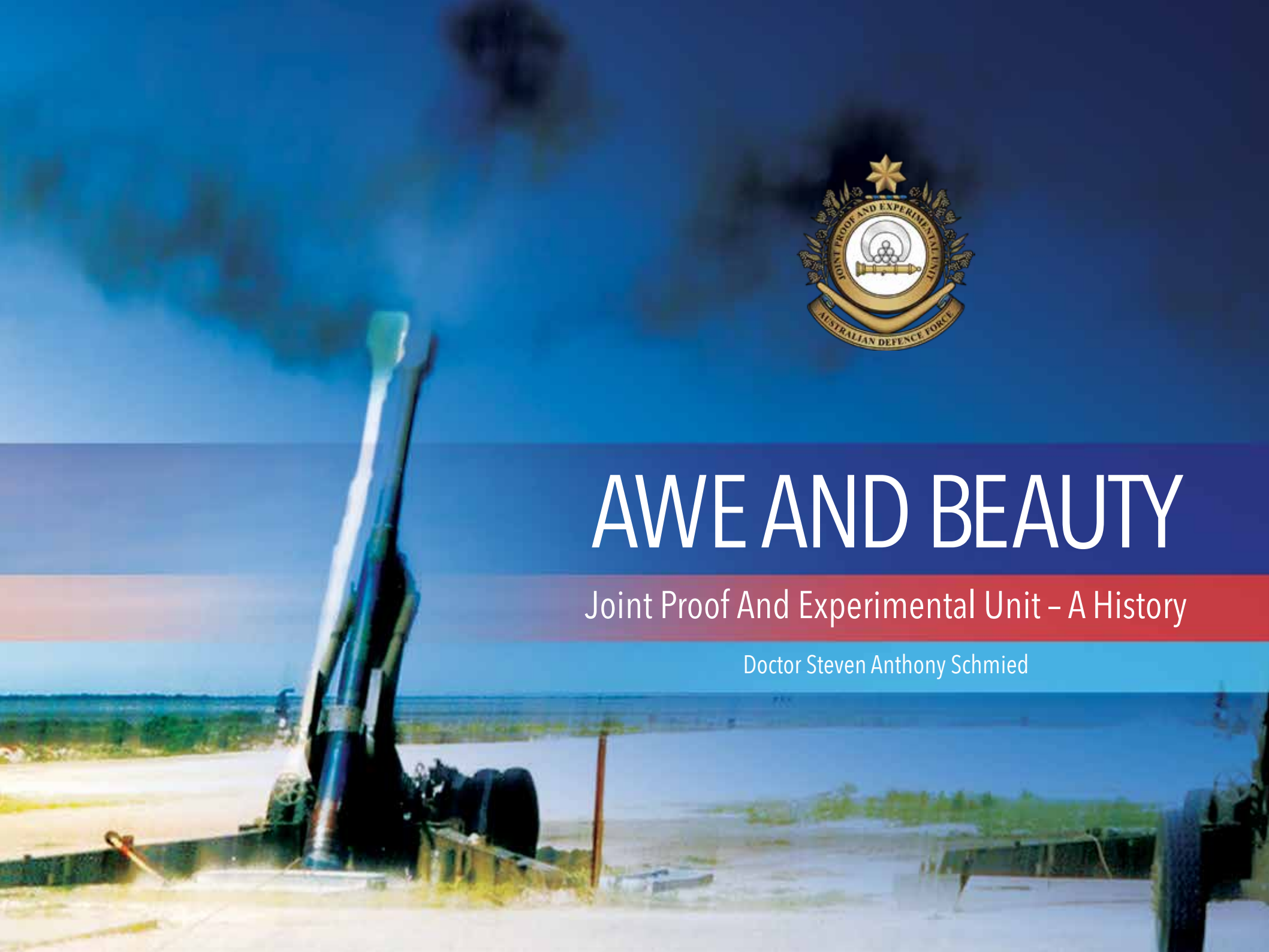


AWE AND BEAUTY

Joint Proof And Experimental Unit – A History

Doctor Steven Anthony Schmied

AWE AND BEAUTY

A History of the Joint Proof and Experimental Unit

Doctor Steven Anthony Schmied

First Published 2019

Designed and produced by
Big Sky Publishing
www.bigskypublishing.com.au

A catalogue record for this
book is available from the
National Library of Australia

AWE AND BEAUTY

A History of the Joint Proof and Experimental Unit

Doctor Steven Anthony Schmied

BIG SKY PUBLISHING

www.bigskypublishing.com.au


JOINT PROOF AND EXPERIMENTAL UNIT
AUSTRALIAN DEFENCE FORCE

CONTENTS

FOREWORD

Lieutenant Colonel (LTCOL) Anthony Watson, CSC
Commanding Officer (CO)
Joint Proof and Experimental Unit (JPEU)
January 2017 - December 2018

JPEU has a proud and distinguished history. The unit is responsible for ensuring that the ammunition and weapons used by the members of the Australian Defence Force (ADF) are safe and fit for purpose. JPEU is one of only a few units within Defence that has touched every member who is serving or has served; everyone in training and on operations who carries a weapon, uses ammunition. Unknown to most Service personnel and the general public, they depend on JPEU for not only their safety but also for their confidence in the weapons and life preservation systems that we employ will operate when, where, and how they expect them to.

The unit's prestigious history dates from the Australian Army Ordnance Department Inspection Services, established in 1902. The lineage may be further traced to the restoration of Charles II in 1660 and his reformation of Office of Ordnance and the Board of Ordnance by Royal Warrant in Britain. The unit is one of the oldest joint and fully integrated units in the ADF, with Australian Public Service (APS) and uniform staff working together at the Proof and Experimental Establishments of Port Wakefield (P&EE-PW) and Graytown (P&EE-GT) since 1929 and 1968 respectively.

On 20 December 2018, P&EE-GT marked 50 years since its move from Fort Gellibrand at Williamstown in Victoria to its current location, while P&EE-PW this year (2019) marks 90 years since its establishment in 1929. There is not only significant history that must be captured and never forgotten, but more important are the stories and tales of the men, women and their families who have worked, played and lived the history of this amazing unit that we must not let slip away. It is this history, these stories, the memories, and the tales that make the unit what it is today, and will shape and influence its future success.

Over the period of 2017 to 2018, JPEU for the first time in many years experienced a large revitalisation of its staffing. The new members have been welcomed with open arms. With the transition of staff, there is a risk that the unit may easily forget its heritage and proud history. For this reason, I requested Doctor Steven Schmied to write *Awe and Beauty*, based on previous and current staff's perspectives, to ensure that their memories and stories may be captured and not forgotten.

Figure 1. Rainbow Over The Range
(Port Wakefield Archive)

AWE AND BEAUTY

Awe and Knowledge

Historically the term *Awe* only referred to the fear that God may stir in the mind and the soul. The desire to please and appease the Awesome has driven Man to great acts of kindness and terror, each with their own beauty. As religion may be believed to be the ultimate battle for the human soul, war is also the battle for human beliefs, with treasure and blood the price that may need to be paid.

The mission of the JPEU is to understand the nature and behaviour of awesome events, such as the behaviour of a bullet or the ability of a vehicle to withstand the blast from a mine or Improvised Explosive Device (IED). These events are extreme in their danger, power and briefness of time. The challenge has been to capture the event accurately, if at all. The unit has by necessity been innovative in developing processes, techniques and equipment.

Even before the establishment of formal inspection facilities for military supplies, the custom of carrying out inspections played a prominent part in British national life. In the guilds of the 13th and 14th centuries, special measures were taken to inspect the work of apprentices and journeymen to guard against any bad or makeshift work. Before a journeyman could set up on his own, he had to submit a sample of his work to the wardens of his guild who subjected it to severe inspection. If his work was accepted, it was known as his "masterpiece" and he was then recognised as a master in that particular trade.

In the field of munitions production, the inspection was established as early as the 15th century, when John Judde was appointed Master of Ordnance on 12 December 1456. Judde was charged especially with the inspection as well as the provision of war material of all descriptions. Then in 1543, the office of the Surveyor of the Ordnance was created with the responsibility of inspection of Government stores

In the reign of Charles II in 1683, a warrant was issued detailing the permanent establishment of a Surveyor-General, whose duties were:

> "*to survey and make proof of all ordnance, powder, small arms and all other emotions and provisions of war and not to suffer any stores to be received which are not good, serviceable and also duly proved and marked with our mark if it ought to be.*"

This may be taken as the first authentic reference to proof and the placing of the acceptance mark on the accepted work.

In Defence, proof is:

> "*the final acceptance inspection of ammunition or a piece of equipment*"

Munition are proofed by firing a sample from each manufactured batch, with the projectile retrieved after firing to study it for signs of deformation and to check the function of the fuse of an artillery shell.

Figure 2. *Awe And Beauty* Of The Detonation Of 84 Tonnes Of Explosives. The Shock Wave Is Seen Expanding Out (Left)
(Port Wakefield Archive)

Figure 3. Plate Battery Test (Right)
(Port Wakefield Archive)

The requirement for an Australian Surveyor-General was not required for the first decades after Federation as Australia did not have the capability to manufacture any weapons larger than infantry rifles, and it was implicit that war materiel would continue to be obtained from Britain. Within a few years, WWI destroyed this illusion. Far from being able to rely on British supplies, the war placed such a strain on Britain's ability to produce quality munitions that at the height of the fighting in France, she was pleading with the dominions to manufacture artillery shells. These experiences were reflected in post-war moves to make Australia less dependent on Britain for its defence needs. In 1921, a Munitions Supply Board was created within the Australian Department of Defence to oversee the government factories and facilitate civilian production.

The beginnings of quality control of Australian-manufactured munitions began when the Munitions Supply Laboratories at Maribyrnong in 1922, under the control of the Inspection Branch, headed by Chief Inspector of Munitions, LTCOL H.B.L. Gipps. One of Gipps' early priorities was to establish a proof facility.

The Royal Australian Navy (RAN) hydrographers made surveys of coastal sites suitable for proof firings involving over-water recovery of shells that laid the groundwork for the establishment of Port Wakefield.

In conclusion, the purpose of a Defence Force is to protect a nation from external threats whilst allowing military force to be exerted on other parties to protect the nation's interest. Unfortunately, this requires the use of deadly force. To ensure that this force does not backfire on the Defence members, JPEUs function is to conduct test and evaluation of ordnance so as to ensure it is safe and suitable for use by the wider defence community. Failure of defence ordnance can and has resulted in the injury and death of Defence members as well as the inability of Defence to defend Australia's sovereignty.

Proof And Experimental Organisation

Mr Paul Buchler
CO Proof and Experimental Organisation (PEO)
1990

It is commendable that you have chosen to write about the PEO. The PEO had an interesting and exciting history, one that deserves to be told. As MAJGEN Des Muller said when PEO left Logistic Command *'it's a world class act'*, one that punched well above its weight, achieved much and before its organisational demise, had considerable world-wide influence.

The history of the PEO reflects the history and development of Australia's armament industry. Commencing from a need to test things that go bang in the night, which principally required real estate, it evolved to encompass armament development, testing, and evaluation from conventional to guided weapons, which required the development of intellectual capital. Its role and functions were defined in a Defence Instruction (DI(G)LOG 08), whilst a snapshot of some of its work are described at the Commendation; please ignore the fact that my name is on the Commendation - the outcomes were a PEO achievement.

The management of Proof and Evaluation has gone through a number of changes:

- **1943.** By this time, the inspection of munitions was a function of the respective Defence Services. Inspections typically took place in an Inspection Bond at each manufacturing site. Stores which required firing proof were dispatched from the Bond to the Proof Range concerned. By agreement between the services, that Proof of Arms and Ammunition was carried out by the Inspector-General of Munitions, Department of the Army.
- **Febuary 1950 - 1951.** Proof ranges at this time are located at Port Wakefield (SA), Puckapunyal (Vic), Bendigo (Vic), Fort Gellibrand (Vic) and Stockton, New South Wales (NSW). The Army Design & Inspection Branch was transferred to the Department of Supply to undertake development, design and inspection functions, including proof. The Branch also conducted proof and testing of Royal Australian Air Force (RAAF) and RAN munitions, as well as munitions for the UK. RAAF was responsible for the development and design of its own munitions, that were maintained an Air Research and Development Unit (ARDU) at Laverton. ARDU at this time has around 300 staff.
- **October 1951.** The title "Design Establishment, Army Branch" was changed to "*Technical Services Establishment, Army Branch*".
- **1996.** P&EEs were transferred to the Army Technology and Engineering Agency (ATEA).
- **1997.** P&EE-GT, whilst remaining part of ATEA, was part of the new Support Command (Army). Small Arms Test Centre (SA TC) Mulwala facility was temporarily closed for firing until substantial safety work was completed. Some of the munitions proofing functions undertaken at Mulwala were transferred to Graytown and Benalla.

- **March 2004.** As a result of a review into logistics support to Defence, the Chief of the Defence Force (CDF) approved the formation of the JPEU, incorporating the Headquarters (HQ), P&EE-GT and P&EE-PW. The CO resides at the unit headquarters in Orchard Hills, NSW. April 2017 P&EE GT originally commanded two detachments; the Munitions Test Centre (MTC) Benalla, Vic, and the (SATC) located within the ADI Ltd (now Thales) facilities. MTC and SATC have now closed. The unit is currently part of Explosive Ordnance Branch (EOB), Joint Logistic Command (JLC). The unit is responsible for the static and dynamic testing of all ADF weapon systems that involve the use of high explosive ordnance, from small arms to stand-off missile componentry. JPEU also supports non-Defence clients.

The relationship between the UK and Australian Explosive experts, Ammunition Technical Officers (ATO) remains to this day, with the officers conducting a number of courses at the Defence Academy of the United Kingdom (UK), Shrivenham.

Further, the unit is truly tri-service, with both RAN and RAAF personnel historically and currently serving in the unit. The unit personnel, with their years of knowledge (the current average age of the unit is 51, down from recently 59 due to the posting in of some younger members) and high-end skills unavailable anywhere else in Australia, represent the true capability of the unit.

Commendation

Mr Paul Buchler

Headquarters Logistic Command

The Colonel Operations has brought to my attention your significant contribution during the past years to Logistic Command.

Your drive and determination to establish commercial activities within the Proof and Experimental Organization is most commendable. In addition, your contribution to risk based range safety methodology has gained for you national and international respect.

In displaying such dedicated effort you have brought great credit upon yourself and Logistic Command.

D.J. McLACHLAN
Major General
General Officer Commanding
Logistic Command

December 1991

Figure 4. Commendation
(Paul Buchler)

Figure 5. Plate Battery Plate Battery Circa 1957-63
(Port Wakefield Archive)

Badge, Flag And Shoulder Patches

LTCOL Anthony Watson

As P&EE-GT, prepared to celebrate the 50th anniversary of the move to Graytown from Fort Gellibrand, a new badge, flag and unit patch were approved by the Vice Chief of the ADF on 23 October 2018. In an email to all unit personnel, LTCOL Watson explains the significance of this approval for JPEUs identity.

Subject: BRIEF - 181023 - VCDF - Joint Service Badge, Flag and Shoulder Patches for Joint Proof and Experimental unit - Approval, 23 October 2018

Ladies and gents,

Some of you may not be aware, but in 2015/2016 the ADF changed the branding policy which then required all units to review their current flags, patches, and badges to ensure they complied with the new requirements. There was a two-year moratorium that units could continue to fly flags and wear patches that did not comply with the policy while the applications were being submitted. Interestingly, we have been unable to find any approvals for our current unit or the historical sub unit flags since the unit was established.

After a couple of false starts back in 2016 and again this year we have finally got approval on 23 October 18 from The Vice Chief of the Defence Force (VCDF) for our new flag, a JPEU specific patch and a badge.

The new JPEU flag is not much different than the one we have been flying since approximately 2004 which includes a central Charge so should be of no surprise. It includes the Snap Gauge, Cannon Balls and the Dexter Gun, which date back to the Army Quality Assurance Services in the 1930s that we can all draw lineage too. However, if you are new to JPEU a quick explanation of your charge that is centred on the ADF Ensign (flag) that we will shortly fly at each Establishment:

- **Unmounted cannon pointing 'Dexter'**. A 'Dexter' is used to refer to the right side of the design or the left side from the point of view of the observer. Field guns or cannons were proofed to ensure that they were of adequate quality and free from casting defects. Until the issue of the royal warrant, both cannon and balls, along with most other military supplies, were provided by contractors with little or no redress and were of questionable quality, due to poor workmanship and deliberate use of defective/other than specified materials. The enacted Proof laws established the Royal Proof House for acceptance of ordnance, swords, and firearms, and enacted laws including the death penalty for public officials and contractors found short-changing or overcharging the military for their stores and equipment.
- **Six cannon balls piled.** Six cannon balls piled fess, signifying ordnance (guns, not the Corps) and wherefrom the concept of Proof originated under Henry VIII. A "fess" is used to describing a belt or sash in Heraldry terms, therefore this will need to be confirmed if it can also be used to describe a stack/pile of cannon balls. The size of the cannonballs on the Board of Ordnance Shield is of the existing size for heraldic purposes only, because if the cannons balls were designed to gun scale they would be insignificant.
- **Fixed outside gauge.** This gauge has a common term of 'Snap Gauge', which was used to measure the maximum dimension of a cannonball, to ensure they would fit the bore of the cannon.

You will note that the St Edwards Crown and boomerang have been removed from our flag, as has the unit name. Unfortunately, we could not find any written documentation that authorized either subunit to have the St Edwards Crown (a King's Crown). As a result, JPEU could not draw official

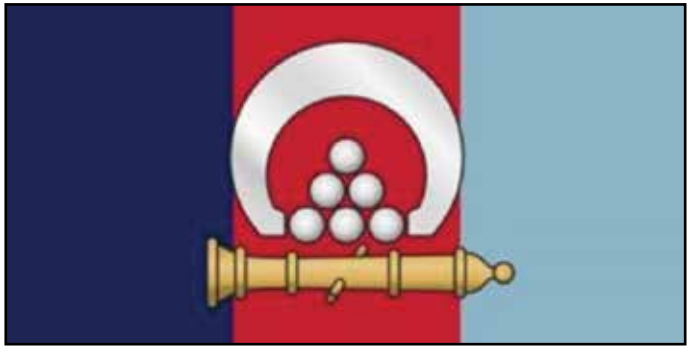
Figure 6. Electronic Flag And Shoulder Patches
(JPEU Archives)

lineage to this. It is very unlikely when the units were first established that the approval was not granted, however, we have been unable to source this information. Had we attempted to gain approval to use the St Edwards Crown, a submission would have to have been raised through to the Governor-General to explain the significance and the lineage of the Crown to the JPEU. We would have to have evidence in writing that that approval had been granted previously by a Governor-General, on behalf of the Queen or a King, for this to be even considered by the current Governor-General.

The Boomerang has been removed as it appears on the standard surround for all ADF unit badges, while the wording has been removed to comply with the new policy.

A flag is one of, if not the most important, identifiers for a unit. We can't have a unit, without a team of people who are united to achieve a common goal (our unit Mission). Our Flag is and always should be a continual reminder of our mission and our purpose. Our mission and our contribution to Defence is one you all should be very proud of. I am.

Over the past two years, JPEU has grown and become more united as a unit. The approval of the unit flag by VCDF is a significant and important achievement but also a milestone towards us truly being '*One JPEU*'.



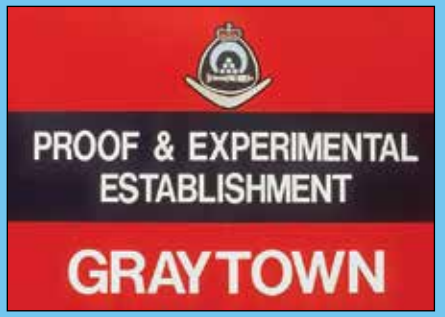


Figure 7. Historic Flags, Badges And Plaque
(JPEU Archives)

Chapter 2.

GRAYTOWN

Graytown Historic Sites

The main Graytown Historic Sites are detailed in Table 1 and shown in Figure 9.

Table 1. List Of Graytown Historic Sights

Serial	Description	Location Grid Reference (GR)
	Sites listed in 1999 [1]	
1	Compton Vale Homestead Well	16168 21060
2	Mitchellstown School Ruins	27502 18883
3	Mitchelstown Homestead Ruins	27321 19207
4	Rowells Homestead Ruins	23771 18160
5	Junction Track Deep Gold Mine Shafts	26356 18329
6	Major Creek Tramway Bridge: *Clouston's Crossing*	21234 18414
7	Western Boundary Gold Diggings	16977 19406
8	Northern Boundary Gold Mine Shafts	26912 20434
9	Sunnyside Homestead Ruins and Shearing Shed Ruins (1)	23934 18740
10	Sunnyside Homestead Ruins and Shearing Shed Ruins (2)	24747 19119
11	Explosives Battery Two Gold Mine Shafts (1)	24892 21207
12	Explosives Battery Two Gold Mine Shafts (2)	25122 20960
13	Crossle Homestead Ruins	19365 18830
	Additional sites known in 2019	**Approximate GR**
14	*Ford Falcon* Dam	26000 19000
15	*Vietnam War* Bunk	18800 26500
16	AUSROC I Launch Site	20100 17500
17	Convict Built Weirs (5)	19800 19500
18	Lemon Tree	19500 18900
19	*Shell Shock* Tank	27100 19100

Serial	Description	Location Grid Reference (GR)
20	Crompton Vale / Museum	16500 20900
21	Home Block	16600 20800
22	Golf Course	15500 20500 (South West (SW) corner)
23	Wetlands	24700 17300 (SW corner)
24	Married Quarters	15400 21400
25	Airstrips	15500 19900 (SW corner)
26	Penrose & Oddy's Mill	27600 19300 (SW corner)
27	Gillies' Folly	20800 18900
28	Scar Tree	25100 17800
29	Todd's Paddock	21100 20900
30	William Oddy's Siding	21500 18900
31	Amelia Oddy's Siding	21300 17800
32	Emu Siding	22400 20500

Figure 8. The Awe Of A 66mm Rocket Propelled Grenade Explosion Set Amongst The Natural Beauty The Eucalypt Forest And Salvation Jane / Paterson's Curse Flowers (Graytown Archive)

Figure 9. Map Of Graytown Historic Sites

Not In Our Backyard Part 1

In investigating the history of the unit, a recurring theme has been "*Not In Our Backyard*". The unit has deliberately chosen remote locations due to the energetic nature of the unit's activities. As the growing population of Australia has encroached on the unit, the unit has had to address its impact on the community. In Melbourne, Fort Gellibrand was the first to suffer from the issue of "*Not In Our Backyard"* as housing built up around the fort whilst firings continued to be conducted twice a day, five days a week.

Fort Gellibrand was the centre for the proof of ordnance and is located on Battery Road near Point Gellibrand at the southernmost tip of the Williamstown peninsula as it juts into Hobson's Bay and Port Phillip Bay. Fort Gellibrand is of historical importance to Victoria for its association with the development of Defence strategies for the colony in the nineteenth century, and for its association with the convict hulk period of the penal system in the colony.

Gellibrand's Point was named after Joseph Tice Gellibrand, a lawyer and principal of the Port Phillip Association who drew up the treaty used by John Batman to purchase Port Phillip from the Aborigines in 1835. A 30-metre long stone jetty was built by convict labour in 1838 where Gem Pier now stands. A wooden lighthouse tower was constructed in the early 1840s and later replaced with a bluestone tower.

As part of a series of coastal defensive works were built in the Colony of Victoria from the 1850s to the turn of the century in response to a perceived threat of attack from hostile warships, Fort Gellibrand was built in 1855 during the Crimean War, to guard against a possible Russian invasion. It was still in use sixty years later for training new soldiers for WWI.

In January 2011, a brick bunker and tunnel were uncovered when an underground rainwater tank was being installed at the adjacent cricket club. It is believed that the bunker was constructed in the late 1850s and it was probably used to store artillery rounds for the 'Right Battery'.

The Department of Supply was tasked with locating a suitable alternative site within Victoria. The areas considered as the site for a proof range were Drouin, Point Leo, Beveridge and Compton Vale (Graytown).

Compton Vale was selected as it was deemed to have the soil required to test the functioning of variable time fuses. The soil had to be mainly firm sand, deep sandy loam that is free of slate, stone, and gravel. This soil was available at Compton Vale.

Standing down at Fort Gellibrand on a stormy winter's day, the site still feels remote and barren; a good location to proof weapons.

What Goes Up Must Come Down

Vertical Recovery (VR) is a technique used to assess the performance and suitability of payloads that are required to withstand and operate in a high "G" environment; particularly pertinent during fuse research and development. It involves the firing of a spin-stabilised inert projectile at close to 90 degrees elevation. Due to its spin-stabilisation and high angle of fire, the projectile will remain gyroscopically stable at the apex of its trajectory. It will retain the same orientation for its downward journey, returning to earth base first, close to the firing point. The projectile and fuse are then recovered and the fuse, undamaged by impact, can be examined.

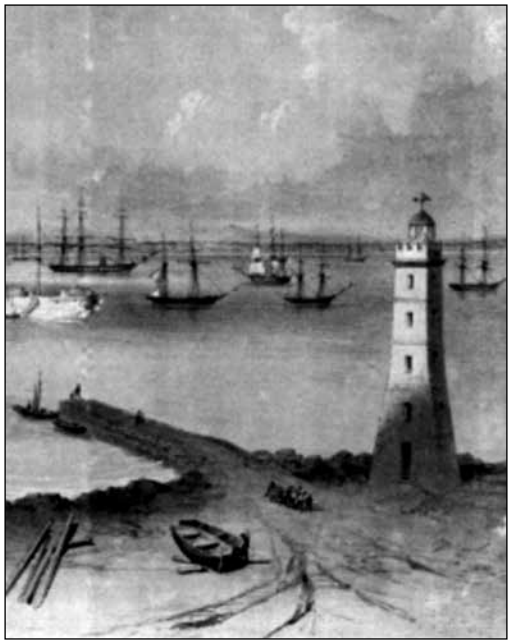


Figure 10. The 'Right Battery' At Williamstown (Fort Gellibrand) (Top) And Fort Gellibrand Cannon Ball (Bottom)
(Department of Defence and Steven Schmied)

VR requires uniform soil to a depth of approximately 10 metres. The soil had to be mainly firm sand, deep sandy loam that is free of slate or stone; this soil was available at Compton Vale. The close proximity to the Department of Supply Explosives Branch Process and Plant Development Section aided the selection of Compton Value as there was very little time lost during the transportation from Mulwala and Maribyrnong factories to Compton Vale. [1]

From 1958, firings were conducted at both Fort Gellibrand and P&EE-GT, until 1963 when Fort Gellibrand ceased operations. In 1968, Fort Gellibrand was relocated in its entirety to P&EE-GT, with the unit opened on 20 December 1963. A 50th-year celebration was held at Graytown on 11 December 2018.

The VR was able to fire a 25 lb. projectile vertically to a height of around 20,000 feet. The fuse function is tested under the extremes of spin and resultant 'G' force applied.

There was a close call in 1976 when a VR round landed close to VR Observation tower; *HMAS Graytown*. Bill Leviston was standing in the door and Greg Hall was in the observation tower. The round came down and went through the tray of a truck parked next to the tower. A plaque now marks the spot. A further hazard is due to the loamy soil that may have collapsed during recovery. Later operations used a metal sleeve to shore up the hole.

On 12 August 2004, P&EE-GT conducted the last firing of the Quick Fire (QF) 25 pound artillery gun. Similarly, high elevation trials have been conducted at Port Wakefield, using a M2A2 Howitzer.


HMAS GRAYTOWN
0032

Figure 11. 25 Pound Vertical Recovery Gun And HMAS Graytown; Vertical Recovery Observation Building (Previous Page)
(Graytown Archive and Steven Schmied)

Figure 12. Recovering A 4-In Naval Projectile (This page And Next Three Pages)
(Graytown Archive)

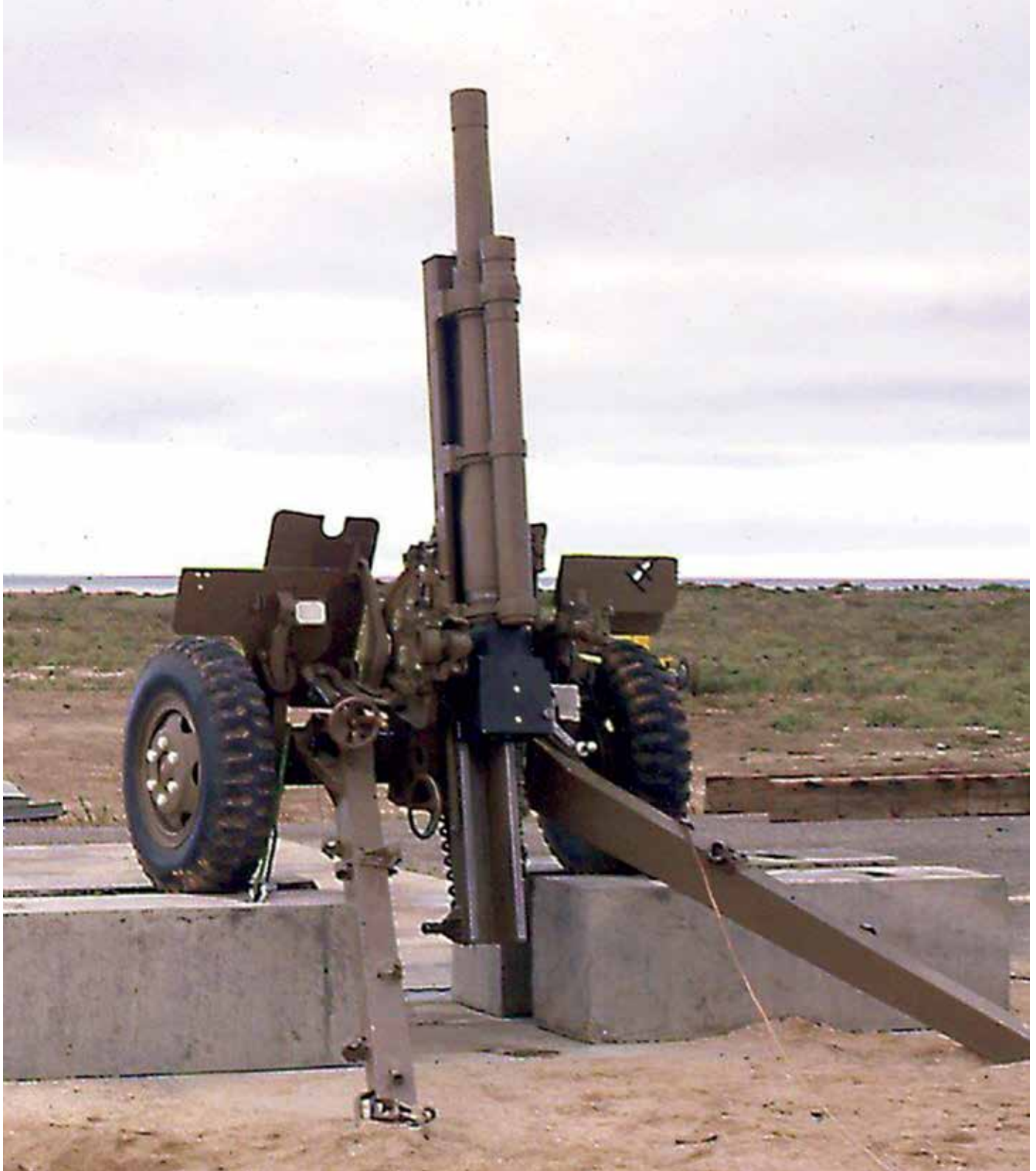
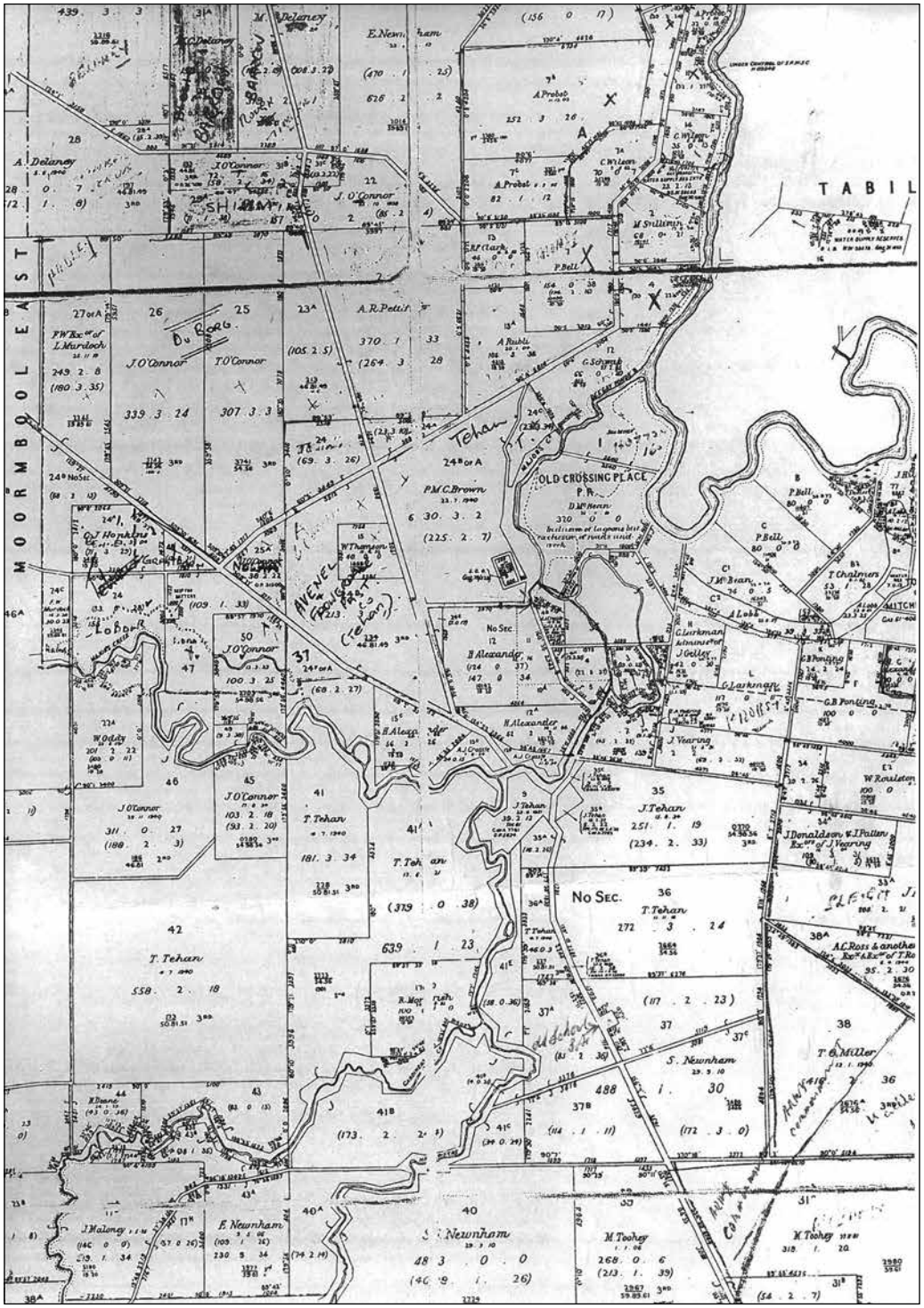


Figure 13. M2A2 Rigged For Vertical Recovery
(Port Wakefield Archive)

Figure 14. Graytown Allotments (Left) And Inside The Sunnyside Shearing Shed (Right) (Graytown Archive and Steven Schmied)



Wheat And Sheep

Generally, the soils at Graytown may only kindly be called poor. Predominately soft alluvial gravel, the soil is favourable to the classic Australian landscape of eucalypts and scrubby brush, and downright aggressive against being farmed. This has not stopped Europeans from trying. Horticulture mainly consisted of wheat, with kitchen gardens around the homesteads. Unfortunately, the last remaining intact homestead, *Sunnyside*, was used for target practice and destroyed in the 1990s.

The dominant agriculture of the Graytown area was livestock, with sheep and lambs comprising 95% of the total headcount. Grazing continued on the base until the early 2000s, when Defence discontinued the practise. The result was that alternative fire control measures are now needed. A number of bushfires or controlled burns have occurred over the site since the time it was occupied and used for military live firing.

The tranquillity and lushness of Rowells Road contrast to the environment on the higher ground. Here the ground is dry, hard and rocky. Farming was harder up here, though some families tried.

Grazing pastures are a two-edged sword within the range. During restoration work, anti-erosion earthworks are first undertaken and the area prepared for the sowing of permanent pasture. While the pasture promotes resilience in the wet periods of the year, it also provides fuel for the summer months, exacerbating the fire risk. In order to control the pasture growth and to defray range management costs, the Army has traditionally decided to accept grazing on the range.

Figure 15. Specified Range Danger Area Post-January 1949 (Next Page Top Right) And Post-1952 (Next Page Bottom Right). Shown Boundaries Are Indicative And Based On Imprecise Historical Information
(Ian Bullpitt)

Figure 16. Map Of Graytown Main Buildings (Next Page Left)
(Graytown Archive)

One of the main successes was that many of the revegetation works from previous years were having a significant beneficial environmental impact, particularly in terms of ground stability, water quality and increasing areas of vegetation potentially usable by native fauna. In comparison, a failure was the overgrazing of an important area of native tussock grassland by cattle in Graytown. [2]

Farming was not the only agricultural industry carried out at Graytown. Licenses for beekeeping were issues for Graytown. These activities were confined to within 500 metres of the internal boundary of the property and the sites advised to the licensee.

Compton Vale

Ian Bullpitt

P&EE-GT consists of 5,500 hectares of land, which is undulating and varies from good grazing land to scrub and swamp. The unit shares a common boundary with the Puckapunyal Military Training Area. The land that makes up P&EE-GT had been progressively been acquired from local farmers by Defence as an extension to Puckapunyal since August 1949.

Records examined to date have provided an only limited explanation for the various extensions to the Proof Test Area (PTA). The original extension of the PTA into the current Graytown footprint (1949 - 1951) may have been provided to cater for increased ranges of artillery/armour weapons firing from within the PTA (likely) or for proof and experimental firings within the now-Graytown footprint (less likely) [3]

The Department of Supply purchased the Compton Vale Homestead Estate, which consisted of 7,500 acres at a cost of 110,000 pounds in 1952. The site was named *Compton Vale Proof and Experiential Establishment*.

After the construction of the firing battery building at a cost of 11,000 pounds, proofing tasks commenced immediately at Compton Vale, despite the unit still being based at Fort Gellibrand.

Other works were also undertaken, power was connected at a cost of 12,700 pounds, including:

- Ammunition Preparation Building (APB)
- brick magazine
- gun and carriage store
- Accuracy Sub-Range
- other hard standings, bridge, and access roads.

The firing of light weapons continued at Fort Gellibrand until 1963. The headquarters and main stores continued to be located at Fort Gellibrand and staff would travel during weekdays to Compton Vale.

Several problems were identified with the selection of Compton Vale as the proofing site. There were two main concerns. The first was the lack of skilled labour from the Nagambie and Heathcote townships. The second concern was the remoteness of the site for Army personnel. As the soldiers were still living in Melbourne and sent to Compton Vale during weekdays, they were accommodated in hotels within Nagambie at a great cost to the Army. To reduce this problem, it was proposed that accommodation be built at Compton Vale. Married quarters and single living-in accommodation were proposed to be constructed, however, as the area was very remote, this idea didn't initially eventuate. Eventually, two married quarters were built opposite the front gate.

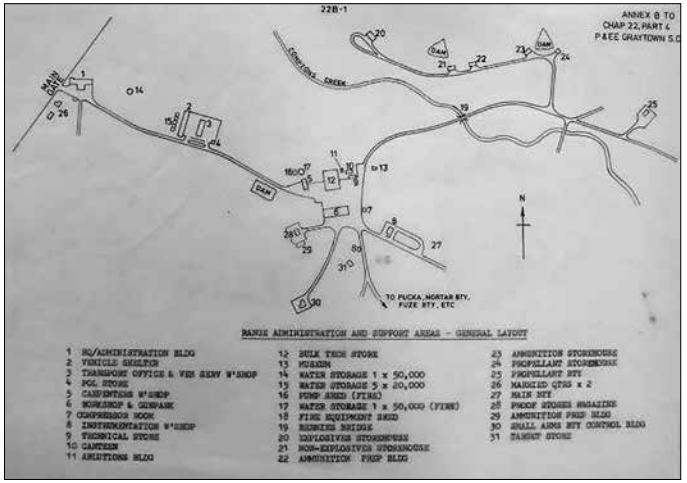
Whilst the provision of remote living allowance means that no one lives at the base, the Graytown Community Centre now stands outside the main gate. Interestingly, the electricity bill for P&EE-GT is still addressed to Compton Vale.

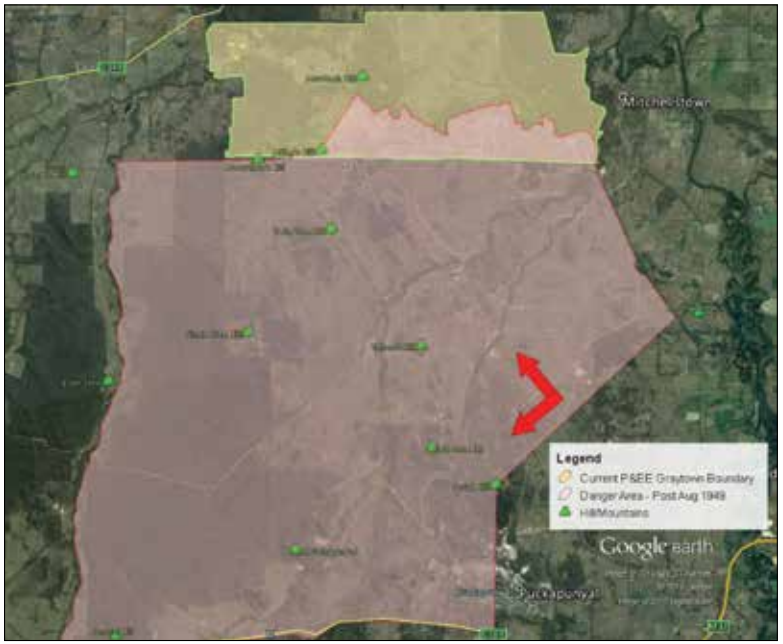
P&EE-GT principally fires small to medium calibre weapons with 20mm to 105mm natures being most commonly fired. Larger calibre weapons were fired, with ranges up to nine kilometres able to be fired without recourse to a Puckapunyal overshoot. Ranges up to 20 km have been fired from Puckapunyal into Graytown.

Firing tasks conducted at Graytown generally only require a short range (up to 6km), or they concentrate on the gun/launcher aspects. Special features of P&EE-GT include:

- **Propellant Battery.** An enclosed stop butt is located 150m from the firing point to catch inert projectiles. This battery is used for propellant and component proof/ trials, vertical accuracy tasks up to 1000m and other general purpose firings.
- **20mm Proof Facility.** A purpose-built facility planned to be in operation mid-1988 for 20mm and other small arms firing tasks.
- **Vertical Recovery Battery.** Projectiles are fired vertically for 'subsequent recovery from uniformly consistent soil. This battery is used for fuse recovery during fuse development work.
- **Explosives Battery.** Explosive items of up to 50kg (confined) and 160kg (unconfined) may be initiated.

Whilst the *Compton Vale* homestead no longer exists, the pepper trees still stand proudly in the sight of the *Home Block*.





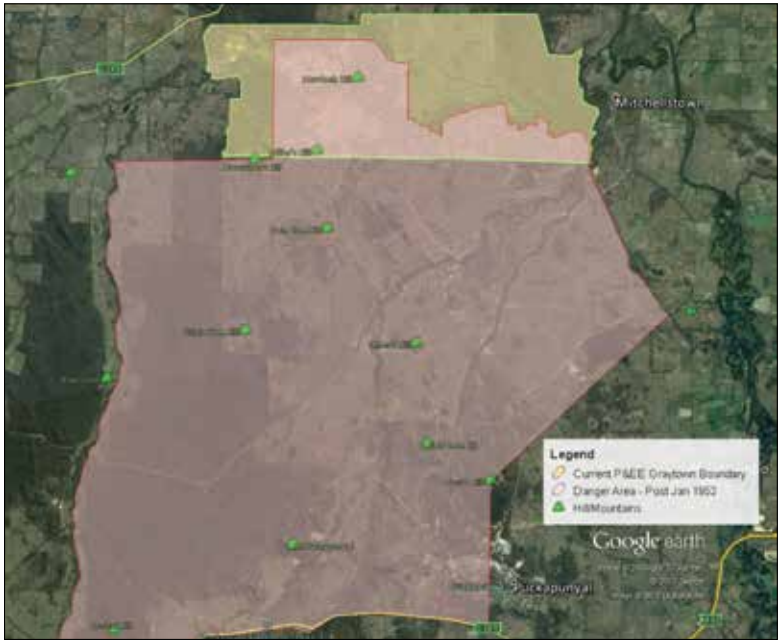


Figure 17. Gunner Martin Schwalder Shearing The Home Block Sheep (Right) And The Married Quarters (Left)
(Bill Leviston and Graytown Archive)

Home Block

Bill Leviston and Colin Fox

Farming did not end with the departure of the civilian farming families. Compton Vale was renamed *Home Block by* the Graytown staff, with the farmhouse used as a married quarter until two new married quarters were built just outside the main gate in the 1960s.

From 1964 to the mid-1970s, the paddock around the farmhouse was used for both a kitchen garden and the upkeep of livestock, including sheep, chickens, and pigs. Horses were also kept by the OC Major (MAJ) Tucker. Interestingly, the award for the annual unit golf competition was the *Tucker Shield*, consisting of a lavatory seat for the highest scorer.

The last person to live in the homestead was Corporal (CPL) Gordon Fort, the caretaker, and storeman. Gordon lived in the homestead with his wife and three children until he moved into one of the newly built married quarters; located just outside the main gate. He continued to live in the married quarter after his wife died, until his retirement from the army in 1979. Gordon was also provided with an Army vehicle to conduct his boundary patrols. Gordon returned as a civilian, working in the Quartermaster's Store (Q-store) as a clerk, before transferring to the ammunition technical area until 1982.

The Graytown community centre is now located where the married quarters used to stand.

A Walk In The Park

Greg Oakley

The essence of the activities that the unit perform and the deep professionalism with which they are performed may be demonstrated in the experience one may achieve by visiting the unit's Graytown location.

Driving through the Victorian countryside on a road connecting the wine towns of Heathcote and Nagambie, narrow road leading the entrance to the unit appears amongst the stands of eucalypt. The non-descript road leads to a guarded entrance, with access strictly controlled. On the day of the visit, a red flag flies indicating live firing activities are in progress. Mobiles and cameras are not permitted.

After a safety briefing and donning safety vests, you head off with your guide through the beautiful forest on a dirt road. Animal life abounds on the closed range; kangaroos, koalas and a plethora of birdlife may be seen (and avoided in the case of the kangaroos).

Graytown has cool to cold, frosty winters during which most of the rainfall occurs and warm to hot summers. It has an average annual rainfall of 596 mm. Winter droughts occur and summer and autumn droughts are frequent. To the south is Mount Puckapunyal (413 m) with a series of rocky ridges and low hills (about 150-250 m) extending north to south. Rolling, undulating and alluvial terraces and floodplains are present in between the hills. Soil types are mostly duplex soils (relatively low natural fertility and water-holding capacity), with smaller areas of deep, silty or sandy alluvium, cracking clays and gravely to rocky ridges with skeletal soils. Most soils have high to extreme potential for accelerated erosion following disturbance. Surface drainage lines are orientated mostly north to north-east with all systems flowing into the Goulburn River. Some of the creeks on Graytown are annual and cease flowing during summer.[2]

Endangered Species

Graytown contains a large and excellent example of Box-Ironbark Forest (Northern Goldfields) communities and good examples of Alluvial Terraces Herb-rich Woodland; Creek line Grassy Woodland communities; Buloke Woodland; White Box Woodland; Long-leaf Box Woodland; Native Grassland; and Wetland Herb field all of which are restricted in Victoria. At the time of European settlement, Box-Ironbark forest and woodland covered the inland slopes and plains from western Victoria to southern Queensland. Since then, 85 percent of this ecosystem has been cleared in Victoria. Graytown contains six nationally vulnerable flora species.

The Graytown range contains a number of relatively high nature conservation values and habitat for certain threatened species. Defence recognises that the Graytown ranges contain some places of 'conservation worthiness'. Defence commissioned a flora and fauna survey of the range resulting in the identification of:

- two nationally threatened plant species
- 12 state significance plant species
- four state significance plant communities
- records of two nationally significant birds; Swift Parrot and Regent Honeyeater
- 13 state significance bird species.

Graytown also supports 25 mammal, 182 bird, 11 frog, and 7 native fish species.

The unit has worked extensively to revegetate the base. Working with Goulburn Valley water, this work has reduced the erosion and amount of the silt entering the river. The work continues with Grassland trials, to bring back the native grasses.

Control of pest animals such as European Rabbit, Red Fox and domestic and feral cats has been undertaken for over 30 years through baiting, habitat control, trapping and shooting by contractors.

Previous habits, such as the artillery corps members' (gunners) delight in catching and selling snakes from the area have also ceased.

Figure 18. Graytown Park-Like Forest (Previous Page)
(Steven Schmied)

Figure 19. Grasslands Trial
(Steven Schmied)

Warring - Goulburn River

In the Aboriginal Daungwurrung language, the Goulburn River that borders Graytown has several names: Warring, meaning “big or large water”. The Goulbourn River and wetlands provided a valuable food source, especially when floods would replenish the billabongs, attaching bird life from as far away as the Northern Territory.

Explorers Hamilton Hume and William Hovell explored the area in 1824, at first naming the river after Hovell. It was later renamed Goulburn either after Henry Goulburn, British Under Secretary for Colonies (1812-21) or after his brother Frederick, Colonial Secretary of New South Wales (NSW) (1820-24).

The Goulburn River flows from south to north approximately through the middle of the former shire. At Nagambie, there is Lake Nagambie and downstream the Goulburn Weir (1890), supplying irrigation waters to the Murchison district. Lake Nagambie is a leading rowing venue.

The members of the unit have enjoyed fishing in the Goulbourn, as shown in an early photo of the catch of a sizable 37lb Murray Cod by Bill Leviston.

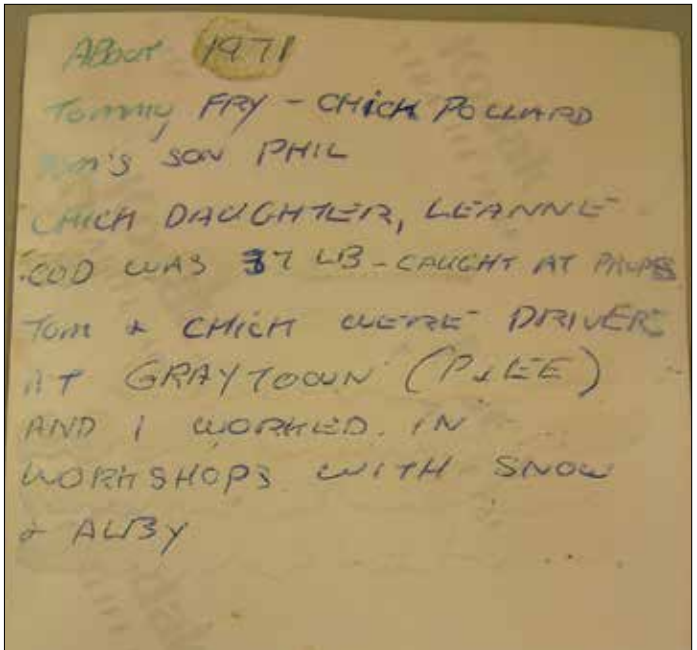


Figure 20. Murray Cod Caught In The Goulbourn River
(Bill Leviston - Centre)

Figure 21. A Scared Tree In The Graytown Wetlands
(Steven Schmied)

Songlines And Scar Trees

Indigenous tradition indicates that Graytown covers the Country of a number of Indigenous groups. Indigenous groups that have interests in the planning areas include the Ngurai-illam Wurrung, Bendigo Dja Wurrung Aboriginal Association Incorporated, Taungurung Clans Aboriginal Corporation, and the Yorta Nations.

Further, Songlines converge within the wetlands. The English word *Songline* describes an ancient concept that is embedded in traditional Aboriginal cultures. They are often referred to as "Dreaming Tracks", and can also be called "strings" in the sense that they connect different people and sacred sites. These songs, or song-cycles, have various names according to which language group they belong to, and tell the story of the creation of the land, provide maps for the country, and hand down the law as decreed by the creation heroes of the Dreamtime. Some Songlines describe a path crossing the entire Australian continent. It is believed that the Graytown range, and especially the Graytown wetlands, sit astride important Songlines at the intersection of the Goulburn River, running North-South and the Great Diving Range, running East-West.

Marked into the landscape is evidence of the first nations, being scarred trees in the wetlands in the south-eastern corner of the base. When Aboriginal people scarred trees they removed large pieces of its bark and used it for traditional purposes. The wounds scarred trees still display tell of the many uses Aboriginal people found for them:

- resource harvesting, for example for canoes or containers
- food implements
- shields
- temporary shelters
- initiation sites
- tombstones.

The number of scarred trees is dwindling and the remaining ones need to be protected. Scarred trees are now fragile reminders of the resource harvesting techniques practised for thousands of years [4].

Major's Line

The Major's Line refers to wheel-tracks left by the exploring party led by the NSW Surveyor-General, Thomas Mitchell, on his return journey from Victoria's Western District in 1836. He passed through the future shire during 5-7 October, travelling north-east. Overlanders such as Charles Ebden and Alexander Mollison came to the district in 1837, using the 'line' as a guide. Overlanders followed in his footsteps and used the same river crossing, as did the postman on the mail route from Melbourne to Sydney, established in 1838. [5] Major's Line passes through Graytown.

Figure 22. Major's Line Monument
(Graytown Archive)

Gold!

Up to 1868, Spring Creek area was prospected by locals without success. However, in 1868 gold was discovered in the Graytown area, in a field lying between the McIvor (Heathcote) and the Rushworth diggings.

Graytown is a gold mining ghost town located approximately 120 km north of Melbourne on the road between Heathcote and Nagambie in Victoria, Australia. Graytown was named after Mr Wilson Gray and who later became Judge Gray in New Zealand.

Graytown was formerly known as Spring Creek which was surveyed in 1848. Alfred Corbett, James Mills, Charles Wolf, and William Polkinghorne reported their find to the Mining Registry on 20 October 1868 and staked a claim 150 yards square. The first sinking was 50 feet deep at Moonlight flat and yielded 2 deadweight (approximately 3 grams) to the tub with 18 inches of wash dirt. Corbett and Company announced that a good, deep run of gold existed and a week later the "*Rush*" started.

Suddenly, there were 400 miners in the area. In another week, Rushworth, Whroo, and particularly Heathcote, were depopulated and the miners' ranks at Graytown swelled to 900, many of which were Chinese. The Chinese presence is still observable in the Graytown cemetery where a marble lid covers a traditional upright (standing) grave.

In 1868, more than 30,000 miners arrived from nearby Heathcote, Whroo, and Rushworth, further significantly depleting the population of those towns. Day after day, endless numbers of drays loaded with furniture continued to arrive, and women and children began to appear. At this time, Graytown was compared in size to the Ballarat Gold Rush days. A rough estimate showed that at one stage Graytown had 500 to 600 pubs and shanties pouring forth streams of beer and blue rum to nobles, lords, ignoble scamps and 'interesting' people attracted by the widespread fame of the Spring Creek Rush.

A borough was constituted on 9 August 1869, comprising 23 sq. km. A township was surveyed in 1869 and named 'Moormbool' although lack of water proved a problem with some of the material allegedly washed in beer. Moormbool was renamed named Graytown after Moses William Gray who had been a Parliamentary member for the nearby Rodney electorate, 1860-64. He was a passionate land reformer.

The alluvial gold rapidly disappeared and by late 1870 the population had declined to 150, with rows of unoccupied dilapidated shops. The death knell came in 1870 when a flood swamped the mining endeavours and destroyed numerous buildings. Many of the remaining structures were moved elsewhere. By 1875 the borough had a population of 130 persons, and in 1880 it was absorbed by McIvor shire. A plaque now stands on Mine Shaft Hill commemorating the rush.

Defying the force of history, Graytown's leading citizen was William Oddy, storekeeper and grocer, borough mayor and magistrate, who remained there for 44 years, 40 years after Graytown's decline. His Worship the Mayor of Graytown was fined 1/- for each of his pigs allowed to wander about Graytown streets.

Graytown is now a State forest and farming area, with Osicka's vineyard near Major Creek. The Spring Creek nature conservation reserve, part of the Heathcote-Graytown National Park, is noted for large trees that are absent or uncommon elsewhere. It is on a minor road from Heathcote to Nagambie and is 25 km north-east of Heathcote. Immediately north of Graytown is the hilly Moormbool ironbark forest, and to its south is Major Creek, along which there are fertile river flats.

Figure 23 Mine Shaft (Left) And Warning Sign (Right)
(Graytown Archive)

Water

Greg Oakley

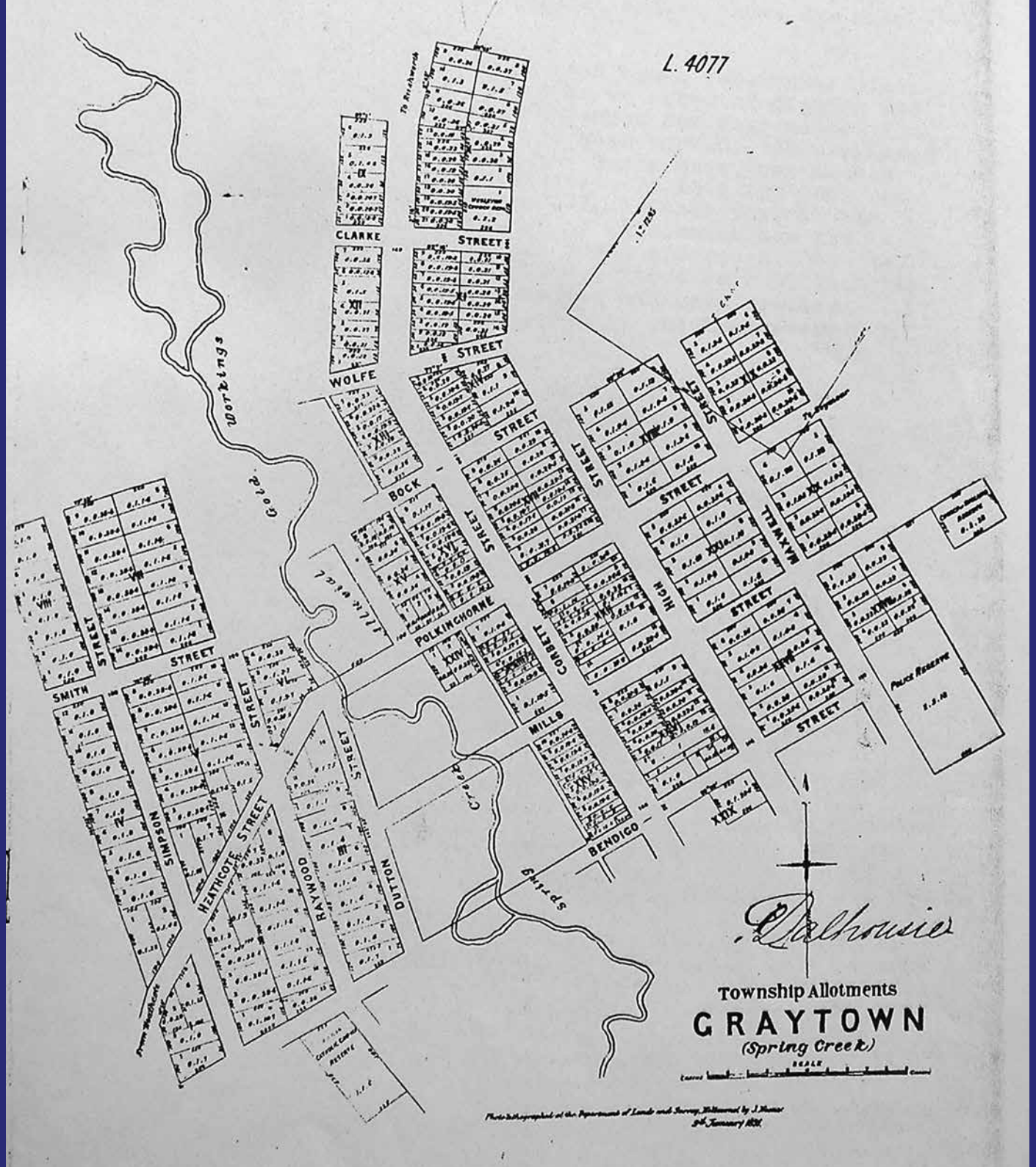
As with most areas in Australia, water has been both an issue and a blessing for Graytown. Some parts of the base have ample water supply from the Goulburn River and the surrounding wetlands, whilst other rest on parched elevated terrain. To capture what water is available, five convict-constructed weirs where constructed on Major Creek, some with cast iron sluices.

On the south-eastern corner of the range, abutting the Goulburn River, are some of Australian most pristine but unknown wetlands. The wetlands are a protected area, with only a limited number of Defence personal permitted entry. The wetlands are filled when heavy rains to the west cause the local creeks to flood.

The flood begins with rain in the nearby hills. The next day does not bring any water down the creek, however the second day the flood travels from west to east down Compton's Creek, taking four days to cross Graytown. Eventually, the wetlands are filled, with the water remaining for 3 to 5 years. In 1974, a flood made the Goulbourn River impassable, Seymour was flooded and staff were trapped at Graytown for four days.

The nearby Goulburn Weir, completed in 1891, was the first major diversion structure built in Australia and remains a remarkable feat of engineering that uses the Goulburn River to irrigate half a million hectares of farmland. On completion of the Goulburn Weir, the Nagambie Lakes were formed. Water transport allowed a prosperous trade in red gum timber, which was brought to Nagambie by barge, milled into blocks and sent to Melbourne for road making. Not far away are the beautiful, old timber Kirwan's Bridge and the '*strutted stringer*' style drawbridge, known as *Chinaman's Bridge*.

Figure 24. Graytown (Spring Creek)
(Graytown Archive)



Within the wetlands sits the ruins of the Rowells Road homestead. The homestead site today is a tranquil setting alongside Major Creek, marked by an old but very healthy apple tree. After stopping the car next to the footprint of the homestead, a short walk brings one to the oldest orchard in Victoria. The creek is home to freshwater crayfish, yabbies, mussels and platypi.

Whilst the homestead is within the template of the ranges, the unexploded ordnance is not the only danger. One must also be alert to the wildlife hazards, as the same creek attracts large numbers of poisonous snakes, from tiger and brown snakes to red-bellied black snakes. In some areas of the wetlands, snakes are so prevalent that staff do not go near the waterholes.

Timber

Timber harvesting has been carried out in Graytown and the surrounding areas since 1905 by the Penrose and Oddy mill (P&O). Once milled, the timber was loaded on barges on sailed down the Goulburn.

The forests were of some importance for the supply of minor timber products, chiefly firewood, fence posts, railway sleepers ad mining timbers. Graytown has woodlands of Grey Box and open forests of Red Ironbark are found in the area. Grey Box, Yellow Gum, River Red Gum and Yellow Box are also found on the lower slopes. Higher up the slopes, Grey Box is associated with the Long-leaf Box. On the crest of low ridges, Stringybark and Red Ironbark are prevalent.

The significance of the timber industry declined due to the almost complete extraction of timber suitable for milling, the lower firewood consumption and the decline in local mining activities. After the Second World War (WWII), the demand for firewood decreased as oil heaters and later natural gas was used for heating in metropolitan areas. [6]

To extract the timber, a 9.2km long tramway was built through Graytown to the mill. A bridge still exists over Major Creek, called Clouston's crossing, after Councillor Hagan who proposed the bridge. The Premier for approved the construction in 1905, costing £11 4s 7d, and awarded from six submitted tenders.

The mill was sold to the McIvor Timber & Firewood Company in 1909; the company established by some of Australia's leading industrialists; William Hedges, William Knox and Herman Schlapp. The mill continued to operate through two further sales until closing in 1935.

Figure 25. Fuse Battery Weir On Major Creek
(Steven Schmied)

Figure 26. Tramway Bridge Over Major Creek
(Steven Schmied)

Lemon Tree

Colin Fox

An object of pride is the Lemon Tree, commemorated with a plaque. Planted over 100 years ago, the tree represents a connection to the original settlers.

In 1978 P&EE-GT the unit hosted a visit by members and relatives of the Crossle family. The occasion was a nostalgic one for the sisters Marian Doris May Crossle, aged 78 years, and Helen Verner Chamberlain (nee Crossle), aged 72 years, as they inspected the site of their old homestead, now situated at the Vertical Recovery Battery, Graytown Range. All that now remains of the Crossle homestead is a few yards of dilapidated fence line and a lemon tree which is thought to be approximately 100 years old.

To commemorate the family's visit, OC Major B.W. Kennedy RAA, invited the sisters to unveil a brass plaque placed at the base of the old lemon tree. The plaque is inscribed as follows:

This Lemon Tree Marks The Site Of
The Old Crossle Homestead

In 1978 the Graytown Area was re-visited by; Sisters Marian Doris May Crossle and Helen Verner Chamberlain nee Crossle who lived in the Homestead from 1936 to 1943.

This plaque was unveiled by the Crossle Sisters as; guests of the Officer Commanding. Major B.W. Kennedy RAA17 November 1978

The Crossle sisters association with Graytown is not confined to their old homestead. They are grand-daughters of William Oddy who was an eminent citizen of Graytown during the 1868 gold rush, serving as a councillor, three times Mayor and General Store-keeper until his accidental death in 1912. Further, Marian Crossle was the aunt of Alan Moore who served at the unit from 1986 - 1987.

The lemon tree has been rejuvenated with some loving care by Mr Paul Kerris and Colin Fox after it had fallen a victim of Victoria's past drought. The plaque was remounted in 2018 on a rock from the range by Paul, Steve Roscoe and Colin Fox.

Figure 27. Placing The Plaque At The 100 Year Old Lemon Tree And The Plaque
(Graytown Archive)

Figure 28. Graytown Prisoner Of War Forest Camp 6 (Left) And POW Band (Right)
(Graytown Archive)

Prisoners Of War

In the WWII, a prisoner-of-war camp was set up 3.5km NNE from current P&EE-GT site. The camp was known as 'Graytown POW Forest Camp 6; a subsidiary of No. 13 POW Camp, Murchison, Vic - one of six POW camps located near the towns of Tatura, Rushworth and Murchison. The forest camp at Graytown operated until circa 1947. Approximately 250 Italian and German POW were detailed Forest Camp 6. Some Finnish seamen were also held at Camp 6 Graytown.

The most notable POWs were the German Raider "Kormoran", which fought HMAS Sydney in November 1941; both ships were sunk. Of the Kormoran's complement of 393 officers and men, 315 were recovered along with three of the four Chinese taken captive when the Kormoran sank the Eurylochus 10 months earlier. [6]. The prisoners remained interned in Australia under Army control until January 1947 when they sailed from Melbourne on the Orontes.

Internment camps were established for three reasons - to prevent residents from assisting Australia's enemies, to appease public opinion and to house overseas internees sent to Australia for the duration of the war. Most POWs in Australia were sent from overseas.

Each compound was enclosed by a double row of wire fencing two metres high, with coiled barbed wire between. Guard towers were erected at the corners of the compounds, and the whole perimeter was illuminated during the hours of darkness. Prisoners were held in timber frames barracks with galvanised iron roof and walks, about twenty in each building. Kitchens, mess huts, shower blocks, laundries and latrines were also located within the compound. Each camp was divided into two or more compounds to facilitate an as-far-as-possible separation of nationalities.

The POWS were engaged in cutting firewood for the camps and for use in the hospitals in Melbourne. The POWs were allowed freedom of the bush by day. The POWs and internees also grew vegetables in the camp. There was a breakout of 21 German prisoners who tunnelled under the barbed wire at Graytown in January 1945.

The camp was later used as a depot by the Forest Commission. In 1981 a number of state forest areas were added to the parks and reserve system, primarily for conservation purposes. Little physical evidence of the camps remains, other than some building foundations and wire from the camp fences after the camp was deliberately burnt down by the Forest Commission in the 1990s. [7]

Shell Shock Part 1 and History In The Landscape

Anthony (Tony) Crooks, Greg Oakley and Bill Leviston

Following WWI, the *Great War*, many veterans returned home suffering from Shell Shock, now called Post-Traumatic Stress (PTS). One such soldier returned to the solace and beauty of his farm at the eastern end of the range. There, on a hill overlooking the Goulburn River, he set about hand digging a water tank to provide a more reliable source of water to the farmhouse and livestock. The tank still exists, one man's form of quiet mindful meditation.

Further history is written into the landscape. Recently two additional historical sites were identified; *Ford Falcon Dam* and the Vietnam War Bunker.

The Vietnam Bunker is in a remarkably good condition, with only a broken beam. There are a large amount of tank track markers on the ground in front of the bunker.

The range had two grassed airfields; one located 600m east of the central Observation Post (OP) at Vertical Recovery Battery. This airstrip was 1600' x 200' and on a bearing of 70°. The other airstrip was located 1000m to the south of the HQ and was 1800' x 200'.

During the 1980s, the refrigeration mechanic would fly his private plane to the airfield when it was time to service refrigerators used to prepare munitions for climate proofing.

Figure 29 The Top Water Tank (Top Left), *Ford Falcon Dam* (Top Right) and the Vietnam War Bunker (Bottom)
(Steven Schmied and Graytown Archive)

Figure 30. Leopard Tank (Next Page) 105mm Howitzer (Right) And 50th Anniversary Commemorative Plaque (Left) (Steven Schmied)

Quiet Sentinels To Fifty Years Of Service

Anthony Crooks

The main base is protected by two Quiet Sentinels; a Leopard Tank and a recently added 105mm Howitzer artillery piece.

In 2007, the Leopard Tank was removed from service and replaced with the M1A1 Abrams. Various units were issued with a Leopard to serve as monuments, including Port Wakefield even though unlike at P&EE-GT, the Leopard never operated at P&EE-PW, So when Defence Science and Technology Group (DSTG), the then Defence Science and Technology Organisation (DSTO), at Fisherman's Bend was also issued with a Leopard but didn't have anywhere to store it, I jumped at the chance and said "*we'll take it*".

DSTG were also concerned that they would need to pour an expense thick concrete pad to stand the tank on. However, I believed that given the tank is designed to operate on dirt, a concrete pad was unnecessary. So our tank proudly stands at the main gate.

The Howitzer is the gun that was used for many years of proof and experimentation at Graytown. The 105mm Howitzer also reflects that Graytown used to swam with National Service members during the Vietnam War. The "Nashos" would come in groups of 20 to attend their artillery courses in the 105mm Howitzer, prior to deploying.

To celebrate the 50th anniversary of Graytown it was brought out of service and used to conduct a 5 round salute. LTCOL Watson given the fitting honour of firing the last round. A commemorative plaque was also placed with the Howitzer.

Chapter 3.

PORT WAKEFIELD

Sand

Peter Bell

P&EE-PW had its origins in the young Commonwealth of Australia's program to become as self-sufficient as possible in Defence materiel. The colonial governments had each had an independent defence force which was seen as an adjunct of the imperial military structure; for example, the troop detachments which the Australian colonies sent to the South African War fought as units of the British Army until Federation in 1901. All the colonial forces in Australia were supplied with arms from British factories, and were advised and sometimes commanded by British officers.

In 1926 when a committee of two, LTCOL H.B.L. Gibbs, of the Munitions Supply Board, and Captain W. Spooner, RAN, selected 240 hectares of land near the head of St Vincent Gulf for the purpose of conducting proof firings of Quick Fire (QF) 18 pounder (pdr) ammunition for the munitions factory at Maribyrnong, Victoria. In selecting Port Wakefield, the committee was influenced by the large stretch of sand which is exposed at low water, thereby facilitating the recovery of fired projectiles. [8]. This technique is called 'over water recovery'; the only range in Australia where projectiles can be fired into a coastal area and retrieved relatively undamaged for assessment. Only sixty miles south was Adelaide, with all the military infrastructure of a capital city, including an artillery battery based at Fort Largs. Gipps and Spooner concluded:

> *It is considered unlikely that a better site for a Proof ground exists anywhere on the inhabited coast of Australia, and we, therefore, recommend that the Commonwealth acquire sufficient land to form a Proof Range on this site … a total range of 28,000 yards.*

P&EE-PW opened in 1929 as South Australia's first defence science institution. The first rounds were fired on 5 December 1929. Until 1939 firings were conducted at three monthly intervals, but the tempo naturally increased from 1939 onwards.

In 1937 the first Australian-made 3-inch anti-aircraft gun produced by the Government Ordnance Factory at Maribyrnong successfully passed all its 'proofing' tests at P&EE-PW and was accepted by the Army.

The site's isolation is also a great advantage, with few neighbouring settlements. The only other significant township in the vicinity of Bald Hill was Port Wakefield about six miles north. Dotted a few miles apart around the upper gulf coast were little ketch ports: Lorne and Port Parham on the east side of the gulf, Port Clinton, Price and Ardrossan on the west.

Ardrossan had a jetty, but most of the others were simply landing places on an open beach where ketches could put into load wheat bags or wool bales from a small boat, and ship them down the Gulf to Port Adelaide for export. Never prosperous settlements, by the 1920s these local "ports" had faded away to a couple of buildings, busy for only a few days, or at most weeks, each year after the wheat harvest and the shearing.

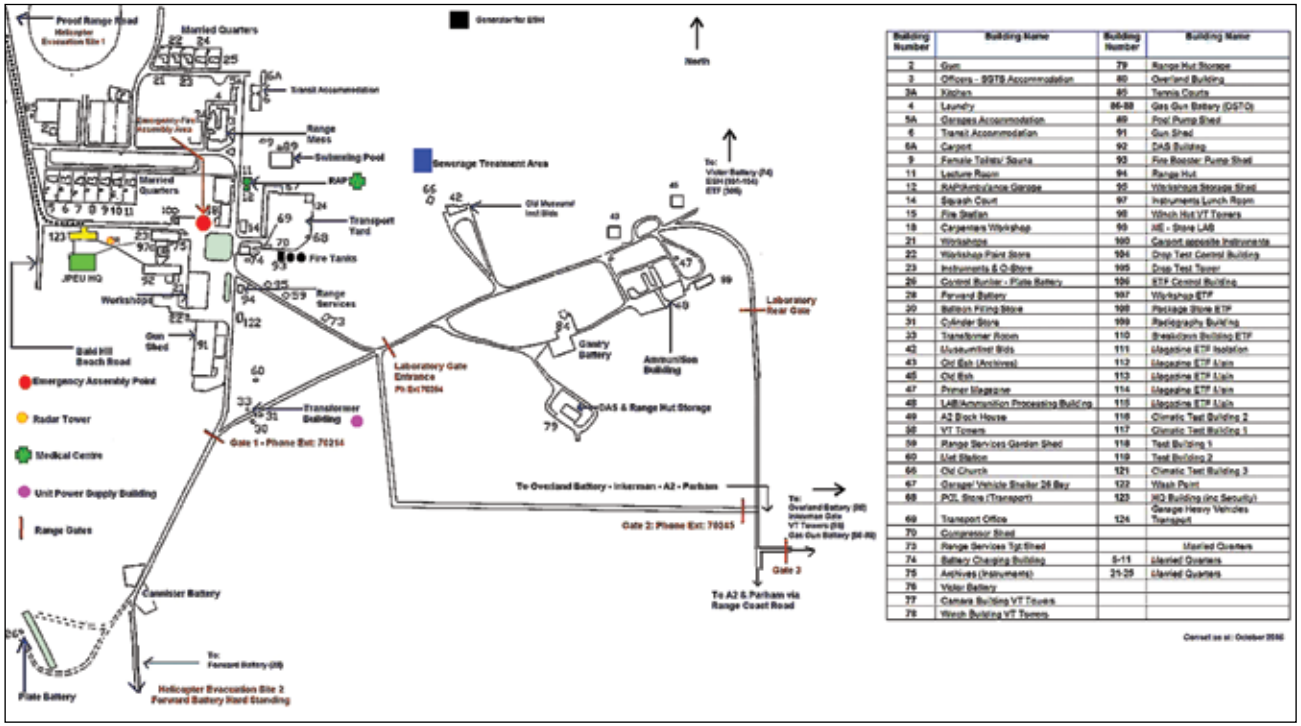
Figure 31. Two Mark 82 Aerial Bombs Detonated At *The Groyne* (Port Wakefield Archive)

Lorne, the only ketch port directly abutting the proposed proof range site, had been surveyed as a government coastal township in 1884 but few allotments had ever been sold there, and by 1922 it was nothing more than a store and a farmhouse. The storekeeper's living was provided by wool growing for most of the year. The store was abandoned in 1925, about the time construction work commenced at the Proof Range.

The stretch of coastline around Bald Hill, although only a short distance north of Adelaide, was sparsely inhabited. The surrounding land was in the *Hundred of Inkerman* proclaimed for settlement in 1856, but the flat coastal land was marginal sheep-grazing country, with wheat farms further inland. Little traffic used the coast road along the Gulf; South Australia's main northern transport axis was along the railway that ran through Hamley Bridge, thirty miles away. In 1922 a new line was being built north parallel to the gulf shore through Balaklava, but even that was fifteen miles inland.

Its original land and sea area of 1924 has been increased in 1938, 1944 and 1987 to test projectiles of increasing range. The isolation allows P&EE-PW to host weapons trials, munitions proofing and environmental testing for the RAN, Australian Army and RAAF. Along with weapons testing, the site is also used for destruction of expired and unsafe ordnance. The site is not normally used for military training and carries out its assurance function for Defence throughout the year.

The visitor's experience of P&EE-GT is juxtaposed to the landscape of P&EE-PW. Situated at the headwaters of the Spencer Gulf in South Australia, Port Wakefield is where the Australia desert meets the sea. The seabed off Port Wakefield was selected because the low tide left a large flat expanse of bare sand, so artillery shells and other projectiles could be fired into the water at high tide and then recovered undamaged for inspection when the tide went out.



Building Number	Building Name	Building Number	Building Name
2	Gym	79	Range Hut Storage
3	Officers - SSTS Accommodation	80	Overland Building
3A	Kitchen	85	Tennis Courts
4	Laundry	86-88	Gas Gun Battery (GS70)
5A	Garages Accommodation	89	Pool Pump Shed
6	Transit Accommodation	91	Gun Shed
6A	Carport	92	DAS Building
9	Female Toilets/ Sauna	93	Fire Booster Pump Shed
11	Lecture Room	94	Range Hut
12	RAP/Ambulance Garage	95	Workshops Storage Shed
14	Squash Court	97	Instruments Lunch Room
15	Fire Station	98	Winch Hut VT Towers
19	Carpenters Workshop	99	ME - Store LAB
21	Workshops	100	Carport opposite Instruments
22	Workshop Paint Store	104	Drop Test Control Building
23	Instruments & O-Store	105	Drop Test Tower
26	Cryotest Bunker - Plate Battery	106	ETF Control Building
28	Forward Battery	107	Workshop ETF
30	Balloon Filling Store	108	Package Store ETF
31	Cylinder Store	109	Radiography Building
33	Transformer Room	110	Breakdown Building ETF
42	Museum/Ind Bldg	111	Magazine ETF Isolation
43	Old Bde (Archives)	112	Magazine ETF Main
45	Old Bde	113	Magazine ETF Main
47	Primer Magazine	114	Magazine ETF Main
48	LAB/Ammunition Processing Building	115	Magazine ETF Main
49	A2 Block House	116	Climatic Test Building 2
50	VT Towers	117	Climatic Test Building 1
59	Range Services Garden Shed	118	Test Building 1
60	Mat Station	119	Test Building 2
66	Old Church	121	Climatic Test Building 3
67	Garage/ Vehicle Shelter 26 Bay	122	Wash Point
68	POL Store (Transport)	123	HQ Building (inc Security)
69	Transport Office	124	Garage Heavy Vehicles Transport
70	Compressor Shed		
73	Range Services Tyr Shed		Married Quarters
74	Battery Charging Building	5-11	Married Quarters
75	Archives (Instruments)	21-29	Married Quarters
76	Visitor Battery		
77	Camera Building VT Towers		
78	Winch Building VT Towers		

Correct as at: October 2000

Figure 32. Port Wakefield Range Map (Top)
(Port Wakefield Archive)

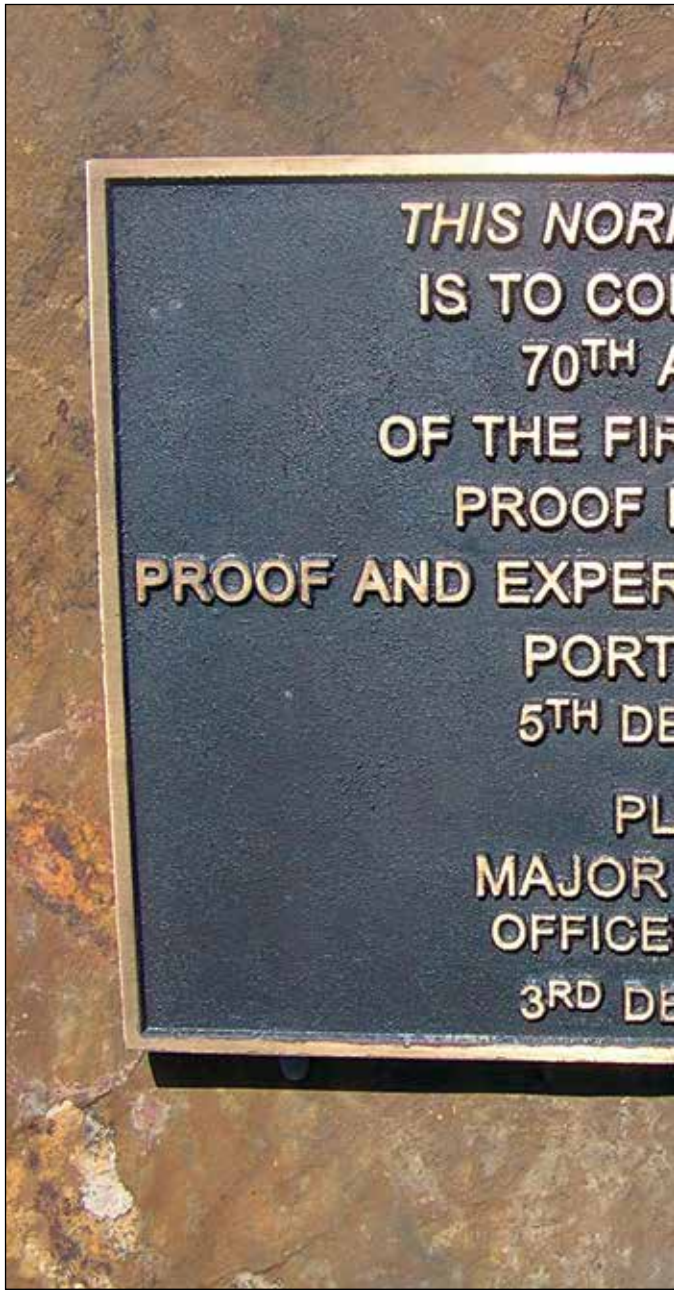


Figure 33. Plaque (Middle) And Norfolk Island Pine (Right) Commemorating 70th Anniversaries Of The First Firing, And 60th Anniversary Article (Left)
(Steven Schmied And Port Wakefield Archive)

Proof Range celebrations

At the conclusion of the Proof Range open day a very successful cabaret was held with 'Opus' - members of the Fourth Military Band supplying the music.

During the evening a 60th birthday cake was presented and cut by Brenda Phillips of Port Wakefield. Brenda is the daughter of one of the longest serving members, the late Mr Cad Sharman. Brenda was assisted in the cake cutting ceremony by one of the newest Proof Range personnel, Gnr Tom Faulkner.

A group of former Proof Range personnel were present, having been the committee who organised the open day 10 years ago.

As usual, the food was excellent and I believe everyone present gave a 'thumbs up' approval. There is no doubt that the open day and the cabaret cemented even further the close liaison that exists between the Proof Range and Port Wakefield and district.

• *Commanding Officer, Major David Morgan and his wife Sue enjoy the birthday celebrations.*

Diamond Jubilee

OPEN DAY
and
CABARET EVENING

The Proof and Experimental Establishment at Port Wakefield will hold a **Range Open Day on Saturday November 25, 1989.** All interested persons, both civilian or military, serving or retired, are invited to attend.

The day will consist of static displays, equipment demonstrations and live firings of past and present Artillery pieces. Activities commence at 1100 hr and conclude at 1500 hr. Food and drink facilities will be available. A commemorative Port Crock priced at $17.50 and other Regimental items will also be on sale.

A Cabaret Ball with buffet supper will be held on **Saturday evening** commencing at 1930 hr. Cost $15 per head. There are limited tickets. Post payment to Function Co-ordinator, Proof and Experimental Establishment, Port Wakefield SA 5550.

For further details contact Capt. G. Potter or Mr G. Manners, telephone (086) 671 005.

1929 **60** 1989
years


FOLK ISLAND PINE
MMEMORATE THE
ANNIVERSARY
RING OF THE FIRST
ROUNDS AT THE
RIMENTAL ESTABLISHMENT,
WAKEFIELD,
ECEMBER 1929.
ANTED BY
A.M. BOLLARD
R COMMANDING
ECEMBER 1999.

Figure 34. Looking North To The Headquarters And 90m Tower Over The Exposed Tidal Flats From Observation Post (OP) X10(Steven Schmied)

Overwater Recovery

Ken Scott

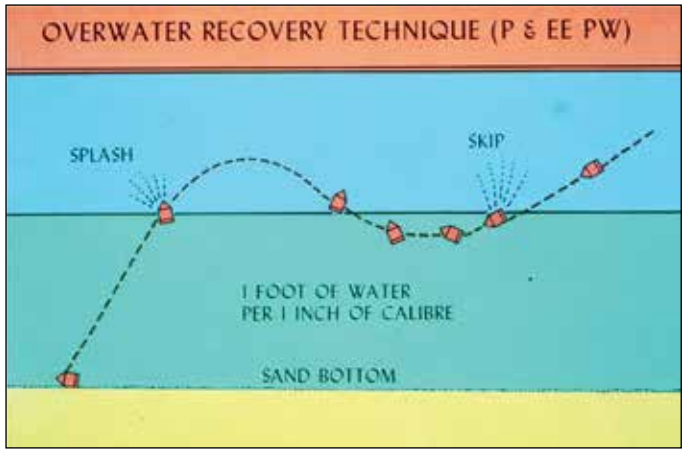
One way of recovering projectiles for proof studies is by over-water recovery: firing a projectile so that it splashes into shallow water and can be retrieved without impact damage. Due to the length of the range, Port Wakefield generally allows firings of all calibre out to 33km. Apart from Australia, only the UK uses this technique.

At high water, a projectile is fired at a predetermined low elevation. The projectile enters the water, exits, and re-enters the water with minimal energy. At low tide, the projectiles are recovered and then examined for any damage caused by firing, production or design faults exposed by firing stresses.

A classic task for overwater recovery is to determine where the "Driving Band" has remained attached to the projectile. Unlike smaller calibres, artillery shells have a softer metal (usually copper or lead) driving band fitted to the harder shell, with the driving band gripping the rifling in the barrel to create the stabilising spin. The test is to prove the band is not torn off the projectile, by using high-speed imagery and recovering the projectile intact.

Originally manned OPs were used to observe where on the water the projectile entered. The observers would call in the splash location, with the location triangulated between multiple OPs. Today, unmanned cameras are used to obverse the rounds, with the cameras able to automatically track the rounds in flight and the data relayed back to the test team via a dedicated high-speed fibre optic network.

The overwater recovery technique is not without its issues. In some instances, the round is not able to be recovered as buries itself in the sand rather than skipping out of the water. These rounds may take years to slowly work their way back to the surface.



Establishment of Port Wakefield

Port Wakefield (population approximately 650) is situated 100kms north of Adelaide and considered the first of South Australia's ports to be founded in 1838, only 2 years after Adelaide. The discovery of the Wakefield River in 1838 by William Hill that was named to perpetuate the memory of Edward Gibbon Wakefield, the man whose ideas founded the colonisation of South Australia.

The area around Port Wakefield was initially explored by Captain Matthew Flinders in March 1802. The area was already inhabited by First Nations peoples from the Kaurna Tribe. Their land stretched from Cape Jervis in the South to Crystal Brook in the North, and across to Gawler and Myponga in the East.

After the discovery of copper at Burra, and at the request of the Patent Copper Company, a government township was laid out at Port Wakefield and auctioned in 1850 [9]. The township was originally to be called Port Henry to honour the first civilian Governor of South Australia, Sir Henry Edward Fox Young, but once Sir Henry saw the locality he declined the honour. Instead, the township then took its name from the river [10].

Figure 35. Overwater Recovery Technique (Left) And Driving Band On A 105mm Projectile (Indicated By Arrow) (Right)
(Port Wakefield Archive)

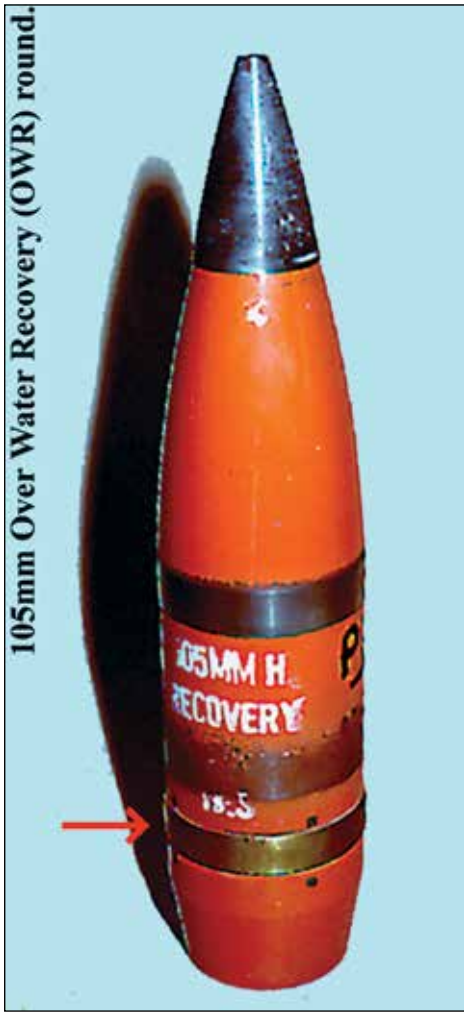
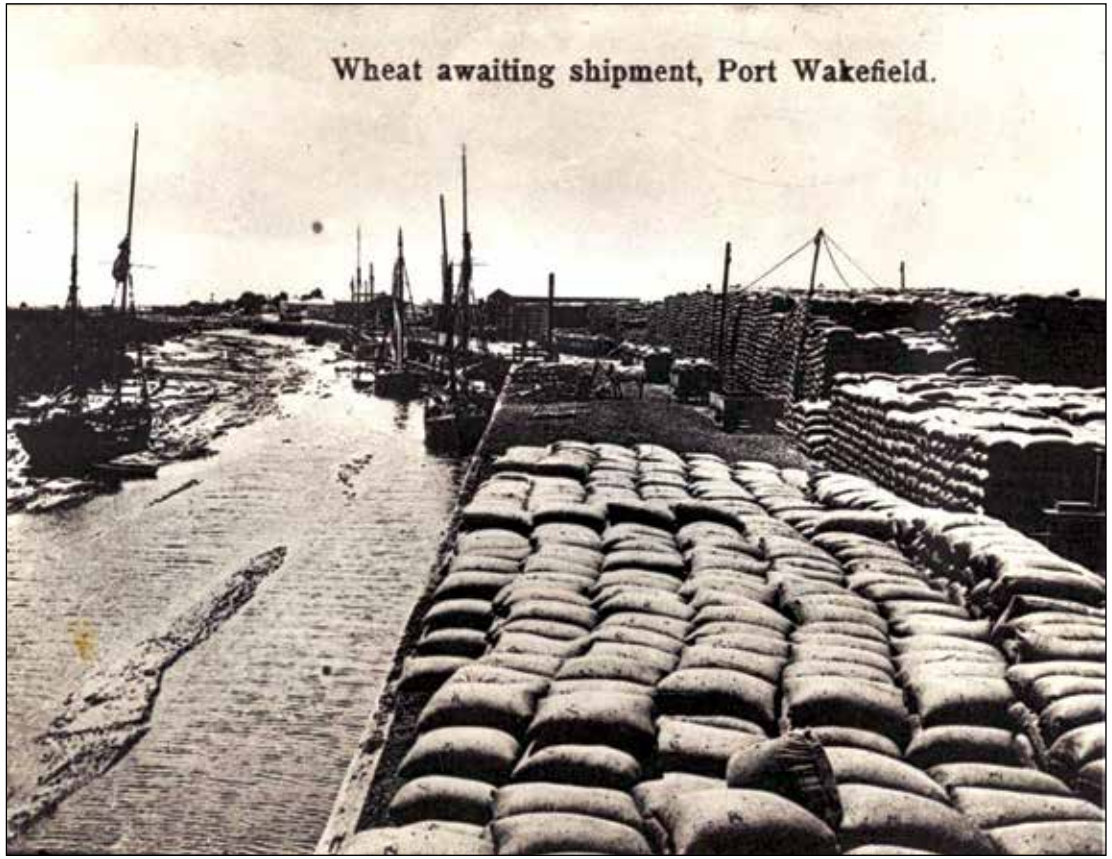


Figure 36. Port Wakefield (Right), Wheat Awaiting Shipment At Port Wakefield 1870s (Left) And Looking Towards Port Wakefield (Next Page)
(Port Wakefield Archive and Steven Schmied)

A smelter was built at Burra and the metal was carried from there to Port Wakefield by mules. Spanish muleteers were brought into the country to handle the animals. Ketches conveyed the copper to Port Adelaide to the copper company wharf and backloaded with coal shipped from NSW or the UK for the smelters at Burra. Carriage of the copper ore was by bullock wagon, some 145 kilometres by a rough track that became impassable in winter. Another solution was needed.



In 1849 the mouth of the Wakefield River was discovered by Mr Buck, a lighterman. The mouth of the Wakefield River was found to be suitable - it was considered 'easy of approach and secure' despite a sandbar blocking the estuary and access only for vessels of shallow draught. Thomas Lipson, the colony's harbour master, investigated the site and recommended that a channel be dredged through the sandbar. This was done, shipments of ore and supplies being made at the same time. By March 1850 dredging was almost complete, and the sale of town land began shortly after. A wharf was built and overseas sailing ships anchored in the Gulf whilst ketches lightered cargoes of wheat to them. The Customs House was built in 1856, the same year as the oldest hotel *the Rising Sun*.

Unlike the towns later surveyed during the 1860s to 1890s and which were modelled on Light's plan for Adelaide, Port Wakefield had a very different town layout. There is no main street lined with businesses and shops; instead, the layout gives a scattered town. With a central oval area originally intended for a church, and one long diagonal from northeast to southwest, the town is otherwise laid out on a grid pattern. The street names reflect its origins as an adjunct to the business of exporting copper: the names of Burra and Walters of the Copper Company and Edward Gibbon Wakefield divided among the streets.

Later, Port Wakefield found new products to ships; wool and later wheat. In 1866 the port was beaten only by Port Adelaide in its wool exports, exporting over 3,300,000 pounds of wool. For the pastoralists east of the head of the gulf, Port Wakefield was the obvious port. It was considered by a number of captains to be a safe harbour and the turnaround time to be quick and efficient. Customs facilities were established at the port in 1855 because of the number of ships sailing directly to and from overseas ports.

In 1870, a railway was opened to tap the potential of the inland and was successful in bringing produce into Port Wakefield for trans-shipment. The line was extended five years later. Three years later another stretch of railway was laid that gave farmers and pastoralists direct access to the deep water port at Wallaroo. Port Wakefield, the town, rather than the port, adapted. The railway workshops established in the town were a boon.

Wheat was now to become the major export from Port Wakefield - agricultural expansion was rapid following the development of mullenising to clear the scrub, new grubbers for digging the stumps, and finally in 1876 the invention of the stump jump plough. The wharves of Port Wakefield became stacked high with sacks of wheat waiting for shipment in the ketches of the mosquito fleet, or by lighters to the large ships anchored in deep water. In 1909, 300,000 bags of wheat were exported.

Fishing also was carried out from the port; beginning from the 1860s modern refrigeration has ensured that this remains a useful addition to the port's viability. The railways dealt a blow - the broad gauge railway link to the east/west railway bypassed Port Wakefield, and the railway workshops were relocated to Peterborough. Port Wakefield became a fishing port. The heyday of the ketch trade is long gone yet the town continues to prosper, servicing the heavy road traffic that travels to the Yorke Peninsula and the north.

Figure 37. Port Wakefield Train Station Building (Port Wakefield Archive)

Creating a Proof Range

Peter Bell

The 1922 recommendation was accepted in principle within the Defence Department, but no immediate need was seen to act on it. That requirement arose in 1924 when the Explosive Ordnance Factory at Maribyrnong began to recondition the Army's stock of artillery shells. Australia's standard field artillery weapon was the British 18-pounder Mark IV quick-firing gun, produced in enormous quantities during the war, and with the guns, the Army had acquired large stocks of UK-made shells. In 1924 Maribyrnong began reloading 6,000 of these wartime shells with new propellant charges and re-branding some of them, and the need for proof firings became more pressing.

A small proof range had already been established at Maribyrnong, which was much more conveniently located for testing the factory's products. However, it was unable to do recovery, for which the Bald Hill site had been recommended. For a time, there was talk of retaining the proof range at Maribyrnong and establishing a separate recovery range at Bald Hill, but by October 1925 the Munitions Supply Board had decided there should be only one proof facility: a combined Proof and Recovery Range at Port Wakefield.

Work had commenced on the site before the end of 1925, and the South Australian Harbors Board was erecting piles in the gulf marking the range's seaward boundaries to deter intrusions by fishing boats and other vessels. This raised the question of the range's name. The Harbors Board thought

the name "recovery range" was too insipid to discourage trespassers, and suggested using "a name which will suggest gun firing". Gipps agreed and recommended the name Artillery Proof Range, but the Munitions Supply Board was unconvinced and the official name adopted was Port Wakefield Proof Range.

Early site plans show the layout of a guardhouse, casualty station, married quarters, powerhouse, water supply dam, workshops, explosives stores, roads and two artillery ranges, all of which are still identifiable within the site today. There were two batteries planned, one for general artillery, the other equipped with a chronograph for measuring shell velocity; these correspond approximately to the sites of Land and Gantry batteries today. Ranging poles were erected at 1,000-yard intervals down the shoreline.

Progress reports detailed that the water supply works and telephone lines were completed by June 1926, most buildings erected by March 1927, and the diesel powerhouse was tested in February 1928. Although the establishment was small, its remoteness meant that it had to be self-contained, so from the outset, the entire building complex was equipped with reticulated electricity, water and sewerage, and the administration, guardhouse and range were linked by telephone. These were relatively sophisticated requirements for the time, and construction of the range kept the contractors at work for over three years. The Proof Range was ready for its first firings by 1929.

Batteries

There are four batteries currently in use at the Range:

- **Forward Battery.** Forward Battery is suitable for most proof firings, including High Explosive (HE). The battery has facilities for propellant charge adjustment and instrumentation of all types.
- **Victor Battery.** Victor Battery is used for proof and trials of Variable Time (VT) fuses that used a small, short range, Doppler radar in the projectile to detect the target. The target at Victor Battery consists of large (up to 11-foot diameter) radar reflective aluminium mesh ball slung between two 80 metre high towers.
- **Canister Battery.** Non-operational. The battery was used for firings from field carriages. It is not used for HE firings.
- **Plate Battery**. Plate Battery was originally constructed as an armour plate range. Plate Battery is now dismantled as a firing battery and is used for equipment storage.
- **Overland Battery.** The acquisition of the Leopard tank by the Australian Army brought the need to test its high-velocity 105mm gun. In the early 1980s, a new battery called Overland Battery was established specifically for that purpose. Overland Battery is largely a static trial battery with a few dynamic tasks taking place annually
- The range has ample area for the establishment of ad hoc batteries to carry out specific tasks.

Railway

Carrying heavy loads such as armour plate and large gun barrels between batteries always presented difficulties. In 1960, a 5' 3" gauge railway track was built from the laboratory area to Plate Battery to facilitate these tasks. It carried a 50' long flat top truck, weighing 6 tons. Most of the track has subsequently been torn up, but the last 20m or so at the Plate Battery end is still intact.

Figure 38. Range Head Circa 1920s, Regimental Aid Post (RAP) 1929 (Centre Top), And Range Head And Plate Battery Circa 1977 (Centre Bottom)
(Port Wakefield Archive)

Figure 39. Travelling Crane At Plate Battery Built-In 1939 (Top Right), Overland Battery (Middle Right) and Plate Battery Prior To The Amiens Gun Pit Being Filled In (Bottom Right)
(Port Wakefield Archive)


Workshops
TSO's Dump
Fire Station
Steel Store
Lecture Room
Range Hut
RAP & OR's Tavern partially hidden by shade & top of trees
HQ
Transport Office
Carpenter's Shop with flue
Officer's Sergeant's Mess
Sportsies Club/Bar 2 Lg Bldgs & the smaller one
OR's Lines

Figure 40. Proof Range In The 1950s Showing Three New Married Quarters Bottom Right
(Port Wakefield Archive)

Buildings and Accommodation

Peter Bell

During the wartime emergency, accommodation at the Proof Range was completely inadequate, as the permanent peacetime establishment was only 15 people, and there was no civilian accommodation available for rent in the vicinity. Subsequently, the mess was built before or during 1939. In October 1941 a detachment of the 4th Garrison Battalion from Fort Largs was transferred to Port Wakefield for its protection and accommodated in tents. However, they had nothing to do there and were withdrawn early in 1943.

All the wartime activity meant that the Proof Range establishment increased dramatically in size. Inspection Branch Staff were based there permanently instead of travelling to the range for each proof, as had been the pre-war practise. There was an ongoing building program throughout 1942 and 1943 to provide not only accommodation and messing facilities, water supply and sewerage installations for an increased number of staff, but also batteries, magazines, roads, workshops and administrative buildings to cater for the increasingly strenuous program of proof firings. The 1928 powerhouse was converted to a mess and canteen; as from 1939 onward the Proof Range was receiving reticulated power from the state grid.

Fragmentary sources show that instead of new houses, accommodation huts were provided. Three of 60' x 20' dimensions were approved in 1943. It was decided that most of the new buildings and infrastructure would not be required after the war, and they were always envisaged as temporary expedients. Due to the need for speed and wartime material shortages, nearly all the new buildings were timber-framed and clad with corrugated iron, or more usually asbestos cement because of the shortage of zinc. One exception was the brick Officer Mess, apparently built at some time before the war. A plan of the site in April 1944 shows 61 buildings and structures on the Proof Range site; there had been 28 in 1927.

The decades following the WWII saw great diversification in military technology, and the Proof Range was constantly upgrading facilities and building new ranges to meet new requirements. Three new brick houses were built as married quarters just inside the range entrance in 1950.

Some of the wartime accommodation huts remained in use as married quarters for several years after the war, but presumably, most of the temporary buildings were demolished and sold, as they were no longer required.

Chummy The Horse

Tom Faulkner and Ken Scott

By about 1950 the staff establishment and physical form of the Proof Range had both reverted to something like their pre-war state. In that year the range retired the two recovery horses, replacing them with a Land Rover. This ended a long tradition, probably unbroken since 1788, as P&EE-PW was the last unit in the Australian Army to have horses on its strength.

As the pace of proof firings quickened, in 1939 the Army bought its own cart and two horses for shell recovery. Many of the wartime staff were women; members of the Australian Women's Army Service operated the scientific instruments, and also carried out tasks such as range recovery. The last horse to serve in the Australian Army was 'Chummy', who aided the recovery of the rounds from the mud flats. The Land Rovers have in turn been supplemented by four generations of hovercraft and woven within these changes; tri-cycles with balloon tyres, quad bikes and All-Terrain Vehicles (ATVs) have been utilised as well.

The tricycle can be fun! On one occasion it was left unattended on the beach for a short time as the tide came in. The tide at Port Wakefield runs at a smart walking pace, and when the rider next looked around, the tri-cycle was seen floating upright on its balloon tyres, heading merrily out into the Gulf.

Although the hovercraft is used to assist recovery, its primary purpose is for use as a patrol craft removing fishing boats when they encroach onto the range. The main issue with the hovercraft was that they caught and tore their skirts on exploded ordnance, the skirts filled with sand and they occasionally dived in nose first.

Figure 41 Australian Women's Army Service (AWAS) Members Recovering Artillery Shells With Chummy The Horse 1944 (Left)
(Port Wakefield Archive)

Figure 42 Hovercraft Montage (Centre)
(Port Wakefield Archive)

Figure 43. Quad Bike (Right)
(Port Wakefield Archive)

Figure 44. Amiens Gun With Original Barrel At Canberra Station (Top Left), Chassis Being Cut Up For Scrap In 1963 (Left) And Removal Of The 8 Inch Naval Barrel (Bottom Right)
(Port Wakefield Archive)

Amiens Gun

Peter Bell

The story of the Amiens Gun shows the ingenuity of the unit members, as well as the unfortunate tendency, like the destruction of the Sunnyside homestead, to not preserve the unit's history; a trait not isolated to the unit.

The German gunners had mounted an 11-inch naval gun on a railway chassis and used it as a siege weapon to shell Amiens during the German offensive of 1918. After the war, the captured gun had been displayed as a war trophy in many places before being located at the Canberra railway station. The chassis of the Amiens Gun was set up in a pit at Plate Battery and used for 8-inch gun proofs until 1947.

The story of the Amiens Gun is detailed by LTCOL David Brook in his 1979 Australian Defence Force Journal (ADFJ) article and reiterated by Peter Bell, who states:

> *Lieutenant Colonel David Brook recently gave an interesting talk at the Naval, Military and Air Force Club Military History Night, the topic being 'The Amiens Gun and Port Wakefield'. To cut a very long story short - the Amiens Gun was captured toward the end of WWI by the 51st Battalion, Australian Imperial Force (AIF), as a result of which, the gun was eventually shipped to Australia as a 'war trophy' to which we had claimed.*

The characteristics of the gun, manufactured by Friedrich Krupps in 1904, include:

- range 26,000 yards
- calibre 283 mm
- weight of shell 660 lbs (300 kg)
- weight of bare gun 44 tons
- total weight of gun, mounting and platform approximately 185 tons.

Given its size and bulk, the shipping, unloading, transport and display of the gun was not without some considerable difficulty; most ship's captains refused to consider it. The site selected at P&EE-PW for the mounting was near the Plate Butts where a 30-ton travelling gantry crane had been installed in 1939. The crane would be invaluable during barrel changes and in order to allow for the height of hoist, a hole was dug to emplace the mounting. This hole eventually measured in its finished form 66 feet long, 23 feet wide and 8 feet deep. An automatic pump took care of drainage. The contractors for this portion of the work were Hansen and Yuncken, a well-known South Australian firm of builders and contractors. Certain other earthworks were carried out, much concrete poured and eventually in great secrecy, the mounting was delivered to P&EE-PW on 16 November 1943.

Unit files record that the mounting was to be delivered by rail to Port Wakefield Railway Station. However, no heavy cranes or other lifting devices were available locally and so the mounting was offloaded at Mile End goods yard by a South Australian Railway heavy crane onto a 16-wheeled low loader. This low loader has solid rubber tyres as befitted the period. A police escort was provided and the 100 km drive to P&EE-PW commenced. A portion of the road to P&EE-PW was unsealed at that stage, and therefore great care had to be exercised. Some minor incidents such as wheels breaking through the road surface occurred but these did not seriously upset the progress up the Port Wakefield road.

Assembly of the mounting was supervised by a Warrant Officer J.H. Carey with the assistance of six RAEME tradesmen from Keswick Barracks. This took about three weeks. It involved fitting "several truckloads of new and reconditioned parts". A telegram discloses that 50 pieces of gun components made up the loads.

The 11-inch barrel and the roof that covered the breech area of the gun from are now at the Australian War Memorial in Canberra. The chassis was never returned to Canberra but remained at P&EE-PW until 1963 when it was inexplicably cut up for scrap.

The Amiens Gun pit was eventually filled in after it filled with water after a pipe was accidentally cut and not discovered the next morning.

Figure 45. Amiens Gun At Plate Battery With 8 Inch Barrel, Circa 1944

Figure 46. Original Highway Gun (Top Left), 155mm Highway Guns with MAJ Andrew Langford (Bottom Left) and Plaque (Right) (Port Wakefield Archive and Steven Schmied)

Highway Gun: The Original And The New

Originally published in the Plans Producer on 10 December 2010 [11]

For years a gun stood guard of the highway on the outskirts of Port Wakefield, creating a landmark for motorists eager to reach the highway town for a rest stop.

After an absence of more than a year, the iconic gun was replaced with a 155mm 'Long Tom' on an M1 carriage last Wednesday as the result of negotiations between Wakefield Regional Council and commanding officer, MAJ Andrew Langford.

The previous gun arrived in Port Wakefield in 1941, and after it was decommissioned, became a well-known landmark at the turn-off to the proof range. However, last year (2009) it was taken to Sydney to commemorate the defence of Sydney Harbour during WWII. Hundreds signed a petition protesting at the relocation, including people from across South Australia and interstate.

Local identity Wendy Garvie, who organised the petition, was ecstatic to see the new gun in place. And their pride was evident as a small crowd gathered to see the gun in its new position on the highway last Wednesday.

MAJ Langford was determined to have the project completed before his relocation to Canberra in the coming weeks, while Warren Miller, who refurbished the gun in the proof range workshops was also present, along with Steve Zink, Artificer Sergeant Major (ASM) of the workshops. MAJ Langford likened the gun to icons such as the Big Lobster at Kingston, the Big Pineapple, and the Big Banana.

The new gun is a 155mm Long Tom on a M1 carriage (circa 1943) and will be located at the same site. The M1 carriage design allowed a variety of firing systems to be mounted, enabling the testing of ammunition and firing systems of in-service Australian ordnance. The carriage is

a solid stable platform, allowing the proofing of ordnance such as 76mm Naval and 105mm Tank, and continues to be used today.

Council Chief Executive Officer Phil Barry said the gun replacement project was recognised by MAJ Langford as a critical project between the proof range and council, on behalf of the local community. A second gun will later be placed in the Port Wakefield township, which is hoped will prove a popular tourist stop for travellers. While a plaque will be placed with the highway gun, it is intended to be a landmark rather than a tourist stop.

Not In Our Backyard Part 2 - The Battle For Port Parham

Colonel (COL) Lee Dell

Port Wakefield, like Fort Gellibrand, has experienced the "Not in Our Backyard" syndrome. Port Parham started with a fishing shack inside the range during Work War II. After the war, further shacks were built, with the houses now cuddling up to the southern fence of the range. Only warning signs stopping residence from entering the range along the beach. Further, sand mining used to be conducted inside the range at Point Lorne, through these operations have now been abandoned, the old homesteads removed. The Toll Keepers house, dating from the days when the Port Wakefield Road had tolls, has also been removed.

Further, the residences of Port Parham have always been somewhat jealous of the access the unit members had to the range, enjoying exclusive access to the fishing and crabbing. Fishers from Port Parham still occasionally stray into the exclusion zone.

The issue came to a head in 1983 when Defence proposed to extend the facility to the neighbouring Port Parham. Defence wished to test larger guns, including the 155 mm Howitzer, so needed 30 km extra area. Kim Beazley, the then Federal Defence Minister, wanted to wait on the environmental study before making a decision. Premier John Bannon was against this.

The Army wished to compulsory acquire the land, lease it back for 10 years and close the beach. As the public became aware of the plan, protests broke out. The Highway Gun on Port Wakefield road was turned into a tent, defaced and graffitied. ABC, Channel 7 and 10 frequented the beach to have interviews with the residents and fly over the site in their helicopters. In the end, 2900 hectares were acquired including 16 farms and two houses inland. Port Parham gave up two km of land and coast (it was the army's anyway) and Port Parham has thrived ever since.

This was not the only time local residents and the unit have come into conflict. As COL Dell recalls:

> *"During the Vietnam War period, a shot was fired from a Navy ship. It was a 'recovery' shoot which was dependant on the tides. The tides were at the optimum for recovery at 0300 hrs. There were two results of this, both of which were unforeseen. The first was a shock wave which damaged property in a circle with a radius of about 10 miles and was later put down to an atmospheric inversion.*
>
> *We had to wait nine months for the second result to manifest itself: there was an unexpected rash of new babies in the range community."*

Figure 47. Highway Gun With Protest Graffiti
(Port Wakefield Archive)

Figure 48. Regionally Significant Broad-Banded Sand Swimmer
(Port Wakefield Archive)

Badlands To Sanctuary

Originally published in "*1929 - 2004: Celebrating 75 Years Of 'Quiet" Achievement"* [12]

Like Graytown, Port Wakefield thrives with wildlife, which is beautiful but also dangerous. P&EE-PW incorporates areas of potentially international environmental significance:

- Originally an ecologically degraded area from early cropping and grazing activities, P&EE-PW has now through the efforts of revegetation and ongoing environmental management been transformed into a vital ecosystem
- P&EE-PW displays a contradiction of activities. Controlled explosions mark the landscape, alongside active conservation and restoration projects of biological importance.

Fishers also recognise the abundant fish life within the range and regularly risk life and limb to chase good catches.

There are several plants of significance listed within the wider P&EE-PW area. However, the Environmental Impact Assessment found none to be present at the nominated site due to past clearing and stock grazing.

P&EE-PW is seen to have a positive impact on a threatened bird species, the Slender-billed (Samphire) thornbill. This species is listed as *Vulnerable* under both the South Australian National Parks and Wildlife (NPW) Act 1972 and the Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act 1999. Currently, the farmland proposed to be acquired for the project contains areas of samphire and saltbush habitat that is in poor condition and the Slender-billed thornbill does not appear to use this land. The habitat is present only in P&EE-PW due to existing land degradation factors (weeds, piggery effluent and grazing) outside the range [13].

Migratory wading birds arrive each year in their thousands from Russia to feed in the rich littoral environment, whilst on land, lizards, snakes, scorpions and other wildlife abound. Juvenile snakes especially have a habit of exploring inside the buildings.

The unit was awarded national recognition for their ability to have the wildlife happily living amid the daily firing tasks.

Officer Commanding, Farmer and Horse Trainer

COL Lee Dell

The role of OC is one that has many facets. Commander of staff, strategic visionary, chief negotiator with the local community, Proof Officer (technical expert), confidant and friend. As with Graytown, the OC may also add gentleman farmer. This requirement to be a *Jack-Of-All-Trades* and Master of a few more is retold by COL Dell:

> *I completed the Royal Military College of Science, Shrivenham, specialising in armaments and explosives. On completion, I began a series of attachments to Proof Ranges around the UK. I was based at Eskmeals on the coast of the Lake District and ranged from there to Lark Hill on Salisbury Plain and then to Pendine on the Welsh Coast. This was followed by a short stay at Shoeburyness and finishing at Inchterf in Scotland. The staff at each of these Establishments could not have been more helpful and all stood me in good stead for my subsequent posting at (then) P&EE-PW as OC and Proof Officer.*
>
> *I was fortunate to be in the UK at the beginning of their adoption of High-Speed photography and rapidly became enamoured of the equipment, the techniques and analysis of the results.*
>
> *We had just arrived from an English winter into an Australian summer. The brightness of the sunshine and the incredible blue of the skies impacted on our psyche. The drive north was through flat, dry country unrelieved by any features or vegetation. We were in the middle of a drought, which did not help. Not having any photographs, we did not what to expect, so were not surprised.*
>
> *As a result of the drought, local graziers were off-loading stock at very low prices. We already had pigs so I thought a few sheep would not go astray, particularly as the Range was over-endowed with feed. The Regimental Funds had some experience so I tasked them with buying up to 100 head. They sold for a shilling a head. We had the stock transported to the range and that is where the fun began. The sheep instinctively gravitated to the water which necessitated someone to herd them back to the other side. This was working quite well until the shepherds got fed-up with it. It fell to me as the instigator of the plan, to take over shepherding duties which I did on a Lambretta. All went well and the sheep were getting fat and I was looking forward to off-loading them and getting back to a peaceful sheep-free existence. As it turned out, Command had got wind of the sheep and told me in no uncertain terms to get rid of them immediately that, fortuitously, I was planning to do. We made a tidy little profit for Regimental Funds.*
>
> ***Lee Dell, horse trainer (failed).*** *A civilian friend asked if we could look after his one-eyed, in-foal, mare. I agreed and after a bit decided I would try out my very rusty equestrian skills. I did not have tackle so leapt on the horse bareback. This was a blueprint for disaster and I only lasted about five minutes before I hit the dust. The mare would probably have been non-plussed at all this carry-on and accidentally stood on my head. I finished up with a concussion."*

Luckily, COL Dell was not alone in farming experience; a famous member of Port Wakefield was Phil White. Phil owned the last farm to be purchased to extend the range near Overland Battery. Phil worked as the range night watchman for many years. Like Graytown, the range farmed livestock including pigs, cattle, sheep and chickens, the Range Mess slops going to the animals. Phil's butchery skills would be then called upon to slaughter and dress the animals, along with kangaroos shot at night, prior to serving in the Mess and Rangers Tavern.

Figure 49. Phil White And The Landscape And Sheep Opposite The Site Of Phil's Farm (Next Page)
(Port Wakefield Archive and Steven Schmied)

Figure 50. The Range's Tough Farming Country Looking Across To The 80m Towers
(Steven Schmied)

The Fertile And Dangerous Sea

The Vincent Gulf is a fertile but dangerous body of water, enjoyed but feared by unit members, their families and the local community. The sea teems with fish, crabs and even whales, whilst king tides flood the range's salt flats.

Around X10 (the 10 km point on the range), the range deliberately only fired to a range of 9500m and recommence at 10,500m. This allowed the unit and the families to gather to collect crabs and fish in the near shore deep gutter for flathead. The fishers would even stay out fishing on the incoming tide until they would float in with the tide. The families would then enjoy a BBQ lunch in the shelter, cooking the crabs in a large copper pot.

Whilst the tests would blast large holes in the seagrass, the grass was found to return within weeks. These areas of cleared sand would become the favoured home of large flathead and snoot, providing enhanced fishing.

Unfortunately for some poor victims, large Great White Sharks also frequent the area, with the most infamous

Figure 51. Covered Shelter "Crabbing Hut" (Top Left) And An Excellent Crabbing Day At X10 (Right) And Bare, Round Impact Patches In The Seabed From Testing (Bottom Left)
(Port Wakefield Archive)

being *Port Wakefield Tommy* or *Old Tom*. The legend of Tommy started when the sailing ship *Sobella* was riding at anchor at Port Wakefield on 28 March 1855. Previously the ship had made several voyages to the colonies under CAPT Coleman. On that trip, he had with him his wife and three children (one boy and two girls). About midday, while all hands were occupied elsewhere, the little boy fell overboard unnoticed by anyone. Shortly afterwards, while a search was being made and in full view of all aboard, a large shark was seen to pass under the ship, and afterwards, swim away with the poor little boy. The sight had such an effect on CAPT Coleman that the sailors had difficulty in restraining him from jumping overboard. Later in the afternoon the captain, his wife, and two little girls were taken ashore, prostrate with grief. [14]

Later, *Old Tom* became very daring, and on one occasion attacked a boat going out fishing. After this, a reward was offered for Tom's capture, which was accomplished later on, to the relief of everybody.

Unfortunately, the sea itself has proven to be more dangerous than *Old Tom*. On more than one occasion, members of the unit have searched for recovered fishers drowned at sea and washed up on the range's barren shores. On one occasion, a fisherman went out into a storm, with his body found by Alan Stewart on the beach, an arm sticking out from the storm-massed seaweed. Later two children from Ardrossan also drowned, with one washing up on the range and one in the mangroves south of Port Wakefield. As Alan sadly said on this discovery:

"See them come, see them go."

Fire

Ken Scott

At both Graytown and Port Wakefield, the unit has strong connections with the Country Fire Service (CFS).

With the nature of the work carried out by the unit, fire is a constant hazard. With the most memorable fire being in 2009 when white phosphorous drifted in from the beach on the afternoon sea breeze known as the "*Wakefield Doctor*". Crews with over 25 fire vehicles battled the fire. The fire was eventually brought under control, but not before a third of the range had been burnt.

Figure 52. Clockwise From Top Left. White Phosphorous Round Impacting The Beach, Aftermath Of The 2009 Fire Looking North and Fighting The Fire
(Port Wakefield Archive)

Figure 53 Sir Jack Brabham On Winning In 1955 (Next Page), Scott Kelly With Sir Jack Brabham and Lady Margaret Brabham (Top Right) and Port Wakefield Racing Posters (Bottom Right)
(Port Wakefield Archive)

Grand Prix

In the 1950s Port Wakefield was known around the world as the home of the Australian Grand Prix Circuit. The famous Australian driver Jack Brabham won his first Australian Grand Prix (AGP) in 1955 at Port Wakefield. Brabham's win in his Cooper T40 Bristol was also the first AGP won by a rear-engined car. [15]

The Port Wakefield Circuit was a located approximately 1 km east of Port Wakefield. It was the first purpose-built motor racing facility built in Australia after WWII and only the second in Australian history. The circuit was created out of necessity in 1953 when two years prior the South Australian state government banned motor racing on public roads, a ban that would stay in place until 1985 when it was rescinded to create the Adelaide Street Circuit for use in the AGP.

Port Wakefield was a small circuit for its time, in an era of three to four-mile circuits, the limitations imposed created a circuit of just 2.1 km. The circuit ran clockwise. Lap times for the circuit were around the 1-minute mark, with Brabham and Reg Hunt (Maserati A6GCM) sharing the fastest lap of the 1955 AGP at 1:03.00.

When it came to be South Australia's turn to again host the AGP in 1961, the Port Wakefield Circuit was declared inadequate and the 3.38 km Mallala Race Circuit was created, with part of Port Wakefield's facilities used to create Mallala. The last race meeting, organised by the Austin 7 Club of South Australia, was held on 14 May 1961, after which the circuit faded very quickly back into the landscape.

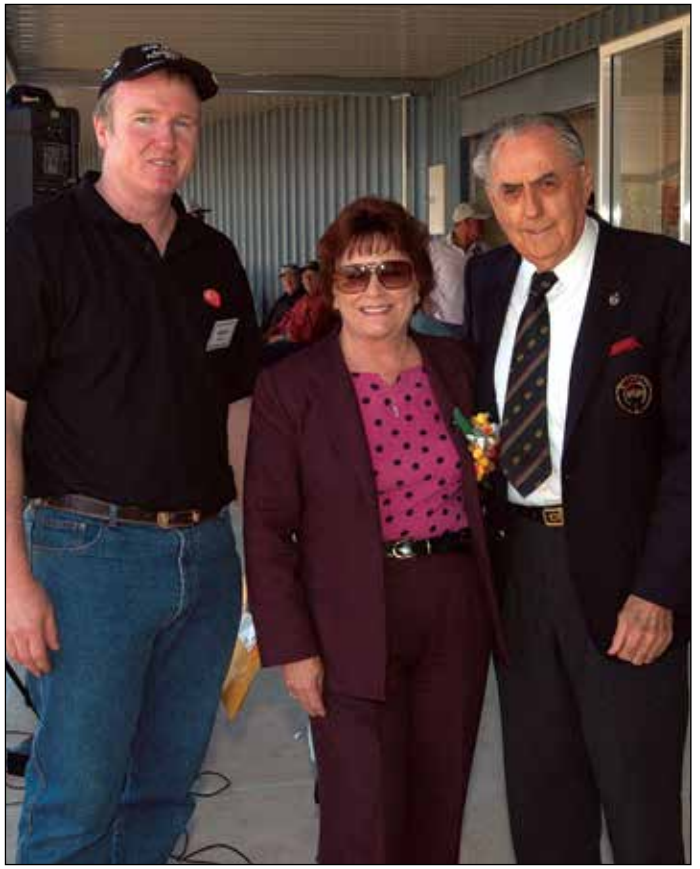


Figure 54. The Officers' And Sergeants' Mess
(Steven Schmied)

Port Wakefield Ghosts

Anne Thompson

Defence establishments appear to each have their ghost tales. This may not be surprising given their often long histories and the casualties of war. Examples include Sophia Susanna Campbell [16] and the other five ghosts of RMC Duntroon Officers' Mess, and the white lady and the haunted self-moving lift of A Block at Victoria Barracks Melbourne.

The *Port Wakefield Ghost* has been reported at various times since the 1940s. Most often the encounter is on a dark and stormy night on Highway 1 near the base.

Though there are many different experiences with this spectre, the most frequent similarities are that while driving down the highway, the driver sees a lonely figure in a WWII RAAF uniform walking along the side of the road. The driver, hit with a feeling of empathy pulls over to ask the man if he needs a ride somewhere. The man asks to be driven to Adelaide so that he can see his sickly mother, one woman quoted the man as saying "My mother is dying, can you give me a lift to Adelaide, so I can say goodbye before she goes?"

The young airman asks if it's okay if he rests just for a little while and falls asleep either in the passenger seat or laying down on the back seat. When they arrived at the address they looked around and he was gone; they went into the address and spoke to the woman who lived there. When they told the woman the name which the young man had given them, she said: *"that's my son who was killed in a plane crash during a training flight out of Mallala during WWII"*. It is believed his body was recovered and buried in an unknown location, and that his spirit is still trying to get home to Mum.

Another tale is that of a local businessman, who recounted how the ghost was picked up one night heading into Port Wakefield. He related how he was entering the toilets at the Shell Service Station behind a man in a RAAF uniform. The uniformed person went inside first and when the businessman entered the room straight after him, the man had disappeared!

The base also has reports of a ghost in Married Quarter Number 3 (now demolished) and 'Simon the Ghost' in Officers and Sergeants Mess, is reported to cause doors open and close themselves. The real 'Simon' was actually a manikin that moved freely around the range from his home in the Officers and Sergeants Mess.

Chapter 4.

ORCHARD HILLS

Not In Our Backyard Part 3

Until recently, Headquarters JPEU was located at Defence Establishment Orchard Hills (DEOH) west of Sydney, after originally based at 380 St Kilda Road Melbourne until 2004. In 2017, JPEU proposed to move from Orchard Hills to Port Wakefield. This proposal was presented to Commander Joint Logistics (CJLOG) and approved 20 November 2017. The last member of JPEU Administration Officer Karen Sherlock left Orchard Hills on 26 June 2018.

In recent times, Orchard Hills also had the issue of "*Not In Our Backyard*". The story also illustrates the benefits of having a Defence Establishment integrated with the local community, and highlights that Defence personnel are also locals. The following article appeared in the Western Weekender newspaper on 19 September 2018 [17].

Figure 55. Former Headquarters at Orchard Hills (Port Wakefield Archive)

Figure 56. New Port Wakefield Headquarters Building
(Port Wakefield Archive)

The Department of Defence is playing down the impact of a new missile testing facility to be built at Orchard Hills.

A 76-year-old resident, who wishes to remain anonymous, has been living across from the Defence facility for 47 years and told the Weekender she's concerned about the project.

"There were blasts many, many years ago when they were doing some sort of testing, it made our houses crack, our china falls off the shelves, it was absolutely dreadful," she said. "We all complained about it back then and they stopped, to hear they're planning something again is just terrible and unfair."

The $70 million project is proposed to deliver a naval guided weapons testing facility to the Defence Establishment at Orchard Hills. The building will allow them to undertake maintenance on weapons to ensure they are safe and fit for purpose.

A Defence Force spokesperson said the impact of the project will be nothing but positive for the community.

"Consistent with the Federal Government's Local Industry Capability Plan, the project is likely to generate a range of employment opportunities in the local area through demand for local services, resources and material," the spokesperson said.

"Construction will require a diverse range of consultants, contractors and construction workers, which will have flow-on benefits to local small and medium businesses with demand for accommodation, and the construction workforce's use of cafes, restaurants, and community resources."

When asked about noise pollution, the spokesperson did not respond.

Whilst the CO of the unit is currently based in Campbell Officers in Canberra, a new HQ building is being constructed at Port Wakefield next to the existing HQ.

Chapter 5.

THE WORK

Test and Evaluation

Peter Leggatt

Submission to the Foreign Affairs, Defence and Trade references committee by Peter Leggatt AMWU member and employee of Defence working at PP&EE-PW, 19 October 2015

Introduction

JPEUs function is to conduct test and evaluation of ADF ammunition and ordnance so as to ensure it is safe and suitable for use by the wider defence community, (i.e. uniformed members of Defence). Failure of Defence ammunition and ordnance can and has resulted in the injury and death of Defence members as well as the inability of the ADF to defend Australia's sovereignty.

Capability

The unit conducts testing to collect performance data that in turn is provided as technical information input for the determination and assessment for the life cycle of Defence ammunition and ordnance.

Performance tracking of an explosive item through its life will typically lead to extensions in shelf life, resulting in significant savings to Defence.

Equipment used to conduct the performance and simulation testing is of a highly specialised nature and requires suitably qualified engineers and technicians to operate and gather the data, to ensure the performance information provided, is real, unbiased and within defined limits and accuracies.

With the testing and data capture being of a highly technical nature, the subsequent qualifications needed to conduct such testing activities requires specialist training and many years of experience to provide the required level of integrity to the test process and results.

Workforce Demographics

The civilian workforce includes engineers and technicians working in the testing and evaluation field, operating the test equipment, setting up and managing the data collection process, evaluating and reporting on test findings.

Military personnel employed are members of the following Army corps:

- **Royal Australian Army Ordnance Corps (RAAOC).** Including the CO and OCs
- **Royal Australian Artillery (RAA)**. Provide personnel who operate the weapon systems
- **Royal Australian Electrical and Mechanical Engineers (RAEME)**. Provide support in maintaining equipment

Not Just Army

The unit is not just staffed by Army personnel and public servants. The RAN has had up to six personnel posted to P&EE-PW, including an officer, meteorologist, gun maintenance staff, electrician and a cook. The RAAF also has staff posted to the unit.

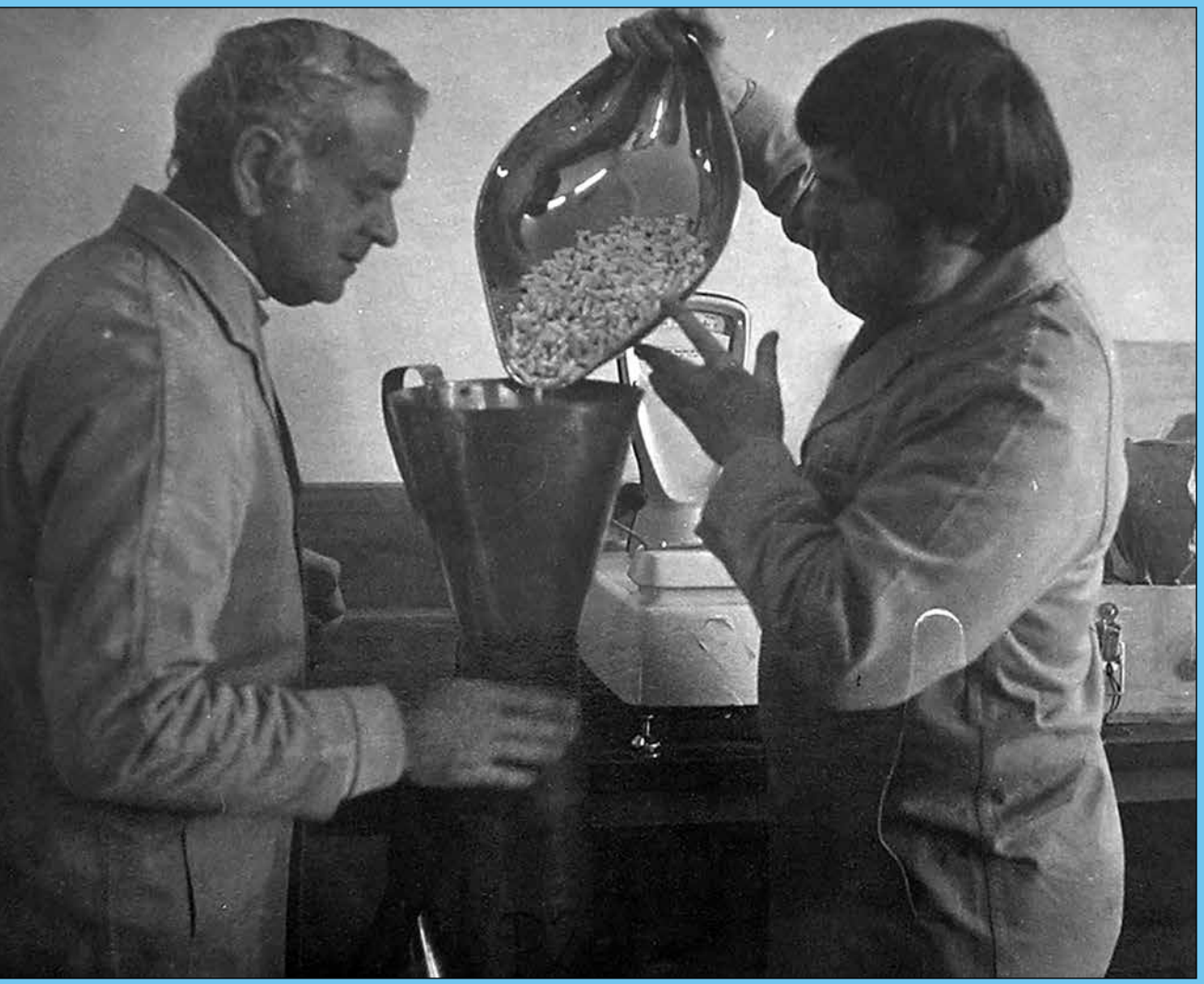
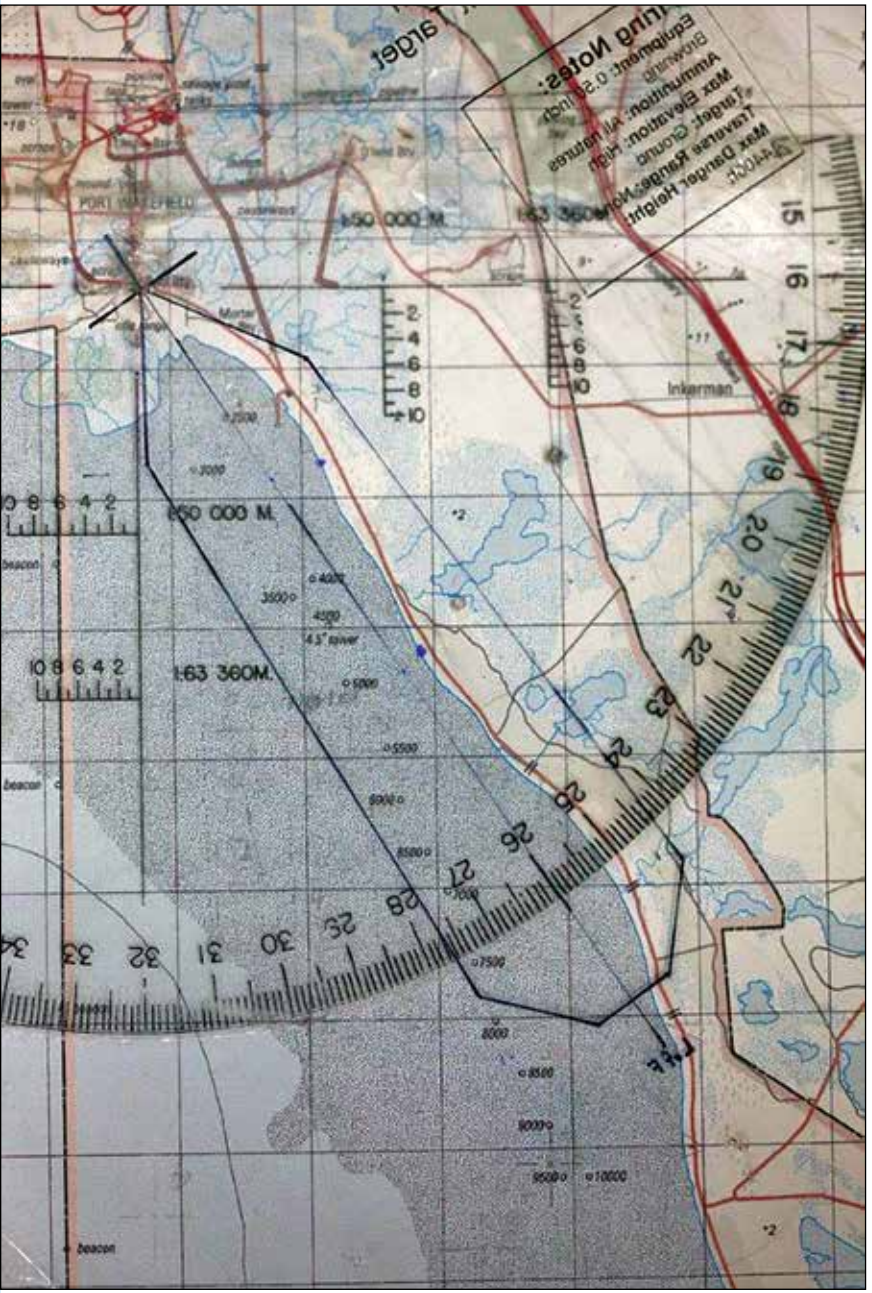


Figure 57. Clockwise From Top (Right and Middle Right). 5in54 Mobile Proof Gun Mount (MPGM), Setting Up At Plate Battery and Mr Norm Mcleod And Mr Howard Campbell Filling A Shell
(Port Wakefield Archive and Graytown Archive)

Figure 58. Port Wakefield Safety Trace (Next Page)
(Port Wakefield Archive)



Prove It!

The need for proof and the risk weapons pose to our own personnel may be illustrated through the following example:

> *April 1953 - Puckapunyal Area: Six military personnel from the 2nd Medium regiment when a 100lb shell prematurely exploded in a 5.5" field gun during artillery practice at the Puckapunyal Artillery Range. Some 24 shells had been fired from the gun before the explosion. The explosion destroyed the 5.5" gun, the breech of the gun, which weighed almost 450kg, was hurtled through the air for 25m before embedding itself in the earth. The explosion was the first of its kind to be heard on the range since 1941 when a small field artillery piece blew up without serious injuries to the crew.*[3]

Not only does the proof testing prove that each batch of munitions and explosive is safe and accurate, the tests also check the performance of:

- Systems new and near the end of their service life; e.g. an artillery barrel is still safe and accurate after years of service.
- After being stored or transported; e.g. stored on a ship for months on end.
- Shaken after a long overland road trip or transported in a helicopter.

Need accurate data to prove the handful of sample bullets are outside specification and therefore an entire batch of hundreds of thousands of bullets, worth millions of dollars, needs to be scrapped. To build up the statistically significant results, many rounds may be fired after being conditioned in hot, cold, wet, dry, salty and vibrating environments.

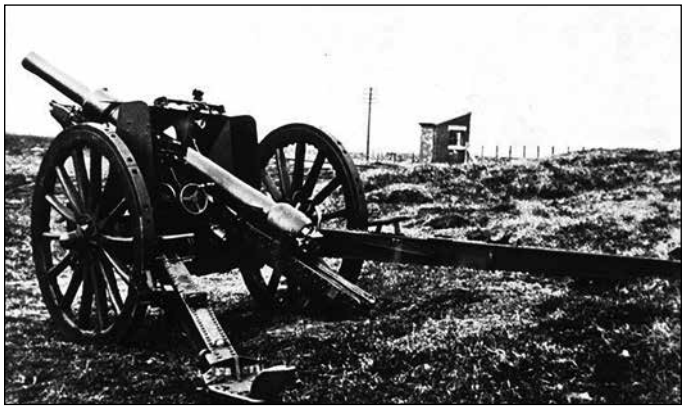
Figure 59. 105mm 1st Premature - 1962 (Left) And In Front Of The Headquarters Building At Port Wakefield (Right)
(Port Wakefield Archive)

P&EE-GT typically fires 1,000 - 10,000 munitions and explosive items each year, with P&EE-PW testing similar amounts of munitions.

As an example of the amount of work required to conduct proof test, on one occasion a batch trial of 1,000 rounds of 20mm ammunition was tested in the 100m indoor range at P&EE-GT. To test each bullet, the team was required to open the safety door to the range, load the new gun, close the door and then fire the round. At the end of the testing, The weapon system was fine, however, a locksmith was needed to be called when the door lock broke.

Guns

A wide range of weapon systems have been tested by the unit, including small arms, artillery, rockets and explosives. A montage of some of the more common systems used over the ranges' long histories is shown on the following pages.



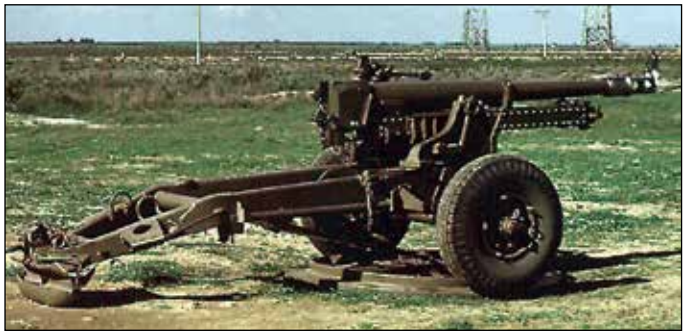
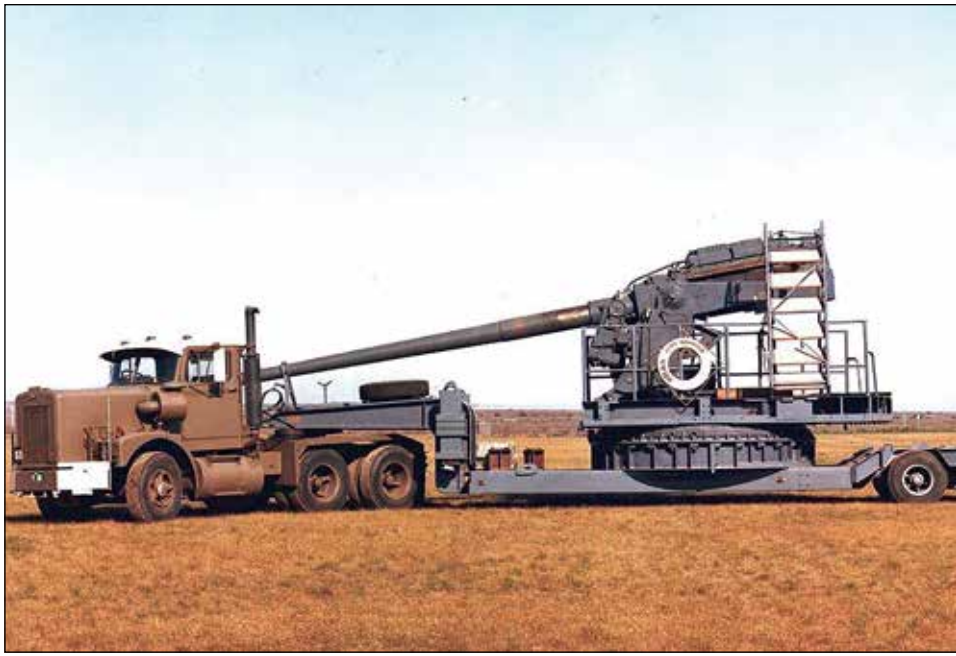


Figure 60. 18-Pounder Mark IV Quick-Firing Gun, 5.5 Inch Howitzer And 25-pounder
(Port Wakefield Archive)

Figure 61. From Left: 76 mm Gun, 105 mm Hamel, 4.5 Inch Naval Gun (covered) Next To The 106mm Recoilless Rifle Firing At the Target At Top Left and 5in54 HMAS Port Wakefield Mobile Mark 1
(Port Wakefield Archive)



Environmental Test Facility

In 1997, the Proof Range and the Army Technology at Port Wakefield, along with the Engineering Agencies Environmental Test Facility at Salisbury, were amalgamated as P&EE-PW. The Environmental Test Facility was moved into a purpose-built explosive ordnance facility north of the range head. Graytown also conducts environmental testing on smaller systems.

Environmental Test activities involve subjecting Defence ammunition and ordnance to simulated natural and induced environmental threats, as well as tracking item performance throughout the ammunition/ordnance life. Such testing includes, but is not limited to vibration, mechanical (drop and shock) and climatic (heat, cold, rain, dust, pressure) testing, performance testing and non-destructive inspections on encased EO using Radiography. Items that have been exposed to simulated environments are then subjected to being functioned or test fired where measured performance is checked against norms. The facility is able to:

- simulate of natural environments; i.e. temperature from -60°C to 100°C, humidity, temperature/humidity cycling, salt ingress, rain, sand/dust and water ingress, solar radiation, altitude and pressure
- simulate of induced environments; i.e. Drop testing up to 12m where explosives are dropped onto a concrete pad, impact and shock, vibration and harmonics for aircraft, road, sea and other transport are also carried out
- conduct accelerated aging.

Like Graytown, the facility is guarded by two sentinels; a Leopard tank and 105mm Leopard Tank Barrel on the Proof mount.

Two of the most amazing environmental tests are:

- *Cook-Off* test, where munitions and explosives are burned on a bonfire to ensure they do not explode in a warehouse fire or vehicle accident. Similar ammunition boxes are tested to ensure the rounds are contained as they cook off. To ensure the bonfire is carefully calibrated, the timber is seasoned in giant walk-in ovens, with the members taking the opportunity to cure delicious beef jerky at the same time: "*the oven was on anyway*".
- Sympathetic tests, where explosives are set up to next to others or bombs are shot, both to ensure chain reaction explosions will not occur.

Figure 62. 105 mm Tank Barrel Proof Mount
(Graytown Archive)

Figure 63. (Right) Environmental Test Facility Sign, 12 Metre Drop Test Tower (Left), Leopard Tank (Page 85), And 105 mm Tank Barrel (Page 84) (Proof Range Archive and Steven Schmied)


P&EE

Figure 64. Proof Of Anti-Submarine Cartridge Containers For Mortar Mark 10 - RAN
(Graytown Archive)

Figure 65. (Page 87) Bonfire Test Ready (Left), Medium Calibre Fuel Fire Test (Top Centre) And Sympathetic Reaction Testing (Top Right and Bottom Right)
(Proof Range Archive)


5


HE

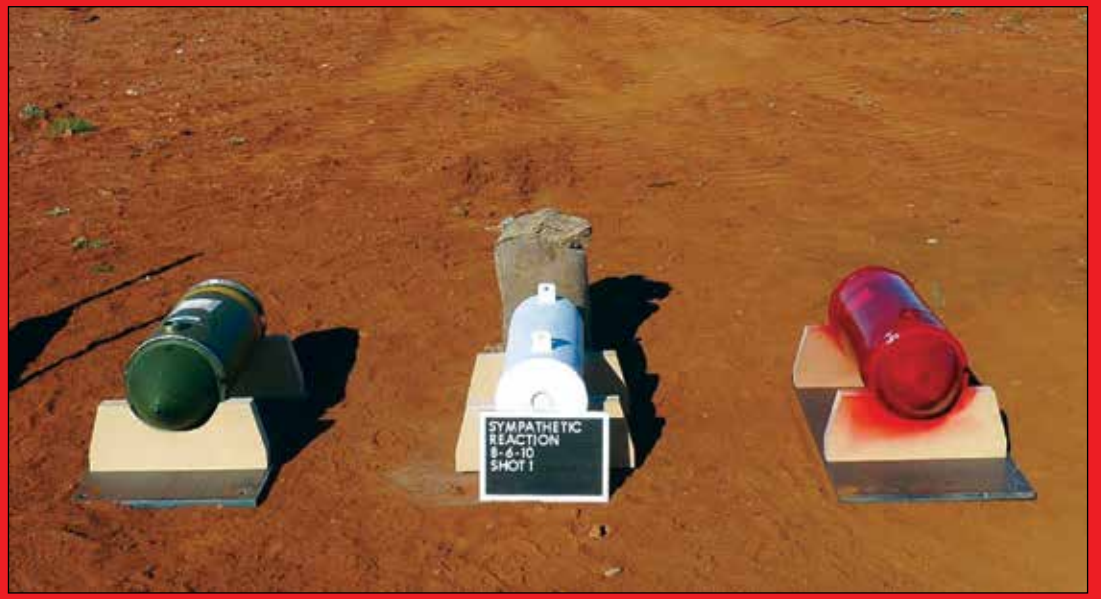

SYMPATHETIC
REACTION
8-6-10
SHOT 1

Figure 67. Flying Plate Ground Preparation (Top)
(Graytown Archive)

Figure 68. Flying Plate Test With The Plate's Maximum Height Measured (Bottom)
(Graytown Archive)

Watch Out Below!

The unit has a long history of testing vehicles resistance to mines and improvised explosive devices, including for:

- M113 armored personnel carrier
- Applique Armour
- Land Rover 110
- Australian Light Armoured Vehicle (ASLAV)
- Hawkei protected mobility vehicle.

An important part of the testing is the accurate preparation of the soil, so the blast is directed correctly at the vehicle. The soil is carefully prepared in compacted layers, with an un-forecast rain storm leading to the entire tedious process needing to be repeated if the soil becomes too wet

Once the soil is prepared, test charges are used to blow a 1.5-ton steel plate into the air; the *Flying Plate* test. The height of the plate is recorded, with the goal of approximately 20m for a properly prepared test site.

To cope with long hours of testing in weather ranging from boiling hot summers to freezing cold, rainy weather in winter, the team now has the "luxury" of the *Graytown Hilton*. This series of huts is a far cry from the old days spent in tents.

A testament to the work of the unit to assisting develop, test and prove the survivability of Australian Army vehicles, is that since its introduction to service, there have been no fatalities in the Bushmaster despite the increased IED risks during modern operations.

Instrumentation Section: A Beautiful Set Of Numbers

Phil Colbourne

To capture the data, various types of equipment have been used, from metal gauges, to still and moving images to radars and other modern instrumentation. The design of these often bespoke equipment was the responsibility of the Instrumentation and Imaging sections.

At the end of the day, a statistically significant set of results need to be gathered to prove or disprove that the equipment performed as specified, including allowing for climatic conditions, altitude and alike.

One of the major activities was to conduct tests of new ordnance and then produce ballistics tables. This was done by specialist statisticians, who would convert the test results data into the ballistics tables, working with slide rules and graphs in the days prior to computers.

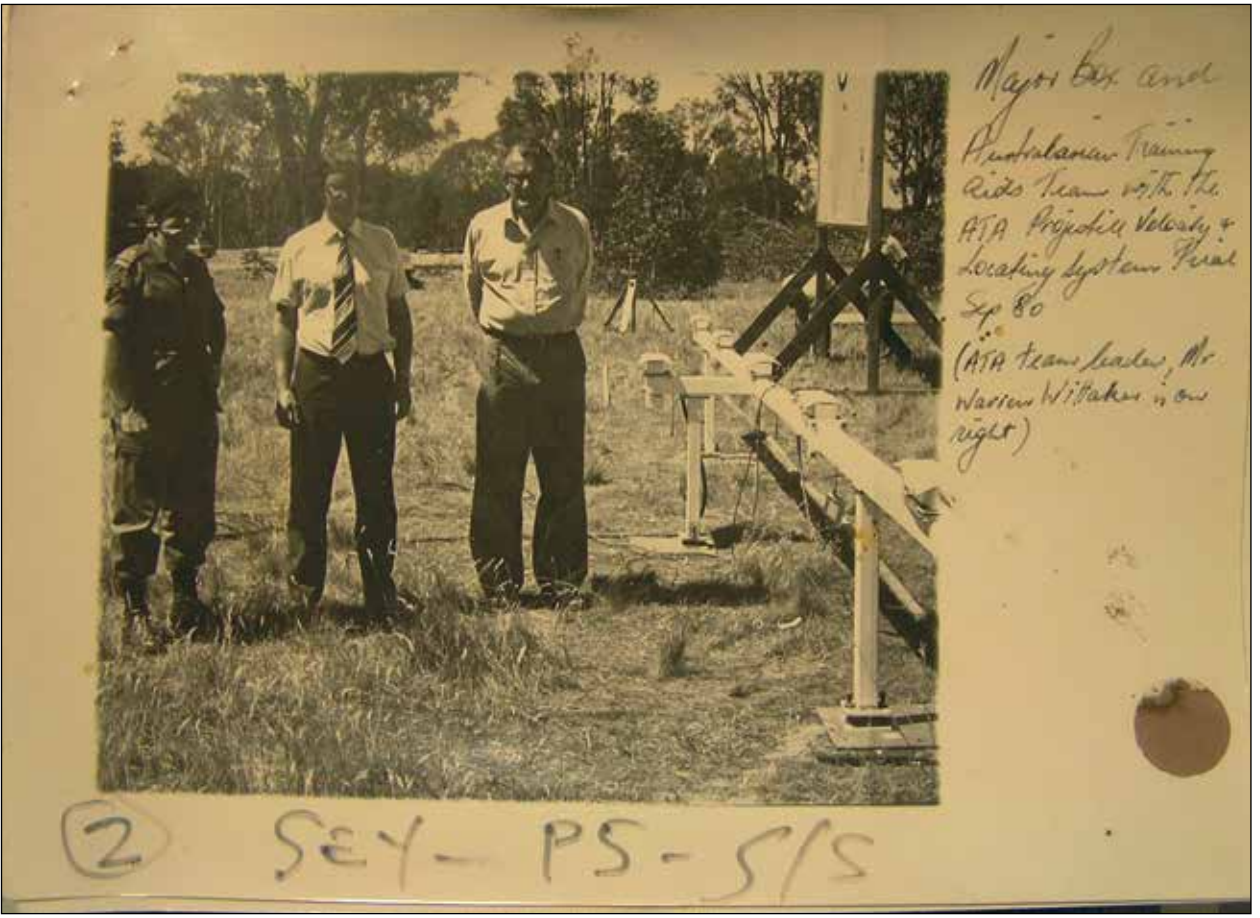


Figure 69. Clockwise From Left: Projectile Velocity and Locating System 1980, A Ballistics Table (Top Right), and M2A2 With Test Equipment (Bottom Right) (Bill Leviston and Graytown Archive)

Figure 66. M113 Armoured Personnel Carrier Hull Test (This Page and Next Page)
(Graytown Archive)


30A
134196

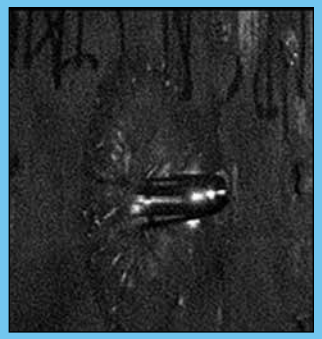


Figure 70. Camera Setup (Top) And Bullet At Moment Of Impact Right (Bottom)
(Port Wakefield and Graytown Archives)

A Picture Tells A Thousand Words

Ken Scott, Ian Argent and James Cowie

The role of the technical imagery team is vital to the work of the unit. To achieve this, the imaging staff have used the fastest and latest equipment, from film still and movie cameras to megahertz range digital cameras. The cameras are also paired with projectile tracking radars and other systems.

Whilst the team may capture thousands of images and hours of video for each test, the skill and patience of the imager are to:

- imagine the magic image that will tell the story of the test
- set up the cameras so as to be able to capture the image
- wade through the mountains of data to find that one magic image.

The imaging technology has changed, progressing from film to digital, for both still images and film. The evidence of these earlier technologies is preserved in the buildings, with dark rooms still available.

Workshops: We Built It and We Fix It

The unit has fully equipped workshops at both Port Wakefield and Graytown. The workshops maintain the equipment as well as being able to manufacture bespoke equipment. Further, the workshops hold a range of barrels at all stages of the barrel's life cycle, ready for testing.

The precision required in the objects created by the workshop and their supporting contractors is also impressive. As an example, the Vulcan gun mount has a tolerance of 0.0005 inches on the front mount.

Figure 71. Graytown Trial No 589 Air Gun (Bottom Right), Graytown Carpenter Store circa 1969 (Bottom Left), 155 mm M777A2 In The Port Wakefield Workshops (Top), Barrels And Targets In The Workshop Store (Next Page)
(Graytown Archive and Port Wakefield Archive)


GROSS WEIGHT
150 KG

Experiments: What If?

Bill Leviston

Whilst proof is the "bread and butter" tasking for JPEU, the more interesting and enjoyable role is to conduct experiments to extend Defence's knowledge and improve the safety of the systems.

With the experiments generally involving things that go bang, the question "What if?" may have some unexpected and spectacular outcomes.

Some examples of these "What if?" experiments were:

- As the team watched on from Mine Shaft Hill near Fuse Battery, A container load of propellant was blown up to determine how much explosive was required to ignite it and whether a container was a safe method of transportation.. Whilst the resulting giant fireball may look awesome, the result proved that the transportation method was sufficient.
- In September 1982, ATO CAPT Steve Chapman was on exchange from England. The team was given the task to test 25 pallets of explosive, detonating 3 pallets of 20 boxes each at once at the Explosive Battery; 3 tons simultaneously. Stand on, Bill said the explosion wasn't that bad after he had hand lit the fuse and driven up to the observation point on the top of Murdoch Hill, with the shock wave a beautiful sight as it expanded. A unit member Tommy was fishing at Mitchelton and observed 10mm high ripples on the water. Windows were cracked in Puckapunyal, lights fell out in the workshop, a tremor was felt in Nagambie and reported as an earthquake. The subsequent investigation recommended limiting the explosives to five boxes at a time.

Figure 72. Testing Propellant Transport
(Bill Leviston)

If Goes Wrong, Fix It!

Phil Colbourne

Occasionally things do go wrong. When it does, the members of the unit need to use their skill to solve the problem.

We were testing rocket systems; the 66 mm rocket systems. The Army wanted something with more range and hitting power than the 66 mm rocket-propelled grenade. So we were testing a whole range of rocket systems, typically 81 mm rocket-propelled grenade. This particular one we fired into a building we made up of besser blocks. Inside the blocks, we had polystyrene on the back wall and on the floor. Inside the building was a mass of gauges to measure the blast inside the area.

This rocker went through the front part of the building and embedded to the polystyrene blocks and didn't function. So I stood there and all looked at me and said: "*What are you going to do?*" "*Well*", I said, "*I'm going to wait for 30 minutes for a start*". For this particular trial, we had colonels, a brigadier and other high ranking members as it was high profile trial. So I said rather loudly, "*Does anyone have a smoke*". I didn't smoke, but what I was eluding to was that I want to find a little spot where I could sit and ponder what I was going to do to fix this thing up. After 30 minutes, I walked down to the range and looked in through the aperture. I could see this warhead stuck into the polystyrene, and was just swinging in the Graytown breeze. The fins had deployed, and it was just swinging there. So I thought, "*God damn it if this thing drops now and lands on its nose, it could potentially go off and I'm gone, I'm finished*".

So with that, I did the quickest U-turn and walked, because as you are not allowed to run, I must have been like these professional Olympic walkers I reckon by the time I got up to the top of the range. I explained what had happened. So I was greeted with a whole number of different looks and saying "*well what are you going to do about it?*" I said, "*What we should do is to get rid of that warhead, it should be exploded*". However, if I did that we would lose 2 -3 days of the trial as it would blow up the building and destroy everything in it.

Figure 73. RBS 70 Firing At X10
(Port Wakefield Archive)

Figure 74. Clockwise From Top. The 5”54 MPGM Firing From ‘Victor’ Battery At The Large Sphere (Indicated By The Red Arrow With The Projectile In Flight Indicated By The Blue Arrow) (Next Page), Sunset At The Proximity Towers (Right) And The Proximity Fuse Balls (Left)
(Port Wakefield Archive)

I came up with an idea that I would like to hook a line and pull it (the warhead) out without functioning or touching anything. I can then detonate it outside the building and continue with the trial. It worked! There was no risk, apart from to me, but I knew what I was doing. The brigadier put me in for a commendation in for the innovative model. This was another one where you put together your training and what you have learnt from others in your past and put it together for another’s advantage.

Close Enough Is Good Enough

Ian Argent And Ian Bell

As one drives along Port Wakefield Road, the outstanding feature of the unit is Victor Battery’s two 80m high towers that are used to test proximity fuses. The range used to have an earlier timber proximity fuse tower on the beach. The base of the old timber tower still stands off the gulf shore near range marker A4.

Proximity fuses mean that the target does not need to be hit directly, the round simply needs to get close enough to trigger the proximity fuse; *Close Enough is Good Enough*. It is estimated that it increases the lethality by 5 to 10 times, compared to other fuses [18]. Before the proximity fuse’s invention, detonation was induced by direct contact, a timer set at launch, or an altimeter. The probability of a direct hit on a small moving target is low; a shell that just misses the target will not explode. A time or height-triggered fuse requires both a good prediction by the gunner and accurate timing by the fuse. If either is wrong, then even accurately aimed shells may explode harmlessly before reaching the target or after passing it. In 1940, it was generally estimated that good anti-aircraft brought down one plane for every 2500 rounds.

The fuse senses the target using either radio waves, optical (light), lasers or acoustic (microphones). Modern fuses may be set to only detonate the round when specific targets are sensed, such as being programmed to “listen” for the signature of a specific type of ship or aircraft.

At P&EE-PW, RAN 76mm projectiles and 5”54 rounds are tested using the *Ball*. In years gone by naval 4.5” proximity rounds were tested as well, along with 4.7”. To test the proximity fuses, the RAN decides on the radar cross-

section of the target that they wish to test against (visible targets appear differently to radar) and this size *Ball* is raised to 60m on cables and rounds are fired in proximity to it from the Victor Battery. P&EE-PW has a three size *Balls* and an Exocet missile shaped target.

The RAN also has fuses that detect heat signatures and are tested by firing a projectile over the top of 'burning barrels' (essentially two 44 gallon drums with the top cut out) at set distances apart. The fire in the drums is provided by a particular fuel mixture that becomes quite 'active' if the drum gets fragged by the round going off nearby. It is a fairly intensive test, lots of manpower needed to sustain it, as the fuel runs out about every 5-10 rounds and of course the drums must cool before they can be refuelled. It was a bit of a gunner's favourite; occasionally, when the test items were completed and the fire was still burning, a bit of 'target practice' occurred to see if one could hit the drum; with spectacular results! The opportunity for this ceased with the introduction of anti-fragmentation walls.

Big Guns And Bombs

Tom Faulkner

The difference between Graytown and Port Wakefield that strikes home is the size; Port Wakefield is big. The size of the range and its isolation allow very large calibre weapons to be tested and even bigger explosions to be conducted.

Port Wakefield has tested Naval Guns up to 26 tons and 8 inch calibre, Air Force bomb and bomblets, and large explosions.

A memorable test was the 1993 - 1994 trials of the Singaporean Long Barrel Self-Propelled Artillery. Fitted with a motor and driver's position, these guns had a 40km range, too far even for Port Wakefield. So a farm was leased at Port Arthur on the other side of Vincent Gulf, and the rounds fired back into the range. The police closed Yorke Highway for an hour each time the guns were fired.

The unit members still are unsure whether the drivers were brave or foolhardy, with many of them suffering nose bleeds after the gun was fired. However, it may not have only been the Singaporeans who tempted fate, with the rumour that a married quarter was moved ¾" on its foundations after a 106mm recoilless rifle was tested a little too close. The pressure test chamber definitely jumped into the air and landed 2" back after a submarine component imploded during depth testing.

Figure 75. Singaporean Long Barrel 155 mm Self-Propelled On The Farm At Port Arthur
(Port Wakefield Archive)

Rocket Trials

Ian Bell

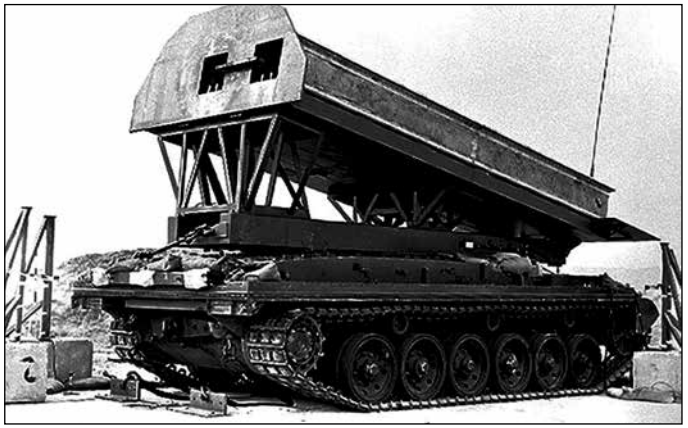
The P&EE-PW briefly played a part in the Anglo-Australian Joint Project. In 1948, before Woomera became operational, the British Long-Range Weapons Establishment sought Australian Army cooperation to carry out small-scale missile tests at the Proof Range. These involved testing experimental Doppler radar for tracking 3-inch rockets fired down-range. To launch the rockets, the crew built a concrete launching pad at Plate Battery, described as "nothing more than a heavy concrete block with a groove cut in it to set the trajectory." A series of tests in February 1949 tracked rockets fired from this launcher, as well as aerial bombs dropped by the RAAF. The concrete launching pad still stands at Plate Battery.

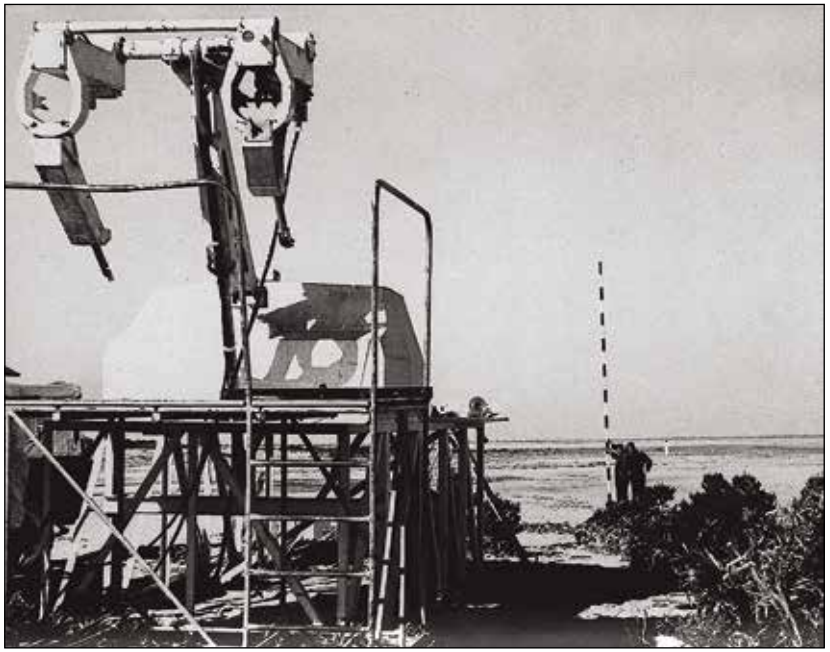
The Australian-designed and built anti-tank guided missile Malkara was successfully tested at Graytown from 1958 - 1961.

A variety of rocked propelled munitions have been and continue to be fired with the Graytown Area, including the 66 m and 84 mm rocket-propelled grenades, as well as the AIM "*Sidewinder*" short-range air-to-air missiles (from the 1960s) and FGM-148 Javelin man-portable "*fire and forget*"

Figure 76. Anglo-Australian Project Missile On The Launching Ramp (1948) (Top)
(Port Wakefield Archive)

Figure 77. Rocket Launcher Track Mounted on Beach (Bottom Left), Malkara Missile (Bottom Right)
(Port Wakefield Archive)





anti-tank missile (from the 1990s). It is also likely that the US 3.4" M20A1 rocket launcher ("*Super Bazooka*" - 1950s and 60s' era) was fired in the area. [3]

Aerial delivered bombs and missiles have also been tested by JPEU. Early testing of Ikara Missile was carried out at Woomera and P&EE-PW. The image shows a flight trial and proving test conducted on a 0.6 scale test missile.

Ikara, the ship-launched antisubmarine missile system, was developed by the Australian Government Aircraft Factory in the 1960s. Ikara operated by radio command until it reached the vicinity of a submarine, where it would parachute a lightweight torpedo towards its target. Ikara was an all-weather, urgent-attack weapon that travelled to its target quickly. Ikara had an advantage over other antisubmarine weapons at the time because it was immediately ready for firing. The Ikara missile was fitted to RAN frigates and was also operated by the Brazilian, Chilean, British and New Zealand navies. Its use was phased out in the 1990s as the service life of the ships to which it was fitted came to an end. [19]

More recently, the 70 mm rockets used on the Armed Reconnaissance Helicopters (ARH) were tested.

Figure 78. Malkara Rocket Launching Platform on Beach (Top) Armed Reconnaissance Helicopter 70mm Rocket Test Firing (Bottom)
(Port Wakefield Archives)

Figure 79. "*Hoveroc*" Gimbal Test Team (Top)
(D. Gambling, Mal Crozier, Don Northam) [20]

Figure 80. "*Hoveroc*" Flight Test Team (Middle)
(D. Gambling, Mal Crozier, Don Northam) [20]

Figure 81. "*Hoveroc*" Tethered Test Setup At The P&EE-PW 80m Towers (Bottom)
(D. Gambling, Mal Crozier, Don Northam) [20]

Figure 82. AUSROC-1 (Next Page, Top Left) And Launch Site Map (Next Page, Bottom Left)

Figure 83. Test Ground Explosive Bulge Testing Of Submarine Hull Steels (Next Page, Top Right), Metal Storm 40mm Grenade Launcher (Next Page, Bottom Right), And Car Bomb (Next Page, Middle Right)
(Graytown Archive and Port Wakefield)

The Hovering Rocket

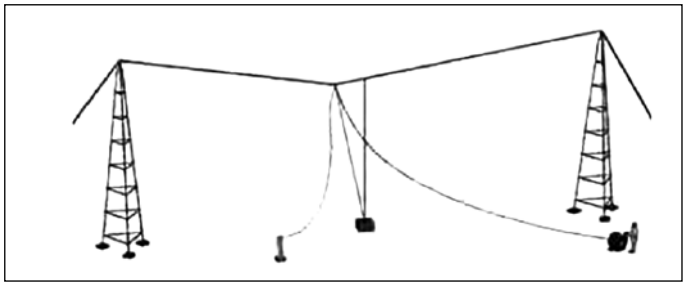
David Gambling, Mal Crozier and Don Northam

Recognising the need to put more in-depth efforts on countermeasures to the emerging anti-ship missile threat, the government research laboratories at the United States Naval Research Laboratory (NRL) and DSTO stepped up their respective programs on systems simulation and critical hardware developments. In Australia, this work culminated in successful flight demonstrations of the hovering rocket, "*Hoveroc*", which opened the doors to further development and collaboration with the United States of America (USA). [20]

When it came to testing, the two existing high towers at Port Wakefield appeared appropriate for a tethering system for the vehicle tests.

The tethered flight test of the "*Hoveroc*", now called Nulka, occurred at Port Wakefield on 26 April 1981 as planned. The first third of the test was visibly controlled flight, albeit with two instances of surviving the end of tether disturbance. Afterwards, the motion became chaotic. The tethering system required a person to take up the slack in the line manually to prevent it from becoming tangled with the motor while allowing movement of the vehicle. Graham Boothroyd suffered hand burns during the process because no one had been able to devise an affordable automatic system for doing this satisfactorily.

Mal Crozier and Arnold Deans were completely satisfied that the system was successfully controlled in all aspects after a few hours of analysis of the telemetry record. Essentially, the result was as expected from the modelling. However, many days were required to convince everyone that the time for a free flight test had arrived. Lloyd Odgers and Bob Scott presented the case to Ted Hayman, who had long discussions with colleagues in Canberra.



The first free flight took place on 2 May 1981. It was a complete success with the vehicle gently descending to the ground, as planned. Poor weather delayed the second free-flight test until 7 May 1981. This was more ambitious and included an in-flight manoeuvre, but the vehicle gently descended into the three-metre deep seaweed bed bordering the beach.

To this day, P&EE-PW continues to support these trials of the Nulkas as needed, most recent involvement was earlier this year (2019).

Reach For The Stars

The AUSROC-I Program commenced in 1988 when a group of undergraduate students in Mechanical Engineering at Monash University, designed and built AUSROC-I. AUSROC-I was successfully launched on 9 February 1989. The flight lasted one minute, reaching 3 km in altitude and 161 m/s. AUSROC-I is a liquid fuelled rocket, based upon a modified Pacific Rocket Society design.

In 1994, the Australian Aviation Museum Association conducted a survey of Aviation and Aerospace Heritage sites, including Graytown. The survey was conducted by the National Estate Grant Program, with the site to be included on the Register of the National Estate. The survey was conducted on 17 September 1994. [21] Currently, the site is not listed on the Register of the National Estate.

The AUSROC-I launch site was Victoria's first rocket launch site and as such plays an important part in Victoria's Aerospace History.

The rocket specification was:

- Length - 2600mm
- Diameter - 100mm
- Stabilisation - 4 Fins
- Recovery System - Parachute.

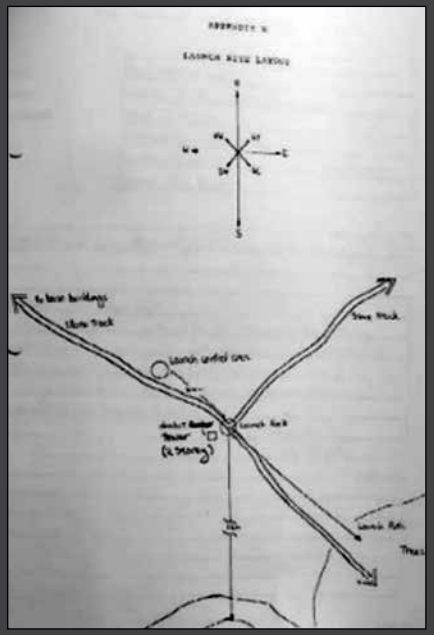


Figure 84. Preparing For Explosive Hardening
(Graytown Archive)

Exotic Tests

Ken Scott And Ian Fox

The unit has done various interesting and exotic tests, including:

- Explosive bulge testing of submarine hull steels.
- Australian designed electric gun "*Metal Storm*".
- Car bombs.
- Infrastructure vulnerability. Following the 9/11 terrorist attacks, Defence, USA Department of Defense, the Australian Federal Police and the Victorian Police conducted tests against infrastructure; e.g. are bridge support legs able to be destroyed by an exploding bus.
- Submarine flares tested at Point Wilson.
- Development of the standards for explosives and other hazardous material placards used on trucks and other vehicles.

Explosive Hardening

Phil Colbourne

An interesting test was civilian rail hardening, done by the Army. It started out as the railways needed to harden rails for the shipping of iron ore in North-West Australia because the carriages are heavy. Portions of the railway line are affected by the sun, and especially points and corner pieces that have a tremendous force on them. We came up with an idea to harden the rails so they can withstand the weight of the heavily loaded carriages.

The rails are tested with a Brinnell Hardness Tester. We used a sheet of explosives that was called HLX, a plastic explosive that was "environmentally friendly"; a funny term really as it is explosive. It meant an explosive was desensitised, didn't have an effect on humans, wasn't carcinogenic before or after.

We would glue the HLX to the rails in different thicknesses over a five day period. Different areas required different hardness, so some rails needed three serials (explosion) to reach the required level. Further, if you used too much explosive, you risked cracking the rail. Not enough explosive, you wouldn't get the hardening and you wasted your time. We would spend a number of hours gluing it to the rails

HLX has a high-velocity detonation and a lot of energy. As the rail is on the ground, there is a shock that goes through the ground. I can remember the first one, we got calls from Puckapunyal as the married quarters suffered from broken windows; that's 20km as the crow flies. There was a big investigation and it turned out is was the gun runners.

The explosives do an excellent job, and when it is done properly. The product will last many years with the continuous running of the iron ore carriages. I ended up going over to Western Australia to help out.

The rails generally came in October, which was quite cold. We would spend a number of hours gluing it to the rails, the explosive would freeze and the explosives wouldn't go off. So I used an intermediate charge and it went perfectly.

You had to be innovative all the time with the trials. The group effort and the camaraderie were fantastic.

Chapter 6.

A COMMUNITY OF PROFESSIONALS

Quiet Excellence

LTCOL Mathew Brooks, Officer Commanding (OC) P&EE-GT, January 201 - December 2017

JPEU is unique. The people are unique, the environment is unique and most importantly, the work is unique.

My motivation for sponsoring this book always had to do with people. They are the foundation of the unit; dedicated and disciplined. They are a combination of uniformed and non-uniformed who have dedicated their careers and lives to ensure that the ADF has munitions, platforms and explosive ordnance that is safe and suitable for service. This support to the Australian warfighter has never wavered and demonstrates the professional nature of our workforce.

As the OCof Graytown, I wanted to ensure that their stories were captured and shared for the new generation of test and evaluation specialists. As the unit continues to evolve, these historical links are critical to understanding the importance of the work and the pivotal role that the workforce plays in its success. Many of these individuals have since retired and in some cases, left this life; however, their character and experiences are preserved in stories. Capturing this rich tapestry allows the unit to reflect on its trajectory and will continue to shape us into the future.

Figure 85. 50th Anniversary - Commander Joint Logistics (CJLOG) Awarding Mr Anthony Crooks (Graytown Archive)

Figure 86. Clockwise From Top Right: The Country Club, Stubbie Holder, Opening Plaque, And Gate
(Steven Schmied)

Awe and Beauty may be the history of the unit, but more importantly, it documents its many changes while capturing its unique identity. This book reflects the unit and will provide an opportunity for future generations to understand our character and our function.

JPEU is staffed by a community of professionals who conduct precise and highly dangerous activities with a quiet calm.

The expertise and passion of the unit are demonstrated by the recent award of a Commendation to Mr Anthony Crooks by Commander Joint Logistics (CJLOG) Major General David Mulhall at the Graytown 50th Anniversary Celebrations.

Canteen - *The Graytown Country Club*

Bill Leviston

A centre of the Graytown community is the canteen; the Graytown Country Club. An inclusive venue, the Club was not divided into Officers, Sergeants and Other Ranks (ORs). Many fun, memorable and possible infamous events are likely to have occurred at the Club. The first canteen was near the old headquarters building. However, the laboratory proved to be too close for comfort (in case of an accident), with the canteen moved to opposite the transport yard.

In 1964, I started as the cook and everyone brought food in for lunch that I would prepare. I later moved to the workshops.

When the new headquarters building was built, the kitchen was established, with the current OPS room serving as the Sergeants' and Officers' mess, the current lunchroom as the Other Ranks (ORs) canteen and the kitchen in the middle. It was then when a cook from Puckapunyal ORs canteen was employed to cook at Graytown. For a fixed price, everyone got a hot lunch and morning and afternoon tea, 'smoko', with Ammunition section used to deliver 'smoko' to everyone on base.

The workshop, with Bill as the cook, continued to provide Christmas lunch. A band would play, guests were invited, and even crayfish was served.


The
GRAYTOWN COUNTRY CLUB
Constructed by the Carpenters
&
the Razor Gang
Opened 12 May 1977
Maj. R.W. Kennedy O.C.

Figure 87. Clockwise From Left. The Sporties Club / Bar With The Officers And Sergeants Mess In The Foreground, An Event At the Ranger's Tavern (Top Right) And The Ranger's Tavern circa. 1968 (Bottom Right)
(Port Wakefield Archive)

Ranger's Tavern

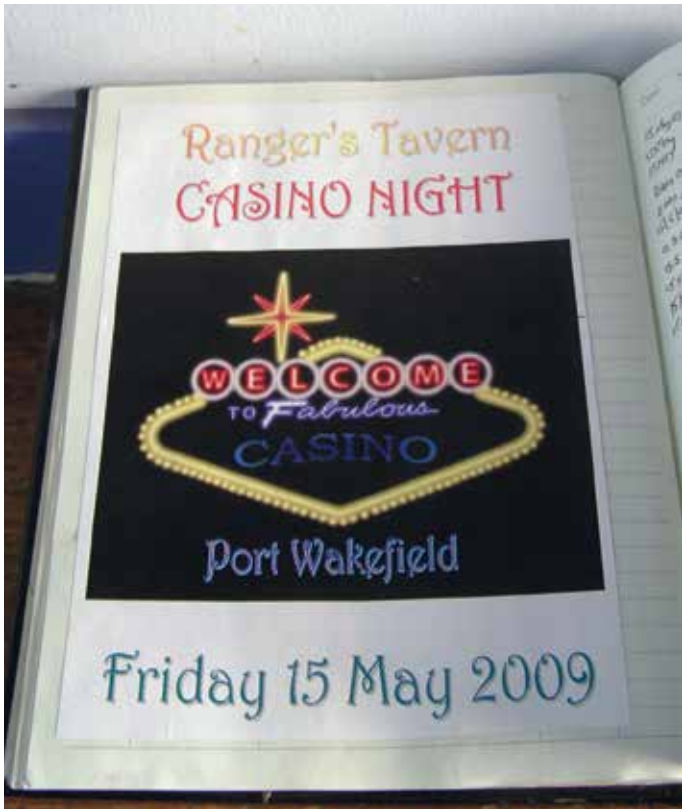
Tom Faulkner

Where Graytown has the Country Club, the Ranger's Tavern and the Sporties Club / Bar are the Port Wakefield social clubs.

Many grand balls, Anzac Day, Melbourne Cup and other events have been held in the Tavern, both for the range families and the local community. From Bucks' and Hens' Nights, Birthday Parties and Friday night drinks, the Tavern was the gathering place. Many of the unit members married locals, integrating bring the two communities further.

The Tavern saw its peak around 1972 when the range swarmed with National Service (*Nashos*) training for Vietnam.

Unfortunately, this establishment has also suffered from the lack of families on base and living in members. Where there used to be six cooks on staff, there are now none remaining. Even the much sort after 'Hilton Rooms' are no longer sought after by the Other Ranks (OR). These most favoured rooms existed when the OR lines were being refurbished, with staff accommodated in six individual private caravans next to the golf club.



Euchre Anyone?

Bill Leviston and Colin Fox

At 'smoko' and lunch, it was a race upstairs in the workshop to get a seat at the Euchre table.

From 1964 to 1970, the staff were ferried from Nagambie to Graytown in two Side-Seater Dodge trucks. The staff also set up a euchre table in the truck. There was only about 8 staff at this point.

As the unit grew, in 1988 the dodge trucks were replaced by an Army Bus, fitted with a Euchre table and seats with stubby holders.

The tradition of Euchre on the communal bus ended when travel and isolated locality allowance were introduced and staff commenced travelling by private car and living in areas including Bendigo, Heathcote, Euroa, Kilmore and Seymour.

Fore!

Graytown Golf Course

Bill Leviston

Standing on the first tee of the old Graytown golf course, a golfer's heart feels heavy looking down the overgrown fairway and imaging a crisp drive. Like many defence bases, Graytown had a nine-hole bush golf course. Unfortunately, the course has not been maintained.

The skills required to play golf are analogous to those required to the work conducted by the unit; accuracy, attention to detail, repeatability and all over in milliseconds.

In the 1970s, each week the uniform members would play sport on Wednesday afternoons; known *Sporties*. Some played football at Puckapunyal and others went fishing.

There were 6 - 8 golfers at Graytown, so we decided to build our own golf course. Using a bulldozer, grader and much manual labour, a course was shaped around the swamp, with sand scrap greens. We tried to keep as many trees as possible.

So now on Wednesdays, the civilian staff would play golf. Unfortunately, a copy of the scorecard has not yet been found.

With this, the unit unofficial motto was lived up to:

When it's time to work, it's time to work, When it's time to play, it's time to play

Even after the golf course fell into disrepair, some members kept up the golfing tradition. Tom "Fatty" Faulkner would practise his golf at lunch by teeing off towards the swamp from near the APB car park. He did have to be careful not to hit others who would be collecting witchery grubs for fishing bait, storing the grubs in cigarette packets.

Port Wakefield Golf Club

Tom Faulkner

Port Wakefield used to have a thriving golf community, with unit members and locals playing competitions at both the range and the Port Wakefield town golf courses. Post golf drinks were had at either the clubhouse or the Ranges Tavern.

The members had fun with "challenge" days, including rubber clubs, smoke grenades and putting under land drovers.

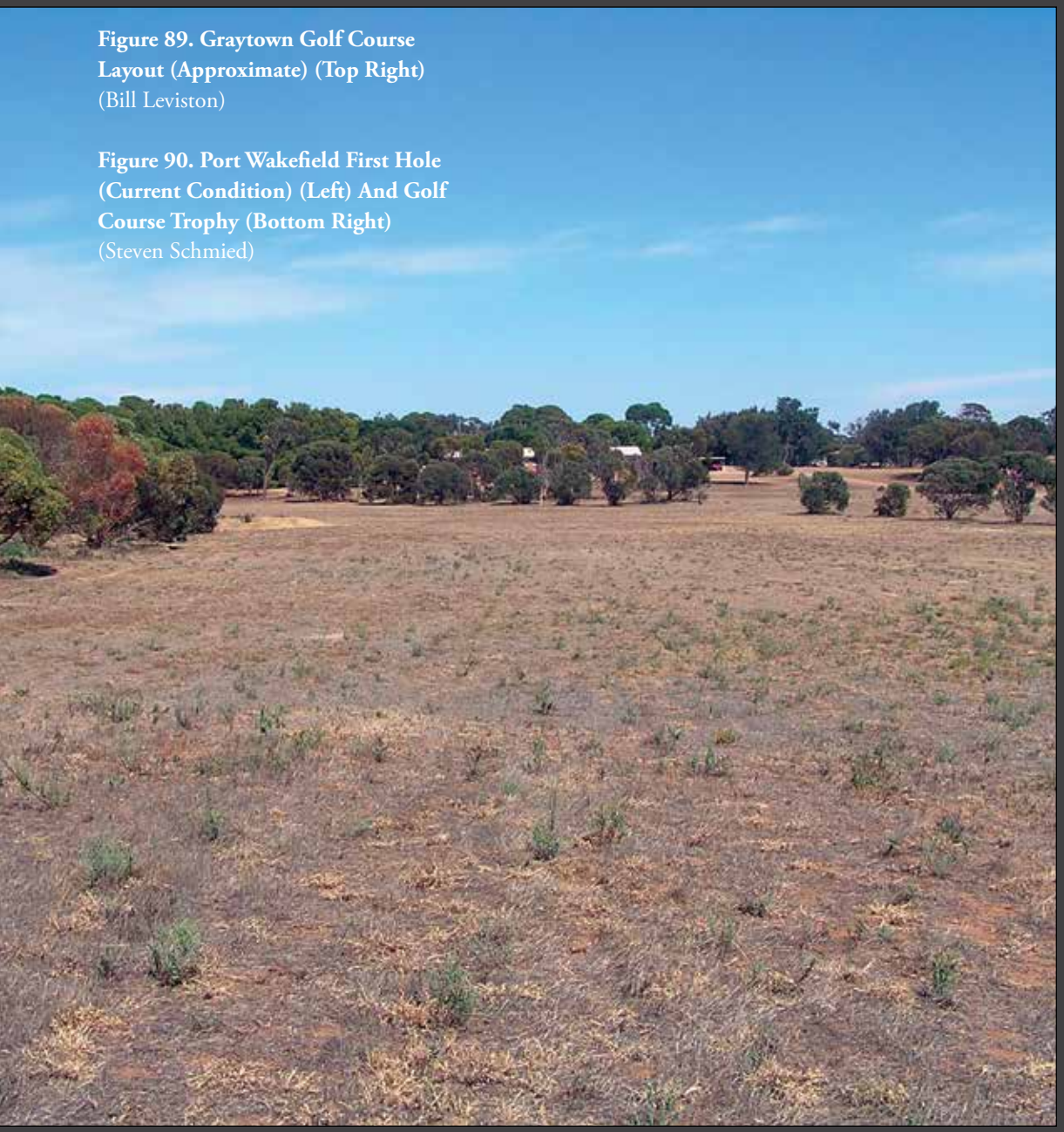
Unfortunately, the course is now closed, with part of the area taken by the new explosives storage bunkers. The clubhouse has also been demolished.

One may get a feel for the nature of the range golf course by visiting the Port Wakefield town golf course, with similar black sand scrap greens, flat layout and dry fairways.

Figure 88. Graytown Technical Store circa 1969
(Graytown Archive)

Figure 89. Graytown Golf Course Layout (Approximate) (Top Right)
(Bill Leviston)

Figure 90. Port Wakefield First Hole (Current Condition) (Left) And Golf Course Trophy (Bottom Right)
(Steven Schmied)



Museums

Bill Leviston

The history of the unit has been captured to varying degrees. Both Graytown and Port Wakefield have previously established and maintained Museums, though Graytown's museum closed sometime after 1973 when the photo was taken.

The home block has two large Peppercorn trees, next to which used to be a shed. In 1980, the OC MAJ Kennedy decided to establish the Graytown Museum. So after the foundation pad was poured, MAJ Kennedy directed 20 staff to manually lift the shed and move it into its new position.

The Compton Vale Museum was formally opened by COL (later brigadier retired) M.H. MacKenzie-Orr GM OBE, on 5 December 1980. The purpose of the museum was to preserve items of equipment and weapons previously used on the range. The museum also had memorabilia from WWII and a comprehensive Corps badge selection. Unfortunately, the museum was closed (in the 1990s) with the collection dispersed.

Pride of place at the Graytown headquarters is the *Big Book*; the photographic history. It is from the *Big Book* that many of the photos in this history originate.

In 1983, the museum at Port Wakefield was named the Frank Adlam Memorial Proof Range Museum, in honour of CPT Adlam who served at Port Wakefield for 19 years. The museum held over 1,000 items relating to the activities of P&EE-PW since its inception. In 2000, the museum was closed, and the bulk of its contents were transferred to the Royal Australian Artillery Museum at North Fort in Sydney. The reason for this is unclear, as most of the collection was specifically related to the Proof Range's activities, rather than to the general history of artillery. The Army Museum of South Australia at Keswick Barracks in Adelaide was also a recipient of some of the Adlam Museum collection. A few items from the museum still remain at P&EE-PW.

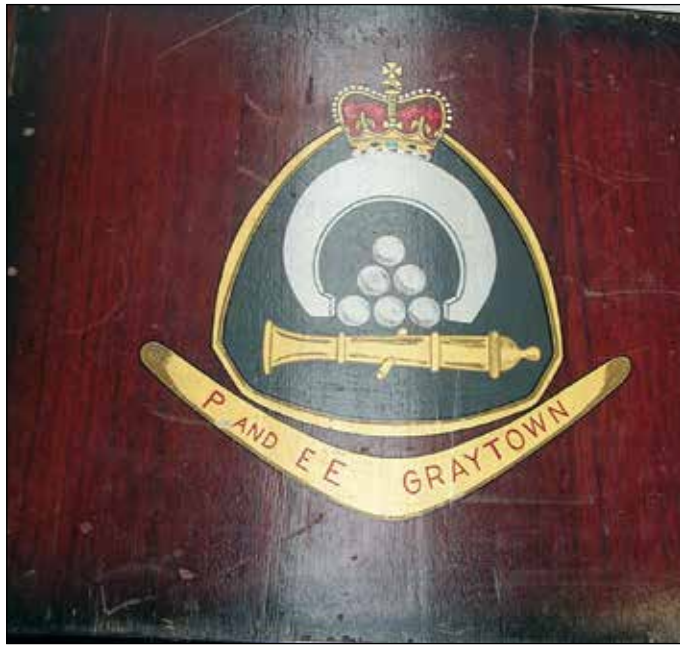


Figure 91. Graytown Museum 1973 (Next Page), The P&EE-GT *Big Book (Right)*,Mrs Frank Adlam Opening The Port Wakefield Museum Dedicated To Her Husband in 1983 (Left) (Graytown Archive and Port Wakefield Archive)

Figure 92. Bill Leviston's Farewell
(Graytown Archive)

Farewell To Bill Leviston

LTCOL Anthony Watson

JPEU presents a unique and challenging command environment with the unit being fully integrated made up of public servants, contractors and military personnel split over three states. Especially confronting for some of the officers is the age and experience of the workforce, whom many had children of their age or older. Equally as pleasing was the professional pride and passion of the staff in their work.

These unit traits are exemplified by Mr Bill Leviston, who currently holds the record of 39 years as the longest-serving member of the unit, though others, such as Ken Scott, are close at over 30 years.

A summary of Bill's career is:

- 19 March 1948. Born in Seymour.
- 1956. Moved from Monea to Nagambie.
- 9 January 1964. Employed at P&EE-GT as a temporary labourer (Position No 11), working as a cook in the kitchen at Headquarters then located behind the current Q-Store - Building 12. The OC was MAJ Padman. The wages were 26% of the basic wage plus 5 shillings - £1 - 1s - 6d per week.
- 3 July 1969. Position No 6 Examiner. Employed in the workshops as a general hand for 4-5 years.
- 23 July 1969. Trod on a rusty nail with his right foot.
- 10 July 1974. WO2 Andy Weir recommended and MAJ Terry Hedges approved Bill to be put on as permanent.
- 27 October 1977. Position No 4 as a Technical Assistant Grade 2.
- 27 January 1981. Present when a Cart 30mm round exploded in the jig whilst the pressure gauge hole was being drilled.
- 29 October 1982. Employed in the APB. Subsequently manages the Non-Explosive Store.
- 2003. Bill retires after 39 years.

Community Engagement

COL Lee Dell

As with most Defence units, JPEU has always aimed to be part of the local community, especially given the remoteness of the locations. From ANZAC day services, to simply living in the community, the staff are the locals. With the isolation of the base, the families banded together, with multiple father & son, and husband & wife teams have worked and continue to work on the base.

The children were not the only ones to enjoy the base. The wives banded together for morning teas, fortnightly shopping trips, and everyone enjoyed a vibrant tennis club and thriving the golf club. Beer brewing was also a favoured pastime, along with growing mushrooms at the battery shelters.

Unfortunately, the heyday of the base community waned with the introduction of remote living allowance and families desire to live closer to Adelaide. Today, many members commute from Adelaide to the base, some staying in the Officers and Sergeants Mess during the week.

In Port Wakefield, the unit was very integrated into the community, especially given the isolation and the relatively high proportion of the town that has a member of their family working on the base. At one time, Port Wakefield had 15-20 sporting bodies, ranging from football, basketball, netball and cricket, with members coming from both the unit and their families.

As COL Dell recalls:

"*We had a large quantity of boxing training gear in the Q Store, most of it in mint condition. I sounded out the local boys' club and offered to lend them the gear. I was invited to attend their meeting to explain the deal. I should have been suspicious of this invitation but agreed. When I arrived at the hall it was packed and I was welcomed as a visitor from the Range. I was then informed that this was their Annual General Meeting (AGM) and the first item on the agenda was the election of their new President. The feeling of disquiet increased. On the call for nominations, there was silence until a chap at the back, near me, said 'I nominate Major Dell.'*

I began by declining due to the pressure of work but was howled down. I grudgingly accepted but stipulated it would be for six months that turned into my entire posting. By the time I left (escaped), I was a boxing instructor, fundraiser and President."

COL Dell also was the founding captain/coach/ orange boy of the basketball team, with the team filled with young, fit and sporty National Servicemen who took to the game. COL Dell is proud that he was able to see 'his' team win the local comp.

The community was also welcome on base, with the Rangers Tavern and golf course open to locals. Unfortunately, the increased security following 9/11 has restricted this engagement.

Figure 93. ANZAC Commemoration In Nagambie And Open Day At Graytown (Next Page)
(Graytown Archive)

COL Dell's responsibilities to the community didn't end with boxing. COL Dell recalls:

"Judy and I were talked into judging the Belle of the Ball at one of the small towns near the Range. We arrived at the hall in our finery, black tie and evening dress. We were seated on the stage with another couple and the ladies promenaded around the dance floor. I turned to the other couple and said "Well, for mine, it is a standout. Number 4."

The others looked at each other, cleared throats and with faces like thunderclouds said "The winner is clearly Number 6. Don't you agree?"

Feeling the blood pressure beginning to rise, I said: 'No, I do not agree.'

The other judge stood up and said: 'We are pleased to award the Belle of the Ball to Number 6.'

I was ropeable but being a guest was unable to do anything but glare. We left shortly after."

Another time, a bedraggled young couple arrived at the HQ with a tale of woe. They were exploring the coast and followed the coast from Port Wakefield, not realising there was a hazard. Their car was thoroughly bogged. We decided to come to their aid and provide a little light relief for the troops. That was the high spot and things went downhill from there. We started with a Land Rover which promptly sank in the mire. The Rover was followed in quick succession by a tractor.

However, sometimes relations are strained by trial accidents, such as during an RPS70 anti-aircraft trial, when the system locked on to the Lear Jet rather than the towed target. Unfortunately, when the pilot released the target, the 5km long cable draped across the power lines, blacking out Port Parham. Further, due to the geography and geology of the Saint Vincent Gulf, explosions may be heard on Kangaroo Island; 130 km away and the walls of houses have cracked on the other side of the Gulf due to the shock being transmitted by a reef of rock that runs under the base.

These events did not sour relationships with the community. In 2018 over 2,000 people attended the Port Wakefield open day, indicating there are keen interest and curiosity in the operation of the little known unit.

Figure 94. A Crane Bogged On The Beach At Port Wakefield
(Port Wakefield)

Figure 95. "*The Range*" Married Quarters (Top) And The Swimming Pool (Bottom) (Steven Schmied and Port Wakefield Archive)

Childhood Wonderland

Ken Scott and WO1 Carla Dell

WO1 Dell spent three years living at Port Wakefield as a child from the ages of 7 to 9 when her father COL Lee Dell was OC from 1967 - 69

For the children of Port Wakefield, life really was a joyous life on *"The Range"*; the name for the Married Quarters. As the base expanded and three new brick houses were built as married quarters just inside the range entrance in 1950, over 60 children lived on base in the 23 married quarters. Two families had 10 children and two married quarters each. Facilities included the swimming pool (that also acts as the emergency water supply in case of fire), tennis court, golf course, sauna, squash courts and gym.

The children were driven into town in busses driven by Lex "Robbo" Robertson; termed *Robbo's Mail Bus*. Each day, the big 40 seat bus took the younger children to Port Wakefield kindergarten and primary school, returning with unit workers who lived in town. A smaller 20 seat bus took older children to meet the bus to Balaklava High School. At 3 pm the cycle was reversed, with the younger children picked up first and then the elder children, before the adults were bussed back, Port Wakefield.

After school and on the weekends, the children were given a free run of the base. They were taught how to identify unexploded ordnance, to mark it with a stick and to tell their parents. The older children were tasked to look after the younger ones.

Popular activities included:

- climbing guns and 80m towers (then as high as they dared, getting to the top by their teenage years. Paper planes were thrown from the towers.
- catching pigeons and spotlighting for rabbits.
- climbing the pomegranate tree outside the OCs married quarter.
- riding their bikes down to the 10,000 shelter and Point Lorne to fish and crab. The older children even stayed out on the old tower to fish through the high tide.
- floundering at night.

Times and the focus have changed, with no one now allowed to access the beach without a safety escort.

Adventure Training

Defence has traditionally extended its training and strengthened morale by conducting adventure training. Memorable adventures included:

- Trekking in Wilpena Pound in the Flinders Ranges, South Australia.
- Vic Health charity bike ride from Perth to Melbourne.
- Assisted in the re-floating of a beached yacht during adventure training, Ex 'Clam Chowder' 2000.
- 17 April 1943. On the 1st leg of the ferry flight to 34Sqn from Mascot airport, Sydney to RAAF Base Forest Hill, NSW, an H84 De Havilland *Dragon* the aircraft failed to arrive at its destination. No evidence has ever been found to show where the aircraft crashed. [22] Members of Graytown led by OC CAPT M.C. Gratton went in search of the Dragon. Unfortunately, they did not have any success.
- Mountain bike days led by LTCOL Watson (CO JPEU) and SGT Paige in 2017 and 2018.

Figure 96. Adventure Training in Wilpena Pound and Perth To Melbourne Ride (Next Two Pages)
(Port Wakefield Archive and Graytown Archive)


Highpoint city
Vic Health
BIKE RACE
28 631

Figure 97. Unit Cartoon (Middle)
(Graytown Archive)

Figure 98. Revival Kit At The Graytown Country Club (Left and Right)
(Steven Schmied)

Figure 99. The *Rave* Newsletter (Next Page, Left)
(Port Wakefield Archive)

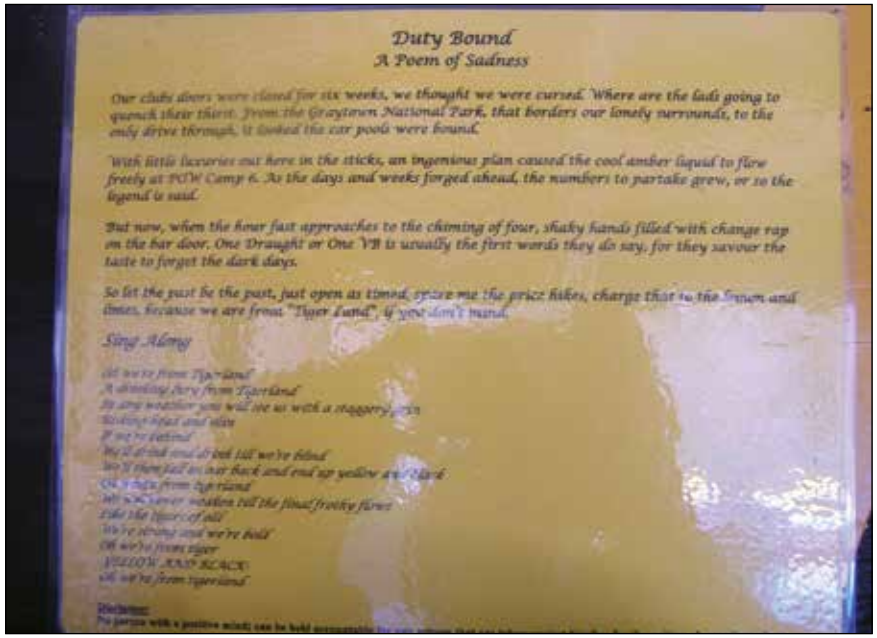
Humour

Bill Leviston

The unit published a newsletter, often with jokes and cartoon about the members' experience of living and working at Graytown.

An example of the tongue in cheek humour was the "*Prick Of The Week*" award. A beautifully crafted brass set of men's testicles, this award was presented weekly at the Friday knock-off drinks. The award was then worn around the recipient for the following week. In deference to rank, in a run-off for the award, it was generally awarded to the higher ranking member.

Eventually, a replacement award was manufactured after the original was launched into the Goulburn River from Chinaman's bridge by the Q-store clerk Richard "*Happy Dick*" Mansfield; known as *happy* as he never smiled unless he wanted a favour from the workshop.


Duty Bound
A Poem of Sadness

Our clubs doors were closed for six weeks, we thought we were cursed. Where are the lads going to quench their thirst. From the Graytown National Park, that borders our lonely surrounds, to the only drive through, it looked the car pools were bound.

With little luxuries out here in the sticks, an ingenious plan caused the cool amber liquid to flow freely at POW Camp 6. As the days and weeks forged ahead, the numbers to partake grew, or so the legend is said.

But now, when the hour fast approaches to the chiming of four, shaky hands filled with change rap on the bar door. One Draught or One VB is usually the first words they do say, for they savour the taste to forget the dark days.

So let the past be the past, just open as timed, ignore me the price hikes, charge that to the Crown and times, because we are frost. "Tiger Land", if you don't mind.

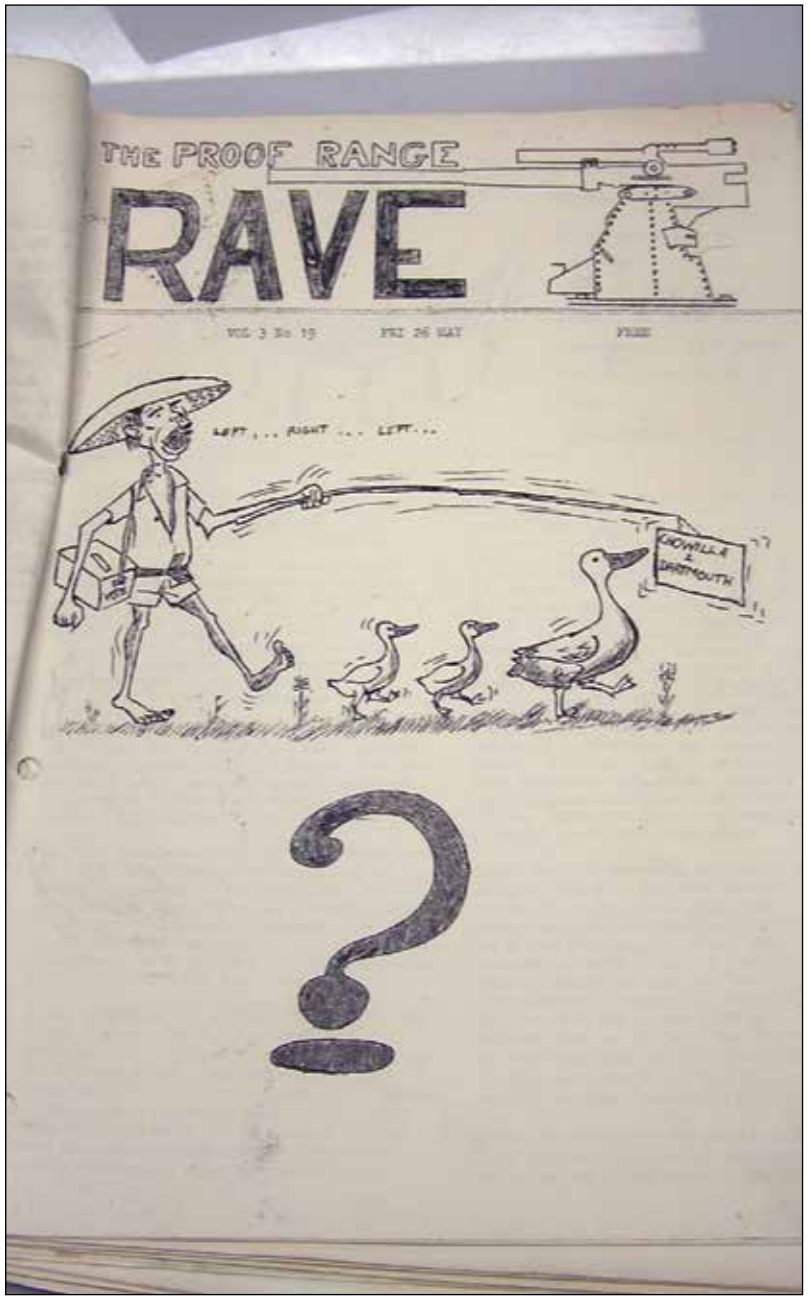
Sing Along

Bill Leviston describes the time that he won the award.

One time the smoke alarm went off as someone had left their toast to burn in the toaster. Everyone was outside and not impressed. And that's true; Mr Bill Leviston.

Finally, the unit has also provided tongue-in-cheek naming honours to members, including *Gillies' Corner*; named after Ben Gillies; a RAEME CPL who was towing a generator and rolled the trailer.

Port Wakefield also had their sense of humour, captured in the local *Crab* and *Rave* newsletters.



Nick Names

Bill Leviston and Colin Fox

Defence, reflecting the wider Australian community, loves nicknames. Some may come from kindness, some less so, others simply to shorten a long or difficult to pronounce the name. However, no matter the origin, nicknames help build a sense of belonging and shared culture. The origin story of two of the unit's nicknames of legend also reflects the work of the unit.

Burning Grounds were used to dispose of unspent ammunition, projectiles, lead casings, 12 gauge cartridges and accumulated munitions provided by metropolitan police for disposal under contract. Munitions are burned twice using wood and diesel accelerants. Older burn bin or pit are located in a clearing without a gravel layer, with newer ones with a gravel layer. Later, a purpose-built oven was installed on hard stand apron.

During one operation, CAPT Scott Morris and CAPT Matthew Dwyer put a bit too many munitions into the burn bin, blowing the top off. They were collectively known thereafter as "*Little Bang, Big Bang*".

"Big Bang", now LTCOL Dwyer, returned at the CO in 2018 and is helping write the next chapter in the unit's now hopefully less obscured history.

Figure 100. Burn Bin (Right)
(Graytown Archive)

Figure 101. The Unit's Mission (Bottom)
(PEO Archive)

Figure 102. An F-111 Flying Over P&EE-PW In 1980 (Top)
(Port Wakefield Archive)

Chapter 7.

THE FUTURE

JPEU Eyes Looming Ordnance Challenges

The unit has faced closure or commercialisation in the past and may again in the future. However, as this article by LTCOL Gary Potter details, the unit is essential to ensuring the safety of Defence personnel.

LTCOL Gary Potter, CO JPEU May 2004 - January 2007

Originally published in the Australian Defence Magazine, 10 January 2008 [23]

If it's green and goes *'Bang',* it goes through JPEU first. The JPEU is one of the unsung but essential elements of a self-reliant and professional defence force. Defence's JPEU is a sort of insurance policy for ADF warfighters. Formed on 1 May 2004, it is responsible for the static and dynamic testing of all ADF weapon systems which involve the use of high explosive ordnance - from small arms to stand-off missile componentry.

It was created as a direct command business unit of the recently formed Joint Logistics Group (JLG) to amalgamate under a single headquarters the previously semi-autonomous P&EE-GW and P&EE-PW.

The unit is an integral part of the process that enables the respective service Technical Regulatory Authorities to ensure that the weapon systems and their ordnance is Safe and Suitable for Service (S3). The JPEU supports the S3 process by being an ISO9000:2001 quality accredited organisation.

P&EE-PW was established in 1929 to take advantage of the site's unique tidal flats that allowed for the soft recovery of fired rounds using a technique called 'over water recovery'. P&EE GT was established in 1968 to take advantage of the region's loam type soils that were suitable for another recovery technique, called vertical recovery. Due to the cessation of fuse development, the vertical recovery capability is no longer maintained.

By being a direct command unit of JLG, JPEU is better able to align its operational outputs. However, the challenge has been engaging key stakeholders, such as Capability Development Group (CDG), the Defence Materiel Organisation (DMO), DSTO and the respective Services to ensure they all understand our tasking, resourcing and manning needs. This is particularly so for CDG as scoping future explosive ordnance (EO) proof capabilities is often quite difficult. Noting these future EO challenges, a significant proportion of the unit's business is still generated supporting DMOs ADF Logistic Managers manage their in-service explosive ordnance or weapon systems fleets.

CO LTCOL Gary Potter says that one of his biggest challenges in managing the unit is preparing it to meet these future requirements while meeting the day-to-day demands of supporting our many stakeholders. This is not aided as we are separated across five sites, three states and even a time zone. Communication is therefore paramount.

My other big challenge is managing the unit's specialist, and in many instances unique, equipment," he said. "We have not been as successful in the past as we could have been in managing and replacing such equipment. This was not due to a lack of effort, but confused lines of responsibility. The formation of the unit under Joint Logistic Group has clarified these lines of responsibility."

LTCOL Potter says that the combination of military and civilian personnel in the JPEU means that the unit also has the advantage of maintaining a steady-state highly skilled civilian base, which has a broad experience and knowledge, against a military workforce that ensures the unit's focus is retained on supporting the ADF.

"The integrated environment within JPEU is absolutely vital for the unit to function. Many of the skills sets are not found in the general military population and they also take many years to develop," he said.

"The mix of civilian and ADF personnel makes for even better outcomes because the range of skills and experiences is so much broader. Indeed, I am keen for the unit to be seen as a first appointment posting for ammunition technical officers and technicians and other specialist EO trades from all the Services. Personnel posted to JPEU will be exposed to all types of EO, including experimental and not in-service natures."

There has been no change to the role that we have played in Defence for the past 75 years. Our mission is still:

"*We will provide EO and weapon system proof, test and evaluation services to enable the Australian Defence Force to train, fight and win.*"

New Defence Capabilities

The unit has a long history testing and supporting new capabilities and defence research, as technology and techniques for conducting tests.

Some of the new capabilities may include:

- Joint Strike Fighter (JSF)
- Land 400 Armoured Fighting Vehicles (AFV)
- Naval Ships, including Air Warfare Destroyer (AWD) and Future Frigates
- unmanned aerial vehicles (drones).

New technologies and research may include:

- computer (numerical) simulation of explosions and bullet effects

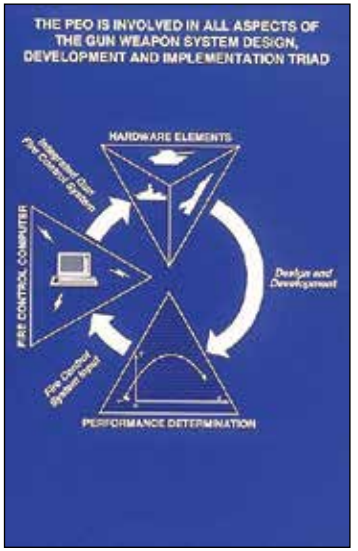


Figure 103. Testing the Universal Gun Mount On The Hawkei
(Graytown Archive)

- Terminal Effects Centre to test the effect of bullets on the human body.

An example of new technologies is the ability to use robotic cut down to remove the staff from the danger of opening shells, unmanned aerial vehicles (drones) for aerial imagery and computer simulation of explosions and bullet effects.

Shell Shock Part 2

LTCOL Mathew Brooks

JPEU has the potential to change the world. It has the knowledge, commitment and drive. The unit has consistently contributed more to capability development than its current role as its workforce is dedicated to protecting our Soldiers, Sailors and Airmen. During small arms terminal effect tests conducted at P&EE-GT, cavitation bubbles were observed to be created by the shockwave travelling well in front of small arms projectiles upon entry into ballistics gelatine; the closest representation to the body.

The hypothesis is that the small arms, blast and blunt force (concussion) shock events generate cavitation bubbles that may cause neurological damage to the brain and nervous system, triggering PTS and other neurodegenerative disorders. PTS is a significant issue among Defence personnel and veterans returning from operations, with hundreds of thousands committing suicide globally since 2002.

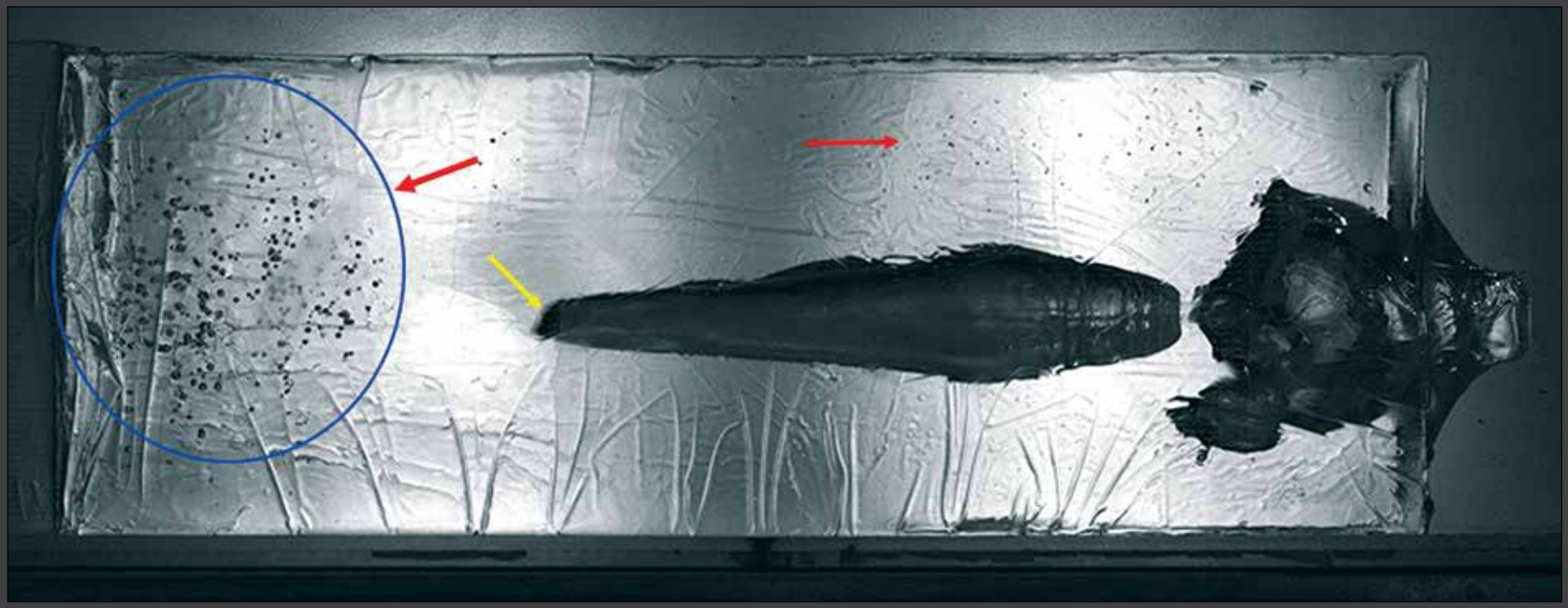


Figure 104. Small Arms Cavitation Bubbles. Blue Area Contains The Cavitation Bubbles With The Red Arrow Indicating A Single Bubble. Bullet Fragment Is Indicated With The Yellow Arrow. (Graytown Archive)

After discussions, Doctor Steven Schmied and I sought and received an initial grant from the RAAF Project Jericho.

It is known that the high-energy implosion due to cavitation bubble collapse is responsible for corrosion or surface damage in many mechanical devices. In this case, cavitation refers to the bubbles created by a shock to the body from either blunt force, blast or a bullet impact. The presence of a similar damage mechanism in biophysical systems has long been suspected but has not been investigated. This new study investigated how to possibly predict, prevent and detect cavitation injury in the brain and body from blunt force (concussion), small arms and blast shock events.

This original work demonstrates the dedication of the workforce and their drive to support all members of Defence.

Chapter 8.

ROLL CALL

Leaders

The unit proudly displays boards listing the unit's Commanding Officers (CO), Officers Commanding (OC), Regimental Sergeant Majors (RSM) and Master Gunners (MG).

Commanding Officer

1 Mar 2004 - 15 Jan 2007	LTCOL G.G. Potter
15 Jan 2007 - 19 Jan 2009	LTCOL D.L. Garside
19 Jan 2009 - Dec 2010	LTCOL M.R. Ahern
Jan 2011 - Dec 2013	LTCOL L.M. Monkivitch, CSC
Jan 2014 - Dec 2016	LTCOL A.R. Langford
Jan 2017 - Dec 2018	LTCOL A.J. Watson, CSC
Jan 2019 - present	LTCOL M. Dwyer, CSM

Regimental Sergeant Major

Jan 2009 - Dec 2011	WO1 G.L. Boyce
Jan 2012 - Dec 2014	WO1 S.J. Schuman

Officers Commanding - Graytown

Dec 1968 - Aug 1969	MAJ F.M. Sojan	RAA
Aug 1969 - Aug 1972	MAJ J. Newman	RAAOC
Aug 1972 - Jan 1973	CAPT S.J. Irvine	RAA
Jan 1973 - Jan 1975	MAJ T.C. Hedges	RAA
Jan 1975 - Sep 1976	MAJ T.H. Arrowsmith	RAAC
Sep 1976 - Nov 1979	MAJ B.W. Kennedy	RAA
Nov 1979 - Nov 1981	MAJ J.E. Box	RAAOC
Nov 1981 - Dec 1983	MAJ M.V. Tabone	RAAOC
Dec 1983 - Oct 1984	MAJ I.W. Burns	RAA
Oct 1984 - Oct 1986	MAJ G Barkley	RAAOC
Oct 1986 - Jan 1989	MAJ A. Catterall	RAAOC
Jan 1989 - Dec 1990	MAJ S.C. Hosking	RAAOC
Dec 1990 - Jan 1993	MAJ P.N. Veretennikoff	RAA
Jan 1993 - Jan 1996	MAJ R. Hall	RAAOC
Jan 1996 - Jan 1998	MAJ J. M. Spalding	RAAOC
Jan 1998 - Jan 2000	MAJ A.J. Poynting	RAAOC
Jan 2000 - Dec 2001	MAJ B.J. Sammut	RAAOC
Jan 2002 - Dec 2003	MAJ A.E. Morrison	RAAOC
Jan 2004 - Dec 2005	MAJ L.M. Monkivitch	RAAOC
Jan 2006 - Dec 2007	MAJ J.S. McRae	RAAOC
Jan 2008 - Jan 2010	MAJ A.J. Watson	RAAOC
Jan 2010 - Dec 2010	MAJ R.J. Teis	RAAOC
Jan 2011 - Dec 2012	MAJ A.J. Allen	RAAOC
Jan 2013 - Dec 2014	MAJ S. Bowser	RAAOC
Jan 2015 - Dec 2017	MAJ M. Brooks	RAAOC
Jan 2018 – present	MAJ H. Rogers	RAAOC

Officers Commanding - Port Wakefield

Proof Officers Pre. 1942

1929 - 1932	CAPT H.J. Nurse
1933 - 1935	CAPT J.K. Coffey
1935 - unknown	CAPT H.G. Edgar
unknown - 1941	CAPT N.R. Forrest

Proof Officers and Officers Commanding

1942 - 1945	MAJ F.M. Spence	RAAOC
1946 -1953	CAPT G.C. Whittle	RAAOC
1953 - 1955	MAJ A.D. Shaw	RAA
1955 - 1956	MAJ A. McArthur	RAA
1956 - 1957	MAJ G.C. Stillman	RAAOC
1957 - 1959	MAJ D. Swift	RAA
1951 - 1961	MAJ R. Preston	RAA
1961 - 1964	MAJ W. Keane	RAA
1964 - 1967	MAJ J. Flett	RAA
1967 - 1969	MAJ L. Dell	RAAOC

1969 - 1970	MAJ P.G. Prince	RAA
1970 - 1971	CAPT F.R. Adlam	RAA
1971 - 1974	MAJ P. Burns	RAA
1974 - 1977	MAJ D.N. Brook	RAA
1977 - 1978	MAJ I.W. McQuire	RAInf
1978 - 1980	MAJ D. Byrne	RAA
1980 - 1982	MAJ W.D. Feakes	RAA
1982 - 1984	MAJ K.J. Farrar	RAA
1984 - 1986	MAJ D.G. Kennedy	RAA
1986 - 1988	MAJ B.M.L. Hall	RAA
1988 - 1990	MAJ D.R. Morgan	RAA
1990 - 1992	MAJ T.J. Gibbings	RAA
1992 - 1994	MAJ R.H. White	RAA
1994 - 1996	MAJ D.J. McNicholas	RAA
1996 - 1998	MAJ D.L. Garside	RAA
1999 - 2000	MAJ A.M. Bollard	RAA
2001 - 2002	MAJ W.J. Smith	RAA
2003 - 2004	MAJ M.R. Ahern	RAA
2005 - 2006	MAJ D.W. Mallett	RAA
2007 - 2008	MAJ A.R. Langford	RAA
2009 - 2010	MAJ S.J. Fletcher	RAA
2011 - 2013	MAJ M.R. Hartas	RAA
2013 - 2014	CAPT N.S. Ullin	RAA
2014 - 2015	MAJ J.P. Abundo	RAA
2016 - 2017	MAJ N.S. Ullin	RAA
2018 - present	MAJ D.M. O'Connell	RAA

Master Gunners and Establishment Sergeant Majors - Graytown

Master Gunners RAA

Dec 1968 - May 1969	WO1 D. Holbrook
May 1969 - May 1970	WO1 J. Hayes
May 1970 - Dec 1973	WO1 T. Banfield
Dec 1973 - Dec 1974	WO1 N. McManus
Dec 1974 - Mar 1976	WO1 G. McCauley
Mar 1976 - Dec 1978	WO1 A. Sheridan
Dec 1978 - Jan 1981	WO1 F.J. Simmons
Jan 1981 - Jun 1982	WO1 P.A.E. Sparkes
Jun 1982 - May 1983	WO1 T.M. Waters
May 1983 - Dec 1985	WO1 A. Green
Dec 1985 - Dec 1986	WO1 L. Robinson
Dec 1986 - Dec 1987	WO1 B. Dryden
Dec 1987 - Oct 1989	WO1 W.A.K. Pettit
Oct 1989 - Jan 1990	WO1 G.W. Jones
Jan 1990 - Dec 1990	WO1 R.J. Chaney
Dec 1990 - Jan 1993	WO1 H.K.J. Pregnall
Jan 1993 - Dec 1994	WO1 R.J. Poppy
Jan 1995 - Jun 1996	WO1 G.V. Lakey
Jun 1996 - Dec 1996	WO1 B.W. Plant
Jan 1997 - Dec 2000	WO1 G.D. Metcalf
Jan 2001- Dec 2004	WO1 T.M. Nolan
Jan 2005 - Dec 2005	WO1 B.D. Singh
Jan 2006 - May 2006	WO1 G.L. Boyce
Jan 2007 - Jun 2008	WO1 C.W. Mayfield
(Position moved from Range 2009-2014)	

Establishment Sergeant Major

Aug 2008 - Jan 2010	WO1 A.P. Crook	RAAC
Jan 2010 - Dec 2010	WO2 D.H. Pollard	RAA
Jan 2011 - Dec 2016	WO2 M.D. Martin	RAAC
Jan 2017 - Dec 2017	WO2 P.J. Ballinger	RAAC
Jan 2018 - Jul 2018	WO2 G.R Woodhouse	RAINF
Jul 2018 - Dec 2019	SGT A.L. Marshall	RAA
Jan 2019 - Current	WO2 D.J. Saunders	RAAC

Master Gunners (position reinstated)

Jan 2015 - Dec 2016	WO1 J.A. Quinn
Jan 2017 - Current	WO1 M.M. Humphrey

Proof Sergeant Majors and Gun Masters - Port Wakefield

Proof Sergeant Major

1940 - 1942	WO2 A. Sinclair
1943 - 1955	WO1 A.J. Stead
1955 - 1957	WO1 A.K. Irvine
1957 - 1962	WO1 F.R. Adlam

Master Gunners

1962 - 1968	WO1 F.R. Adlam
1969 - 1971	WO1 J. Gill
1971 - 1973	WO1 G. Coyne
1973 - 1975	WO1 M. Sare

1976 - 1978	WO1 A.R. Cleasby
1978 - 1980	WO1 J.G. Pollock
1980 - 1981	WO1 G.H. Gardiner
1981 - 1983	WO1 A.W. Mayfield
1983 - 1985	WO1 D.A. Quirk
1986 - 1987	WO1 K.T. Lakey
1987 - 1988	WO1 G.J. Floyd
1988 - 1989	WO2 D.J. Holmes
1990 - 1992	WO1 G.J. Floyd
1992 - 1993	WO1 W.P. Shields
1993 - 1995	WO1 N.R. Hannah
1995 - 1996	WO1 R.D. Dunne
1996 - 1998	WO1 W.J. Degenaro
1998 - 1999	WO1 G.L. Saun
1999 - 2000	WO2 P.M. Robertson
2000	WO1 I. Gardiner
2001 - 2003	WO1 G.D. Metcalf
2004 - 2004	WO1 D.B. Callaghan
2005 - 2006	WO1 P.M. Robertson
2007 - 2008	WO1 D.T. Rayment
2009 - 2010	WO1 T.J. Whish
2010 - 2011	WO1 P.M. Robertson
2012 - 2014	WO1 B.R. McIntyre
2015 - 2007	WO1 S.J. Baker CSM
2018 - Present	WO1 P.J. Egart

4.8 Seconds

Mr Phil Colbourne

The explosion occurred during a standard testing activity and also caused shrapnel-related injuries to the 48-year-old's leg and thigh. A number of failures of the F1 grenades to detonate were reported in 2006 during combat operations in the Middle East. Later, in September 2007, the grenade was temporarily withdrawn from service after a civilian Defence employee was seriously injured in an accident at the Defence Proof and Experimental Establishment at Graytown, Victoria. [24]

ADI's website says the F1 fragmentation hand grenade, made at Benalla, has a five-second fuse, contains 70 grams of explosives and more than 4,000 small steel balls, and has a lethal radius of six metres, with a safety zone of 30 metres. [25]

The following is an excerpt of an extended interview conducted with Phil on 28 February 2018.

Ammunition is not something you may make a mistake with. You never think that when you leave home one day, you may not come back or you may come back damaged. As a result, the risk assessments we wrote in the unit were exhaustive. The day it all went wrong for me was a "*simple*" acceptance proof of a batch of grenades. Everyone was behind cover and there is no actually throwing of the grenades as we had done in the past. My injury came down to my decisions during the 4.8 seconds the grenade takes to operate.

To test grenade, I placed a special cable tie around the grenade and pulled the pin. Then once the team were all safely in position, a current was run to burn through the cable and release the grenade. Well, as I was making my final checks I saw to my disbelief that the cable had snapped. I thought "God what happened there, that can't happen, this is not supposed to happen."

In the risk assessment, we decided that one should bolt for cover. However, I did not know how long I had left so thought that I fancied I could through this thing well away from me before I could run; I also had the second longest throw of anyone in the unit. As I was leaning right back so I could give it the longest serve that I could, only it went off. I had run out of the 4.8 seconds. That was my decision. I knew I was in a dangerous game.

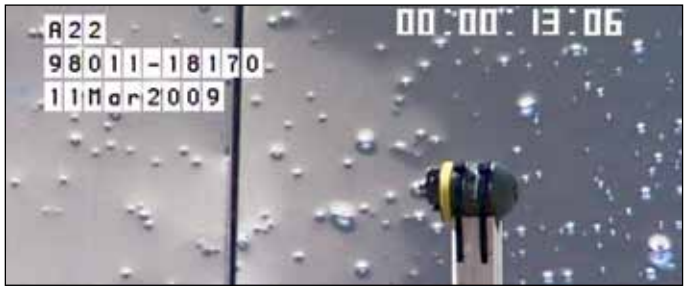
There are a couple of individuals; Paul Kerris and Colin Fox, both lovely blokes. On that day, that fateful day, I actually urged Paul to come down to the battery and get some fresh air. Paul and *Foxy* were the first two to my aid before the medic and chopper got there. They were brilliant right from the very start. However, Paul was affected by the accident.

Injuries and Close Calls

Tom Faulkner, Ken Scott, LTCOL Matthew Dwyer, the Port Wakefield and Graytown Archives.

The unit would like to acknowledge the staff who have been injured or had notable close calls:

- **1948.** Plate Battery weapons had their boresight aligned with a lantern. During a test of new 40mm thick tank armour, Harry Roberts was still down at the target when the weapon was discharged, rupturing both his eardrums. Feral cats who lived in the target structure were observed to suffer the same fate.
- **1975.** A 60 lb. lump of metal landed in the married quarters when a howitzer blew up at Canister Battery.
- **1979.** OC P&EE-GT MAJ Kennedy was crushed between a fence and a car driven by CAPT Johnson in front of the unit's members whilst everyone listing to the cricket at the Country Club. MAJ Kennedy's leg was broken, exclaiming *"Goodness me, I've been run over"*. CAPT Nelson said, *"I concur, Sir"*.
- **1981.** Graham Boothroyd suffered hand burns during *Hoveroc* testing.
- **1985.** Tom Faulkner was working a Plate Battery with the Weibel radars. The standard reset procedure was to unplug the system and pull the fuse out on the bespoke fuse box. Unbeknownst to Tom, his colleague had swapped the plugs in the power point. Tom was thrown across the room when he touched the still live fuse. Tom's heart stopped three times on the way to Balaklava Hospital. After being observed for a few hours, Tom was released and returned to work a few days later. Tom was also famous for stopping a test after spotting a whale in the gulf in 1987.
- **2006.** CAPT Dwyer investigated a vehicle accident where a Land Rover was accidentally driven into the headquarters through the Operations (OPS) team. Although staff and their desks were thrown across the room and the troop carrier ended up with half a wall on its bonnet, everyone escaped serious injury.
- **Date unknown.** During a disposal burn of propellant on the beach, CAPT Kevin Cuthbertson was badly burned on the arm and ear. Tom Faulkner and Frank Wilds aided Kevin.
- **Date unknown.** A member nearly lost their thumb to narcosis after being bitten by a Brown Recluse Spider. Snakes and scorpions were not the only wildlife hazards on the range.



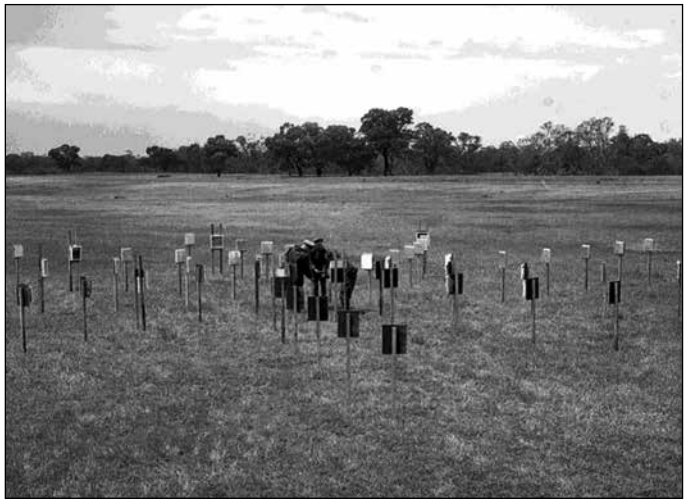


Figure 105. Pending Storm Over Port Wakefield (Top Left)
(Port Wakefield Archives)

Figure 106. F1 Grenade Trial (Middle Left) And M26 Grenade Trial 1966 (Bottom Left)
(Graytown Archives)

Figure 107. Land Rover Accident (Top and Middle Right)
(LTCOL Matthew Dwyer)

Annual Photos

The annual photos provide neatly reflect the progressive accumulation of wisdom within the unit. Unfortunately, the record of photos is incomplete, with those that were able to be found included. Hopefully, the missing photos and unit rolls will eventually be found.

At P&EE-GW, Scientific Imager James Cowie has captured the annual photos, with the photo from 2006 framed and displayed in the lunch room. It is with fondness that the wisdom may be seen accumulating in the unit's members over the year.

Figure 108. Graytown Unit Photo 1978
(Graytown Archive)

Figure 109. Graytown Unit Photo 1984

Figure 110. Graytown Unit Photo 1988

P&EE Graytown

24 February 2006

Mr P.D. Stead, Mr B.J. McDonald, CPL A.T. Mayne, Mr A.J. Keep, Mr J.M. Barlow, GNR E.T. Haritopoulos, Mr R.G. Hart, Mr R. Egan, Mr G.W. Schultz, Mr A.L. Graham, Mr C.R. Fox
Mr R.W. Denness, Mr P.W. Colbourne, CPL C.P. McKenzie, Mr T. Borowiecki, Mr W.J. Ovenden, Mr J. Taylor, Mr T.A. Moore, Mr G.T.A. Finn
Mr J.N. Cowie, Mr G.R. Higgins, Mr P.T. Whitehead, Mr R.J. Ridsdale
Mr G.T. Weatherell, SGT J.A. Turk, Mr S.A. Roscoe, Mr R.G. Maddocks, WO2 T.M.A. Faulkner, Mr T.J. Sandford, Mr P.A. Booth, Mr P.G. Kerris, CPL I.L. Kay, SSGT A. McIntyre, Mr J.H. Roberts
LT S.J. Morris, Mr T.J. Nowland, Mr B.M. Smith, Mr J. Attard, MAJ J.S. McRae, WO1 G.L. Boyce, CAPT M.J. Dwyer, Mr M.W. Arden, Ms W.A. Bednarz

Absent: Mr G.R. Campbell, WO2 R.S. Campey, Mr K.J. Jahne, Mr J.R. McGillivray, Mr M.R. Nairn, Mr G.W. Oakley, Mr M. Perkins, Mrs N.L. Tull

Figure 111. Graytown Unit Photo 2006

P&EE Graytown 2 March 2007

Mr C.R. Fox, Mr M.R. Nairn, Mr G.R. Campbell, GNR E.T. Haritopoulos, Mr P. Russell, Mr G.W. Oakley, Mr K.J. Jahne, Mr R.G. Hart, Mr A.L. Graham, Mr M. Perkins, Mr G.W. Schulz
Mr G.T.A. Finn, Mr T. Borowiecki, Mr B.J. McDonald, Mr G.R. Higgins, Mr R.W. Denness, Mr W.J. Ovenden, Mr P.W. Colbourne, Mr P.G. Kerris, Mr T.A. Moore, SGT G.V. Saint, Mr A.J. Keep
Mr J.N. Cowie, SGT J.A. Turk, CPL W.G. McDonald, Mr R.G. Maddocks, Mr T.J. Sandford, Mr A.P. Crook, Mr P.A. Booth, WO2 R.S. Campey, CPL L. Hayes, Mr S.A. Roscoe, CPL C.P. McKenzie
Mrs R. Clarke, Ms W.A. Wright, Mr J. Attard, CAPT S.J. Morris, MAJ J.S. McRae, LTCOL D.L. Garside, WO1 C.W. Mayfield, Mr B.M. Smith, Mr T.J. Nowland, Mr R.J. Ridsdale, Mrs N.L. Tull

Absent: Mr M.W. Arden, Mr J.M. Barlow, CAPT M.J. Dwyer, LT D. Kachab, Mr J.R. McGillivray, Mr J.H. Roberts, Mr P.D. Stead, CPL K. Taylor, Mr G.T. Weatherell, Mr P.T. Whitehead

Figure 112. Graytown Unit Photo 2007

P&EE Graytown 26 June 2008

Mr G.R. Higgins, Mr J.E. Heywood, WO2 G.J. Winter, Mr R.W. Denness, Mr G.W. Schulz, Mr R.G. Hart, Mr J.R. McGillivray, Mr A.J. Keep, Mr K.J. Jahne, LT D. Kachab, Mr C.R. Fox
Mr P.D. Stead, Mrs N.L. Tull, Mr G.W. Oakley, Mr G.T.A. Finn, Mr M.R. Nairn, CPL L.M. Hayes, Mr G.T. Weatherell, Mr T.A. Moore, Mr G.R. Campbell, Mr B.J. McDonald, Mr P.G. Kerris, Mr W.J. Ovenden
Mr R.G. Maddocks, Mr P.A. Booth, SGT J.A. Turk, Mr R.J. Ridsdale, CFN M.P.L. Reeves, Mr T.J. Sandford, Mr J.H. Roberts, Mr S.A. Roscoe, Mr B.W. Tisdell, Mr P.T. Whitehead
SGT G.V. Saint, Mr J.N. Cowle, Mr M.W. Arden, CAPT M. Leary, CAPT R.J. Teis, MAJ A.J. Watson, LTCOL D.L. Garside, Mr B.M. Smith, Mr T.J. Nowland, Mr B.S. Hall, Ms W.A. Wright

Absent: Mr J. Attard, Mr J.M. Barlow, WO1 A.P. Crook, Mr A.L. Graham, CPL W.G. McDonald

Figure 113. Graytown Unit Photo 2008 Part 1

P&EE Graytown 26 June 2008

Present, from left to right:
Mr R.G. Hart, CAPT R.J. Teis, Mr T.J. Sandford, Mr S.A. Roscoe, Mr B.J. McDonald, Mr G.W. Schulz, Mr J.H. Roberts, Mr J.R. McGillivray, Mr K.J. Jahne, Mr T.J. Nowland, LT D. Kachab, Mr P.T. Whitehead, Mr P.G. Kerris, Mr G.T.A. Finn, Mr G.R. Campbell, Mr G.T. Weatherell, SGT J.A. Turk, CFN M.P.L. Reeves, MAJ A.J. Watson, Mr A.J. Keep, Mr P.A. Booth, CPL L.M. Hayes, Mr R.W. Denness, Mr R.J. Ridsdale, Mr P.D. Stead, Mr B.S. Hall, LTCOL D.L. Garside, Mr M.R. Nairn, Mr G.R. Higgins, Mr W.J. Ovenden, Mr J.E. Heywood, WO2 G.J. Winter, CAPT M. Leary, Mr B.W. Tisdell, Ms W.A. Wright, Mrs N.L. Tull, Mr M.W. Arden, Mr C.R. Fox, Mr R.G. Maddocks, Mr B.M. Smith, Mr T.A. Moore, Mr G.W. Oakley, SGT G.V. Saint

Absent:
Mr J. Attard, Mr J.M. Barlow, Mr J.N. Cowle, WO1 A.P. Crook, Mr A.L. Graham, CPL W.G. McDonald

Figure 114. Graytown Unit Photo 2008 Part 2

P&EE Graytown 27 January 2009

Present, from left to right:
Mr R.J. Ridsdale, Mr J.E. Heywood, Mr J.H. Roberts, Mr R.W. Denness, Mr G.T. Weatherell, Mr R.G. Maddocks, Mr B.J. McDonald, Mr A.L. Graham, WO1 A.P. Crook, Mr J.M. Barlow, Mrs N.L. Tull, Mr W.J. Ovenden, Mr G.W. Oakley, Mr M.W. Arden, Mr R.G. Hart, Mr T.J. Sandford, Mr J.R. McGillivray, Mr T.A. Moore, SGT A.L. Marshall, Mr P.C. Miller, Mr B.W. Tisdell, Mr M.R. Nairn, CPL C.J. Hanslip, CPL S.A. Moors, Mr A.J. Keep, Mr G.W. Schulz, Mr S.A. Roscoe, WO2 G.J. Winter, Mr G.T.A. Finn, Mr K.J. Jahne, Mr G.R. Campbell, Mr P.G. Kerris, MAJ A.J. Watson, CPL W.G. McDonald, Mr B.S. Hall, WO2 R.M. Menadue, Mr G.R. Higgins, Mr P.D. Stead, SGT D.J. Hill, CFN M.P.L. Reeves, Mr B.M. Smith, Mr J.N. Cowie, Mr C.R. Fox, Mr P.A. Booth, Mr P.T. Whitehead

Absent:
Mr J. Attard, CAPT M. Leary, Mr T.J. Nowland, CAPT R.J. Teis

Figure 115. Graytown Unit Photo 2009

P&EE Graytown 4 February 2010

Present, from left to right:

Mr B.M. Smith, Mr R.G. Hart, Mr C.R. Fox, WO2 A.C. Merryfull, SGT A.L. Marshall, Mr C.H. Webber, Mr G.T.A. Finn, Mr B.J. McDonald, Mr G.R. Campbell, Mr J.H. Roberts, Mr R.J. Ridsdale, Mr G.W. Oakley, Mr G.T. Weatherell, Mr T.A. Moore, Mr M.R. Naim, WO2 D.H. Pollard, Mr J.M. Barlow, Mr A.L. Graham, Mr S.A. Roscoe, Mr A.J. Keep, Mr P.C. Miller, CPL C.J. Hanslip, Mr W.J. Ovenden, CAPT L.J. Georgeson, Mr K.J. Jahne, MAJ R.J. Teis, CAPT J.N. Johnston, Mr P.G. Kerris, Mr A.P. Crook, Mr J.R. McGillivray, Mr B.W. Tisdell, Mr J.E. Heywood, LTCOL M.R. Ahern, Mr M.W. Arden, Mr S.J. Daldy, SGT R.C. Jones, Mrs N.L. Tull, CAPT S.J. Allen, SGT D.J. Hill, Mr G.W. Schulz, WO1 G.L. Boyce, WO2 R.M. Menadue, Mr C.D. Jones, Mr G.R. Higgins, Mr P.A. Booth, Mr T.J. Sandford

Absent:

Mr J. Attard, Mr J.N. Cowie, Mr D. Dux, Mr B.S. Hall, Mr R.G. Maddocks, CPL S.A. Moors, Mr T.J. Nowland, Mr P.D. Stead, Mr P.T. Whitehead

Figure 116. Graytown Unit Photo 2010 Part 1

P&EE GT & JPEU-HQ

4 February 2010

Present, from left to right:

Mr B.M. Smith, Mr A.A. Kennedy, Mr R.G. Hart, Mr C.R. Fox, WO2 A.C. Merrylull, Mr R.K. Zarif, SGT A.L. Marshall, Mr C.H. Webber, Mr G.T.A. Finn, Mr B.J. McDonald, Mr G.R. Campbell, Mr J.H. Roberts, Mr R.J. Ridsdale, Mr G.W. Oakley, Mr G.T. Weatherall, Mr T.A. Moore, Mr M.R. Nairn, WO2 D.H. Pollard, Mr J.M. Barlow, Mr A.L. Graham, Mr S.A. Roscoe, Mr A.J. Keep, Mr P.C. Miller, Ms S.H. Vila, CPL C.J. Hanslip, Mr W.J. Ovenden, CAPT L.J. Georgeson, MAJ R.J. Teis, Mr K.J. Jahne, Mrs K.C. Laban, Mr J.R. McGillivray, Mr P.G. Kerris, CAPT J.N. Johnston, Mr A.P. Crook, Mr J.E. Heywood, Ms C. Johnston, LTCOL M.R. Ahern, Mr B.W. Tisdell, Mr M.W. Arden, Mrs N.L. Tull, Mr S.J. Daldy, SGT R.C. Jones, Mr G.R. Higgins, CAPT S.J. Allen, SGT D.J. Hill, Mr G.W. Schulz, WO1 G.L. Boyce, Mr C.D. Jones, WO2 R.M. Menadue, Mrs K.L. Sherlock, Mr P.A. Booth, Mr J.C. Boyter, Mr M. Muszynski, Mr T.J. Sandford, Mr S. Pavic

Absent:

Mr J. Attard, Mr J.N. Cowie, Mr D. Dux, Mr B.S. Hall, Mr P.J. Hall, Mr P. Jezierski, Mr R.G. Maddocks, CPL S.A. Moors, Mr T.J. Nowland, Mr P.D. Stead, Mr G.M. Sullivan, Mr P.T. Whitehead, JPEU-HQ staff located at Pt Wakefield

Figure 117. Graytown Unit Photo 2010 Part 2

P&EE Graytown

28 January 2011

Present, from left to right:
Mr G.W. Oakley, Mr K.J. Jahne, Mr J.N. Cowie, SGT B. Hoskins, Mr G.W. Schulz, Mr W.J. Duff, Mr G.S. Woodham, Mr R.J. Ridsdale, CPL U. Sestoso, Mr J.R. McGillivray, Mr R.G. Hart, Mr J.H. Roberts, Mr C.H. Webber, Mr G.R. Campbell, WO2 A.C. Merryfull, Mr B.M. Smith, Mr G.T.A. Finn, Mr M.R. Nairn, Mr G.T. Weatherell, Mr W.J. Ovenden, Mr A.J. Keep, Mr K. Zeman, CPL A.E. Johnson, WO2 M.D. Martin, CPL B.P. Gillies, WO1 P.M. Robertson, MAJ S.J. Allen, SGT D.J. Hill, LTCOL L.M. Monkivitch, Mr T.J. Sandford, WO1 G.L. Boyce, Mr P.G. Kerris, Mr J.M. Barlow, Mr M.W. Arden, Mr S.A. Roscoe, Mr P.C. Miller, Mr A.P. Crook, Mrs D.J. Hipwell, Mrs N.L. Tull, Mr J.E. Heywood, CAPT L.J. Georgeson, Miss L.J. Haine, CAPT J.N. Johnston, WO2 R.M. Menadue, Mr T.J. Nowland, Mr P.D. Stead, Mr C.D. Jones, Mr T.A. Moore, Mr P.A. Booth

Absent:
Mr C.R. Fox, Mr G.R. Higgins, Mr B.J. McDonald, CAPT H.M. Rogers, Mr B.W. Tisdell, Mr P.T. Whitehead

Figure 118. Graytown Unit Photo 2011

P&EE Graytown 27 April 2012

Present, from left to right:

Mrs N.L. Tull, SGT B. Hoskins, Mr R.J. Ridsdale, CPL A.E. Johnson, SGT C.A. Hawkes, Mr P.A. Booth, CPL B.P. Gillies, Mr C.R. Fox, WO2 A.C. Merryfull, Mr J.M. Barlow, WO2 M.D. Martin, Mr G.R. Higgins, Mr K.J. Jahne, Mr T.A. Moore, Mr J.R. McGillivray, MAJ S.J. Allen, Mr G.T.A. Finn, Mr G.T. Weatherell, Mr T.J. Sandford, BRIG J.M. Spalding, Mr G.S. Woodham, Mr R.G. Hart, CPL U. Sestoso, CAPT N.S. Ulin, Mr A.P. Crook, Mr A.J. Harstedt, Mr G.R. Campbell, Mr I.S. Dawe, Mr C.H. Webber, Mr A.J. Keep, LTCOL L.M. Monkivitch, Mr B.W. Tisdell, Mr P.D. Stead, CAPT S.D. Smyrk, Mr B.J. McDonald, Mr G.W. Schulz, Mr M.W. Arden, Mr P.G. Kerris, Mr B.M. Smith, WO1 S.J. Schuman, Mr J.N. Cowie, Mr P.T. Whitehead

Absent:

Mr D.F. Dizon, Mr W.J. Duff, Miss L.J. Haine, Mrs D.J. Hipwell, Mr P.C. Miller, Mr M.R. Nairn, Mr T.J. Nowland, Mr G.W. Oakley, Mr W.J. Ovenden, Mr J.H. Roberts, CAPT H.M. Rogers, Mr S.A. Roscoe, Mr T.J. Szczerkowski, WO1 R.N. Teale, Mr K. Zeman

Figure 119. Graytown Unit Photo 2012

P&EE Graytown 31 January 2013

Present, from left to right:
Mr I.S. Dawe, Mr P.G. Kerris, Miss L.J. Haine, Mr J.N. Cowie, SGT P.L. Coleman, Mr W.J. Duff, WO2 A.C. Merryfull, Mr B.J. McDonald, Mr J.H. Roberts, Mr R.J. Ridsdale, Mr K.J. Jahne, Mr T.A. Moore, Mr D.F. Dizon, Mr G.W. Oakley, CPL B.P. Gillies, Mr G.T.A. Finn, Mr G.T. Weatherell, Mr B.W. Tisdell, Mr M.R. Naim, SGT C.A. Hawkes, Mr A.P. Crook, Mr P.C. Miller, Mr A.J. Harstedt, Mrs D.J. Hipwell, MAJ S. Bowser, WO2 M.D. Martin, Mr A.J. Keep, CAPT J. Bohm, Mr G.W. Schulz, Mr J.R. McGillivray, CAPT N.S. Ullin, Mr T.J. Sandford, Mr M.W. Arden, CAPT S.D. Smyrk, Mr C.R. Fox, WO1 J.P. Beale, Mr J.M. Barlow, Mr G.R. Campbell, CPL C.O. Stanley, Mr S.A. Roscoe, Mr G.S. Woodham, Mr G.R. Higgins, Mr C.H. Webber, CPL U. Sestoso, Mr K. Zeman, Mrs N.L. Tull, Mr R.G. Hart

Absent:
Mr P.A. Booth, Mr B.M. Smith, Mr T.J. Szczerkowski, Mr P.T. Whitehead

Figure 120. Graytown Unit Photo 2013

P&EE Graytown

29 January 2014

Present, from left to right:
Mr I.S. Dawe, Miss L.J. Haine, SGT M.D. Muggleton, Mr R.G. Hart, Mr J.M. Barlow, Mr K. Zeman, Mr R.J. Ridsdale, Mr G.S. Woodham, CPL J. Chui, WO1 B.R. McIntyre, Mr B.J. McDonald, Mr D.F. Dizon, Mr P.T. Whitehead, Mr P.G. Kerris, WO1 S.J. Schuman, Mr G.W. Oakley, Mr T.A. Moore, Mr T.J. Szczerkowski, Mr S.A. Roscoe, Mr P.C. Miller, Mr A.J. Keep, Mr K.J. Jahne, MAJ S. Bowser, Mrs N.L. Tull, Mr J.R. McGillivray, Mr G.R. Campbell, Mr G.R. Higgins, Mr G.T.A. Finn, Mr C.H. Webber, CAPT J. Bohm, WO2 M.A. Earle, Mr G.W. Schulz, LTCOL A.R. Langford, Mr C.R. Fox, Mr M.R. Nairn, SGT C.A. Hawkes, Mr B.W. Tisdell, CPL B.P. Gillies, MAJ G.T. Sheppard, WO2 M.D. Martin, WO1 J.P. Beale, Mr T.J. Sandford, Mr G.T. Weatherell, Mr A.J. Harstedt, Mr M.W. Arden, CAPT C.G. Harbert, Mr A.P. Crook, Mr J.H. Roberts, Mr J.N. Cowie, Mr W.J. Duff

Absent:
CPL C.O. Stanley

Figure 121. Graytown Unit Photo 2014

P&EE Graytown

29 January 2015

Present, from left to right:
Mr I.S. Dawe, Mr R.J. Ridsdale, SGT M.D. Muggleton, Mr I. Indralingam, CAPT C.G. Harbert, WO2 M.D. Martin, Mr M.W. Arden, Mr J.R. McGillivray, Mr K.J. Jahne, Mr P.C. Miller, Mr G.T. Weatherell, Miss L.J. Haine, Mr R.G. Hart, Mr A.J. Harstedt, Mr A.J. Keep, Mr K. Zeman, Mr J.M. Barlow, Mr M.R. Naim, Mr T.A. Moore, WO2 M.A. Earle, Mr D.F. Dizon, Mr G.R. Campbell, MAJ M.P. Brooks, Mr P.G. Kerris, Mr B.J. McDonald, Mr T.J. Szczerkowski, Mr P.T. Whitehead, Mr G.W. Schulz, Mr W.J. Duff, CPL B.P. Gillies, Mr B.W. Tisdell, Mr A.P. Crook, LTCOL A.R. Langford, Mr G.R. Higgins, SGT G.J. Dade, Mr C.H. Webber, Mrs A.L. Brown, Mr G.W. Oakley, Mrs N.L. Tull, Mr J.N. Cowie, WO1 J.P. Beale, Mr G.T.A. Finn, Mr S.A. Roscoe, CPL B.J. Saunders, WO1 J.A. Quinn, Mr J.H. Roberts, CAPT B.J. Brown

Absent:
Mr D. Dux, Mr C.R. Fox, Mr T.J. Sandford

Figure 122. Graytown Unit Photo 2015

P&EE Graytown

28 July 2016

Present, from left to right:
Mr P.G. Kerris, Mr I.S. Dawe, Mr J.M. Barlow, Mr B.W. Tisdell, Mr C.H. Webber, Miss L.J. Haine, WO1 J.A. Quinn, Mrs N.L. Tull, CPL B.J. Saunders, Mr R.J. Ridsdale, Mr R.G. Hart, Mr G.W. Oakley, Mrs B.T. Nicolaas, WO2 M.A. Earle, Mr M.W. Arden, MAJ M.P. Brooks, SGT G.J. Dade, Mrs A.L. Brown, LTCOL A.R. Langford, Mr A.J. Harstedt, Mr A.P. Crook, Mr G.R. Higgins, Mr I. Indralingam, Mr G.T.A. Finn, WO2 M.D. Martin, Mr M.R. Nairn, Mr S.A. Roscoe, Mr B.J. McDonald, WO1 C.L. Renall, Mr J.N. Cowie, Mr W.J. Duff, Mr J.H. Roberts

Absent:
CAPT B.J. Brown, Mr G.R. Campbell, Mr D.F. Dizon, CPL D.B. Evans, Mr C.R. Fox, CPL B.P. Gillies, Mr A.J. Keep, Mr J.R. McGillivray, Mr T.A. Moore, SGT M.D. Muggleton, Mr T.J. Sandford, Mr G.W. Schulz, CAPT G.B. Sisson, Mr T.J. Szczerkowski, Mr G.T. Weatherell, Mr P.T. Whitehead, Mr K. Zeman

Figure 123. Graytown Unit Photo 2016

P&EE Graytown

31 January 2017

Present, from left to right:
Mr S.A. Roscoe, Mr J.N. Cowie, Mr C.H. Webber, Mr G.T.A. Finn, Mr P.G. Kerris, Mr G.W. Schulz, Mr D.F. Dizon, Mr I.S. Dawe, Mr G.W. Oakley, CPL D.B. Evans, Mr J.R. McGillivray, Mr R.G. Hart, Mrs B.T. Nicolaas, CAPT W.J. Smith, Mr J.M. Barlow, Mr A.P. Crook, WO1 M.M. Humphrey, Mr A.J. Harstedt, SGT A.L. Marshall, CPL B.J. Saunders, LTCOL A.J. Watson, Mr G.T. Weatherell, MAJ M.P. Brooks, Mr A.J. Keep, CAPT A.B. Cassar, WO2 P.J. Ballinger, Mr T.A. Moore, Mr B.W. Tisdell, LCPL L.P. Stopp, CAPT G.B. Sisson, Mr B.J. McDonald, Mrs N.L. Tull, WO2 M.A. Earle, SGT G.J. Dade, Mr W.J. Duff, Mr I. Indralingam, Mr K. Zeman, Miss L.J. Haine, Mr M.R. Nairn, WO1 C.L. Renall, Mr J.H. Roberts, Mr T.J. Sandford, Mr C.R. Fox, Mr R.J. Ridsdale

Absent:
Mr M.W. Arden, Mr G.R. Campbell

Figure 124. Graytown Unit Photo 2017

P&EE Graytown 30 January 2018

Present, from left to right:
Mr I.S. Dawe, Mr J.N. Cowie, Mr W.J. Duff, Mr M.W. Arden, Mrs N.L. Tull, SGT G.A. Thomas, Mr K. Zeman, Mr S.A. Roscoe, Mr B.J. McDonald, Mr R.J. Ridsdale, LCPL R.J. Appleby, Mr G.W. Oakley, Mr P.G. Kerris, CPL D.B. Taylor, Mr D. Cavanagh, WO2 C.J. Brunt, SGT A.L. Marshall, Mr T.A. Moore, WO2 G.R. Woodhouse, Mr J.R. McGillivray, Mr J.M. Barlow, Mr C.H. Webber, MAJ H.M. Rogers, Mr G.W. Schulz, Mr G.R. Campbell, CAPT G.B. Sisson, SPR L.T. Campbell, LTCOL A.J. Watson, Mr A.J. Keep, CPL L.P. Stopp, WO1 M.M. Humphrey, Mr I. Indralingam, Mr S.J. Faulkner, CPL B.J. Gibson, Mr A.P. Crook, WO2 P.J. Ballinger, Mr A.J. Harstedt, CAPT A.B. Cassar, SGT A.J. Gillies, Mr G.T.A. Finn, Mr M.R. Nairn, Mr J.H. Roberts, WO1 C.L. Renall, Mr G.T. Weatherell

Absent:
Mr C.R. Fox, Miss L.J. Haine, Mr R.G. Hart, Mr B.W. Tisdell

Figure 125. Graytown Unit Photo 2018

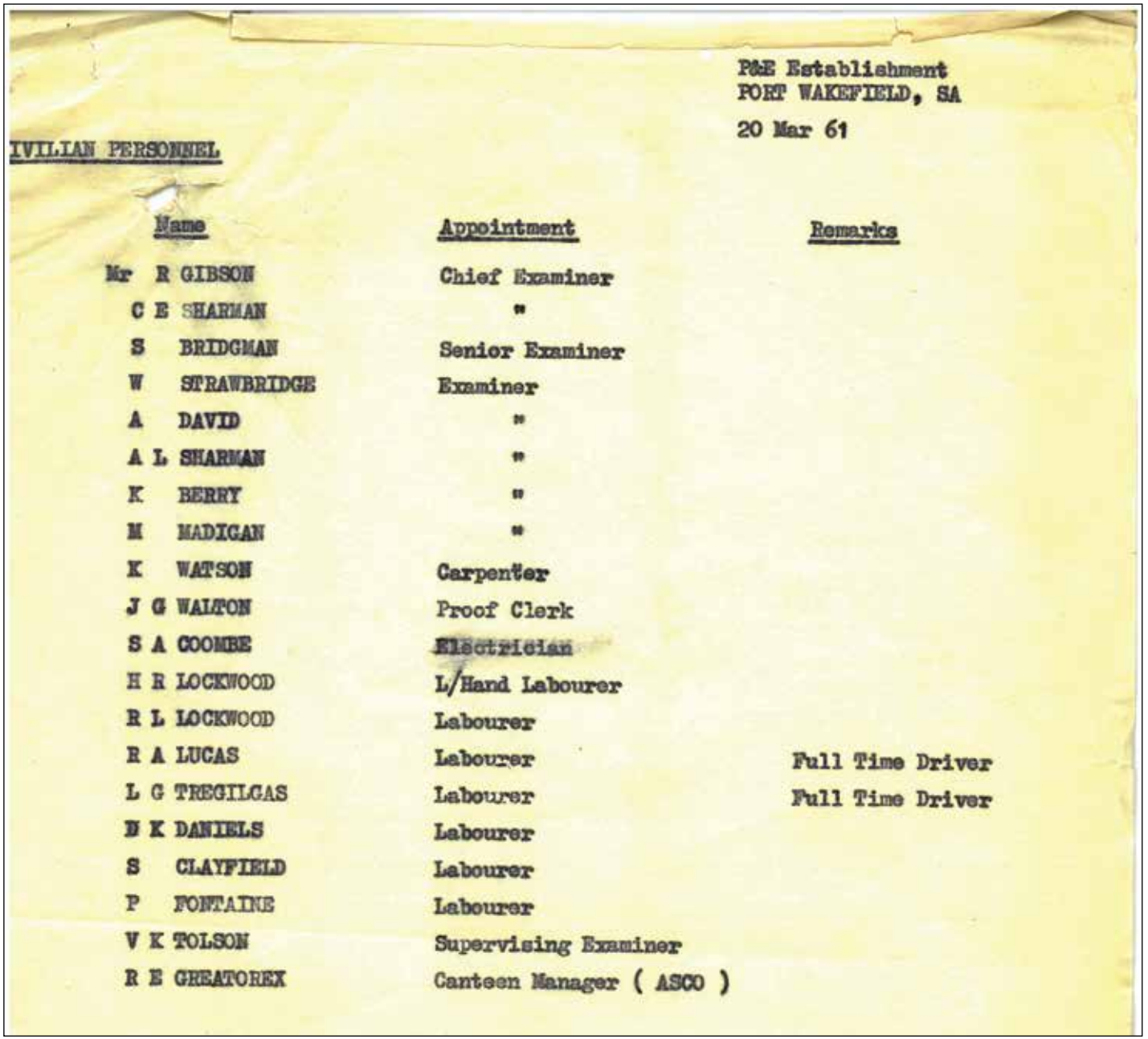
P&EE Graytown 30 January 2019

Present, from left to right:
Mr C.L. Freeman, Mr P.G. Kerris, Mr M.R. Nairn, Mr P.J. Ballinger, Mr B.W. Tisdell, FLGOFF T.G. Riches, Miss L.J. Haine, Mr K. Zeman, SPR G.S. Swalue, Dr M.A. Ullah, CAPT M.K. Bell, Mrs N.L. Tull, Mr I.S. Dawe, WO2 D.J. Saunders, SGT A.L. Marshall, Mr I. Indralingam, CAPT B.W. Callaghan, CPL D.B. Taylor, Mr T.A. Moore, Mr D.B. Wallace, MAJ H.M. Rogers, PTE H.R.L.J. Wings, Miss P.L. Doyle, Mr A.J. Bennett, LTCOL M.J. Dwyer, Mr D.L. Cavanagh, CPL B.J. Gibson, Mr D. Olivo, CPL L.P. Stopp, Mr J.A. Turk, SGT A.J. Gillies, SGT G.A. Thomas, Mr T.R.G. Hadfield, Mr A.P. Crook, WO2 C.J.L. Brunt, Mr A.J. Harstedt, Mr A.J. Keep, Mr C.H. Webber, Mr M.W. Arden, Mr G.W. Oakley, CPL J.E. Hunter, Mr G.T. Weatherell, Mr G.R. Campbell, Mr R.J. Ridsdale, Mr S.A. Roscoe, WO1 J. Anderson, Mr J.N. Cowie, Mr J.H. Roberts, Mr J.M. Barlow, Mr S.J. Faulkner

Absent:
Mr W.J. Duff, Mr G.T.A. Finn, WO1 M.M. Humphrey, Mr B.J. McDonald, Mr J.R. McGillivray

Figure 126. Graytown Unit Photo 2019

Figure 127. Port Wakefield Unit Photo 1930s



P&E Establishment
PORT WAKEFIELD, SA

20 Mar 61

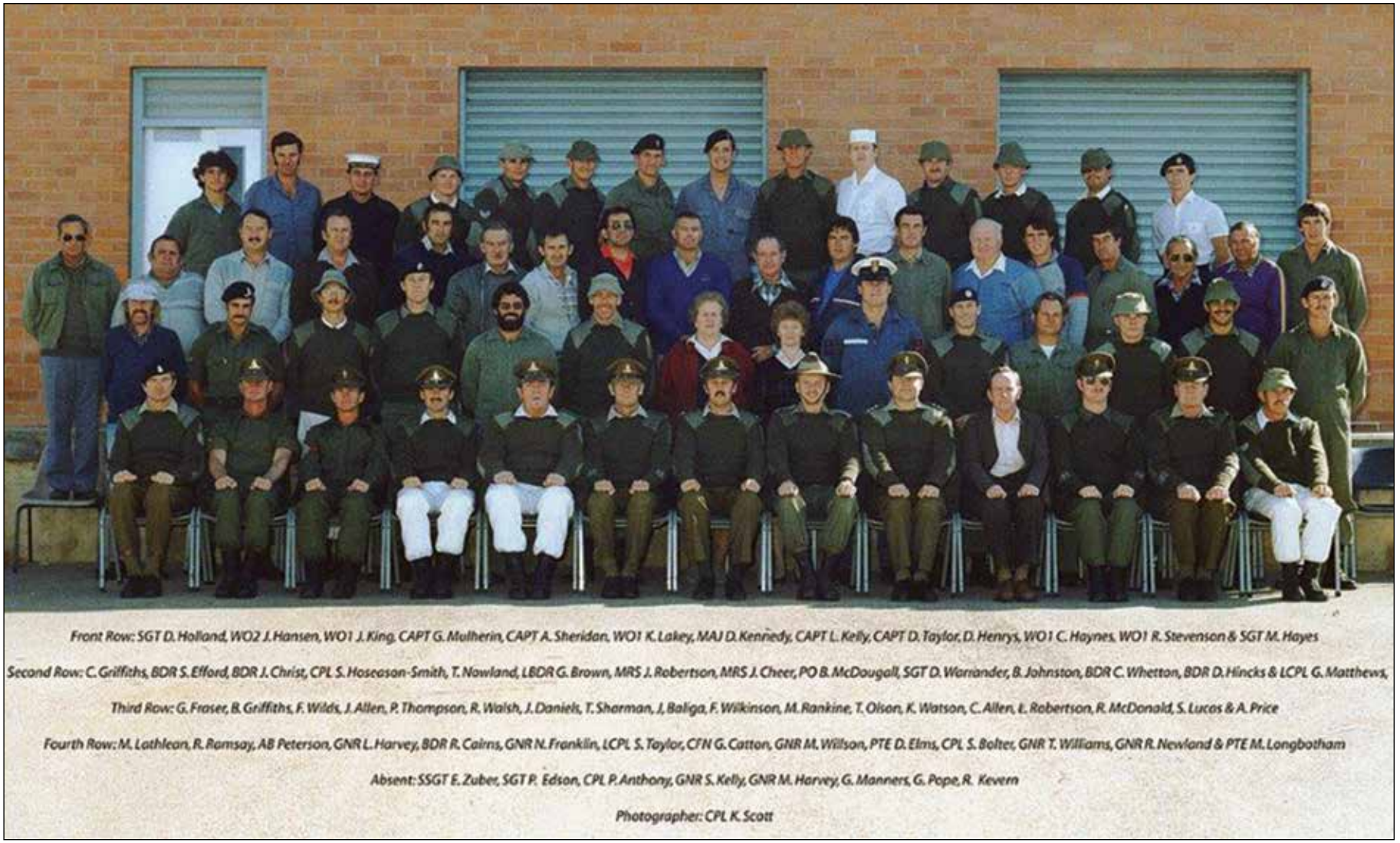
IVILIAN PERSONNEL

Name	Appointment	Remarks
Mr R GIBSON	Chief Examiner	
C E SHARMAN	"	
S BRIDGMAN	Senior Examiner	
W STRAWBRIDGE	Examiner	
A DAVID	"	
A L SHARMAN	"	
K BERRY	"	
M MADIGAN	"	
K WATSON	Carpenter	
J G WALTON	Proof Clerk	
S A COOMBE	Electrician	
H R LOCKWOOD	L/Hand Labourer	
R L LOCKWOOD	Labourer	
R A LUCAS	Labourer	Full Time Driver
L G TREGILGAS	Labourer	Full Time Driver
D K DANIELS	Labourer	
S CLAYFIELD	Labourer	
P FONTAINE	Labourer	
V K TOLSON	Supervising Examiner	
R E GREATOREX	Canteen Manager (ASCO)	

Figure 128. Port Wakefield Civilian Personnel List 1961

Figure 129. Port Wakefield Unit Photo 1971

Figure 130. Port Wakefield Unit Photo 1979



Front Row: SGT D. Holland, WO2 J. Hansen, WO1 J. King, CAPT G. Mulherin, CAPT A. Sheridan, WO1 K. Lakey, MAJ D. Kennedy, CAPT L. Kelly, CAPT D. Taylor, D. Henrys, WO1 C. Haynes, WO1 R. Stevenson & SGT M. Hayes

Second Row: C. Griffiths, BDR S. Efford, BDR J. Christ, CPL S. Hoseason-Smith, T. Nowland, LBDR G. Brown, MRS J. Robertson, MRS J. Cheer, PO B. McDougall, SGT D. Warriander, B. Johnston, BDR C. Whetton, BDR D. Hincks & LCPL G. Matthews,

Third Row: G. Fraser, B. Griffiths, F. Wilds, J. Allen, P. Thompson, R. Walsh, J. Daniels, T. Sharman, J, Baliga, F. Wilkinson, M. Rankine, T. Olson, K. Watson, C. Allen, L. Robertson, R. McDonald, S. Lucas & A. Price

Fourth Row: M. Lathlean, R. Ramsay, AB Peterson, GNR L. Harvey, BDR R. Cairns, GNR N. Franklin, LCPL S. Taylor, CFN G. Catton, GNR M. Willson, PTE D. Elms, CPL S. Bolter, GNR T. Williams, GNR R. Newland & PTE M. Longbotham

Absent: SSGT E. Zuber, SGT P. Edson, CPL P. Anthony, GNR S. Kelly, GNR M. Harvey, G. Manners, G. Pope, R. Kevern

Photographer: CPL K. Scott

Figure 131. Port Wakefield Unit Photo 1986

Figure 132. Port Wakefield Unit Photo 1996

Figure 133. Port Wakefield Unit Photo 2002

Figure 134. Port Wakefield Unit Photo 2008

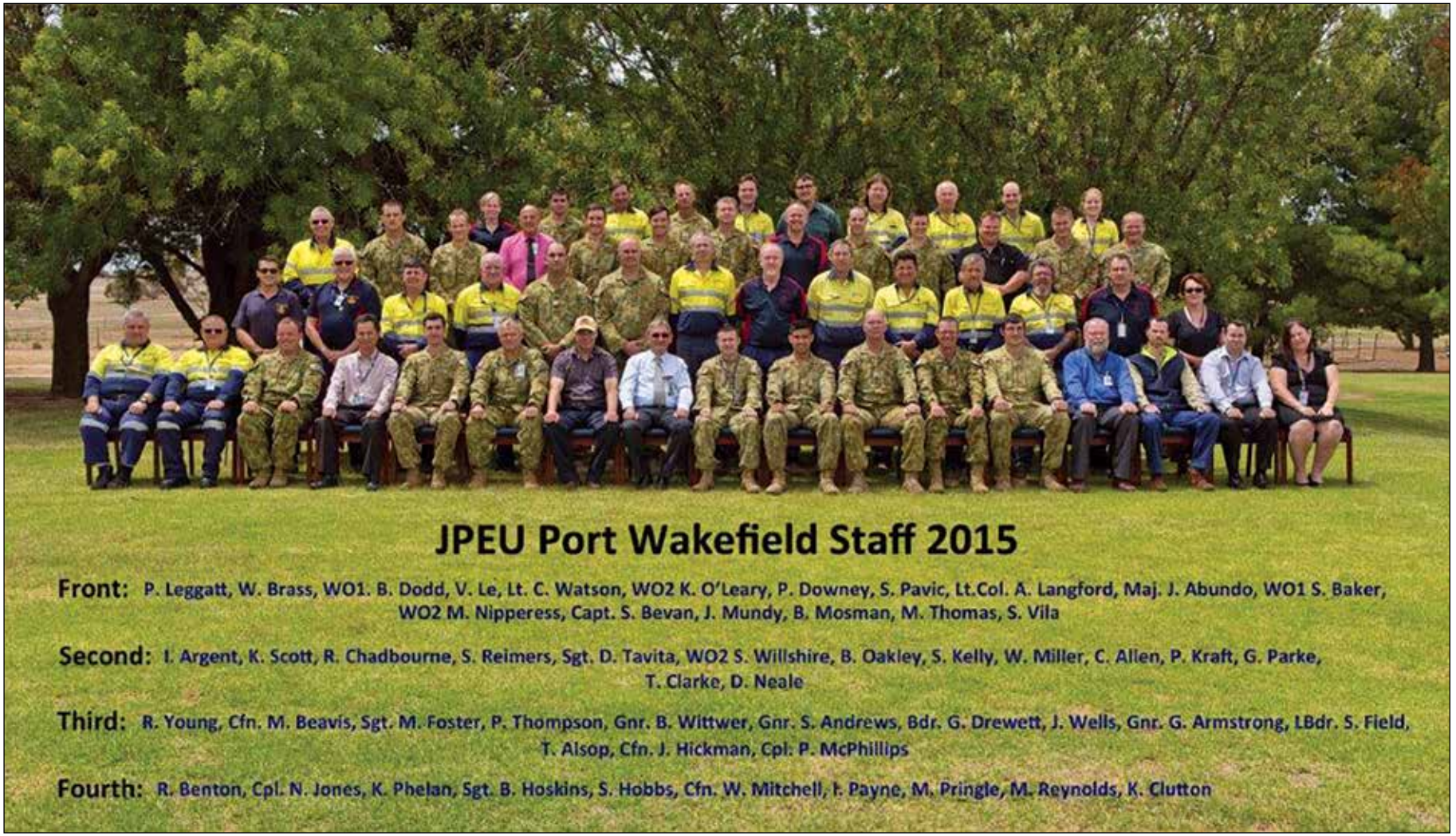


Figure 135. Port Wakefield Unit Photo 2015

PROOF & EXPERIMENTAL ESTABLISHMENT PORT WAKEFIELD 2017

Front Row: Mr. M. Thomas, Mr. B. Mosman, WO1 B. Dodd, Mr. P. Downey, CAPT S. Bevan, CAPT J.Nguyen, WO1 S. Baker, LTCOL A. Watson, MAJ N. Ullin, CAPT W. Smith, Mr. J. Mundy, CAPT D. Chadwick, Mr. S. Reimers, Ms. S. Vila, WO2 K. O'Leary

2nd Row: Mr. G. Parke, Mr. S. Hobbs, BDR G. Clark, Mr. C. Allen, PO J. Jasinski, Mr. S. Kelly, Mr. W. Miller, Mr. B. Oakley, SGT D. Tavita, CPL M. Baker, CPL R. Farrelly, Mr. J. Wells, GNR D. Hinkley, Mr. I. Argent

3rd Row: Mr. K. Scott, BDR S. Andrews, GNR C. Lawrence, CAPT A. Leer, GNR N. Hayes, Mr. P. Nagle, Mr. T. Alsop, Mr. R. Chadbourne, Mr. T. Clarke, GNR A. Willett SGT J. Page

4th Row: Mrs. R. Benton, Mr. M. Pringle, SGT D. Hughes, SGT L. Hirst, SGT K. Scharkie, Mr. I. Payne, Mr. B. Young, Mr. K. Phelan, CPL D. Bishop, Miss K. Clutton

Figure 136. Port Wakefield Unit Photo 2017

P&EE Port Wakefield 2019

Back Row K. Scott, CPL Alexander, LBDR Lawrence, CPL Long, W. Nagle, S. Hobbs, BDR Clark, SPR Rudiger, SGT Hamilton, CPL Muculj, SGT Allegretto, SGT Dawson, GNR Norton, M. Heath, Pastor Heslop

3rd Row I. Argent, SGT Page, S. Andrews, GNR Roberts, GNR Hayes, POMT Stock, CPL Walmsley, K. Grabb, CPL Farrelly, B. Mosman, CFN Hall, I. Payne, BDR Rudduck, LBDR Corey, CPL Foo, D. Heidik

2nd Row GNR White, T. Woollatt, G. Coppock, T. Clarke, C. Allen, J. Wells, S. Kelly, W. Miller, B. Oakely, A. Ruthenbeck, D. Dredge, S. Gibbs, P. Harte, G. Parke, R. Young, R. Chadbourne, M. Pringle

Front Row M. Baker, R. Benton, A. Leer, B. Dodd, SGT George, WO2 Hughes, CAPT Fleming, MAJ Patel, LTCOL Dwyer (CO) MAJ O'Connell (OC), WO1 Egart, WO1 Chiverton, S. Bevan,

WO2 Edwards, D. Klarich, R. Taylor, C. Anderson

Figure 137. Port Wakefield Unit Photo 2019

About The Author

Dr Steven Schmied has been a full time and reserve member of the Australian Army since 1992. As an Army Reservist, Steven is currently assisting the Headquarter Royal Military College - Australia (HQ RMC-A) to rewrite the Australian Army Leadership doctrine. Steven is passionate to research and tell the stories of our common humanity.

Dedication

To my loving wife Pauline, who patiently listened to the stories.

Author's Notes

Throughout history, there are enduring themes. By identifying and understanding these themes, we may understand where we came from and where we may be headed. They are the stories we tell ourselves.

To understand the history and ongoing contribution of JPEU, the story is told through exploring narrative threads of *Awe and Beauty*. From the explosive power of the testing to the brutal nature of the Australian Bush where the unit resides, the unit thrives in the face of awesome danger that is at the same time staggering beautiful. Even the end of their efforts often in results in what may be called a *Beautiful Set of Numbers*.

This publication presents the history of the unit and the ranges at Graytown and Port Wakefield. The unit has one overarching aim, to keep the members of the ADF as safe as possible, whilst also advancing the science and engineering of Defence and civilian programs through technical innovation. This aim continues a long and important history of proof and experimentation, with an originating event being the Charles II's Royal Charter 1662 forming the Board of Ordnance.

The unit's name neatly captures its dual purpose to:

- prove that equipment, primarily ordnance, complies with its specification
- test new equipment and materials.

I believe that this book and the history it describes belongs to the unit; I simply helped to tell their fascinating stories. With this in mind, I commenced by interviewing LTCOL Brooks and touring the base at Graytown. The act of walking the ground allows one to experience the harsh beauty of the central Victorian bush. I then delved into the archives looking for stories, using the rule of thumb that if I found a topic interesting, I hoped the reader would also. Sure enough, I found nuggets of narrative gold in amongst the administrative and technical mother lode; an example of which was the testing of Australia's first space rocket, AUSROC-I, at Graytown. Further, the archives and instructions that showed the ingenuity and technical mastery of the people who worked in this complex field building; custom made test equipment, developing precise procedures, and implementing novel test ideas all brought out the unit's expertise.

The members were then gracious enough to allow me to interview them, to hear their stories, their "*warries*" in Army parlé, and collect their photos and artefacts. I wished for their voices to carry through to these pages, so I have translated the stories directly where possible.

The story of the unit's history is told through exploring narrative threads that wind through the history of the unit and the experiences of the people who have lived and worked in the challenging environments of Graytown and Port Wakefield. The human interaction with the sites has been driven by the environments, from the impact of the notoriously poor but gold laden ground of Graytown and the barrenness of Port Wakefield, to the beauty and abundance of the pristine wetlands formed by the Goulburn River at Graytown. The operations of the unit are investigated, from the initial VR techniques through to current and future testing. The nature of the unit's activities, primarily dealing with deadly items that explode, has led to the development of a culture of professionalism, inventiveness and mastery. Further, the day to day workings of the unit, with its inherent and constant dangers, proceed with a stateliness that verges on the religious and has resulted in not a single fatality over the unit's long history.

A vision to help connect the unit to the rest of the Defence and the wider community is for this book to form the basis of tours of Graytown, Port Wakefield and their surrounding areas, led by current and ex-members of the unit; a journey through both time and space.

Finally, I hope you enjoy reading the unit's stories and viewing the photographs as much as I did researching them. I will always be grateful to the generosity of the members for sharing their stories.

Acknowledgements

I wish to particularly thank:

- LTCOL Mathew Brooks for the initial concept to develop the history and for supporting me in this effort
- LTCOL Dwyer (current CO JPEU) for his continued support in publishing this history
- Mr Anthony Crooks and Mr Greg Oakley for hosting me at Graytown and showing me the base's hidden beauty
- Mr Colin (Foxy) Fox for hosting me at Graytown and sharing his decades of experience
- Mr Ken Scott and Mr Ian Argent for hosting me at Port Wakefield, providing access to the extensive image library and showing the stark beauty of the base and surrounds
- Mr Phil Colbourne for sharing his experience of the day he lost his hand, along with other stories of his time at the unit
- Mr Thomas Faulkner for detailing the day he was electrocuted, with his heart stopping three times on the way to Balaclava hospital
- Mr Bill Leviston for sharing his 39 years of experience at Graytown
- COL Lee Dell and WO1 Carla Dell for sharing the stories of their time at Port Wakefield.

I would also like to thank those current and previous staff for their support:

- COL Michael Ahern
- COL Gary Potter
- LTCOL Matthew Dwyer
- MAJ Daniel O'Connell
- MAJ Heath Rogers
- Warrant Officer Class 1 (WO1) Miles Humphrey
- Mr Stu Baker
- Mr Paul Bulcher
- Mr James Cowie
- Mr Paul Kerris
- Mr Trevor Moore.

I was especially pleased to spend an afternoon with previous employees of Port Wakefield, including:

- Kieran Phelan
- Terry Olson
- Anne and Peter Thompson
- Mick Rankine
- Chris Allen
- Bob Johnston
- Terry Sharman
- Lex Robertson
- Geoff Parke
- John Wells
- Bob Young.

I am also appreciative of the two authors who wrote earlier histories of the unit, and whose work I have repeated or paraphrased:

- Bell, Peter (2004), *History of the Port Wakefield Proof Range: Report to Woodhead International*, Historical Research Pty Ltd, Adelaide [26]
- Bullpitt, Ian (2016), *Preliminary Report; Munitions & Related Hazard Risk Assessment: Graytown GDTS Armour Test Facility*, Defence Project D9553, BOZ Technical Services Pty Ltd, Queensland [3].

Where known, each picture is acknowledged to the owner of the original.

Dr Steven Anthony Schmied
Captain
Hampton Victoria
May 2019

References

1. Triffett, C., *History Of Proof And Experimental Establishment Graytown.* Ordnance.
2. Anderson, B., et al., *Habitat management for tanks and Tuans: Evolving approaches at Puckapunyal Military Area.* Ecological Management & Restoration, 2007. **8**(1).
3. Bullpitt, I., *Preliminary Report: Munitions & Related Hazards Risk Assessment: Graytown DSTG Armour Test Facility*. 2016, BOZ Technical Services Pty Ltd: Queensland.
4. *Aboriginal scarred trees - Creative Spirits*. 2019; Available from https://www.creativespirits.info/aboriginalculture/land/aboriginal-scarred-trees.
5. *McIvor Shire*. 2015; Available from https://www.victorianplaces.com.au/mcivor-shire.
6. Herald, S.M. *Graytown*. 200; Available from: http://www.smh.com.au/news/Victoria/Graytown/2005/02/17/1108500206485.html.
7. McHugh, P., *Forest Camps*. 2018, Victorian Forestry Heritage.
8. Lieutenant K.C. Mathews, R., *The Proof And Experimental Establishment Port Wakefield.* Journal of the Australian Naval Institute, 1983. **9**(3): p. 39 - 44.
9. *Port Wakefield*, in *Port Pirie Quorn*. Unknown.
10. Australia, S.L.o.S. *Port Wakefield*. 2009; Available from: http://www.samemory.sa.gov.au/site/page.cfm?u=1249.
11. Parker, L., *Gun returns ... and here's proof of community teamwork*, in *The Plains Producer*. 2008.
12. Defence, D.o., *1929 – 2004: Celebrating 75 Years Of 'Quiet" Achievement*. 2004: Commonwealth Of Australia.
13. Defence, D.O., *Defence Science And Technology Organisation Ordnance Breakdown Facility Port Wakefield, South Australia: Statement Of Evidence To The Parliamentary Standing Committee On Public Works* 2004.
14. Treloar, F., *Shark Tragedy Of 1855*, in *The Register*. 1926.
15. Walker, T., *Fast Tracks*. 1995: Turton & Armstrong Pty Ltd
16. Agland, M. *Sophia Susanna Campbell - Duntroon, Canberra*. 2009; Available from https://hiddencanberra.webs.com/apps/blog/show/1071087-sophia-susanna-campbell-duntroon-canberra.
17. Barton, N., *Residents raise concerns over new missile testing facility*, in *The Western Weekender*. 2018.
18. Brennan, J.W. *The Proximity Fuze Whose Brainchild*. in *United States Naval Institute Proceedings,* 1968.
19. *R7645 Ikara the Weapon Thrower, 1963: 'First flight trials'*. 2011; Available from http://tlf.dlr.det.nsw.edu.au/learningobjects/Content/R11343/object/r7645.html.
20. Gambling, D., M. Crozier, and D. Northam, *Nulka: A Compelling Story*. 2013: Commonwealth of Australia.
21. Offler, I., *AUSROC I*, M.o.V.S. Works, Editor. 1994.
22. *Missing A34-47 Dragon*. 2017; Available from http://missingdragon.tripod.com.
23. Potter, **G.**, *JPEU eyes looming ordnance challenges*, in *Australian Defence Magazine*. 2008, Yaffa Media,: Surry Hills NSW, Australia.
24. *Hand blown off – Grenade blast leaves man injured*. 2007, Bendigo Advertiser.
25. *ADF suspends grenade use after accident*. 2007, The Sydney Morning Herald.
26. Bell, P. *Defence Science And Industry*. 2017; Available from http://sahistoryhub.com.au/subjects/defence-science-and-industry.

Epilogue:

THE FINAL WORD ON *AWE AND BEAUTY*

Figure 138. 40 Ton Explosion At Woomera
(Port Wakefield Archive)


JOINT PROOF AND EXPERIMENTAL UNIT
AUSTRALIAN DEFENCE FORCE

Awe and Beauty is a collection of stories and memories of the men and women who have contributed to the rich history of the Joint Proof and Experimental Unit. In celebration of 90 years for Proof and Experimental Establishment Port Wakefield, 50 years for Proof and Experimental Establishment Graytown and 15 years for Headquarters Joint Proof and Experimental Unit, enjoy this book and the memories of colleagues and experiences that it brings.

LTCOL Matt Dwyer, CSM – Commanding Officer