PART 1.1 – COVERING NOTE

CTCTRM DTA 01

3 Feb 16

DG DSA

FINAL REPORT BY THE SERVICE INQUIRY INVESTIGATING THE DEATH OF [redacted] WHILE CONDUCTING OFFICER TRAINING AT COMMANDO TRAINING CENTRE, ROYAL MARINES LYMPSTONE, DURING THE 30 MILER COMMANDO TEST ON DARTMOOR TRAINING AREA ON 28 MAY 15

1. The Service Inquiry Panel assembled at DCBRN Winterbourne Gunner, on the 05 Jun 15 by order of the DG DSA for the purpose of investigating the death of [redacted] on 28 May 15 and to make recommendations in order to prevent recurrence. The Panel has concluded its inquiries and submits the final report for the Convening Authority's consideration.

PRESIDENT

[Signature]

[redacted]
Wg Cdr

President
CTCRM DTA SI

MEMBERS

[Signature]

[redacted]
Maj

Panel Member 1
CTCRM DTA SI

[Signature]

[redacted] MBE
WO1

Panel Member 2
CTCRM DTA SI

2. The following inquiry papers are enclosed:

Part 1 (The Report)
Part 1.1 Covering Note
Part 1.2 Convening Orders, TORs & Glossary
Part 1.3 Narrative of Events
Part 1.4 Findings
Part 1.5 Recommendations
Part 1.6 Convening Authority Comments

Part 2 (The Record of Proceedings)
Part 2.1 Diary of Events
Part 2.2 List of Witnesses
Part 2.3 Witnesses Statements
Part 2.4 List of Attendees
Part 2.5 List of Exhibits
Part 2.6 Exhibits
Part 2.7 List of Annexes
Part 2.8 Annexes
Part 2.9 Schedule of Matters Not Germane to the Inquiry
Part 2.10 Master Schedule

Defence Safety Authority

Service Inquiry Convening Order

03 Jun 15

SI President

SI Members

Hd LAIT
Hd MilAAIB
DSA-Legad

Copy to:

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COS/CAF (CGRM)
COS/COMCORE
EA/COMOT
EA/CTCRM COMDT
COS CTCRM
DSA DLSR TL

DSA DG/SI/01/15 – CONVENING ORDER FOR SERVICE INQUIRY INTO A LAND OCCURRENCE INVOLVING A ROYAL MARINE YOUNG OFFICER ON 28 MAY 15 ON DARTMOOR TRAINING AREA.

1. A Service Inquiry (SI) is to be held under Section 343 of Armed Forces Act 2006 and in accordance with JSP 832 – Guide To Service Inquiries (Issue 1.0 Oct 08).

2. The purpose of this SI is to investigate the circumstances surrounding the subject land occurrence and to make recommendations in order to prevent recurrence.

3. The SI Panel is to assemble at the Defence CBRN Centre in Winterbourne Gunner on Fri 5 Jun 15 at 0900L.

4. The SI Panel comprises:

President: **Wg Cdr** [redacted]

Members: **Maj** [redacted]
WO1 [redacted] **MBE**

5. The legal advisor to the SI is **Maj** [redacted] **(DSA-Legad)** and investigation support/assistance is to be provided by the Land Accident Prevention and Investigation Team (LAIT).

6. The SI is to investigate and report on the facts relating to the matters specified in its Terms of Reference (TOR) and otherwise to comply with those TOR (at Annex). It is to record all evidence and express opinions as directed in the TOR.

7. Attendance at the SI by advisors/observers is limited to the following:

Hd LAIT – Unrestricted Attendance.

Hd MilAAIB – Unrestricted Attendance.

LAIT investigators in their capacity as advisors to the SI Panel – Unrestricted Attendance[1].

MilAAIB investigators in their capacity as advisors to the SI Panel – Unrestricted Attendance[2].

8. The Panel will work initially from the Defence CBRN Centre in Winterbourne Gunner and CTCRM, Lympstone. Commandant CTCRM is requested to provide facilities, equipment and assistance suitable for the nature and duration of the SI as required by the SI President.

9. Reasonable costs will be borne by DG DSA under UIN D0658A.

Original Signed

R F Garwood
AM
DG DSA – Convening Authority

[1] On a case by case basis as authorised by Hd LAIT.

[2] On a case by case basis as authorised by Hd MilAAIB.

Defence Safety Authority

Service Inquiry Terms of Reference

03 Jun 15

SI President — Hd LAIT, Hd MilAAIB

SI Members — DSA-Legad

TERMS OF REFERENCE FOR SI INTO LAND OCCURRENCE INVOLVING A ROYAL MARINE YOUNG OFFICER ON 28 MAY 15 ON DARTMOOR TRAINING AREA.

1. As the nominated Inquiry Panel for the subject SI, you are to:

   a. Investigate and, if possible, determine the cause of the occurrence, together with any contributory, aggravating and other factors and observations.

   b. Ascertain whether Service personnel involved were acting in the course of their duties.

   c. Examine what policies, orders and instructions were applicable and whether they were complied with.

   d. Review the levels of authority and supervision covering the task during which the incident occurred.

   e. Establish the level of training, relevant competencies, qualifications and currency of the individuals involved in the activity.

   f. Identify if the levels of planning and preparation were commensurate with the activities' objectives.

   g. Investigate and comment on relevant fatigue implications of individuals' activities prior to the matter under investigation.

   h. Determine the state of serviceability of any relevant equipment.

   i. Determine any relevant equipment deficiencies.

   j. Assess any Health and Safety at Work and Environmental Protection implications in line with JSP 375 and JSP 418.

   k. .Determine and comment on any broader organizational and/or resource factors.

   l. Report and make appropriate recommendations to DG DSA.

2. During the course of your investigations, should you identify a potential conflict of interest between the CA and the Inquiry, you are to pause work and take advice from your DSA Legal Advisor, Hd LAIT and DG DSA. Following that advice it may be necessary to reconvene reporting directly to MOD PUS.

GLOSSARY

Acronym/ Abbreviation	Explanation
AAPTI	All Arms Physical Training Instructors Course (AAPTI)
AED	Automated External Defibrillator
AIPTRM	Assistant Inspector Physical Training Royal Marines
AFCO	Armed Forces Career Office
ALARP	As Low As Reasonably Possible
AoR	Area of Responsibility
ASPEC	Assessment Specification
ASPT	Army School of Physical Training
BCD	Battlefield Ambulance
BFA	Battlefield casualty Drills
BRNC	Britannia Royal Naval College
Cat	Category
Cdo	Commando
Cdr	Commander (OF4 Rank)
CHA	Combat Health Advisors
CHD	Combat Health Duties
Chf	Chief
CI	Chief Instructor
CO	Commanding Officer
CoC	Chain of Command
Comdt	Commandant
COS	Chief of Staff
CP	Check Point
CPR	Cardio Pulmonary Resuscitation
C/Sgt	Colour Sergeant (OR7 Rank)
CTCRM	Commando Training Centre Royal Marines
CTW	Commando Training Wing
CW	Command Wing
DCBRNC	Defence Chemical Biological Radioactive Nuclear Centre
DDH	Delivery Duty Holder
DE&S	Defence Equipment and Support
DG	Director General
DIU	Defence Inquest Unit
DPers Cap	Director Personnel Capability
DTA	Dartmoor Training Area
DS	Directing Staff
DSA	Defence Safety Authority
DSAT	Defence Systems Approach to Training
DSG	Defence Support Group
ECG	Electro-cardiogram (heart tracing)
ES	Emergency Services
FLC	Front Line Command
Flt Lt	Flight Lieutenant (OF2 Rank)
ft	Feet
GP	General Practitioner
GPS	Global Positioning System
HF	Human Factors
HFACS	Human Factors Analysis and Classification System
HIWG	Heat Illness Working Group
HMS	Her Majesty's Ship
hrs	Hours
HQ	Headquarters
IMF	Initial Military Fitness

INM	Institute of Naval Medicine
ISPEC	Instructional Specifications
JCC	Junior Command Course
JNCO	Junior Non Commissioned Officer
JSP	Joint Service Publication
kg	Kilograms
Km	Kilometres
k/ph	Kilometres per hour
Lbs	Pounds (weight)
LAIT	Land Accident Prevention and Investigation Team
Lt	Lieutenant
Lt Col	Lieutenant Colonel (OF4 Rank)
MA	Medical Assistant
Maj	Major (OF3 Rank)
MilAAIB	Military Air Accident Investigation Branch
min	Minute
MOD	Ministry of Defence
mph	Miles per hour
NCHQ	Naval Command Headquarters
OC	Officer Commanding
OCLS	Officer Liaison Careers Office
ODH	Operational Duty Holder
OEM	Original Equipment Manufacturer
Ops	Operations
OPS	Operational Performance Statement
PAR	Population at Risk
PEd	Physical Education
PSQ	Patient Satisfaction Questionnaire
PT	Physical Training
PTI	Physical Training Instructor
PMO	Principle Medical Officer
QT-34	QuesTemp QT-34 (WBGT Monitor)
RAF	Royal Air Force
RM	Royal Marines
RMSPT	Royal Marines School of Physical Training
RMSoM	Royal Marines School of Music
RMYO	Royal Marine Young Officer
RN	Royal Navy
RNSPT	Royal Navy School of Physical Training
RR	Risk Register
RV	Rendezvous Point
SCA	Sudden Cardiac Arrest
SCC	Senior Command Course
sec	Second (time)
Sgt	Sergeant (OR6 Rank)
SHE	Safety Health Environment
SI	Service Inquiry
S/Lt	Sub Lieutenant (OF1 Rank)
SME	Subject Matter Expert
SNCO	Senior Non Commissioned Officer
SOP	Standard Operating Procedure
Spec	Specialisation
SPTW	Support Wing
SQEP	Suitably Qualified and Experienced Person
Sqn Ldr	Squadron Leader (OF3 rank)
Stn	Station
Surg Comd	Surgeon Commander

SW	Specialist Wing
Syn	Syndicate
Telcon	Telephone conversation
TORs	Terms of Reference
TPS	Training Performance Statement
TRA	Training Regulatory Authority
TRiM	Trauma Risk Management
Trg	Training
URTI	Upper Respiratory Tract Infection
VSI	Very Seriously ill
WBGT	Wet Bulb Globe Temperature
WO1	Warrant Officer First Class (OR9 Rank)
Wg Cdr	Wing Commander (OF4 Rank)
YO	Young Officer

DEFINATION OF TERMS

Acronym/ Abbreviation	Explanation

ALARP	Associated with risk management.
Assurance	Positive declaration intended to give confidence; a promise, guarantee or pledge.
DE&S	Parent organisation for the management of procurement and support for equipment in the MOD. Individual or groups of equipment are managed by Project Teams within this organisation.
DSAT	Defence Systems Approach to Training (DSAT) Quality Standard (QS) sets out the strategic principles to be applied to all individual training provided by, or on behalf of, the Ministry of Defence.
DSG Sealand	DSG (Defense Support Group) is one of the largest Defence equipment support providers in the country.
Environmental Factors	Any abiotic or biotic that influences living organisms.
Human Factors	Environmental, organizational and job factors, and human and individual characteristics which influence behaviour at work in a way which can affect health and safety.
Hyponatraemia	Low sodium concentration in the blood.
INM-EMS STM CMO1	Specialist expert who provides guidance from the Institute of Naval Medicine.
Matters	Other issues not germane to the Inquiry.
Medical Cover	Clinical supervision of an activity or event.
Paleo	Food which humans' ancient ancestors might likely have eaten.
Response and Treatment	Reaction and manner of treating a patient or casualty medically or surgically to save and preserve life.
SA80	Selective fire gas-operated assault rifle.
Triage	Medical Term to decide the order of treatment of patients or casualties.

PART 1.3 – NARRATIVE OF EVENTS

Synopsis

1.3.1 **Introduction.** At approximately 0903 on 28 May 15, [redacted] collapsed during the 30 mile endurance march (30 Miler) on Dartmoor Training Area (DTA). The 30 Miler is the final Commando (Cdo) Test faced by all entrants to the Royal Marines (RM) after which they are awarded their Green Beret and marks the point at which they become a RM Cdo. Annex A

1.3.2 **Route.** The 30 Miler begins at Okehampton Battle Camp on Dartmoor, crosses the rugged terrain of DTA, and finishes at Shaugh Prior Bridge. Okehampton Camp is where all participants, including Directing Staff (DS) and other support personnel, are accommodated on the previous evening. The 30 Miler is a tactical navigation endurance march with each participant carrying his SA80 rifle plus approximately 24 lbs / 11kgs of equipment. Annex B Exhibit 1 Exhibit 2

5.56mm rifle
Personal Load Carrying Equipment (PLCE)[1]
Carried In Patrol pack
Second full water bottle
Socks
Thermal shirt
Fleece
1: 50 000 Dartmoor map
Hat
Gloves
Spare rations
Waterproofs
Gore-Tex bivi-bag
Spare trousers

Fig 1.3.1 - 30 Miler Equipment (List)

1.3.3 **History.** The 30 Miler can be traced back to the original Commando Training conducted at Achnacarry during WW2[2]. The aim of the 30 Miler is a fast paced march which simulates a Cdo extraction from a target to a seaborne pickup point. Young Officers (YOs) are allocated 7 hrs in which to complete it, compared to Non-Officer Recruits (Rcts) who must achieve it in 8 hrs. The distance and personal load to be carried remains the same for all. The aim of the 30 Miler is to: Exhibit 2

a. Test endurance.

b. Assess Cdo qualities; courage, determination, unselfishness and cheerfulness in the face of adversity.

c. Achieve the Cdo YO standard as the final part of four Cdo tests.

1.3.4 **Syndicates.** The Batch[3] is divided into Syndicates (Syn) of 10-12 participants who are accompanied by a minimum of two DS; one, an Officer as Annex B Witness 8

[1] This consists of a belt, shoulder harness and a number of pouches. The purpose of PLCE is to hold everything a soldier needs to operate for 48 hours. This includes ammunition/weapon ancillaries, food and water and a means to cook.

[2] http://www.commandoveterans.org/CommandoBasicTrainingCentre

[3] Each RM YO intake is called a Batch which consists of approximately 40-50 persons. Two of these are run at CTCRM per a year.

Primary Safety who has overall responsibility for the Syn, and a Senior Non-Commissioned Officer (SNCO) as Secondary Safety. Each Syn is set off at 10 minute intervals from Okehampton Camp, and Syn members are encouraged to stay close together as a group throughout the march. The march is divided into 6 legs with 6 Check Points (CP). At each CP the YOs refill a fresh water bottle and are given large metal mug of sweet flavoured water and a banana. In addition they are also given a Pasty at CP2.

Exhibit 2

Fig 1.3.2 Overview RMYO 30 Mile Cdo Test Route – 28 May 15

30 Miler Route

1.3.5 **Overview of Incident.** [redacted] was approximately 14.5 miles into the test when he collapsed. He was pronounced dead by the civilian emergency services on scene at 1032 on 28 May 15. The Land Accident Prevention and Investigation Team (LAIT) was alerted to the incident by Chief of Staff (COS), HQ Commando Training Centre Royal Marines (CTCRM) Lympstone at approximately 1230 on 28 May 15. A team was deployed to secure vulnerable evidence and conduct a triage report for Director General (DG) Defence Safety Authority (DSA).

Part 1.2
Annex A
Witness 1
Witness 8
Witness 10
Witness 12
Exhibit 2

DG DSA subsequently convened a Service Inquiry (SI) under Section 343 of Armed Forces Act 2006 on 5 Jun 15.

1.3.6 **Service Inquiry.** The SI, supported by Accident Investigators, Human Factors and medical specialists, has conducted 19 interviews of key personnel involved in the incident. These personnel were involved in the 30 Miler on 28 May 15, either as participants, DS, or in a support role within the CTCRM organisation. In addition, the SI visited the Tarzan Assault Course and DTA in order to view and appreciate both the training environment 24 hrs previous to and including the incident location and the evacuation route. Part 2.1 Part 2.2

Personal History

1.3.7 **Recruitment.** [redacted] attended and passed a Flying Aptitude test[4] at RAF Cranwell in Apr 08. He went to the Admiralty Interview Board[5] (AIB) at HMS SULTAN on 01 Sep 08, during which he was assessed on his suitability to be a Royal Naval Officer. He passed his AIB on 30 Sep 08 and received a bursary[6] from the Royal Navy to study physics at Sheffield University from Sep 08 to May 12[7].

1.3.8 **Aircrew Medical**. He passed his Aircrew Medical in Sep 09 which confirmed that he had no medical conditions which would preclude him from flying training.

1.3.9 **Initial Royal Navy Service.** [redacted] commenced Initial Officer Training (IOT) Britannia Royal Naval College (BRNC) Dartmouth on 19 Nov 12. During the latter part of his training, he was deselected from pilot training on 29 Apr 14 as he could not learn new procedures within the required timeframe. That same day, he requested a transfer to train as a RM Officer. On 2 Jun 14 [redacted] attended and passed the RM Potential Officer Course (POC)[8], which is used to assess a candidate's suitability and level of preparedness for RM Officer Training at CTCRM. Exhibit 3

1.3.10 **Young Officer Training.** On 24 Aug 14, [redacted] commenced his RM YO training at CTCRM. The initial period of training for all RMYOs consists of a 15 month training period to develop the advanced tactical skills and leadership qualities needed to inspire the RMs who will eventually be under their command. In the early stages of training, [redacted] was identified as one of the stronger YOs. Within the first term, Aug 14 to Dec 14, his test results consistently put him in the top quartile of his peers. He was also identified as 'gym superior' which meant he was one of the fittest members of his YO Batch in the indoor environment. Witness 6 Witness 11 Exhibit 4 Exhibit 5

Commando Tests

1.3.11 **Cdo Tests.** During the eighth month the YOs enter the Cdo phase of

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[4] Telcon Lt [redacted] RN (NAVY YEO-727 OPS) and WO1 [redacted] (Panel Member SI CTCRM DTA) at 1705 on 15 Dec 15, clarifying that the test is inclusive to all Tri-Service Aircrew and Air Traffic Controllers (irrespective of whether it involves personnel getting into an aircraft or controlling one from the ground). The type of role that could be potentially offered to the individual will depend on the achieved pass grade.

[5] http://www.royalnavy.mod.uk/~/media/files/cnr-pdfs/admiralty%20interview%20board.pdf

[6] http://www.royalnavy.mod.uk/careers/graduates/bursaries-and-scholarships

[7] Telcon Lt Cdr [redacted] RN (NAVY-CNR-AIB TSO) and WO1 [redacted] at 1510 on 3 Sep 15.

[8] A two-day training course at CTCRM. It is physically and mentally demanding, involving gym tests, endurance and obstacle courses, as well as an essay, discussion sessions and an interview. http://www.royalnavy.mod.uk/careers/royal-marines/how-to-join-the-marines/rm-potential-officers-course#day-one

their training. Within this phase each YO Batch undertake a 19 day operational exposure exercise called Ex CRASH ACTION. During this exercise the YOs are subject to harsh field living conditions, inclement weather and a sustained period of sleep deprivation which results in all YOs being seriously fatigued. On return to CTCRM, the YOs receive two days recovery (of which one of these is spent on the Firing Range) prior to commencing the first of their four criteria Cdo Tests. Each test is then taken on consecutive days over a four day period, equating to one test per day. This is achieved in the order of the Endurance Course, 9 Mile Speed March, Tarzan Assault Course, and finally the 30 Miler.

Witness 18
Exhibit 5
Exhibit 6

a. **Endurance Course.** This is an individual test comprising a challenging 6 mile (9.65 kilometres (km)) course whilst carrying 21 lb (9.5 kilogrammes (kg)) fighting order and personal weapon. The first two miles consist of undulating woodland terrain featuring obstacles such as tunnels, pipes, wading pools and an underwater culvert. The latter four miles (6.43 km) remain an obstacle-free metalled road return run back to CTCRM. YOs are to complete this in 71 minutes (mins) and Rcts 73 mins. This is followed by a marksmanship test where the recruit must hit 6 out of 10 shots at a small 25m target (simulating a range of 200 metres (m)).

Exhibit 7

b. **9 Mile Speed March.** This is a 9 mile (14 km) speed march, as a formed body, which is to be completed in 90 mins (at an average pace of 6 miles per hour (mph)) whilst carrying fighting order and personal weapon.

Exhibit 8

c. **Tarzan Assault Course.** Starting at 1 min intervals on the Cdo Slide (Fig 1.3.2), this is an individual test that commences with a number of High Aerial Apparatus followed immediately by the Bottom Field Assault Course, and then finishing with a rope climb up a 30 foot (ft) near-vertical wall (Fig 1.3.3). It must be completed whilst carrying fighting order and personal weapon in 12 mins for YOs and 13 mins for Rcts.

Witness 11
Exhibit 9

Fig 1.3.3
30 Foot Wall

Fig 1.3.4
Cdo Slide

d. **30 Miler.** This is a tactical navigation endurance march to be completed as a Syn whilst carrying Personal Load Carry Equipment weapon, spare clothing and rations, (see list 1.3.4). YOs must achieve this in 7 hrs (at an average pace of 4.3 mph) and Rcts in 8 hrs. Annex B Exhibit 2

e. **Retests.** If a YO fails a Cdo Test, then they will get an opportunity to retake it again in the four day window that follows the 30 Miler. If a YO fails two or more of the tests, it is unlikely that a chance to re-attempt them will be offered. Witness 6 Witness 8 Witness 11

Pre-incident

1.3.12 **Previous 24 hrs.** [redacted] passed the first two Cdo Tests; the Endurance Course on 25 May 15 and the 9 Mile Speed March on 26 May 15. He failed the third test, the Tarzan Assault Course on 27 May 15, as he could not fully complete an obstacle called the Chasm (Fig 1.3.5). Witness 6 Witness 11 Witness 16 Exhibit 9

Fig 1.3.5 The Chasm

Aerial view of the Tarzan Assault Cse

1.3.13 **Chasm.** As part of this obstacle [redacted] had to Commando Crawl[9] along the top of the rope to the halfway point, where he was to stop, and then under control rotate until he was hanging onto the rope upside down. Using a previously taught technique (Fig 1.3.4), he would have been expected to complete the 'half-regain' in order to return on top of the rope under control. After composing himself, he would then have been expected to continue to the end of the obstacle and complete the remainder of the course[redacted] had previously completed the obstacle many times under the instruction of the Batch Physical Trainer, as well as completing the 'Battle Physical Tests' which included having passed competent in both the Assault Course and Full Regain[10]. Witness 6 Witness 11 Witness 16 Exhibit 4

[9] This technique involves mounting the rope with the upstream foot hooked on top of the rope and the knee bent close to the buttocks; the downstream leg hangs straight to maintain balance. The upstream foot, in conjunction with both arms is used to pull and push to gain momentum whilst traversing the rope.

[10] Whilst on a rope in a Commando Crawl position suspended over a water tank, the individual is to lower under control until hanging with straight arms, then climb back onto the rope using the method instructed known as a 'Full Regain.'

Fig 1.3.6 Rope Half-Regain

1.3.14 **Medical Referral.** Poor technique resulted in [redacted] not being able to fully complete the drill in the required manner. This meant he was unable to complete the obstacle and therefore failed the test. He was retested later that afternoon in line with CTCRM policy and passed with one second to spare (11 minutes 59 seconds (secs) on the 12 mins time assessed test). The YOs' Batch PT noted that [redacted] looked pale and that he had complained of chest problems and was struggling with a bad cough. This was brought to the attention of the YO Batch Chief Instructor (CI) who ordered [redacted] to report to the Medical Centre CTCRM. The Principal Medical Officer (PMO) CTCRM subsequently cleared [redacted] as fit to continue onto the final test, the 30 Miler.

Witness 1
Witness 6
Witness 11
Witness 14

1.3.15 **Prior to the Event.** Prior to travelling to Okehampton, the 30 Miler DS safety brief was given by the March Commander (March Cdr) at 1500 on 27 May 15 at CTCRM. This was followed immediately by the YOs brief which was given by the Batch Commander (Batch Cdr), assisted by the event's Medical Assistant (MA). Both DS and YOs departed for Okehampton later that evening at approximately 2000. On arrival at approximately 2100, the mandated hydration policy was implemented along with the consumption of their second evening meal, which [redacted] was seen to eat before he went to bed at approximately 2200. [redacted] woke at approximately 0330 and attended breakfast in Okehampton Camp at 0400 on 28 May 15 before forming up with his Syn No 4 at 0450 for a final kit check by the March Co-ordinator (March Coord).

Annex B
Witness 1
Witness 6
Witness 10
Witness 16

Incident

1.3.16 **30 Miler Test Execution.** Although having been cleared fit to undertake the 30 Miler, [redacted] had been highlighted by the DS for additional monitoring to that of his colleagues. Each Syn started at the allotted time with 10 minute intervals between syndicates, and [redacted] Syn, Syn 4, comprised of eight YOs and two DS began their final Cdo Test at 0530 [redacted] was responsible for navigating the first leg and on arrival at CP1 was questioned by both the CI and the MA who both confirmed that he appeared fine and was coping with the initial phase of the march. During the subsequent move to CP2 he appeared to remain focussed and in control, displaying no signs of enhanced fatigue whilst keeping pace with the remainder of the Syn. The DS in charge of CP2 observed that [redacted] demonstrated the usual weariness that was to be expected at this stage of the march; however, one of the Syn YO's did comment that he looked pale.

Witness 1
Witness 2
Witness 9
Witness 12
Witness 17

1.3.17 **Immediately Prior to Collapse.** Approximately 2km from departing CP2, [redacted] pace declined. He began to struggle to keep up with the remainder of the Syn. On occasions, he fell back as much as 30m but managed to catch back up again with the tail end of his Syn. Each time he dropped back he was monitored by the 2nd Safety. On entering a small ascending copse he was last man in his Syn, and as he exited it via a small wall crossing, collapsed at 0903 (see Fig 1.3.7).

Annex C
Witness 1
Witness 2
Witness 3
Witness 12

1.3.18 **Collapse Reaction.** The Syn 2nd Safety, who was at the rear with [redacted] when he collapsed, immediately informed the Primary Safety of the situation.

Annex C
Witness 1

The Primary Safety then used his Airwave Radio to inform the March Cdr of the incident. Initially unable to reach the March Cdr, the Primary Safety passed the details of the incident to the March Coord. The March Cdr did then manage to establish communications and was the primary coordinator throughout the extraction of the casualty. | Witness 2 Witness 12

1.3.19 **First Aid Response.** Initial first aid was delivered by the 2nd Safety immediately after [redacted]. It was observed that he had a rapid faint pulse and shallow breathing. He was unconscious and unresponsive to any verbal or physical interaction. His equipment was removed and he was then placed in the recovery position. During this time the remainder of the Syn prepared a stretcher for his extraction and, under the advice of the Primary Safety, the March Cdr dialled 999. While waiting for the civilian Air Ambulance, the Primary Safety and March Cdr coordinated the move of the military Battle Field Ambulance (BFA) to an RV (Fig 1.3.7). Concurrently, the remainder of the Syn carried [redacted] by combat stretcher for approximately 500m to the BFA RV. The BFA, MA, CI and March Comd met the syndicate at the RV, at which time [redacted] was transferred to the rear of the BFA for transit to CP2. | Annex C Witness 1 Witness 8 Witness 12

1.3.20 **Medical Assistance.** The medical assistance provided during [redacted] initial triage and recovery to Air Ambulance from point of collapse can be broken down into 4 key phases.

a. **Phase 1.** The March Cdr directed Syn 4 Primary Safety to RV with the BFA. Syn 4 began to carry [redacted] to the RV at 0909 using the stretcher held within their march safety equipment. At this stage he was being monitored by the Second Safety and was breathing, had a rapid faint pulse, but was unresponsive. Concurrently, the March Cdr made the 999 call. | Witness 1 Witness 6 Witness 7 Witness 8 Witness 10

b. **Phase 2.** [redacted] was met at the RV by the BFA, MA, March Cdr and CI. After an initial assessment by the MA, [redacted] was placed into the BFA. At this time he was still breathing and had a pulse but remained unresponsive. He was joined in the back of the BFA by the MA and CI who continued to check his pulse during the extraction. The BFA then followed the March Cdr to CP2 to RV with the civilian Air Ambulance. | Witness 6 Witness 10

c. **Phase 3.** On arrival at CP2 at 0924, the MA identified that [redacted] was not breathing and had no pulse. He was then removed from the BFA and placed on the ground and the CI began Cardio Pulmonary Resuscitation (CPR); at the same time the MA prepared the defibrillator (Fig 1.3.8) and attached it to [redacted] at 0926. The reading on the defibrillator identified that it was not suitable to shock him and thus the CI continued with CPR until the arrival of the paramedics. | Annex D Witness 10

d. **Phase 4.** According to the South Western Service NHS Ambulance Trust, the Air Ambulance arrived on the scene at 0928 and was met by the March Cdr who guided the paramedics to the casualty. On their arrival the MA conducted a hand over to the civilian paramedics who then assumed all responsibility for life support. At approximately 1030 the paramedics informed the MA that [redacted] was not reacting in any way to their treatment and was subsequently pronounced dead at the scene at 1032. The CI then remained with [redacted] and accompanied him to Derriford hospital in a civilian Land Ambulance, departing CP2 at 1158 and arriving at the mortuary at 1239. | Annex C Witness 6 Witness 10 Witness 12 Exhibit 10

CP2

BFA RV Point

Point of Collapse

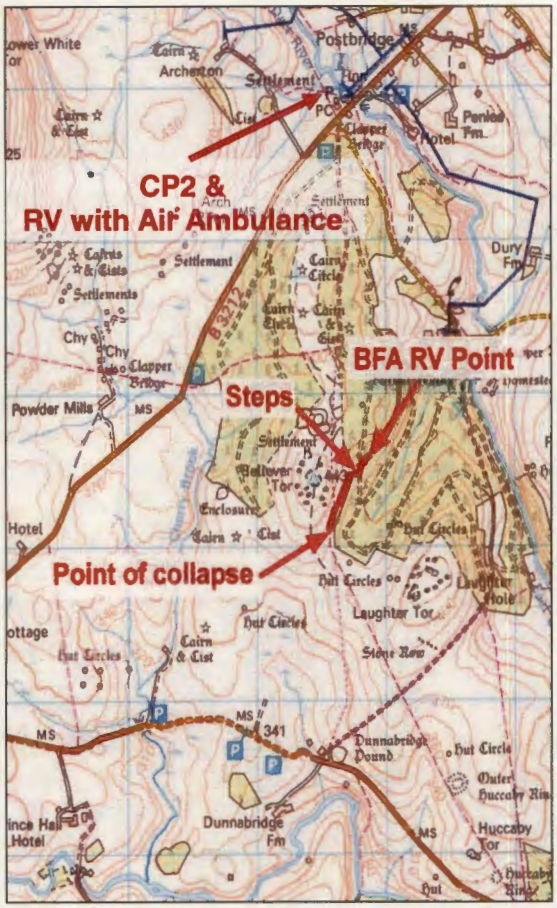

Fig 1.3.7 Incident Area

Fig 1.3.8 HeartStart

Post-mortem

1.3.21 The post-mortem examination was carried out on 3 Jun 15 by Home Office registered pathologist under the authority of Her Majesty's Assistant Coroner for Greater Devon and Exeter. This included cardiac pathology and toxicology reports. The post-mortem report was completed on 4 Aug 15 and released to the Defence Inquest Unit on 6 Aug 15. The post-mortem showed no abnormalities. This assessment included toxicology tests and both visual and microscopic examination of the organs, specifically the heart. [redacted]

Annex E

1.3.22 [redacted] was buried on 25 Jun 15 with full military honours.

PART 1.4 – ANALYSIS AND FINDINGS

Introduction

Part 1.2

1.4.1 This Service Inquiry (SI) was convened by DG DSA on 5 Jun 15 to investigate the circumstances surrounding the death of [redacted] while on his final Commando (Cdo) test, the 30 Miler, on 28 May 15 and to make recommendations in order to prevent recurrence. Whilst the main focus for the SI centred on the preparation and execution of the 30 Miler, the SI's Terms of Reference (ToRs) directed a broader investigation to include organisational and Human Factors (HF) influences.

1.4.2 The SI Panel had access to all of those involved in the preparation and execution of the 30 Miler as well as all of those participating on the day of the incident. Due to the nature of the incident the majority of the evidence was drawn from interviews conducted by the SI as well as documentary and medical evidence.

1.4.3 Below is a table of the key events leading up to, during and post the incident.

Ser	Event	Dates	Time
1	[redacted] joined BRNC Dartmouth[1]	19 Nov 12	N/A
2	Deselected from Aircrew Training	29 Apr 14	N/A
3	Transfer request to join the Royal Marines	29 Apr 14	N/A
4	Starts training at CTCRM	24 Aug 14	N/A
5	Tarzan Assault Course failure	27 May 15	0945
6	Tarzan Assault Course re- run	27 May 15	1445
7	Examined by PMO	27 May 15	1509
8	30 Miler Safety Brief	27 May 15	1500
9	Arrived at Okehampton	27 May 15	2100
10	Began 30 Miler	28 May 15	0530
11	[redacted] collapsed on 30 Miler	28 May 15	0905
12	999 call made by March Comd	28 May 15	0909
13	[redacted] arrives at CP2 in BFA	28 May 15	0924
14	CPR began	28 May 15	0925
15	Air Ambulance arrived on scene	28 May 15	0928
16	First Responder on scene	28 May 15	0932
17	Land Ambulance on scene	28 May 15	0936
18	[redacted] pronounced dead by paramedics	28 May 15	1032
19	[redacted] arrived at Mortuary	28 May 15	1239
20	LAIT Triage Team arrive at CTCRM	28 May 15	1825
21	SI convened	05 Jun 15	0900
22	[redacted] Military funeral	25 Jun 15	N/A
23	Postmortem Report released	04 Aug 15	N/A

Methodology

Incident Factors

1.4.4 Once a Factor had been determined it was then assigned to one of the following defined categories:

a. **Cause**. The factor which led directly to the incident.

b. **Contributory Factor**. A factor which made the incident more likely.

[1] Britannia Royal Naval College Dartmouth.

c. **Aggravating Factor**. A factor which made the outcome worse.

d. **Other Factor**. A factor which was none of the above, but was noteworthy in that it may cause or contribute to future incidents.

e. **Observation.** An issue that was not relevant to the incident but worthy of consideration to promote better working practices.

Human Factors (HF)

1.4.5 An occupational psychologist from the Directorate of Personnel Capability, Army HQ provided HF specialist support to the SI throughout the inquiry period. Support included attendance during interviews, conduct of additional independent interviews, and discussion and advice to the SI throughout. As such, the observations in the main SI report have taken into account many HF components. Annex F

1.4.6 The HF Analysis and Classification System (HFACS)[2] was used to consider and analyse the HF aspects in a systematic manner.

Factors Considered by the SI Panel

1.4.7 The SI conducted the inquiry with a comprehensive set of ToRs (Part 1.2). The ToRs were cross referenced with the Defence Lines of Development[3] to ensure the SI covered all possible avenues of enquiry to answers the ToRs. The SI identified the following areas as worthy of detailed examination:

a. The Environmental Factors.

b. Suitability to participate.

c. Planning and Assurance.

d. Supervision and Medical Cover.

e. Medical Response and Treatment.

f. Equipment.

g. Other Matters.

Available Evidence

1.4.8 The SI had access to the following evidence:

a. Interviews with all of the Directing Staff (DS) and other witnesses.

b. Photography from various sources.

c. Relevant orders.

d. Terms of Reference (TORs) and documentation including briefing material.

[2] Shappell S & Wiegman D, DOT/FAA/AM-00/7, Office of Aviation Medicine, Washington, US. Feb 2000.

[3] DLODS- provide a mechanism for co-ordinating the parallel development of different aspects of capability that need to be brought together to create a real military capability. They are- Trg, Equipment, Personnel, Information, Concepts and Doctrine, Organisation, Infrastructure and Sustainability.

e. Training Records.

f. HF Report provided by DPers Cap.

g. LAIT Triage Report.

h. Defibrillator used during the occurrence.

i. Wet Bulb Globe Thermometer (WBGT) monitoring kit used during the event.

j. Defence Statistics (Health).

k. Instructional Specification[4] (ISPEC) for all Commando Test events.

Services.

1.4.9 The SI was assisted by the following personnel and agencies:

a. Military Air Accident Investigation Branch (MilAAIB)[5].

b. Commando Training Centre Royal Marines (CTCRM).

c. Naval Command HQ (NCHQ)

d. Devon and Cornwall Police.

e. RAF Centre of Aviation Medicine.

f. Land Accident Prevention and Investigation Team (LAIT)[6].

g. DPers Cap HF Specialist.

h. Laerdal Medical Limited.

i. Institute for Naval Medicine (INM).

j. Principle Medical Officer, MOD CALEDONIA.

k. Defence Statistics (Health).

l. Defence Chemical Biological Radiological Nuclear Centre Medical Director.

m. Army School of Physical Training.

n. Royal Navy School of Physical Training.

o. Royal Marine School of Physical Training.

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[4] JSP 822 – ISpecs are produced from the products of Training Design and Development, Assessment Strategy and Method & Media selection process. Each usually contain the details of an Enabling Objective and associated Key Learning Points, the relevant assessment/test, method and media selected, time allocated, resource requirement and essential references.

[5] As of 01 Oct 15 become known as Defence Accident Investigation Branch (Air) .

[6] As of 01 Oct 15 become known as Defence Accident Investigation Branch (Land).

p. Army Cardiologist, Royal Centre of Defence Medicine.

Determining the Cause

1.4.10 The Post-mortem examination was carried out on the 3 Jun 15 by a Home Office Registered Pathologist under the authority of Her Majesty's Assistant Coroner for Greater Devon and Exeter. The post-mortem report was completed on 4 Aug 15 and released to the Defence Inquests Unit on 6 Aug 15. The Post-mortem included analysis of the organs, especially the heart, visually and also microscopically. The toxicology was conducted independently and included in the Pathologists report. The Pathologist who conducted the Post-mortem considered [redacted] death to be due to [redacted] Following the Post-mortem, the heart was sent for assessment by a national expert who reported the heart to be normal. Sudden cardiac arrhythmias may be present in a normal looking heart and normal looking ECG [redacted]. This would not have been picked up by any medical screening in the MoD. Indeed the Post-mortem itself showed no abnormalities. Having been informed that the [redacted], the SI sought to identify any factors which may have made this medical emergency more likely or aggravated the outcome. Annex E

Environmental Factors

1.4.11 The SI wanted to ensure that the correct procedures to enable the 30 Miler execution and the monitoring of environmental changes were in place and suitable. The SI Panel looked at the following areas: location and Heat stress.

Location

1.4.12 The SI considered whether the controls necessary to enable authorised training to be conducted safely have been identified and directed through site specific risk assessment and directed through Standing Orders. The SI examined the Dartmoor Training Area Standing Orders and conducted a reconnaissance of the route from CP2 to the point of collapse. JSP 375, Chapter 40 states that a safe place is one in which the controls necessary to enable authorised training to be conducted safely have been identified by a site specific risk assessment and directed through appropriate standing orders. Exhibit 1 Exhibit 2 Exhibit 11

1.4.13 The SI can confirm that the 30 Miler was conducted in line with the Training Area safety considerations and that the event was conducted in a safe location and was not a factor in the incident.

Heat Stress

1.4.14 **WBGT.** The WBGT (Fig 1.4.1) Heat stress Monitor is a tool used to inform risk management procedures during training and operations via the measurement of air temperature, wind speed and humidity by a dedicated electronic monitoring device; the readings are then compared against the matrix at JSP 539 (Climatic Illness and Injury in the Armed Forces: Force protection and Initial Medical Treatment) Annex A, Table 2A.1[7]. The WBGT should only be used as a tool to inform a commander's risk assessment. Exhibit 13

[7] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/413608/20140819_JSP_539_v2_4_Final.pdf.

Fig 1.4.1– Wet Bulb Globe Thermometer

1.4.15 **WBGT Test.** During the 30 Miler the WBGT was used to assist the DS in assessing environmental risks. The March Comd had deployed the WBGT at CP3 during the 30 Miler and was kept informed of its readings. All WBGT require yearly calibration at Defence Support Group (DSG) Sealand. The WBGT used on the day of the 30 Miler was sent to the INM for testing and was found to be in date with its annual tests and correctly calibrated. However, during interview it became apparent that the March Comd's team were uncertain of the WBGT implementation and use. Although a reading of 17°C had been taken from the WBGT and passed to the March Comd on several occasions, the location and deployment of the WBGT were not in line with the direction given in JSP 539. The Post-mortem gave no indication of Hest stress and, given the benign conditions of the day, it is the opinion of the SI that this was of no consequence. However, the poor understanding of the use of the WBGT could cause or contribute to future accidents and so was deemed an **other factor**. Urgent Safety Advice was issued by the DG DSA on 7 Aug 15.

Annex E
Annex G
Witness 8
Witness 9
Exhibit 13

1.4.16 **Meteorological Office Data.** During all interviews the interviewees commented that the weather was perfect for conducting the 30 Miler: not too cold, some cloud and a light breeze throughout the morning of 28 May 15. Most interviewees who commented on the weather were DS who had participated on minimum of two 30 Milers, with some having participated on the 30 Miler on significantly more occasions. The SI received a detailed weather report for Okehampton Camp from the Met Office for 28 May 15. Fig 1.4.2 shows the estimated WBGT readings for 28 May 15. Whilst Okehampton is not the site of the incident it is at a similar attitude and is the closest meteorological information available.

Witness 2
Witness 8
Witness 9
Exhibit 12

Time (Local)	**0500**	**0600**	**0700**	**0800**	**0900**	**1000**	**1100**	**1200**
Estimated WBGT	12	11	11	12	12	12	12	13

Fig 1.4.2 – Met Office Estimated WBGT for 28 May 15

Ser	**Maximum Work Rate (not to be exceeded)**	WBGT Index Threshold Values	
		Acclimatised (°C)	Un-acclimatised (°C)
1	**Low.** For example, lying, guard duty.	34	32
2	**Medium**. For example, marching 3.6 kph (2.3 mph) with a 30 kg load.	30	26
3	**High.** For example, marching 5.6 kph (3.5 mph) with a 20 kg load, patrolling, digging, field assaults.	27	24
4	**Very High.** For example, marching 8kph (5 mph) with no load, marching 5.6 kph (3.5 mph) with a 30 kg load.	25	20
5	**Extreme.** For example, running in sports kit; speed marching at 9.7 kph (6mph) with a 15kg load	20	Max 30 mins at 20

Fig 1.4.3 - WBGT Index Threshold Table

1.4.17 **Acclimatisation.** The Met Office data was then cross referenced with Table 2A.1 WBGT Index Threshold Values from JSP 539 (Fig 1.4.3). Table 2A from JSP 539 states that for an acclimatised or un-acclimatised person 20°C is the minimum temperature[8] where the work rate advice needs to be considered. Due to the vagaries of the British climate all troops in the UK are classed as un-acclimatised. As can be seen from the Met Office data, at no time did the temperature reach the threshold at which it could have had an impact on the 30 Miler; the highest reading being 13°C. Adherence to the guidance and use of the WBGT will minimise the risk of heat illness to 95% of normal, healthy personnel. Witness 10 Witness 11 Exhibit 14

1.4.18 **WBGT Training.** The SI, in conjunction with Royal Navy Environmental Health[9], has identified that the Naval Service has a training deficiency and they are not operating in compliance to JSP 539. The JSP 539 identifies the following medical and PT personnel receiving training on the use of the WBGT:

a. Naval Service MAs, Army CMPs and RAF Medics.

b. Combat Health Duties (CHD).

c. Combat Health Advisors (CHA).

d. All Arms Physical Training Instructors (AAPTI).

e. RAF Physical Training Instructor.

1.4.19 The JSP directs that within the Naval Service, MAs are the only individuals trained on the use and monitoring of the WGBT. It is the opinion of the SI that the MAs will operate in environments to CTCRM DS and therefore they may be unable to implement the necessary control measures to ensure the training event is deemed ALARP[10]. There is no evidence to support that CTCRM Medics monitor the WBGT regularly as part of their standard duties within CTCRM and, as such, the current risk to training which involves strenuous activity is not ALARP. Within CTCRM the day to day responsibility for using the WBGT is given to the Guard Force on the main gate, which is manned by the Military Provost Guard Service. The SI noted that since the incident, the CTCRM March Co-ord has conducted a WBGT site survey and is looking at additional DS training. Further, the Naval Service has identified a training requirement for the WBGT and will deliver formal WBGT T3 courses to all Naval Service PTs, inviting RM PTs to attend (via liaison with Assistant Inspector Physical Training Royal Marines). An Urgent Safety Notice was released across Defence by Director General DSA on 7 Aug 15. Specific recommendations for the Naval Service are as follows. Witness 14

1.4.20 **Recommendation: Flag Officer Sea Training should review the training requirement for the Wet Bulb Globe Thermometer to ensure that all required users are suitably trained.**

1.4.21 **Recommendation: Flag Officer Sea Training should ensure that those qualified to use the Wet Bulb Globe Thermometer are using it line with the direction given within JSP 539.**

1.4.22 **Recommendation: Flag Officer Sea Training should ensure that formal Wet**

[8] Adherence to the guidance will minimise the risk of heat illness to 95% of normal, healthy personnel. Despite preventive measures, heat illness can still occur, and all personnel should remain vigilant to this risk.

[9] Email fm Lt Cdr [redacted] (NAVY MED_EH POL SO2) to Cdr [redacted] RN (CO HMS TEMERAIRE/SO1 PEd) 0926 2 Jul 15, positively supporting the provision for PTs to be trained in the use of the WBGT.

[10] http://www.hse.gov.uk/risk/theory/alarpglance.htm.

Bulb Globe Thermometer train the trainer courses are delivered to all Naval Service Physical Trainers.

Environment Summary

1.4.23 Whilst the implementation and use of the WBGT was not in line with that stated in JSP 539, it is the opinion of the SI that, given the benign conditions of the day, Heat stress did not contribute [redacted] death. However, due to lack of formal training the operation of the WBGT was not conducted iaw JSP 539. An Urgent Safety Notice was released across Defence by DSA on 7 Aug 15. The Joint Service Heat Illness Working Group[11] (HIWG), under the Surgeon General[12], has been briefed of the training gap. The HIWG and Naval Service Environmental Health have welcomed and approved recommendations for the training of RN personnel.

Suitability to Participate

1.4.24 The SI examined whether [redacted] had undergone the prescribed medical screening and was fit to take part in the 30 Miler. During interview the SI questioned several interviewees on [redacted] physical and mental condition prior to and during the 30 Miler. The SI looked at the following areas: medical screening; determination and drive; physical condition.

Medical Screening

1.4.25 **Pre-CTCRM Screening** [redacted] was medically assessed three times during recruitment and initial training, including two aircrew medicals and one for Cdo training[13] . Two of the medicals were more detailed than basic new-entry medicals as he was applying to train as a pilot, for which the requirements are more stringent. The initial assessment included a review by a cardiologist of his electro-cardiogram (ECG) (heart tracing). The SI Medical Advisors reviewed [redacted] medical records. They advised the SI that there were no findings during the medical screenings that indicated that [redacted] may have had an increased risk of cardiac arrhythmia. Annex E

1.4.26 The pathology report describes one potential heart condition as [redacted] Individuals with this condition have a structurally normal heart with a normal ECG at rest but a high risk of ventricular arrhythmias (electrical abnormality) triggered by adrenalin and similar bio-chemicals in the body due to extreme physical exertion and emotional stress. This condition Annex E

[11] Established to regularly review and update the guidance in JSP 539, using subject matter experts drawn from across the UK military.

[12] The Surgeon General is the clinical director of the Defence Medical Services Department which is the headquarters for the Defence Medical Services. It is a joint service organisation with personnel from all three services and Ministry of Defence civil servants working together to ensure "provision of strategic direction to the Defence Medical Services to ensure coherent delivery of all medical outputs".

[13] The applied standards and specific assessment requirements for General Service entry fitness assessment are detailed in JSP950 6-7-4 /BR1750A 0304 and JSP950 6-7-3 paras 1-3a; 5-7 & Annex B. Additional investigations may be undertaken on a case by case basis as indicated by clinical risk assessment at entry medical assessment and condition-specific policy requirements. Higher standards and lower thresholds for required referral for Service Occupational Medicine Specialist input to final entry fitness determination in relation to some (largely musculoskeletal) conditions are applied to RM candidates i.a.w. JSP950 6-7-4.1 policy.
Aircrew candidates cleared for General Service entry progress to additional Initial Aircrew Medical assessment. Relevant standards are laid down in BR1750A para 1104 and AP1269A Section 5 / Leaflets 4-01/ 4-02 Annex A / 4-05 and specific assessment requirements in AP1269A Leaflets 3-01 paras 8-19/ 4-01 Annexes A,B & F / 4-05. Additional clinical investigations may again be undertaken on a case by case basis as indicated by clinical risk assessment and condition-specific policy requirements. Assessment is again further directed by recording on standard proformae (FMed 144 - Medical Board to assess fitness for commission, or aircrew duties).

[14] [redacted]

as well as other conditions related to Sudden Adult Death Syndrome (SADS) may present itself in periods of unconsciousness. However, there is no evidence that [redacted] had experienced a sudden loss of consciousness during exercise previously. Hence, there was no reason to consider him at risk. The Pathologist report was reviewed by the SI Medical Advisors and they support the validity of the pre-employment medical screening process which did not pick up this cardiac condition as medical screening techniques do not currently exist for it. The SI concluded that the Pre CTCRM Medical screening was not **a factor**.

1.4.27 However the SI **observed** that 1 in 10 deaths in the Armed Forces are due to cardiovascular disease[15] which commonly occurs during or after intense exercise. The physical requirements of service demand periods of intense exercise and requires Defence to fully understand cardio conditions.

1.4.28 **Recommendation: The Surgeon General should establish a process to continually seek improvements in medical screening in order to develop measures that can reduce the risk of death due to latent medical conditions.**

1.4.29 **CTCRM Medical Check.** During interviews it became apparent that [redacted] had been suffering from a dry cough in the days preceding the 30 Miler. Of note, [redacted] had failed and then subsequently passed the Tarzan Assault Course Cdo Test the day prior to the 30 Miler (See 1.3). After he had passed the Tarzan Assault Course on his second attempt he looked unwell and was sent by the CI to the CTCRM Medical Centre to ensure he was fit to attempt the 30 Miler. At the Medical Centre he was assessed by the senior GP (PMO CTCRM). The medical assessment found that he had normal blood pressure, normal temperature and clear chest with normal heart sounds. With the exception of a fast heart rate, which was in line with that expected 15 minutes after the Tarzan Assault Course, there were no abnormal findings that would have suggested he was unfit to attempt the 30 Miler. The PMO advised [redacted] that he should stop during the 30 Miler if he felt unwell. The Pathologist report was reviewed by the SI Medical Advisors and they support the initial review of the PMO medical assessment the day before the 30 Miler. The SI concluded that the medical check was appropriate and was **not a factor.**

Annex E
Witness 3
Witness 6
Witness 10
Witness 11
Witness 12
Witness 14
Exhibit 15

1.4.30 **Reporting of Injury/Illness.** The SI examined the culture surrounding the reporting of illness and injuries. There is currently no system in place to estimate the degree to which illness or injury is under-reported at CTCRM. From interviews conducted by the SI there is an assumption by the Chain of Command (CoC) at CTCRM that suitable safety nets are in place. The key safety net is to ensure accessible care for the medical centre's population at risk (PAR). Interviewees have stated that there is a high degree of satisfaction within the PAR in that respect: the standard General Medical Council Patient Satisfaction Questionnaire (PSQ) includes opportunities to comment on accessibility. Several interviewees remarked how difficult it is to hide illness or injury whilst under training at CTCRM. In the opinion of the SI Medical Advisor, there have been a number of recently trained RM Officers and men who present to the medical centre of their first unit stating delays in presentation because a fear that presenting at CTCRM may be professionally harmful. The SI has assessed through interviews that accessible care for the CTCRM population does exist and is positive. However, the SI has **observed** that the integrity of the information presented to the CTCRM Medical Centre by personnel under training requires further scrutiny and an anonymous audit of RMYOs either at CTCRM or in their first Cdo unit should be undertaken.

Annex E
Witness 2
Witness 3
Witness 5
Witness 6
Witness 11

1.4.31 **Recommendations: Defence Primary Healthcare HQ Regional Clinical Director (SW) Naval Service should routinely conduct an anonymous medical audit of Young Officers and Recruits either at CTCRM or at their first Cdo units in order to ensure that medical conditions are not being under reported during training.**

[15] Cox AT, Boos CJ, Sharma S. J R Army Med Corps 2015: 161:169-172.

Determination and Drive

1.4.32 The SI examined [redacted] motivation, focus and conduct prior to the 30 Miler in order to understand his behaviours and state of mind prior to and during test week. The SI considered the following areas: determination and Cdo spirit.

1.4.33 **Determination.** It is the opinion of the SI that a YO who wishes to pass to become a Royal Marine Officer will push themselves to levels which they are unlikely to have previously experienced. These activities may push the individuals to the physical and mental limits of what their body is capable of sustaining. Indeed, part of the allure and attraction of such a soldiering role is the personal, mental and physical challenge of self and professional development. The balance between pushing oneself to earn the right to wear a Green Beret, and knowing when to stop, may not always be informed by a rational judgement. Indeed, the individual may be extremely fatigued and unable to make the decision to stop at the very time when it is crucial.

1.4.34 **Cdo Spirit.** CO Cdo Wg describes Cdo spirit as a flexibility of mind-set, a will to win and moral integrity. Cdo spirit drives and motivates both instructors and candidates to push themselves to extraordinary limits. This is an integral aspect of Cdo training. CTCRM is required to provide the YOs with the opportunity to demonstrate Cdo spirit and 'will to win'. CTCRM is required to test an individual's ability to show resilience to fatigue beyond normal boundaries. In essence the decision on what is mentally and physically tolerable is handed to the individual at the exact moment when they may be unable to think rationally due to fatigue. Whilst control measures are in place, they rely on the individual to stop. The SI, supported by HF investigation, looked into the personal motivation of candidates to push themselves to their limits. [redacted] was considered by his fellow YOs, friends and DS to be highly motivated to become a RM officer. Based on witness statements, the SI concluded that [redacted] was determined and driven to succeed whilst maintaining high professional standards. He has consistently been described as being focussed, a high performer and someone who would push himself to achieve. He was in the top third of the course and perceived to have been someone who would have made a good RM officer.

Annex F
Witness 6
Witness 11
Witness 19
Exhibit 16

Physical Condition

1.4.35 The SI examined relevant exhaustion implications of [redacted] activities prior to the 30 Miler to fully understand what impact it would have had on his performance. The SI considered the following areas; nutrition, fitness, overtraining, fatigue and degradation.

1.4.36 **Nutrition.** [redacted] was known in his cohort for being serious about his nutrition, largely following a CrossFit[16] approach to nutrition before arriving at CTCRM. CrossFit is based on a 'paleo' diet, where food intake is based upon garden vegetables, especially greens, lean meats, nuts and seeds, little starch, and no sugar. There did not appear to be a general culture on the YO course for taking supplements; this was reinforced by the training and medical staff who advise the YOs not to take supplements or powders. The briefing prior to the 30 Miler includes advice by the MA on nutrition. The importance of carbohydrate in terms of endurance type exercise, particularly over long periods of time, is well known; indeed the Mess food was considered to be providing high carbohydrate meals to fulfil this requirement. The YOs, including [redacted], all ate the Mess food at CTCRM daily. The SI has no evidence to suggest that nutrition impacted on [redacted] health or well being during the Cdo Tests. However, the SI **observed** that the longer term storage of carbohydrate in trainees who have followed restrictive diets as part of their general lifestyle

Witness 2
Witness 3
Witness 10
Witness 16
Exhibit 17
Exhibit 18
Exhibit 19
Exhibit 20

[16] A physical exercise physiology and also a competitive fitness sport, CrossFit workouts incorporate elements from high intensity interval training, Olympic weightlifting, plyometrics, powerlifting, gymnastics, girevoy sport, calisthenics, strongman, and other exercises.

and the influence on military training is worthy of further investigation by Defence.

1.4.37 **Recommendation: Assistant Chief of Staff (Medical), Naval Command HQ, should examine the longer term health effects for personnel on restrictive diets prior to military training in order to determine if such diets create nutritional deficiencies.**

1.4.38 **Recommendation: Commander Core Trg Naval Command HQ, should provide nutrition advice to new recruits before joining the Naval Service.**

1.4.39 **Fitness.** The first phase of RM PT is conducted in the Gymnasium through Initial Military Fitness (IMF), where all trainees are required to pass the IMF Pass Out assessment in week 9 of training. This enables the trainee to progress onto the Advanced Military Fitness, Battle PT and Cdo Tests. [redacted] took his physical training seriously and applied a 'CrossFit' cardio and resistance approach to his fitness whilst trying to follow a strict nutritional diet. He achieved a PT 'Superior' pass, which is awarded to an individual who excels in the gymnasium during IMF, having consistently performed at the top of his peer group during all physical aspects. This accomplishment is achieved on a subjective basis from the Batch's Physical Training Instructor (PTI) in consultation and scrutiny from a senior member of the PT Staff, in accordance with Instructional Specification and IMF guidelines. Whilst it was noted that [redacted] was a top performer in a controlled internal Gymnasium environment, his test results suggests that these physical attributes were not fully transferable to the harsher and more demanding outdoor physical lessons and Cdo tests, where his results were average.

Witness 6
Witness 11
Exhibit 4
Exhibit 5
Exhibit 6
Exhibit 17

1.4.40 **Overtraining.** [redacted] was committed to his nutrition and training regime. The SI considered whether he might be overtraining. Overtraining syndrome reflects the body's inability to adapt to cumulative fatigue resulting from daily, intense exercise training that is not balanced with appropriate and sufficient rest. Overtraining is a process of excessive exercise that may, if left unchecked, lead to a condition termed 'overtraining syndrome'. It is characterised by persistent fatigue and poor performance in results/achievements and changes in mood state. It can also involve frequent illnesses, such as Upper Respiratory Tract Infection[17] (URTI). Respiratory chest complaints are common amongst the YOs. [redacted] cough and complaint of a tight chest was noted by several CTCRM staff. During interviews the SI can also confirm that [redacted] informed his close friends that he was not feeling well throughout the week. Recovery from overtraining syndrome may require weeks to months of complete rest or greatly reduced exercise training. However, during interview, several interviewees suggest that he did no extra training over and above the other YOs. Although he is considered to have worked harder on his fitness than many of his Batch, there is no direct evidence to reveal that he was overtraining. The SI asses that overtraining was not a factor in [redacted] performance but **observed** that it may impact on the performance of other YOs and Rcts. Moreover, that a combination of structured PT and individual training can lead to sub-optimal performance.

Witness 3
Witness 4
Witness 6
Witness 11
Witness 12

1.4.41 **Recommendation: Flag Officer Sea Training should provide education to the Directing Staff, Young Officers and Recruits on the negative impact of overtraining on performance.**

1.4.42 **Fatigue.** All RM Cdos undergo Cdo tests over an 8 day period. Of significance to this SI, YOs are to complete the 30 Miler within 7hrs, whereas Rcts get 8hrs. The rationale presented by CTCRM for the difference in time is to ensure the YOs are physically fit enough to lead Cdos in arduous conditions, then having the extra physical and mental capacity to deal with unforeseen circumstances. In essence, the YOs lead other Cdos from the front and have enough extra physical and mental capacity left in reserve in order to meet

Witness 5
Witness 18
Exhibit 2
Exhibit 16

[17] An upper respiratory tract infection, or upper respiratory infection, is an infectious process of any of the components of the upper airway.

any new challenges. The SI could find no scientific justification for the 1hr differential in times of YOs and Recruits. In order to establish a metric for the Operational Performance Statement (OPS)[18] for YOs, the SI has **observed** that CTCRM requires some scientific evidence underpinned by DSAT.

1.4.43 **Recommendation: Commander Core Trg Naval Command HQ, in conjunction with the institute of Naval Medicine should review the differentials in time allowed to complete the 30 Miler to ensure the rationale for the Operational Performance Statement is robust and appropriate.**

1.4.44 **Degradation.** Degradation is central to the CTCRM training vehicle for YOs to demonstrate their Cdo spirit. Each YO Batch will undertake a 3-week operational exposure exercise called Ex CRASH ACTION. During this exercise the YOs will be subjected to fatigue, field living and a sustained lack of sleep. Whilst the Rcts are tested at the end of a physically demanding phase of training, they are subject to a much less demanding degradation exercise prior to commencing the Cdo Tests. Indeed, the OPS for Rcts demands less from them. Through interviews the SI has been informed that the YOs are expected to lead and have the flexibility of mind to command their men when fatigued; the more demanding pre Cdo test exercise gives them the opportunity to prove this to the DS.

Witness 3
Witness 4
Witness 16
Witness 18
Witness 19
Exhibit 5
Exhibit 17

1.4.45 However, degradation does impact on the immune system. [redacted] informed his close friends that he was not feeling well throughout the week post Ex CRASH ACTION. [redacted] cough and complaint of a tight chest was noted by several CTCRM DS. [redacted] had reported an injury during Ex CRASH ACTION and was rested for 24hrs by the DS, after which he returned to and completed the remainder of the exercise. There is no evidence to link degradation to [redacted] performance.

Exhibit 17

1.4.46 **Control Measures.** The SI observed that a combination of his drive and determination may have hidden the full extent of [redacted] physical state prior to the 30 Miler. The SI therefore considered what more could be done in future to manage the risk posed by individuals pressing on while not fit to do so. Haddon-Cave[19] details a 'questioning culture' and is of the opinion that a culture which does not question medical decisions or provide equally informed judgements based upon performance and knowledge of an individual is not conducive to a robust safety culture. Medical opinion does indeed have a vital role and input, and if positive identification of symptoms or injury is identified, these should take primacy; however, [redacted] showed a lack of positive evidence of illness or injury. The SI assess that the consideration as to whether or not an individual should continue to train needs to be expanded to include the CoC; for example the Batch Officer and CI for all CTCRM training. It is possible to conceive a Veto Protocol where the decision to 'train or not train' has 2 levels. Level one is held at the Medical Centre and level 2 held with the DS. This can be assisted with an 'advisory note' system for situations where the medical staff are unable to provide a clear diagnosis, but there remains a suspicion of sub-optimal health. This would ensure DS formally monitor an individual at a critical phase of training, in particular during a phase of intense physical exertion such as the Cdo Tests (This is different to a Light Duties chit, as they are able to continue with the training programme, but with a greater level of supervision by the DS). Moreover, during periods of heightened physical activity the Veto Protocol would require all key participants in the protocol to meet and formalise the decision. Crucially, the enactment of a Training Veto should not be viewed as a student failure, but as the application of a safe working practice.

1.4.47 **Recommendation: Commander Core Trg Naval Command HQ should**

[18] JSP 822 – Operational Performance Statement is derived from the Job Analysis, the OPS is a detailed statement of the tasks/sub-tasks required to be undertaken by an individual to have the operational/workplace performance. It is written in terms of Performance, condition and Standards.

[19] Haddon-Cave C, An independent review into the broader issues surrounding the loss of the RAF Nimrod MR2 aircraft XV230 in Afghanistan 2006. Oct 2009 HC1025 London.

consider implementing a Cdo Test Veto protocol.

Suitability to Participate Summary

1.4.48 The SI can find no evidence to suggest that [redacted] death could have been anticipated by medical screening using currently available techniques. Indeed he received screening above the initial entry standard for a RM YO. Moreover, his medical assessment the day prior to the 30 Miler was appropriate. However, the SI has a number of recommendations to promote best practise and ensure to the greatest extent possible that future participants in the Cdo Tests are fit to participate.

Planning and Assurance

1.4.49 The SI investigated the planning of the 30 Miler. This was to ensure that the preparation for the event and briefing to all participants was delivered correctly and with the requisite amount of detail. Six key areas were looked at: the CTCRM Risk Assessment; 30 Miler Directive; 30 Miler Route; 30 Miler Brief; Hydration Policy and Training Assurance.

30 Miler Planning

1.4.50 **CTCRM Medical Risk Assessment.** The SI has examined the CTCRM Risk Assessment for the 30 Miler and can confirm that the assessment does not currently cover undefined medical conditions. Furthermore, the overriding CTCRM Medical Risk Assessment does not currently cover undefined medical conditions. Since the sudden cardiac arrhythmia cannot currently be screened for, this condition presents a risk to CTCRM and should be reflected in their Risk Assessment. The SI **observed** that CTCRM should include undefined medical conditions not covered in the Risk Assessment for the 30 Miler.

Exhibit 2
Exhibit 21

1.4.51 **Recommendation. Commander Core Trg Naval Command HQ should include undiagnosed medical conditions within the 30 Miler and overall CTCRM Medical Risk Assessments.**

1.4.52 **30 Miler Directive**. The SI examined the directives and briefs which were delivered to the 30 Miler participants. This was in order to ensure that the briefs were in line with the 30 Miler test requirements and that they provided the necessary detail to enable the safe and successful execution of the 30 Miler. The 30 Miler Directive provides the direction and orders for the execution of the 30 Miler including safety, timings, conduct and medical cover. The 30 Miler route crosses Dartmoor Training Area (DTA) beginning at Okehampton Battle Camp and finishing at Shaugh Prior Bridge (Fig 1.4.4). The 30 Miler Directive was cross referenced with interviews conducted with the DS and YOs who participated on the 30 Miler on 28 May 15. Having conducted this cross reference, the SI found that CTCRM was acting in accordance with the YO training programme, which is the reference document for all training activity including the 30 Miler. In particular, the mandated time and load carried for the 30 Miler Cdo test were in accordance with the Directive. The DS on the day were compliant with the Cdo Training Wg Directive and in the opinion of the SI the Directive was not a factor in [redacted] death.

Annex B
Witness 1
Witness 3
Witness 4
Witness 8
Witness 9
Witness 10
Exhibit 2
Exhibit 16

1.4.53 **Route.** The route is broken down into 6 legs with 6 check points. Two Safety Supervisors, one Officer and one NCO[20], complete the route with each syndicate of approximately 8 students. The Safety Supervisors are present to operate the communications to the March Comd, check the navigation and provide support for anyone becoming a casualty during the event. The YOs are responsible for the navigation and are

Annex B
Witness 8

[20] Safety Supervisor minimum rank is Cpl.

allocated a leg which they must lead. The YOs must complete the 30 Miler in less than 7hrs.

Fig 1.4.4- RMYO 30 Miler Cdo Test Route

1.4.54 **30 Miler Brief.** The day before every 30 Miler the DS, YOs and support staff are given a verbal brief at CTCRM (supported by PowerPoint) on the medical and administrative details of the event. The SI confirmed that the brief had been delivered to all participants and support staff and analysed the power point presentation within the brief to ensure that it provided the correct detail and covered: timings, safety, medical cover, routes, dress, and nutritional advice. This was then cross referenced with witness interviews to ensure the brief was delivered correctly. The 30 Miler Brief was delivered to all personnel involved in the 30 Miler and contained all administrative and medical support requirements of the 30 Miler. From interviews and study of the 30 Miler the SI found that the timings, safety, medical cover, routes, dress, and nutritional advice given in the brief had been followed by the DS and YOs. However, the SI noted that the hydration advice given during the 30 Miler brief was unusual and warranted further examination.

Annex B
Witness 3
Witness 4
Witness 6
Witness 8
Witness 10
Witness 12
Exhibit 22

1.4.55 **Hydration Policy**. The hydration policy is detailed in the CTW 30 Miler Directive Annex A, dated 18 May 15. The policy requires each Rct/YO to consume 13 litres of fluid, between the period of evening meal in Okehampton at 2100, through to completion of the 30 Miler at approximately 1300 the next day. For a YO this relates to 13 litres over a 16hr period including sleep. It is possible to become seriously ill or even die from Hyponatraemia (over hydration). Due to volume of water consumed, the SI sought to establish whether over hydration could have contributed to [redacted] death. The hydration detail contained within

Annex A
Annex E
Witness 5
Witness 6

the 30 Miler brief was passed to the Institute of Naval Medicine (INM)[21] who agreed that, on initial investigation, the amount of water directed to be consumed during the 30 Miler "seemed excessive". From interviews with DS and YOs it appears that [redacted] followed the hydration and nutritional advice given in the 30 Miler brief; he would have ingested 6.5 litres within 12 hours of the 30 Miler. The Pathologist identified that [redacted] was actually mildly dehydrated, consistent with the level of physical exertions of conducting the 30 Miler. The Pathologist confirmed that Hyponatraemia was not the cause, nor did it contribute to [redacted] death. However, the SI considered hydration to be an **other factor** in light of further evidence, debate and argument within the wider scientific community regarding hydration guidelines.

Witness 12
Exhibit 22

1.4.56 **Recommendation: Chief Medical Officer EMS Institute of Naval Medicine should conduct a thorough review of the hydration policy specific to the 30 Mile Cdo Test to ensure that it is based on the best advice available.**

Assurance

1.4.57 The SI investigated the training assurance, including the external and internal auditing system to look for evidence of continuous improvement. External audits are conducted by the Training Requirements Authority for the CTCRM who is the RM Requirements Manager in NCHQ Branch Management. The SI determined that an external 2nd party audit had not been conducted by NCHQ in the last 2 years due to manpower shortages. The Training Delivery Authority rests at 1* Commander Core Training who delegates authority for the delivery and assessment of training to the Deputy Duty Holder who is Commandant CTCRM. The 30 Miler is the Operational Performance Statement (OPS)[22] determined by 3 Cdo Brigade and is outlined in the 30 Miler Directive. The SI investigated whether CTCRM were complying with the Defence Systems Approach to Training (DSAT) process. In particular the DSAT Quality Standard (DSAT QS). JSP 822 defines DSAT QS as the standard which underpins all management of training:

Witness 19
Exhibit 23
Exhibit 24

a. A means of ensuring that individual training and education is delivered to meet the operational/business requirement of the MOD.

b. A framework against which a training organisation/school can develop and implement the Quality Management System that best meets their operational/business need.

c. A Defence-wide benchmark against which the management and provision of individual training and education can be evaluated and good practice identified and implemented across the MOD.

1.4.58 An internal 1st party audit has been conducted on Command Wing (including the YO Cse) as oversight of the Training Delivery Wing and that the DSAT process is in place at CTCRM. However, due to manpower shortages and defence transformational changes, the external auditing system has not been implemented in line with best practice. As a result the YO Cse has not been audited by a 2nd party in the last 2 years[23] and the SI considered this to be an **other factor.** A 2nd party audit would provide external review of their existing procedures, and the assurance that they are compliant with Defence training policy.

Exhibit 23

[21] The Royal Navy's centre of excellence for occupational health advice, information, training and research.
[22] JSP 822 – Operational Performance Statement is derived from the Job Analysis, the OPS is a detailed statement of the tasks/sub-tasks required to be undertaken by an individual to have the operational/workplace performance. It is written in terms of Performance, condition and Standards.
[23] 2nd party audit should be conducted every 2-yrs

1.4.59 **Recommendation: Commander Core Trg Naval Command HQ should conduct a 2nd Party Audit of CTCRM to provide assurance that the training delivered is compliant with Defence training policy.**

1.4.60 The SI can find no evidence to suggest that [redacted] death was influenced by the Planning or Assurance of the 30 Miler. However, the Hydration policy should be reviewed in light of new evidence and a 2nd Party Trg Audit should be conducted on CTCRM.

Supervision and Medical Cover

1.4.61 The SI examined the supervision and medical cover of the YOs, in particular the 24hrs leading up and during the 30 Miler. The SI looked at a number of areas: historical cases, medical cover during the 30 Miler and safety staff qualifications.

30 Miler Medical Cover

1.4.62 **Medical Supervision.** Medical supervision for the 30 Miler is provided by CTCRM Medical Centre and allocated to the 30 Miler by the Cdo Trg Wing (CTW). Only one MA and BFA with driver is allocated to support the 30 Miler. This offers the March Comd support for one seriously ill or injured patient and it is not sufficient, or intended, for multiple serious injuries. At CP2 the DS running the CP observed that [redacted] appeared normal, with the expected amount of fatigue showing that such an event would induce. Whilst the DS had highlighted [redacted] for close monitoring during the 30 Miler, [redacted] was not referred to the MA as the MA was attending another YO at CP2. It is the opinion of the SI that no indication of ill health was evident at CP2. Therefore, the lack of a medical inspection of [redacted] at CP2 was not a factor in his death. However, the SI noted that dependence on a single MA may impact on the medical supervision of other YOs and Rcts and should be considered as an **other factor**.

Witness 6
Witness 8
Witness 10
Witness 14
Exhibit 2

1.4.63 **Medical Assets.** Once he had collapsed [redacted] treatment fixed the only medical asset available to the 30 Miler. As the 30 Miler progressed on 28 May 15 another YO also collapsed and since the event medical asset was not available, the YO received initial treatment from the CTW Syndicate Secondary Safety DS. CTCRM DS are trained to a battlefield first aid standard and are lightly equipped with medical evacuation equipment in the form of the Field Stretcher and Combat First Aid Kit.

Witness 8
Witness 9
Witness 10

1.4.64 **Recommendation: Principal Medical Officer CTCRM should conduct a comprehensive review of the medical support to all Cdo Tests to ensure that it is adequate deal with multiple casualties and provide medical oversight of all participants.**

Historical Cases

1.4.65 In order to provide correlation to historical events the SI examined previous CTCRM fatal injuries. CTCRM injury statistics highlight 6 personnel who have died in Cdo training since 1996. The circumstances surrounding the deaths of a Warrant Officer and a Marine who previously died on the 30 Miler have been examined by the SI. Several recommendations made by the Naval Service Board of Inquiry and HM Coroner for Plymouth after a death during the 30 Miler in 1997 are currently not in place. The SI **observed** that these recommendations remain valid[24].

Exhibit 25
Exhibit 26
Exhibit 27

1.4.66 **Recommendation: Commander Core Trg Naval Command HQ should**

[24] This may lead to the addition of a second MA on the 30 Miler or an adjustment to the test to enable this recommendation.

ensure that all participants receive a short medical interview prior to the 30 Miler and that an MA should inspect all participants at each checkpoint.

Staff Qualifications

1.4.67 **RM Staff Qualifications.** Non-Commissioned Officers without specialist PT qualifications deliver some aspects of the Cdo tests and troop physical training by virtue of completing their Senior Command Course (SCC) for Sgts and Junior Command Course (JCC) for Cpls respectively. This is annotated in the SCC and JCC Training Performance Statements (TPS), which states Sergeants can deliver Troop PT including Speed Marches, and that Corporals can deliver Section PT. Once qualified, no further validation is required, and individuals remain in date for the reminder of their time in the Service. However, investigation into the course programmes revealed that no formal instruction or assessment takes place, other than these courses receive a mandatory brief. This is in contrast to the Naval Service, Army and RAF, who deliver an Endurance Training Leader (ETL) course for non PT specialists. ETL is a 5-day course to train, assess and qualify personnel to the same standard as required in the RM SCC & JCC TPS. This ETL qualification remains valid for a 3 year maximum period, or until an individual's first aid qualification expires (whichever is sooner). On successful completion of the ETL course, the individual's competency profile is updated on JPA. The SI **observed** that the use of SNCOs and JNCOs to deliver directed PT remains at risk until a formal review of these command courses is completed. The SI has identified that these competencies were not a factor in [redacted] death, but is of the opinion that the RM are not following best practice and should factor in through life assurance of RM PT.

Witness 11
Exhibit 28
Exhibit 29
Exhibit 30
Exhibit 31
Exhibit 32
Exhibit 33
Exhibit 34
Exhibit 35

1.4.68 **Recommendation: Commander Core Trg Naval Command HQ should remove the PT competencies reflected in the SNCO and JNCO Command course.**

1.4.69 **Recommendation: Commander Core Trg Naval Command HQ should review the Training Performance Standard required by SNCOs and JNCOs to formally facilitate and deliver PT as part of formal training.**

Supervision and Medical Cover Summary

1.4.70 The single medical asset committed to the 30 Miler was insufficient. When [redacted] collapsed his treatment fixed the only medical asset available to the 30 Miler and relied on the DS to conduct medical cover. CTCRM DS are not equipped, trained or qualified, to deal with serious injuries.

Medical Response and Treatment

1.4.71 The SI examined the medical response given to [redacted] after he collapsed on 28 May 15 to ensure that it was appropriate and timely. This included the immediate actions by the March Comd, [redacted] treatment at CP2 and response of emergency services.

1.4.72 **Triage**. The Syn 2nd Safety, who was at the rear with [redacted] when he collapsed, immediately shouted to the Primary Safety to stop and informed him of the situation. The Primary Safety then used his Airwave Radio to inform the March Comd of the incident. Initial first aid was delivered by the Secondary Safety immediately after [redacted] collapsed. It was observed that he had a rapid faint pulse and very shallow breathing. He was unconscious and unresponsive to any verbal or physical interaction. [redacted] equipment was removed and he was then placed in the recovery position, at which time the remainder of the Syn prepared a stretcher for his extraction. Initially unable to reach the March Comd, the Primary Safety passed the details of the incident to the March Co-ord. The March Comd quickly managed to establish communications and, under the advice of

Annex C
Witness 1
Witness 8
Witness 9
Witness 12

the Primary Safety, the March Comd dialled 999. The March Comd was the primary coordinator throughout the extraction to the rendezvous (RV) with the civilian air ambulance at CP2. The SI Medical Advisors have confirmed that these actions were appropriate for immediate triage.

1.4.73 **Immediate Actions by March Comd**. The March Comd directed Syn 4 Primary Safety to RV with the BFA. The RV was chosen as it was the nearest accessible point due to terrain and width of the access track. Syn 4 began to carry [redacted] to the RV at 0909 using the stretcher held within their march safety equipment. At this stage he was being monitored by the Second Safety and was breathing, had a rapid faint pulse, but was unresponsive. It is the opinion of the SI that the recovery to the BFA and subsequently the RV with the air ambulance and the call for assistance was good practice. Witness 1 Witness 12

1.4.74 **Treatment at CP2.** The BFA arrived at CP2 at approximately 0924. At this point the MA observed that [redacted] had stopped breathing and had no pulse. The MA immediately asked the CI to begin Cardiopulmonary Resuscitation (CPR) as she prepared the defibrillator. The CI continued with CPR until the defibrillator was attached at 0928, at which time the defibrillator advised that it was not suitable to administer a shock[25] to [redacted] The ECG print out covers a period of approximately 8 minutes, from 0928 to 0936 on 28 May 15. The CI continued with CPR until the air ambulance crew arrived and removed the defibrillator to allow access for their equipment. The defibrillator reads the heart rhythm, once every two minutes, and each time the defibrillator analysed the heart no obvious electrical activity in the heart was indicated. As a result the defibrillator advised no shock to be given, which was confirmed by interview with the MA. The defibrillator continued to monitor until the device was removed at 0936 when the air ambulance crew took over [redacted] treatment. From the analysis of the defibrillator print-out by the SI Medical Advisors, the CPR given to [redacted] by the CI was at a good and sustained rate and was the appropriate treatment. The SI **observed** that the action by the MA and the CI, who tried to resuscitate [redacted] was commendable given the circumstances. Annex D Witness 6 Witness 10

1.4.75 **Emergency Services Actions**. The air ambulance arrived on the scene (0928) and was met by the March Comd who guided the paramedic to the casualty. On their arrival the MA conducted a hand over to the civilian paramedics who then took over all responsibility for life support. At approximately 1030 the paramedics informed the MA that [redacted] was not reacting in any way to their treatment and pronounced him dead at the scene at 1032. The CI then remained with [redacted] and accompanied him to Derriford Hospital in a civilian land ambulance, departing CP2 at 1158 and arriving at the Mortuary at 1239. In the opinion of the SI Medical Advisor, the treatment of [redacted] at CP2 was appropriate. Witness 6 Witness 8 Witness 10 Exhibit 10

Medical Response and Treatment Summary

1.4.76 SI Medical Advisors have confirmed that these actions were appropriate for immediate triage and that the CPR given to [redacted] by the CI was at a good and sustained rate. Moreover, the SI Medical Advisors can confirm that the treatment of [redacted] at CP2 by the air ambulance crew was appropriate. This is supported by a review of several interviews by the SI Medical Advisors and the heart rhythm read out from the defibrillator data card which confirms the CPR actions taken. Moreover, in the SI Medical Advisors opinion, the action by the Medical Assistant (MA), and the CI who tried to resuscitate [redacted], was commendable. Annex D

[25] The procedure involves the delivery of an electric shock to the heart and re-establishes normal conduction of the heart's electrical impulse. The machine used to deliver this therapeutic shock to the heart is called a defibrillator.

Equipment

1.4.77 The SI TORs required the SI to determine the serviceability and deficiencies relevant to the incident and that the equipment used on the day of the 30 Miler was working, appropriate and used correctly. The WBGT has been covered earlier in the report. The SI looked at further two key pieces of equipment: defibrillator and the Airwave communications system.

Defibrillator

1.4.78 The defibrillator used by the MA was a Heartstart FR2 (local No 20929798 CTC MC 0086) as shown in Figure 1.4.5. This equipment provides emergency first responders with an effective means to treat victims in Sudden Cardiac Arrest (SCA). It is lightweight, rugged and easy-to-use Automated External Defibrillator (AED) allowing first responders to deliver lifesaving therapy as soon as they arrive on the scene. The memory card from this equipment used by the MA was handed to the manufacturer, Laerdal Medical Ltd, on 30 Jun 15 to provide a data print out of evidence of [redacted] ECG. The accuracy and clarity of this evidence supported the manufacture's feedback that the equipment was fully operational.[26]

Annex D

Fig 1.4.5 - Defibrillator Case

Fig 1.4.6 – Defibrillator Contents

Communications

1.4.79 During the 30 Miler the Primary Safety for each Syn carried an Airwave Radio[27] in order to communicate with the March Comd if there was a problem during the 30 Miler. During interviews concern was raised by several of the interviewees that some of the Syn on the day were too spread out. The general guidelines on the spread of Syn on the 30 Miler are that they keep within shouting distance of each other. This enables the pace to be set by the Primary Safety, allowing verbal communication between DS providing supervision.

Witness 1
Witness 6
Witness 12

1.4.80 When [redacted] collapsed the Syn were close together and so communications was not judged to be a factor in this incident. However, from interviews it is apparent that the Syn had been spaced over a large distance prior to arriving at CP2. If the Syn had been separated it may have caused a delay in obtaining medical help and as such the SI considers it to be an **other factor.** The SI recommends that 2 Airwave radios should be carried by each Syn on the 30 Miler in order enable communications in case the Syn become split, for example, during bad weather. The CTCRM CoC has implemented this advice.

Annex A
Witness 1
Exhibit 2

1.4.81 **Recommendation: Chief of Staff CTCRM should ensure that the Primary and Secondary Safety can communicate with each other and the March Comd.**

[26] Telcon WO1 [redacted]/Mr [redacted] (Laerdal Medical Ltd) dated 14 Sep 15.
[27] Airwave is a British mobile communication company that operates the Airwave Network.

Equipment Summary

1.4.82 The SI can find no evidence to suggest that [redacted] death was influenced by the equipment used on the 30 Miler. However, the use of two Airwave radios in each syndicate would provide more robust communications.

Other Matters

1.4.83 **CTCRM Structure**. The organisation which undertakes Cdo training for YOs is Command Wing but is separate from the Commando Training Wing who organises and runs the 30 Miler. This structure may create gaps in communication at a critical time of training. Many of the supervisory staff on the 30 Miler will not have met the YOs or Rcts prior to the event. As such they may not have been fully briefed on injuries, illness or any risk candidates within their Syn. The SI **observed** that the disconnect in TORs may hinder the proper supervision of risk candidates.

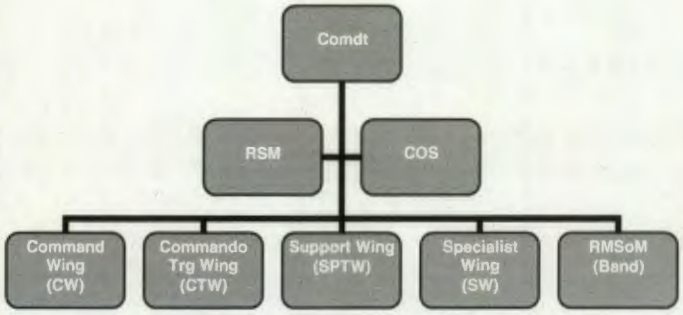

Fig 1.4.7 – CTCRM Structure

1.4.84 **Recommendation. Chief of Staff CTCRM should review the co-ordination between Command Wing and Cdo Training Wing of the 30 Miler in order to assure a robust handover of YOs / Rcts.**

Summary of Findings

1.4.85 [redacted] The SI found no contributing or aggravating factors associated with a [redacted] and could find no link between [redacted] and his participation on the 30 Miler. Moreover, whilst the SI has witness confirmation of a sub-clinical respiratory chest complaint, the SI found no link between a respiratory chest complaint and the [redacted]. Having investigated factors which could have influenced [redacted] death, in particular the environmental conditions on the day of the incident, the SI has determined that the location and Heat stress did not contribute to [redacted] death. Moreover, the SI can find no evidence to suggest that [redacted] death could have been anticipated by medical screening using currently available techniques or that his medical assessment the day prior to the 30 Miler was incorrect. The SI can find no evidence to suggest that [redacted] death was influenced by the planning, assurance or equipment of the 30 Miler. Notably, it is the opinion of the SI that the CPR action taken by the Medical Assistant (MA), and the CI who tried to resuscitate [redacted], was commendable. 1.4.11

Cause

[redacted]

Contributory Factors

1.4.87 The SI identified **no** contributory factors to the incident.

Aggravating Factors

1.4.88 The SI identified **no** aggravating factors to the incident.

Other Factors

1.4.89 The SI identified **5** factors that, whilst not causal or contributory in this accident, may cause or contribute to a future accident:

a. OF1 – Use of the WBGT across Defence is not in line with JSP 539. 1.4.15

b. OF2 – CTCRM hydration policy seems to be excessive in light of the latest research. 1.4.55

c. OF3 – CTCRM have not had a 2nd Party Trg Audit in over 2 yrs. 1.4.58

d. OF4 – The level of medical support to all Cdo Tests is insufficient to deal with multiple causalities and provide medical supervision of the tests. 1.4.62

e. OF5 – The reliance on a single radio per Syn. 1.4.80

Observations

1.4.90 The SI Panel made **10** Observations.

a. OBS1 – Cardiac Disease is the cause of death of 1 in 10 in the UK Armed Forces and as such medical screening should play a key part in mitigating the risk. 1.4.27

b. OBS2 – YOs and Rcts may be masking illness from CTCRM medical staff. 1.4.30

c. OBS3 – Restrictive diets may have an impact on physical performance. 1.4.36

d. OBS4 – Overtraining may have an impact on physical performance. 1.4.40

e. OBS5 – There is no scientific analysis underpinning the time difference between YOs and Rcts in the Naval Service Commando OPS. 1.4.42

f. OBS6 – CTCRM Medical Risk Medical Assessment does not consider undiagnosed medical conditions. 1.4.50

g. OBS7 – The HM Coroner recommendations from 1997 remain valid. 1.4.65

h. OBS8 – The use of SNCOs and JNCOs to deliver directed PT remains at risk until a formal review of these command courses is completed. 1.4.67

i. OBS9 – The resuscitation conducted by CTCRM DS was commendable. 1.4.74

j. OBS10 – The disconnect in 30 Miler TORs may hinder the proper supervision of risk candidates. 1.4.83

PART 1.5 – RECOMMENDATIONS

Recommendations		Analysis Reference
1.5.1.	**Introduction**. The following recommendations are made in order to enhance Defence safety:	
1.5.2.	**Headquarters of the Surgeon General:**	
	a. The Surgeon General should establish a process to continually seek improvements in medical screening in order to develop measures that can reduce the risk of death due to latent medical conditions.	1.4.28
1.5.3.	**Institute of Naval Medicine:**	
	a. Chief Medical Officer EMS Institute of Naval Medicine should conduct a thorough review of the hydration policy specific to the 30 Mile Cdo Test to ensure that it is based on the best advice available.	1.4.56
1.5.4	**Naval Command HQ:**	
	a. Defence Primary Healthcare HQ Regional Clinical director (SW) Naval Service should routinely conduct an anonymous medical audit of Young Officers and Recruits either at CTCRM or at their first Cdo units in order to ensure that medical conditions are not being under-reported during training.	1.4.31
	b. Assistant Chief of Staff (Medical), Naval Command HQ, should examine the longer term health effects for personnel on restrictive diets prior to military training in order to determine if such diets create nutritional deficiencies.	1.4.37
	c. Commander Core Trg Naval Command HQ, should provide nutrition advice to new recruits before joining the Naval Service.	1.4.38
	d. Commander Core Trg Naval Command HQ, in conjunction with the Institute of Naval Medicine, should review the differentials in time allowed to complete the 30 Miler to ensure the rationale for the Operational Performance Statement is robust and appropriate.	1.4.43
	e. Commander Core Trg Naval Command HQ should consider implementing a Cdo Test Veto protocol.	1.4.47
	f. Commander Core Trg Naval Command HQ should include undiagnosed medical conditions within the 30 Miler and overall CTCRM Medical Risk Assessments.	1.4.51
	g. Commander Core Trg Naval Command HQ should conduct a 2nd Party Audit of CTCRM to provide assurance that the training delivered is compliant with Defence training policy.	1.4.59
	h. Commander Core Trg Naval Command HQ should ensure that all participants receive a short medical interview prior to the 30 Miler and that an MA should inspect all participants at each	1.4.66

	checkpoint.	
	i. Commander Core Trg Naval Command HQ should remove the PT competencies reflected in the SNCO and JNCO Command course.	1.4.68
	j. Commander Core Trg Naval Command HQ should review the Training Performance Standard required by SNCOs and JNCOs to formally facilitate and deliver PT as part of formal training.	1.4.69
1.5.5	**Flag Officer Sea Training:**	
	a. Flag Officer Sea Training should review the training requirement for the Wet Bulb Globe Thermometer to ensure that all required users are suitably trained.	1.4.20
	b. Flag Officer Sea Training should ensure that those qualified to use the Wet Bulb Globe Thermometer are using it line with the direction given within JSP 539.	1.4.21
	c. Flag Officer Sea Training should ensure that formal Wet Bulb Globe Thermometer train the trainer courses are delivered to all Naval Service Physical Trainers.	1.4.22
	d. Flag Officer Sea Training should provide education to the Directing Staff, Young Officers and Recruits on the negative impact of overtraining on performance.	1.4.41
1.5.6	**CTCRM**:	
	a. Principal Medical Officer CTCRM should conduct a comprehensive review of the medical support to all Cdo Tests to ensure that they are adequate to deal with multiple casualties and provide medical oversight of all participants.	1.4.64
	b. Chief of Staff CTCRM should ensure that the Primary and Secondary Safety can communicate with each other and the March Comd.	1.4.81
	c. Chief of Staff CTCRM should review the co-ordination between Command Wing and Cdo Training Wing of the 30 Miler in order to ensure a robust handover of YOs / Rcts.	1.4.84

PART 1.6

1. On 28 May 2015, [redacted] collapsed and subsequently died whilst taking part in the "30 Miler" which is the final part of the Royal Marines Commando Test before recruits are awarded their Green Beret. Medical experts and HM Coroner have concluded that his death was due to a [redacted] death is a tragic loss to his family and to the Royal Marines. While his death may not have been preventable in the circumstances, there are lessons that we can still learn from this tragic event. [redacted] had been consistently described as a focussed, high performing Young Officer and was at the time of his death graded in the top third of his Commando course. I have no doubt he would have made an excellent Royal Marines Officer. This has been a thorough Service Inquiry (SI) and I commend the SI Panel for their efforts and the Commando Training Centre (CTC) for their wholehearted co-operation. I accept the findings of the Report and support both the Observations and Other Factors identified along with the subsequent recommendations made.

2. Of note, the Panel did not identify any Contributory Factors which made the incident more likely, or any Aggravating Factors that exacerbated its outcome. Indeed, during the course of the Inquiry it has become clear that the "30 Miler" event itself, and other aspects of Commando training more generally, are being conducted in a highly professional manner by qualified, competent staff who are overall employing thorough event and contingency planning. [redacted] death could not have been foreseen by medical screening, either during the RM application process, in the run up to the event or on the day of his death. The Panel has found that following his collapse the immediate triage response, his evacuation and subsequent treatment were timely and appropriate and gave him the best chance of survival under the circumstances. In particular, the actions of the Chief Instructor and the Medical Assistant who did all they could to resuscitate [redacted] were commendable.

3. The SI Panel has made a number of recommendations based on observations and factors identified during the course of the Inquiry. These recommendations should be seen in the context of what is undoubtedly an appropriate, well run and supervised activity at CTCRM. However, all 3 Single Services should take heed of this report and its recommendations as they will contribute towards increased safety during this type of arduous activity. I will not reiterate all of the recommendations but will reinforce those that I consider to be the most significant.

4. Firstly, I note that whilst the medical support given to [redacted] was highly appropriate and timely, there was a second concurrent incident on the day in which another Young Officer collapsed. Fortunately this was not as serious and he was dealt with by supervisory staff trained in battlefield first aid using the medical stores they carried with them. However, in this instance the primary medical support, capable of

providing the most comprehensive care was fixed by [redacted]' treatment, leaving the rest of the exercise and the other candidates undertaking the test temporarily exposed. This issue is not unique to this SI and I commend supervisors of strenuous and endurance events to ensure they are both equipped and have mitigation in place for dealing with multiple or simultaneous casualty events as part of their risk assessment.

5. Secondly, while the SI panel have analysed the physical factors surrounding this incident in detail, I am conscious that there is also a psychological dimension to this type of endurance training or selection. The "30 Miler", and other physically challenging events that mark the culmination of our most demanding training and selection tests, ensure that a benchmark of physical and mental robustness and resilience is achieved by candidates. This is important in order to allow Defence to identify, cultivate and maintain the very qualities we require from our commandos, specialist troops and their officers. Accordingly, by design these events are necessarily tough and provide some risk, but the benefit is high and can be justified by the provision of personnel who are unlikely to fail in combat regardless of the task. However, when pushing candidates to overcome these demanding benchmark standards, we must be acutely aware of the mental pressure to pass that we may induce. Fuelled by determination, Young Officers and recruits will rightly push themselves to the limit to pass such tests, and in this case, earn the right to wear the Green Beret. In my view, it is likely that [redacted] recognised that his performance was beginning to suffer in the run up to his collapse, but his determination to succeed did not waiver. Neither he, nor anyone else present that day, could have reasonably been expected to recognise the severity of the impending situation. Indeed, in such circumstances the individual may become a poor judge of where their own safe limit lies. Overlaid upon this is the fact that endurance events, by their very nature, test both mental and physical strength concurrently. The task of judging that which can be endured and overcome mentally, as opposed to a physical limitation which cannot, falls to the supervisory staff. Indeed, determining when to shift from encouragement to intervention can be a highly difficult judgment for them to make. This fine line has to be actively managed if we are to balance the need to protect individuals under training against the need to maintain the required input standard to frontline units.

6. On 7 Aug 2015, the Defence Safety Authority (DSA) issued Urgent Safety Advice to units across the MOD on the importance of Wet Bulb Globe Temperature (WBGT) monitoring[1] during warm weather activity and the supporting guidance which is defined in JSP 539. Whilst the environmental conditions on the day that [redacted] died

[1] The Wet Bulb Globe Temperature (WBGT) device is a measurement tool used to inform risk management procedures that utilises ambient temperature, relative humidity, wind, and solar radiation from the sun to get a composite value that is used to monitor environmental conditions. That value, once correlated against regional guidelines, provides guidance on activity modifications and exposure levels during physical activity in heat.

were not a factor, it became clear that some CTCRM supervisors were unclear of the correct use of the WBGT as a heat stress monitor. The WBGT monitor is a key piece of equipment, the importance of which should not be underestimated as it will, if used in accordance with the guidelines (when serviceable and properly calibrated), minimise the risk of heat induced injury to our personnel. Other investigations have highlighted similar observations relating to the use of WBGT and consistent implementation of JSP 539. This therefore warrants attention across all 3 Services, and I note that CTCRM and the Royal Navy are now addressing this issue as a training gap. I will again this year remind all Regular, Reserve and Cadet Units across the armed forces of the importance of the WBGT (and JSP 539).

7. Finally, the SI determined that an external audit had not been completed at CTCRM by Navy Command HQ in the preceding 2 years due to manpower shortages. An external audit would likely have reviewed procedures and given assurance that they were compliant with Defence training policy and these should be done at prescribed intervals. There are a number of other issues that I commend the reader to look at in more detail in the main SI Report including hydration policy, the impact of diet on performance and medical screening.

8. It is extremely sad that we have lost such a promising Royal Marines Young Officer with so much potential. I am satisfied that this was a tragic event that could not have been foreseen or prevented and [redacted] was given the best treatment possible under the circumstances once he had collapsed. I am also satisfied that the training at CTCRM which the Panel has observed is both fit for purpose and run by the Staff in a highly competent and professional manner. There are some issues and recommendations to come out of this SI which are highly unlikely to be specific just to the CTCRM and should be noted by all those across Defence who are responsible for selection, training or day-to-day strenuous or endurance activity.

DG DSA

