of this change to NEQ limit.

200. Unit Commanders have responsibility for the safe conduct of training, and ensuring it is undertaken in accordance with applicable Defence doctrine, including DTAMM, RSO and environmental restrictions in place.

201. Paras 7.4 and 7.12 of DTAMM require commanders, RCO and OICs of practice to balance the urgency of the training with the risk of starting a bushfire and to consider whether any additional restrictions should be placed on live-fire training.

202. The practical reality is that where there exists a “green light/red light” regime, such as “Live firing activities of any type...are not permitted in MTA when the fire danger index is High or above” \[************\] generally speaking any underlying discretion will rarely be considered. That is, generally if there is a “green light”, the training will proceed. In such circumstances there needs to be clear guidance when activities may or may not proceed. Relevant instructions relating to live-fire restrictions in both DTAMM and MTA RSO were not entirely clear.
203. Chapter 2 of DTAMM sets out a number of other persons and groups with responsibilities with respect to training areas. However, none of these is relevant to this Inquiry.

Defence doctrine and other documents relevant to live-firing activities

204. The TOR require us to consider whether any action should be taken to eliminate or mitigate orders, instructions or procedures as they related to the serial of 16 October 2013. In order properly to address this requirement it is necessary to identify and consider the various orders, instructions and procedures that applied on MTA in October 2013.

205. As noted above, the primary orders regulating activities on MTA are DTAMM and RSO. Another document that Defence doctrine required was the BMP, although the exact status of that document is not clear.

206. Further, it is apparent that there is a number of ambiguities and inconsistencies within both DTAMM and RSO as they relate to bushfire prevention and live-firing restrictions, both on MTA and generally. Notwithstanding these matters, it is clear that live-firing activities are prohibited on MTA at FDR of HIGH and above. Given the published FDR on 16 October 2013 was HIGH, the serial which directly led to the resulting bushfire, should not have taken place.

207. There is a number of other issues arising with respect to the genesis of the 16 October 2013 serial concerning the inaccurate descriptions of what was to be expended, which will be discussed later. Here, however, the emphasis is on the fact that a live-firing serial was undertaken during a period of HIGH fire danger and how it came about.

Range Standing Orders (RSO)

208. The extant RSO for MTA were issued in 2007 and, but for an amendment to RSO 6.5 in 2009 to give effect to CDF Directive 11/2009, and the 2011 Safety Board variation to the NEQ limit, no further amendments had been made as at 11 September 2013, when ARCO sent his email, or 16 October 2013.

209. There are several Orders that deal with live-firing on MTA.

210. Chapter 10 is headed, somewhat ambiguously, “Fire Orders”, but the contents of the Chapter make it clear that “Fire” refers to the risk of fire and not to orders for live-firing. These are specifically dealt with in Chapter 14.

211. RSO 10.9 states:

\[ \text{10.9 Live firing activities of any type ... are not permitted in MTA when the fire danger index is High or above.} \]

212. The reference to fire danger index in para 10.9 is an error on the part of the drafter. Fire Danger Index (FDI) is a range of numbers upon which Fire Danger Ratings (FDR) are made.
213. Chapter 14 of MTA RSO provides specific guidance to training units about live-fire practices. Chapter 14 is headed “Live-Fire Practices - General Provisions”. RSO 14.1 states:

14.1 These orders apply to all live firing areas contained within MTA, and are applicable to all users of MTA.

214. RSO 14.18 states:

14.18 Firing Restrictions. Live firing is permitted in the MTA with the following conditions:

   a. activities are not to be conducted in violation of any restricted air space limitations that are in force at the time of firing;

   b. practices are to be designed and conducted in accordance with the requirements of these Orders, relevant manuals and training publications;

   c. activities are not to be conducted when the fire danger index in High or above; and

   d. Must comply with the timing restrictions provided in Chapter 6

[emphasis added]

Again, we note the error of the drafter in referring in sub-para c to “index” rather than rating. This drafting error is, however, immaterial to any relevant consideration.

215. There is no ambiguity when live-fire restrictions apply, or applied on 16 October 2013.

216. During the Hearing phase of the Inquiry RSO 5.15 was referred to as being inconsistent or in conflict with RSO 10.9 and 14.18. Chapter 5 of RSO is headed “Booking and Access”. RSO 5.15 states:

5.15 The RCO may direct the cancellation of all live fire training activities within the MTA in the event of high fire danger and above, dependent on local weather conditions. All live fire training activities within the MTA are automatically cancelled in the event of very high or extreme fire danger and total fire bans. ....

217. We are of the view that with respect to live-firing activities RSO 10.9 and 14.18 are the operative orders. Not only is RSO 14.18 within a Chapter dealing specifically with live-firing, but it and 10.9 provide a clear and unambiguous restriction at HIGH FDR or above. RSO 5.15 might be read as implying a discretion rests with the RCO to cancel, or permit, live-firing at HIGH fire danger. This interpretation, however, is indirect and contained in a chapter on booking access. Importantly, RSO 14.1 clearly states that the orders in Chapter 14 are applicable to all users of MTA.
Recommendation

On matters relating directly to safety or risk, or when live-firing may occur, where there is ambiguity or apparent inconsistency, the most conservative or restrictive order should be followed until formal clarification has been provided.

Fire Danger Ratings (FDR)

218. In 2009 the generic FDR in Australia changed following recommendations arising from the 2009 Victorian Bushfires Royal Commission. The nature of the changes is indicated in [REO]. Relevantly, the colour associated with FDR HIGH changed from yellow to blue and for VERY HIGH from red to yellow. The evidence does not adequately disclose the origin of the table containing colour indications.

219. [REO] REO for MTA gave evidence about confusion on her part concerning the new FDR after first reading Table 4-1 in the BMP. She stated that she had been aware of the restriction on live-firing at HIGH but interpreted the BMP as having effected a change to VERY HIGH. She said [REO]:

When I first read this, my head said, “Okay, this is reflecting the change to the fire danger index and the new ratings that came in post-2009 fires in Victoria.” So in fact I didn’t read this as a change to the risk, an assessment of risk on the site... how I interpreted it at the time with no other information was that previously we called this high, we’re now calling it very high. And that was reflected in the fact that the 2007 range standing orders stated prohibition of activity at high and then in the 2011 fire management plan it stated prohibited under very high. I’ve subsequently learned that that’s all incorrect...[emphasis added]

220. [REO] went on to explain that the underlying fire danger index (FDI) associated with each description, or rating, HIGH and VERY HIGH, did not change. FDI is a measure of how readily a fire starting in such conditions might behave. Both before and after 2009 a HIGH FDR represented a FDI of 12-24. In reality, any change to live-firing restrictions from HIGH to VERY HIGH would in fact be a change to the risk and would authorise live-firing activities at FDI of 12-24 when previously such activities were prohibited at FDI 12 or above.

221. Accepting for the moment that a casual view of Table 4-1 of the BMP might mistakenly lead one to assume the changes to colour effected changes to the FDI at each rating, there is nothing in that document that would authorise a user of MTA to fail to comply with RSO 10.9 and RSO 14.18. Table 4-1 itself refers to and embodies “unit fire orders” which are accepted to include RSO.

222. In early September 2013 DEOTS contacted [ARCO] MTA ARCO, and enquired whether there was any room to manoeuvre on the HIGH fire danger fire restrictions. The response from [ARCO] was:

As you rightly pointed out, the Marrangaroo TA references [RSOs, TASMIS & some briefings] still use the obsolete fire ratings. Of particular interest to DEOTS was the
ban on live firing at a rating of HIGH or above. Where such reference exists, replace with a fire index rating of VERY HIGH or above.

223. This purported variation to RSO occurred after what appears to have been a very informal approach by DEOTS. The change itself was also very informal coming in an email to DEOTS from ARCO, on 11 September 2013. DTARPI MTA RCO, accepted that although the email was sent by ARCO, the contents were simply the communication of a decision made by him and authorised in the email sent.

224. On its face, the email in referring to "obsolete fire ratings", with no reference to either DTAMM or BMP, seems to have been based on the same flawed reasoning. RCO admitted to, namely a misperception that what was previously called HIGH was now called VERY HIGH.

225. Whatever the basis of this decision, it purported to vary the clearly expressed live-fire restrictions at MTA without proper justification or authority. CACOI have made other submissions dealing specifically with this decision in relation to findings that, they submit, should be made adverse to DTARPI.

226. The effect of this email from ARCO was to mislead DEOTS on the live-fire restrictions on MTA and ostensibly to permit live-fire activities to occur at levels higher than had previously been permitted.

Manual for Fire Protection Engineering (MFPE)

227. Chapter 6 of the Manual for Fire Protection Engineering (MFPE) which applies to all Defence owned or leased properties, requires the preparation of a BMP for all Defence properties designated as bushfire prone. The requirements of Chapter 6 stated at 6.1 are to be considered a "Legal and other Requirement" under the Defence Environment Management System. Para 6.34 states:

6.35.1 All BMP shall incorporate fire regimes designed to provide appropriate and safe areas for the ADF to train.

228. Nothing in Chapter 6 specifies that a BMP itself assumes the authority of Defence Orders or Instructions or that the contents of such a document override any existing Defence doctrine.

The MTA Bushfire Management Plan 2011 – 2014 (BMP)

229. In May 2011, and in accordance with the requirements of the MFPE, civilian contractor GHD prepared the MTA BMP. The BMP is an extensive document that follows the template for such documents as laid out in the MFPE.

230. This document itself provides no direct guidance on when live-firing activities within MTA might be permitted. Table 4-1 at p74 is headed “Bushfire readiness and restrictions”. Beside the heading “During Bushfire Season” it states “Restrictions below +
unit fire orders.” DTARPI accepted that the reference to “unit fire orders” would include a reference to RSO Chapter 10.

231. Within Table 4-1 there is a statement that “Live firing activities and the use of open fires is prohibited” at VERY HIGH FDR. While this is not in terms inconsistent with RSO 10.9 or 14.18 it is misleading in that it might imply that live-firing is permitted at HIGH FDR.

232. In relation to HIGH FDR Table 4-1 indicates that “Activities must be consistent with Standing Orders...”. This necessarily imports RSO 10.9 and RSO 14.18 and the prohibition on live-firing activities at HIGH FDR. Table 4-1 provides no imprimatur or justification to change existing live-firing restrictions. Such a change would be a significant matter and the lack of any discussion in the BMP about the reasons for such a change suggest that no such change was proposed.

233. Chapter 2 of the BMP sets out a Bushfire Mitigation Works Program for MTA. One of the stated aims of these works is “Ignition Reduction - Managing operational and Defence activities such that unplanned fire ignitions are minimised”. At p63 a number of mitigation measures relevant to facilitating successful fire response is set out. Para 2.3 of the BMP states:

An accessible and well maintained fire trail network, complemented by adjoining fuel reduced and slashed areas, is critical for successful implementation of the Marrangaroo Range BMP. The presence of UXO... may constrain fire-fighting strategies as:

- fire suppression operations must be confined to trails and cleared areas with limited options for aggressive initial attack strategies involving ground crews, equipment and plant;

- there is a reliance of indirect fire fighting techniques (such backburning or burning out) in fuel types highly prone to spotting. In such circumstances on days of higher fire danger backburning during fire suppression operations may be difficult and potentially dangerous. This highlights the need to reduce overall fuel hazard in cooler months as part of a regular prescribed burning program and ensure control lines are supported by adjoining slashed or fuel reduced areas; and

- There are limited options to undertake mop up and blacking out along fire edges to consolidate control lines.

Considering these constraints, the implementation and maintenance of an accessible fire trail network complimented (sic) by adjacent fuel reduced areas is essential for successful fire suppression and prescribed burning programs.

234. Even if Table 4-1 could be read as implying live-firing at MTA would be permissible at HIGH FDR, such change was dependent on the matters outlined in the bushfire mitigation works program having been completed. Here they had not. DTARPI agreed that to his knowledge there had been no hazard reduction for at least 15 years that some
of the trails were impassable by 2WD vehicles and that none of the recommended water tanks were in place

The Defence Training Areas Management Manual (DTAMM)

235. Chapter 7 of DTAMM titled “Fire Danger Periods and Australian Defence Force Live Fire Activities” is on its face ambiguous and provides conflicting direction on the circumstances in which live-fire activities are permitted on Defence Training Areas. The COI heard that DTAMM is the primary document in terms of regulating activities on Defence Training Areas

236. Para 7.1 of DTAMM states:

7.1 The commencement or continuation of live-fire activities during periods declared by State or Territory authorities as ‘high’ to ‘extreme’ or ‘catastrophic’ (or however, described) fire danger may pose unacceptable levels of risk. It is Defence policy that live-fire activities in such periods are not to be permitted unless there is an authorised operational imperative. The requirements of seeking any waiver consideration are detailed in following paragraphs [emphasis added]

237. Para 7.4 includes:

7.4...The general intent is that no live-fire activities be conducted in periods declared by State or Territory authorities with restrictions that equate to Total Fire Ban.

238. Para 7.6 deals with waivers, but only with respect to live-fire activities during periods of Total Fire Ban. Para 7.6 states:

7.6 Where there is a real and immediate requirement to conduct a live-fire activity during a period of State or Territory declared Total Fire Ban, a waiver may be granted after consideration of the circumstances on a case-by-case basis. A decision to allow an activity must be jointly agreed by an operational authority approving the imperative for the activity and the relevant TA OA responsible for the TA management...

239. There is no guidance on what “authorised operational imperative” means in para 7.1 and the restriction there stated that live-fire activities are not to occur during periods declared as “‘high’ to ‘extreme’ or ‘catastrophic’”, which may not be periods of Total Fire Ban.

240. DTARPI gave evidence that he changed the RSO because this was, in his opinion, effectively mandated by DTAMM. In particular he referred to para 7.11 states:

7.11...fire orders promulgated in Range Standing Orders or Range Instructions are to incorporate progressive imposition of restrictions to mitigate the risk of fire in accordance with the EMP...
241. This purported change reflects a rather selective reading of Chapter 7 and is inconsistent with the email of ARCO that suggests the change was made on the basis of the obsolete fire ratings.

242. On a plain reading of para 7.1 there may be no live-firing activities conducted on Defence Training Areas at FDR HIGH or above without a waiver, or at least an “authorised operational imperative”. We note that on 20 December 2013 an Interim Report addressing this issue was provided by us to CDF.

243. In relation to the conditions on MTA in September/October 2013, if there were some confusion or ambiguity on the proper indication of Defence intent, specific guidance should have been sought on the issue. This is the more so when the purported response is one which objectively increased the risk of an activity.

244. REO gave evidence of discussions she had with DTARPI about these issues several weeks after the email of 11 September 2013.

In that you refer to discussions you had with DTARPI the range control officer?---Yes.

Where he’d asked you to look into whether or not changes to fire danger rating have some impact as to what should be in the range standing orders?---Yes, that’s correct. I must admit when I walked away from the conversation I wasn’t quite sure what he wanted me to look into but I’d said I’d look into it and that would be a follow-up conversation with him down the track. But we had discussed changes from high to very high. And again I had in my head that what we used to call high we’re now calling very high.

But there’s no doubt you had a discussion about that type of issue with DTARPI before the fire?---It was about the ratings and restrictions and in fact total fire bans. I recall that one of the last things I said to the was, “No, total fire ban is total fire ban.”

So it may have related -- again, as I said, when I walked away, I wasn’t absolutely sure what he was asking. It may have related to the Defence intent, which is at 10.1.1 of the fire orders regarding....

That’s of the DTAMM?---Of the range standing orders relating to Defence’s intent that fire activity actually would not occur when the rating equates to a total fire ban in states and territories. It was the first time I’d met the major was whilst I was picking up the key. There was a few things to look into. He gave me a few things to look into and that was one of them. It went to the back of my head and low on my priority list. But I also did make the statement at that time that I wasn’t the authority on being able to change what’s in the fire orders. And again I was working off my knowledge of the bushfire management plan that stated that at very high activities were to cease. But in fire danger ratings below that, activities could occur, so long as there were mitigations in place. [emphasis added]
245. It may be that [DTARP1] was unduly influenced in his decision by his experiences at other Defence Training Areas. As he stated [\ldots]

*My experience of explosive natures is that most of the ranges I’ve been to actually only have Total Fire Bans on their ranges when they fire explosive natures. So my consideration as part of that was that this had a lower restriction on top of what I found as a normal acceptance on a range.*

246. Given there had been no hazard reduction at MTA for over 15 years, fire trails were impassable by 2WD vehicles, no fuel reduction by slashing had occurred and water tanks had not been placed in strategic locations, if any consideration were to be given to varying the existing orders, it would have been more appropriate to increase the live-fire restrictions on MTA rather than reduce them.

247. The evidence clearly establishes that [DTARP1] did not have authority to amend RSO. The authority to effect such changes rested solely with DOTAM and, pursuant to a delegation from DOTAM, to DDTAM, in this case [DTARP2].

248. [DTARP2] confirmed in evidence that [DTARP1] did not have authority to amend RSO and that consequently the email from ARCO did not constitute a valid amendment to RSO. As [DTARP2] pointed out, even if [DTARP1] genuinely believed that the BMP and other doctrine mandated a change to RSO, “it requires my signature on it as well… in the military you’ve got to sign off things” It was a decision that should have come to him.

249. [DTARP2] indicated that if the current procedure had been followed and [DTARP1] came to him with a proposed amendment to RSO 10.9 it is likely he would have signed off on the change. But, taking into account DTAMM, BMP and everything he knew [DTARP2] acknowledged that upon closer reflection any decision to sign off on such a change to RSO would have required further examination. We conclude that approval of such a change to RSO was not inevitable.

250. [CO] asserted in evidence that at MTA live-firing could take place at a FDR of HIGH, but how he came to that view was not explored or examined.

251. The relationship between the MFPE, DTAMM, BMP and RSO is at best confusing, and likely to lead to confusion in application. It is also the case that within those documents there are internal inconsistencies and ambiguities that make proper interpretation difficult. However, RSO para 10.9 and para 14.18 are themselves clear and unambiguous.

**The effect of the purported amendment and draft RSO**

252. The evidence before the Commission clearly establishes that the bushfire occurred as a result of an ignition following the demolition serial at Internal Range on 16 October 2013. Further, the evidence is that those conducting the serial understood that the serial was permitted because the FDR for MTA was HIGH, and if the FDR had been VERY HIGH the serial would not have proceeded. But for the email the serial would not have proceeded because those conducting it would regard a FDR of HIGH as a “red light.” As the
FDR for the following day was VERY HIGH and a total fire ban then issued, we conclude that the serial would not have taken place on that day.

253. The unilateral decision of DTARPI to change the live-firing restrictions effectively meant that there was no oversight by the chain of command of this decision.

254. But for the purported amendment to RSO 10.9 made by DTARPI on 11 September 13, the activities of 16 October 2013 that led to the bushfire would not have taken place. DEOTS would not have been permitted to initiate the serial on 16 October 2013 at a time of HIGH fire danger.

255. The Inquiry has before it a draft of a proposed new Chapter 10 of the MTA RSO and particularly to para 10.23 which, if made, would authorise live-firing at FDI 12-25 (that is, HIGH FDR). CACOI do not submit that it would never be appropriate to allow live-firing activities at MTA during periods of HIGH fire danger. We have previously considered the inappropriateness of using only FDR to determine whether live-firing should be permitted, and noted that neither the current regime nor the proposed regime take into account whether any of the recommended bushfire mitigation strategies had been completed.

Recommendation

All documents be reviewed to remove ambiguity and perceived inconsistencies.

Marrangaroo Training Area Range Standing Orders be subject to further examination, with particular consideration of the bushfire mitigation strategies referred to in the Bushfire Management Plan 2011 – 2014 before amendments to Chapter 10 are made. The basis upon which Range Standing Orders might fix a cut-off point for live-firing exercises should depend on continued bushfire strategies.

Range Standing Orders and Marrangaroo Training Area Bushfire Management Plan be reviewed annually. If hazard reduction has not occurred or the fire trails remain degraded, Range Standing Orders should take account of heightened risk.

The Role of the Regional Environmental Officer (REO)

256. REO2 was the MTA REO from June 2007 until he was deployed in October 2012. He returned from deployment in May 2013. It appears during that period the role of MTA REO was shared between a number of persons and, for a time, taken on as an extra duty by the Senior Environment Manager. One of his roles as REO was to ensure the BMP was commissioned and delivered as required by the MFPE. This he did.

257. REO2 told the Inquiry that he would have provided a copy of the completed report to DOTAM and also to the Base Support Manager "because of our contractual relationship with our comprehensive maintenance services contractor, they would also retain a copy and that is designed also to inform their processes for future consultations"
258. The evidence suggests that 20 years had passed since there had been any fuel/hazard reduction in the Internal Range area.

259. The BMP outlined a number of matters that needed to be attended to for bushfire mitigation, from fire trail work, to vegetation slashing to water tanks and particular firefighting resources.

260. **REO2** sought to explain where the funding came from to undertake works identified in the BMP, but his answer was less than clear. It does seem to suggest a significant role for the REO as well as for Base Support Services to obtain funding. On the other hand, **REO** seemed to suggest that as REO she had only limited ability to obtain funding for significant matters, but had made plans with the RFS to undertake a hazard reduction burn in Autumn 2014. This, she suggested, would not involve any significant financial impost on Defence.

261. In giving evidence to the Inquiry, **DTARP** indicated that DOTAM undertakes minor maintenance but otherwise does not have funding to undertake the majority of maintenance.

262. **REO2** had responsibility for a number of training areas and in the five years he was REO at MTA would get on site about once per month. **REO2** as REO of MTA, sat as a member of the BFMC for Lithgow and “attended as often as I could.” As the Inquiry heard from RFS officers, unfortunately it appears there was a very infrequent attendance at BFMC meetings by Defence representatives.

263. **REO2** was, however, aware of the Lithgow BFMC BMP of August 2010 that assessed the risk of a fire at MTA as “Almost Certain” with “Major Consequences”. He indicated that he was involved in efforts to try and have recommended hazard reduction burns implemented with the assistance of the RFS but nothing had eventuated in the three years before he was deployed.

264. Even acknowledging the significant logistic issues involved in organising a hazard reduction burn and that **REO2** was away from May 2012 for a period, the evidence suggests that, in reality, nothing was done to implement a hazard reduction program until **REO** became MTA REO in August 2013 and took significant steps within a few weeks to get the process started.

265. The lack of any hazard reduction burns at MTA for a considerable period resulted in increased fuel loads in the bush surrounding the Internal Range and other parts of MTA. There is no doubt that the fuel loads made it more likely that a hot fragment from any explosive disposal might ignite a fire. The heavy fuel loads would also have made it more difficult to contain fire and accelerated its rate of spread.

266. The evidence suggests there was some degree of confusion among various parties having responsibility for MTA to organise, finance and implement various maintenance matters, particularly with respect to those outlined in the BMP.
267. We accept that financial restraints may at times prevent particular works or mitigation strategies being undertaken. In such circumstances the REO should retain a role in advising the RCO and DOTAM whether the failure to undertake recommended works increases the risk of bushfire to such an extent that some further restriction should be imposed on the range of training activities beyond anything contained in RSO.

Recommendation

The lines of responsibility be made clearer and some individual, perhaps the Regional Environmental Officer, or agency be given overarching responsibility to ensure recommended works related to bushfire mitigation on Defence Estate are carried out in accordance with the Bushfire Management Plan which the Manual for Fire Protection Engineering directs be prepared.

268. Again we express our thanks to CACOI and we also acknowledge the excellent support and assistance given to us by the COI Manager and the administrative staff. We submit Part I of our report.

Annexes:

A. Acronyms and Abbreviations
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>84mm HEAT</td>
<td>84mm High Explosive Anti Tank</td>
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<td>105mm HOW</td>
<td>105mm Howitzer</td>
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<td>A/CDF</td>
<td>Acting Chief of the Defence Force</td>
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<td>ADF</td>
<td>Australian Defence Force</td>
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<td>ARCO</td>
<td>Assistant Range Control Officer</td>
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<td>BCSS</td>
<td>Base and Customer Support Services</td>
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<td>BFMC</td>
<td>Bush Fire Management Committee</td>
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<td>Bush Fire Risk Management Plan</td>
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<td>BMP</td>
<td>Bushfire Management Plan 2011 - 2014</td>
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<td>Counsel Assisting Commission of Inquiry</td>
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<td>CDF</td>
<td>Chief of the Defence Force</td>
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<td>CJLOG</td>
<td>Commander Joint Logistics Command</td>
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<td>CMD</td>
<td>Conventional Munitions Disposal</td>
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<td>CO</td>
<td>Commanding Officer</td>
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<td>Commission of Inquiry</td>
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<td>Comp B</td>
<td>Charge Demolition Block 600gm Mk5</td>
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<td>Computer Systems Armaments</td>
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<td>Defence Explosive Ordnance Training School</td>
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<td>DOTAM</td>
<td>Director(ate) of Operations and Training Area Management</td>
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<td>Defence Restricted Network</td>
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<td>Defence Security Manual</td>
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<td>DSO</td>
<td>Defence Support Organisation</td>
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<td>Defence Support and Reform Group</td>
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<td>NCO</td>
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<td>NEQ</td>
<td>Net Explosive Quantity</td>
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<td>Charge Demolition 230gm Plastic Explosive Number 4</td>
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<td>Personal Protective Equipment</td>
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<td>PRDD</td>
<td><em>Permanent Range Demolitions Detail</em></td>
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