The Auditor-General ANAO Report No.26 2015–16 Performance Audit

# Defence's Management of the Mulwala Propellant Facility

**Department of Defence** 

Australian National Audit Office

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Canberra ACT 15 March 2016

Dear Mr President Dear Mr Speaker

The Australian National Audit Office has undertaken an independent performance audit in the Department of Defence titled *Defence's Management of the Mulwala Propellant Facility.* The audit was conducted in accordance with the authority contained in the *Auditor-General Act 1997.* I present the report of this audit to the Parliament.

Following its presentation and receipt, the report will be placed on the Australian National Audit Office's website—http://www.anao.gov.au.

Yours sincerely

h Hehi

Grant Hehir Auditor-General

The Honourable the President of the Senate The Honourable the Speaker of the House of Representatives Parliament House Canberra ACT

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ANAO Report No.26 2015–16 Defence's Management of the Mulwala Propellant Facility

# Contents

Su	mmary and recommendations	7
	Background	7
	Conclusion	7
	Supporting findings	8
	Recommendations	12
	Summary of entity responses	12
1.	Background	17
	Introduction	17
	Audit approach	20
2.	Project rationale and planning	21
	Did Defence manage the development of plans for the Mulwala Redevelopment Project	22
	Did Defence adequately identify and manage the risks involved in ostablishing a new facility?	20 26
З	Establishing the new facility	20 20
5.	Did Defense manage and review the project's construction and commissioning phases	29
	effectively?	30
	Did Defence manage the completion of the project effectively?	35
	Has the project delivered the agreed outcomes?	36
4.	Delivering munitions to the Australian Defence Force	39
	Did Defence manage the 1998–2015 operating contracts effectively and achieve value for	
	money?	40
	Did Defence manage the competitive tender for a replacement operating contract effectively?	46
	Has Defence achieved better value in the interim 2015-20 contract?	49
5.	Managing the operating environment at Mulwala	51
	Has Defence improved environmental and safety compliance at Mulwala since 1998?	51
	Is Defence adequately preparing for decontamination and demolition at Mulwala?	56
Ар	pendices	63
Ap	pendix 1 Department of Defence response	65
Ap	pendix 2 Lend Lease response	66
Ap	pendix 3 Thales Australia response	68



## The Mulwala Facility, November 2013

Source: Defence.

ANAO Report No.26 2015–16 Defence's Management of the Mulwala Propellant Facility

# Summary and recommendations

# Background

1. The Mulwala Facility is the sole remaining manufacturing site of military propellants and high explosives in Australia. The 1030-hectare site is near the border of New South Wales and Victoria. Until recently, it included around 300 buildings, the majority of which were constructed in the early 1940s and the remainder in the early 1990s. The nearby munitions facility at Benalla, Victoria, uses some of the output of the Mulwala Facility in its operations. The facilities at Mulwala and Benalla are owned by the Commonwealth and operated by a third party. In 2001, the Government announced that the Mulwala Facility would be redeveloped by 2004, at a cost of up to \$220 million.

## Audit objective and criteria

2. The audit objective was to assess the effectiveness of the Department of Defence's management of the Mulwala Redevelopment Project. The audit focused primarily on the progress of the project, including its cost and schedule performance, and Defence's management of risks and issues. In this context, the audit also considered:

- the transition from the 1998 Mulwala Agreement (and the companion Strategic Agreement for Munitions Supply, for the Benalla Facility) to the 2015–20 Strategic Munitions Interim Contract; and
- the progress of environmental remediation of the Mulwala site.

3. To form a conclusion against the audit objective, the ANAO adopted the following high-level audit criteria:

- project risks were identified and managed effectively;
- the project is progressing to the expectations of the Commonwealth in terms of value for money, timeliness and delivery of required capability;
- arrangements for contractor operation of the redeveloped facility ensure that production capability is available when needed by the Australian Defence Force; and
- progress is being made in resolving environmental issues associated with both legacy and redeveloped facilities.

# Conclusion

4. When completed, the Mulwala redevelopment should deliver a facility with much higher levels of safety, automation and environmental compliance than are provided by the plant built in 1942–43. However, Defence's management of the project, particularly in its early stages, was not effective.

• The redevelopment is expected to be completed more than five years late, due to Defence's misunderstanding of the technical risk in the project, the general lack of commercial expertise in constructing propellant manufacturing facilities, and shortcomings in Defence's project management resourcing and approach. Defence's subsequent internal review processes provided useful advice on key risks and their remediation.

• Reflecting the delay in completion arising from the unexpected complexity of the redevelopment, the costs are estimated at some \$415 million by 2017, against an approved project budget of \$371 million (inflation-adjusted). This estimate includes further work, at a cost of some \$44 million, that is still required to bring the facility up to an industrial level of production, as originally intended. Significant expenditure is yet to be budgeted for decontamination and demolition.

5. From 1999 to 2015, Defence has paid \$526 million for munitions produced by the Mulwala and Benalla Facilities, and has paid \$1.874 billion in order to build, operate and maintain the facilities.<sup>1</sup> The capability to manufacture munitions in Australia has provided regional economic and employment benefits and some strategic value in terms of security of supply. Defence advised Government in 2000 and 2014 that the facilities should be closed, and also advised in 2012 that the strategic requirement to manufacture munitions in Australia is minimal. This suggests that the cost of building, operating and maintaining the facilities did not represent value for money.

6. From 2009 to 2014, Defence unsuccessfully attempted to conduct a competitive tender for operation of the Mulwala Facility and the related munitions facility at Benalla. In late 2014, Defence entered into a five-year interim contract that provides some improvement in value for money. With the redevelopment of the Mulwala Facility nearly completed, Defence is now in a better position to advise the Government on options for the future operation of the facilities, and develop a cost-effective implementation plan.

7. Defence has made progress on environmental remediation of the Mulwala site, but the process is expensive and long-term, and will require continued commitment. Because of the hazardous nature of some of the soon-to-be-redundant buildings, Defence should develop a risk-based implementation plan for decontamination and demolition.

# **Supporting findings**

# Project rationale and planning

8. Defence did not manage the development of plans for the Mulwala Redevelopment Project effectively. Defence had difficulty in aligning the project into either its capability or facilities project model, and applied some aspects of both models to the project. The area in Defence performing the role of Lead Capability Manager for the project changed several times.

9. Between 2001 and 2006, Defence sought to redevelop the Mulwala Facility through the then Government's preferred option of private financing. This approach did not succeed because Defence had little leverage over the then contractor, Australian Defence Industries, and because of the safety and environmental problems at Mulwala. After the Government approved Budget funding for the project in 2006, Defence negotiated a contract that was signed in 2007.

10. The project was announced without detailed requirements. The scope of the project was adjusted to match the cost envelope announced in July 2001. This approach excluded some key requirements of the redevelopment, such as decontamination and demolition of redundant

<sup>1</sup> The cost of building, operating and maintaining the facilities equates to the cost of approximately 13 F-35A Joint Strike Fighter aircraft at the 2015 price of approximately \$140 million each.

buildings. Further, extensive scope changes occurred until contract signature in 2007, and continued to be made until the end of the project.

11. Defence's advice to government in 2001, 2005 and 2006 did not adequately assess the risks involved in establishing a new propellant facility. In April 2006, Defence assessed the technical risk as low, but made no mention of cost and schedule risk. While the technology to be used in the new facility was long-proven, the risks involved in establishing a new chemical plant to produce hazardous materials required assessment and mitigation. In the event, the contracted schedule was too short, provision for project/engineering staff was inadequate, and Defence did not take into account the general lack of commercial expertise in constructing propellant manufacturing facilities.

#### Establishing the new facility

12. Defence did not manage the Mulwala Redevelopment Project's construction and commissioning phases effectively. The construction phase commenced late, and within a year was facing delays and unrealistic scheduling. The commissioning phase, involving the introduction of hazardous chemicals into the new facility, also experienced long delays. Defence attributed these delays to technical problems, contractor inexperience in work of this nature, and lack of Defence project office resourcing and expertise.

13. By 2010, Defence and the prime contractor (Lend Lease) were involved in lengthy and expensive disputes over project scope and schedule. Between 2011 and 2015, Defence negotiated five deeds with Lend Lease, providing further payments, extended deadlines and changes of scope. While the deeds contributed to better relations with the contractor, the first two deeds failed to provide enduring solutions to the technical and schedule issues affecting the project.

14. Defence commissioned four Gate Reviews of the project to assess progress. The reviews provided useful advice on key risks and their remediation. Following the first review, the project was placed on Defence's Projects of Concern list in December 2012. In late 2013, after the second review, Defence adopted a more pragmatic approach under which overall commercial considerations would take precedence over rigid enforcement of the contract. In early 2015, Defence adopted an effective two-stage process for finalising the project, which enabled the new facility to commence the ramp-up to industrial-scale production. As at February 2016, Lend Lease's rectification of the last of the five significant defects was expected to be completed by August 2016, more than five years after the contracted completion date of June 2011.

15. When completed, the Mulwala redevelopment should deliver a facility with much higher levels of safety, automation and environmental compliance than are provided by the plant built in 1942–43. Defence advised the ANAO that the Mulwala Redevelopment Project would be completed within its \$371 million budget. However, this advice excludes funds used from non-project sources to pay for redevelopment costs. Further work, at an estimated cost of some \$44 million, is also required to bring the facility up to an industrial level of production. Taken together, total current and planned expenditures are estimated to be some \$415 million by 2017, with significant expenditure yet to be budgeted for decontamination and demolition.

### Delivering munitions to the Australian Defence Force

16. The operating contractor, Thales, has met Defence's orders for propellant, high explosives and munitions under two related contracts. For over a decade, the contracts were largely self-managed by Thales, and Defence did not manage the subsidies (capability and other payments) effectively. Recognising its longstanding contract-management shortfalls, Defence established a Strategic Munitions Contracts Directorate in 2011, and achieved some savings. This directorate successfully managed a complicated transition to the interim contract in 2015, including the acquisition of the Benalla Facility by Defence.

17. From 1999 to 2015, Defence paid \$526 million for munitions produced by the Mulwala and Benalla Facilities. Defence paid \$1.874 billion in order to build, operate and maintain the facilities: \$1.386 billion in capability and other payments; \$371 million in redevelopment costs; and \$117 million for environmental and facilities remediation.

18. In general, domestically produced munitions are more costly than similar munitions sourced internationally.<sup>2</sup> A 2013 RAND review of Australia's munitions manufacturing industry observed that, if maintaining a domestic munitions industry is desirable, using the full production capacity at Benalla is the key to controlling costs. The capability to manufacture munitions in Australia has provided regional economic and employment benefits and some strategic value in terms of security of supply. Defence advised Government in 2000 and 2014 that the facilities should be closed, and also advised in 2012 that the strategic requirement to manufacture munitions in Australia is minimal. This suggests that the cost of building, operating and maintaining the facilities did not represent value for money.

19. Between 2009 and 2014, Defence sought to conduct a competitive tender for a new operating contract to replace the 1998–2015 contracts, but did not manage the process effectively. The tender was cancelled because of delays in the release of the Request for Tender and uncertainties arising from the unfinished Mulwala Redevelopment Project. Defence's costs for the tender process were some \$24 million. Defence had envisaged introducing improved contractual arrangements through the tender process, but the significant government assistance still required would have continued to reduce value for money for Defence.

20. An interim operating contract for the period 2015–20 includes a performance regime and reduced government assistance, representing some improvement in value for money. There would be significant merit in another approach to market to replace the interim contract. In doing so, Defence should learn key lessons from the first, unsuccessful, attempt. In particular, it should clearly define Defence's current and future munitions requirements, and allow sufficient time to complete the process before mid-2020.

#### Managing the operating environment at Mulwala

21. Defence has improved environmental and safety compliance at Mulwala. The department has expended \$8.4 million of \$11.8 million allocated for groundwater decontamination at Mulwala (Figure S.1). Defence has also expended \$108.4 million of \$154 million allocated for new Work Health and Safety and environmental requirements, but

ANAO Report No.26 2015–16 Defence's Management of the Mulwala Propellant Facility

<sup>2</sup> See paragraph 4.14.

the Mulwala site is still operating under some environmental waivers, mostly because of the delays in Final Acceptance of the Mulwala Redevelopment Project.

22. Defence is not adequately preparing for decontamination and demolition at Mulwala. A significant amount of funding will be required for decontamination and demolition works, given the potential for spontaneous combustion of some soon-to-be-redundant buildings. At the time of the audit, no funding had been planned or approved. Due to the planning time involved and the number of planning, environmental and heritage approvals that will be required, Defence will need to commence these processes as soon as possible.

23. A 2014 scoping study estimated that the cost of decontaminating and demolishing redundant buildings at Mulwala would be some \$31 million. This minimum cost does not include a range of additional work, and the final clean-up of Mulwala is likely to cost considerably more.





Source: Defence.

ANAO Report No.26 2015–16 Defence's Management of the Mulwala Propellant Facility

# Recommendations

Recommendation<br/>No.1To achieve better value from the significant investment in a domestic<br/>munitions capability to date, the ANAO recommends that, by the end of<br/>2016, Defence:

- (a) advise the Government on options for the operation and maintenance of the Mulwala and Benalla Facilities from June 2020; and
- (b) develop a plan for the timely and cost-effective implementation of the Government's preferred option.

#### **Department of Defence response:** Agreed.

Recommendation<br/>No.2To plan effectively for the decontamination and demolition of<br/>redundant buildings at the Mulwala Facility, the ANAO recommends<br/>that Defence:

- (a) develop a risk-based implementation plan for management of the site; and
- (b) advise the Government on relevant risks and costs by mid-2016.

**Department of Defence response:** Agreed.

## **Summary of entity responses**

24. The proposed audit report was provided to Defence, with extracts provided to the principal contractors involved in the Mulwala Redevelopment Project and the Mulwala Facility: Lend Lease, Thales Australia, ATK and GHD.

25. Defence, Lend Lease and Thales Australia provided formal responses to the proposed audit for reproduction in the final report; these are provided in the Appendices. Other relevant comments received from Defence, Lend Lease, Thales and ATK have been incorporated into the report. Summaries of the responses from Defence and Thales Australia are set out below. Lend Lease did not provide a summary response.

#### **Department of Defence**

Defence acknowledges the findings contained in the audit report of Defence's Management of the Mulwala Propellant Facility, and agrees with the two recommendations made by the ANAO.

The Mulwala Propellant Factory is now the most modern propellant facility in the world, providing a strategic capability to the ADF as well as ongoing, highly skilled employment in regional Australia.

Defence welcomes the ANAO findings that the Gate Review and Projects of Concern processes utilised by CASG increased transparency of the issues associated with the project and had positive effects on the project outcomes.

The Mulwala Redevelopment Project has delivered a facility with much higher levels of safety, automation and environmental compliance than the plant it replaces. Throughout the duration of the project the management of personnel and plant safety, together with the emphasis on achieving environmental compliance were of paramount importance. Of significance, the

Mulwala facility has continued to produce large quantities of high quality propellant to the Australian Defence Force (ADF) and commercial customers whilst incorporating the new facility into the plant's operations.

Defence has replaced previous contractual arrangements for the supply of propellant, high explosives and munitions with the Strategic Munitions Interim Contract, a performance based contract that will provide an improved value for money outcome to Defence.

The project has delivered improved environmental and safety compliance at Mulwala. Defence actively manages the longstanding environment and heritage issues associated with historic and present day manufacturing at Mulwala, in conjunction with other Federal, State and Local community stakeholders.

#### **Thales Australia**

Thales Australia thanks the ANAO for the provision of the extract of the draft report [...] and for the invitation to provide a response regarding this document. The content of [the extract] was heavily redacted—no recommendations were included and only a limited number of summary findings and conclusions. On this basis, it is extremely difficult for Thales to provide an appropriate commentary on the suitability of the report and recommendations for the future. Beyond this though, the Commonwealth has demonstrated strong leadership in reinvigorating the Mulwala facility through asset modernisation, environmental remediation and the establishment of the new propellant precinct—although troubled in its project execution. Further the implementation of the Commonwealth's performance-based Strategic Munitions Interim Contract (SMIC) is already delivering over 20% reduction in the costs to operate the facilities realized since the start of SMIC. The company is fully committed to being the Commonwealth's operator of these critical major hazard facilities which have proven (with preceding munitions facilities) to provide a vital capability to the Australian Defence Force in times of major conflict.

**Audit Findings** 

ANAO Report No.26 2015–16 Defence's Management of the Mulwala Propellant Facility

# 1. Background

# Introduction

1.1 The Mulwala Facility is the sole remaining manufacturing site of military propellants and high explosives in Australia. The 1030-hectare site is near the border of New South Wales and Victoria. Until recently, it included around 300 buildings, the majority of which were constructed in the early 1940s and the remainder in the early 1990s. The nearby munitions facility at Benalla, Victoria, uses some of the output of the Mulwala Facility in its operations. The facilities at Mulwala and Benalla are owned by the Commonwealth and operated by a third party. In 2001, the Government announced that the Mulwala Facility would be redeveloped by 2004, at a cost of up to \$220 million.

#### Box 1 What is propellant?

In the ballistics context, propellant is an energetic, reactive and dangerous chemical product that is manufactured in the form of grains or pellets. Propellant is used to fill cartridge cases or artillery shells, which are then capped with a projectile (a bullet, high-explosive shell, etc) to make a complete round of ammunition (or, generically, munitions). When a weapon trigger causes a hammer to strike the primer, the propellant begins a controlled burn that, in microseconds, propels a bullet or other projectile towards its target. The propellant manufactured at Mulwala is nitrocellulose-based.

#### The Mulwala propellant manufacturing process



#### Source: ANAO analysis.

To achieve consistent performance, safe operation and long-term storage, the final propellant product must meet stringent requirements in relation to chemical composition, size and quality. Much of the propellant produced at Mulwala is finely tuned to optimise the performance of the Australian Defence Force's main infantry weapon, the F88 Austeyr rifle. Each grain of propellant for the 5.56mm ammunition (magnified at right) is 1.15mm long, 0.95mm in diameter, and has a hole through the middle.



## The Mulwala Facility

1.2 Construction of the Mulwala Facility began in October 1942, and by September 1945 it had manufactured 330 tonnes of propellant. The buildings and equipment constructed and installed at Mulwala in 1942–43 are still in use, and continue to produce propellant for both Australian Defence Force and commercial use.<sup>3</sup>

1.3 The safety and environmental standards that apply today bear little resemblance to those from the 1940s. The plant's operation for over 70 years has left a legacy of environmental problems, and a range of workplace safety issues requiring ongoing management (Figure 1.1). The Mulwala Redevelopment Project (or the project), announced in July 2001, was intended to modernise the plant and address some of the environmental and safety issues. The project has been managed by the Department of Defence (Defence).



Figure 1.1: Propellant Press House cutting machines, 2000

Note: Operators manually feed strings of pressed propellant to the cutting machines. This process, still used in 2016, is an example of the manual nature of the work in the old Mulwala Facility.

Source: ADI Limited, Preliminary Proposal for modernisation of the Mulwala Facility, June 2000.

<sup>3</sup> The MIT Observatory of Economic Complexity ranks Australia 11<sup>th</sup> worldwide as an exporter of propellant powder during 1995–2013. At US\$8.7 million in 2013, the value of Australian propellant exports was 8 per cent of the value of propellant exports by the top exporter, the United States, at US\$106 million; see <a href="http://atlas.media.mit.edu/en/profile/hs92/3601/">http://atlas.media.mit.edu/en/profile/hs92/3601/</a>, accessed 11 November 2015.

# Ownership of the Mulwala Facility, and organisational arrangements within Defence

1.4 The Mulwala Facility has had a number of changes in ownership and operation (Table 1.1).

Table 1.1: Ownership and operation of the Mulwala Facility, 1942–2016

Years	Description
1942–84	Mulwala was managed by a variety of government bodies, outside of the usual Defence estate framework.
1984–89	With the establishment of the Office of Defence Production within Defence, the Mulwala Facility came under Defence administration.
May 1989	Australian Defence Industries Pty Limited (ADI) <sup>a</sup> was established as a wholly-owned Government corporation. ADI assumed responsibility for seven sites—including Mulwala—that made ammunition components.
1991–93	ADI made representations to the then Government about the viability of the Mulwala Facility. <sup>b</sup> ADI and Defence signed a Long Term Ammunition Agreement in 1993, and Mulwala was returned to Defence ownership. ADI was required to invest \$148 million (1992 prices) to construct a new facility at Benalla. In return, Defence would procure munitions for a period of 20 years to 30 June 2015, and, as part of the cost of munitions, would repay ADI's investment. ADI's investment would be completely repaid by 30 June 2015, on which date Defence could exercise an option to purchase the Benalla Facility at a peppercorn price of \$1.
By 1996	ADI rationalised Australia's munitions production to two sites—Mulwala (propellants and high explosives) and Benalla (a new \$150 million munitions factory completed with private financing).
1998	In preparation for the sale of ADI, Defence and ADI renegotiated the operating contracts for Mulwala and Benalla. This led to the signing of two new agreements in July 1998: the Mulwala Agreement relating to the Mulwala Facility, and the Strategic Agreement for Munitions Supply (SAMS) relating to the Benalla Facility.
November 1999	The Government sold ADI to Transfield Holdings Limited and Thales Australia (at that time Thomson CSF) for \$346.8 million, but due to a range of occupational health and safety, environmental and modernisation issues, Defence retained ownership of Mulwala. The Mulwala Agreement and the SAMS were novated to the new owners.
2006– present	The former ADI is wholly owned by Thales Australia. Under the trading name Australian Munitions, Thales continues to operate both Mulwala and Benalla. <sup><math>c</math></sup>

Note a: Australian Defence Industries Pty Limited was renamed ADI Limited in January 1996. For convenience, the remainder of this report refers to the company as ADI.

Note b: ADI advised Defence that it could not cost-effectively operate Mulwala, given the overheads associated with running an inefficient and sub-optimal facility that required both modernisation and the rectification of significant occupational health and safety and environmental issues. See ANAO Audit Report No. 40 2005–06, *Procurement of Explosive Ordnance for the Australian Defence Force (Army)*, fn. 49, p. 48.

Note c: For convenience, this report refers to Australian Munitions/Thales Australia as Thales.

Source: ANAO analysis.

1.5 Two of the eleven groups within Defence have responsibility for managing key aspects of the Mulwala Facility. The Capability Acquisition and Sustainment Group (CASG, formerly the Defence Materiel Organisation) manages the contracts for operating and redeveloping the facility. The Defence Estate and Infrastructure Group (formerly the Defence Support and Reform Group) supports CASG with program management for the delivery of capital estate projects.

## **Overseas production of propellants**

1.6 Internationally, the number of propellant manufacturing facilities is limited. Locations of overseas production sites include Belgium, Sweden, Finland, Switzerland, South Africa, Brazil, Canada and the United States. The factories in Canada and the United States are considered sister factories to the Mulwala Facility—all three were built in the 1940s. The US facility (Radford Army Ammunition Plant, in Virginia) transitioned to a new prime contractor in 1995 and 2012, and has undergone significant modernisation efforts in recent years. The Canadian facility (in Quebec) has been operated by five owners since it was privatised in 1965. Both the Canadian and American facilities have also had to deal with longstanding environmental issues. Nearer to Australia, Indonesia commenced the development of a new propellant facility in 2014. In 1999, the United Kingdom took an alternative approach, and chose to cease production of propellant in Bishopton, Scotland. At the time, the UK Government was satisfied that sufficient and reliable alternative sources existed in Europe and further afield to meet future requirements.

# Audit approach

1.7 The audit objective was to assess the effectiveness of the Department of Defence's management of the Mulwala Redevelopment Project. The audit focused primarily on the progress of the project, including its cost and schedule performance, and Defence's management of risks and issues. In this context, the audit also considered:

- the transition from the 1998 Mulwala Agreement (and the companion Strategic Agreement for Munitions Supply, for the Benalla Facility) to the 2015–20 Strategic Munitions Interim Contract; and
- the progress of environmental remediation of the Mulwala site.

1.8 To form a conclusion against the audit objective, the ANAO adopted the following highlevel audit criteria:

- project risks were identified and managed effectively;
- the project is progressing to the expectations of the Commonwealth in terms of value for money, timeliness and delivery of required capability;
- arrangements for contractor operation of the redeveloped facility ensure that production capability is available when needed by the Australian Defence Force; and
- progress is being made in resolving environmental issues associated with both legacy and redeveloped facilities.

1.9 The audit method involved review of Defence records relating to the Mulwala Redevelopment Project and management of the Defence estate, ANAO visits to the Mulwala and Benalla Facilities, and discussions with senior Defence and Thales management.

1.10 The audit was conducted in accordance with ANAO auditing standards at a cost to the ANAO of approximately  $$384\ 000.^4$ 

<sup>4</sup> Aspects of Defence's management of the Mulwala Facility have been discussed in two previous audits: ANAO Audit Report No.40 2005–06, Procurement of Explosive Ordnance for the Australian Defence Force (Army), and ANAO Audit Report No.24 2009–10, Procurement of Explosive Ordnance for the Australian Defence Force. A high explosives plant was constructed at Mulwala in 1988–92, at a cost of \$96 million; given its relative modernity, this plant is not considered in this audit report.

# 2. Project rationale and planning

#### Areas examined

- Defence's management of planning for the Mulwala Redevelopment Project; and
- risk management of the project.

#### Conclusion

Defence had difficulty in aligning the Mulwala Redevelopment Project into either its capability or facilities project model. From 2001 to 2006, in line with government direction, Defence sought private finance for the project, but had little leverage in attempting this approach. Defence concluded that two successive private finance proposals in 2005 did not represent value for money. Government then approved Budget funding for the project, and reduced the project scope so that it aligned with the 2001 cost announcement. Demolition of the old facility was one of the omitted items. After the Government approved Budget funding in 2006, Defence negotiated a contract that was signed in 2007.

Defence's focus on cost meant that there was limited focus on the risks inherent in the project. Early on, Defence concluded that the project was low-risk, because the technology was longproven; this substantially underestimated the risks inherent in a large-scale project to build a plant that would handle, and produce, hazardous chemicals.

2.1 Between 1998 and 2000, Defence reviewed options for retaining a domestic capability for the manufacture of propellant. Since at least the 1990s, Defence had recognised that the Mulwala Facility presented serious occupational health and safety and environmental concerns, and was contributing to an inefficient and costly manufacturing process. In the 1998 Mulwala Agreement with Australian Defence Industries (ADI), Defence undertook to conduct a Strategic Review with a view to modernising the facility.

2.2 Completed in 1999, the Strategic Review identified five options for modernisation. The recommended option was to replace essential areas at Mulwala, at a cost of \$1.096 billion over 30 years. The expected price premium for a domestic munitions manufacturing capability was 32 per cent.<sup>5</sup> In advice to Government during 2000, Defence also canvassed with Ministers the option of closing the Mulwala Facility, on the basis that there was no compelling justification to retain the current level of domestic propellant and high explosive manufacturing capability. Subsequently, the then Government requested that Defence submit a proposal to retain a domestic manufacturing capability and redevelop the facility at Mulwala.

2.3 The Government announced on 9 July 2001 that the Mulwala Facility would be retained and updated, at a cost of over \$200 million. In addition, Defence would address environmental and safety remediation of the Mulwala site, and would negotiate for ADI to purchase the site and build a new facility in exchange for a higher-priced 20-year supply agreement with the ADF.

<sup>5</sup> In 2011, in response to an ANAO audit recommendation in 2010, Defence conducted a more thorough review. The review concluded that, from a military and strategic perspective, there was only a limited case for domestic munitions manufacturing, because enhanced stockpiling and robust global supply arrangements would yield an acceptable risk for reliable supply of munitions to Defence. The review noted, however, that the facility provided economic and employment benefits. Defence advised Government of this review in 2012.

2.4 On 20 September 2001, the Prime Minister signed a public declaration with the Mayors of the Moira, Delatite and Corowa Shire Councils, committing the Government to invest up to \$220 million in the Mulwala Redevelopment Project, with new long-term arrangements intended to be in place by 2004 (Figure 2.1).

Figure 2.1:	Prime Minister's	commitment to a new	w Mulwala Facil	ity, 20 September 200	1
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Source: Defence.

# Did Defence manage the development of plans for the Mulwala Redevelopment Project effectively?

Defence did not manage the development of plans for the Mulwala Redevelopment Project effectively.

Defence had difficulty in aligning the project into either its capability or facilities project model, and applied some aspects of both models to the project. The area in Defence performing the role of Lead Capability Manager for the project changed several times.

Between 2001 and 2006, Defence sought to redevelop the Mulwala Facility through the then Government's preferred option of private financing. This approach did not succeed because Defence had little leverage over the then contractor, Australian Defence Industries, and because of the safety and environmental problems at Mulwala. After the Government approved Budget funding for the project in 2006, Defence negotiated a contract that was signed in 2007.

The project was announced without detailed requirements. The scope of the project was adjusted to match the cost envelope announced in July 2001. This approach excluded some key requirements of the redevelopment, such as decontamination and demolition of redundant buildings.

Further, extensive scope changes occurred until contract signature in 2007, and continued to be made until the end of the project.

#### Responsibility for the project

2.5 Defence had difficulty in fitting the Mulwala Redevelopment Project into either its capability or facilities project model. In practice, Defence applied aspects of both models to the project.

2.6 The area in Defence performing the role of Lead Capability Manager for the project changed several times. The Navy sought to transfer the role to Army in 2011, but the Army did not formally accept the role until July 2013. In June 2014, the Army proposed that there be no Lead Capability Manager, and that the then Defence Materiel Organisation (DMO) should assume the role of 'Project Realisation Manager'. The DMO agreed that the project did not align with the normal Capability Manager project responsibilities, as it did not deliver any specific capability to the Services. In consequence, the DMO (now Capability Acquisition and Sustainment Group) assumed the new role in January 2015.

2.7 Defence advised the ANAO in November 2015 that the armed Services are no longer directly involved in the management of the Mulwala Facility. The 2014 Strategic Munitions Interim Contract is now the basis by which certain munitions are provided to the Services. The Services are directly involved in deciding which munitions are sourced from Benalla.

## Financing the project

#### The private finance option, 2001–06

2.8 The July 2001 Government decision focused on seeking private finance for the redevelopment of the Mulwala Facility by selling the facility to ADI, with direct investment by the Government retained as an alternative option. In a change of strategy in July 2003, the Government decided to redevelop the facility through private financing by ADI under an operating lease.<sup>6</sup> After much delay, ADI submitted a private finance proposal in March 2005, and a revised proposal in July 2005. Defence concluded that neither the original nor the revised proposal by ADI represented value for money.<sup>7</sup>

2.9 On 15 December 2005, ADI declined to provide a third private finance proposal. Defence therefore recommended in January 2006 that the Minister seek Government approval of a direct investment option (that is, Budget-funded), and also advised him that it might in future seek additional funding to remediate the Mulwala site.

2.10 Notable factors leading to the failure of the private finance option included that:

- ADI was not a willing participant in the negotiation, as it already had a long-term supply contract with Defence (to 2015), and the prospect of a new 20-year contract in return for modernising the plant gave Defence little leverage over ADI.
- ADI had returned the Mulwala site to Defence ownership in 1993 because of its safety and environmental problems, and had little incentive to resume ownership of the site.

#### The direct investment option, 2006 onwards

2.11 The May 2006 Budget provided \$338.7 million (\$323 million out-turned) for the Mulwala Redevelopment Project. The Budget measure included additional resourcing of \$131 million, with Defence to provide \$208 million from existing resources.<sup>8</sup> An ongoing cost increase of \$9 million per year after the completion of the project was to be absorbed by Defence.

2.12 Contract negotiations between Defence and Bovis Lend Lease<sup>9</sup>, under a sole-source arrangement, ran from April to August 2006. In September 2006, as a form of Second Pass approval<sup>10</sup>, the Minister wrote to other members of the Government advising that an affordable contract price had been agreed within the previously agreed project cost. The Minister also noted that only \$63 million had been allocated for site remediation, facilities upgrade, insensitive

<sup>6</sup> The intent of seeking an operating lease of the Mulwala Facility was that the proposed long-term supply agreement would not be reflected on the balance sheet of either Government or Defence.

<sup>7</sup> The ADI proposals were based on the sale of the facility to ADI at a nominal value of one dollar. Defence would have incurred costs of about \$100 million per year, requiring additional funding of about \$60 million per year.

<sup>8</sup> Funding of \$208 million was set aside as part of a review of Defence funding priorities in the 2005–06 Budget and the 2005–15 Defence Management and Finance Plan.

<sup>9</sup> Bovis Lend Lease has changed its name a number of times in recent years. For convenience, this audit report generally uses the term Lend Lease for the company.

<sup>10</sup> Defence did not develop an Operational Concept Document or Test Concept Document to support Second Pass approval. The Statement of Requirement in ADI's 2003 Request for Tender was in effect the Function and Performance Specification.

munitions capability and heritage management works, whereas the full cost of these separate works was estimated at \$230 million.

2.13 The Mulwala Redevelopment Project design-and-construct contract with Lend Lease was signed on 8 June 2007. Lend Lease subcontracted ATK Launch Systems—the rocketry division of Orbital ATK—to provide the production process design, critical equipment and support for start-up, product qualification and performance testing of the new facilities.<sup>11</sup>

## Project scope

2.14 The project scope underwent many changes from 1999 to 2007 (Table 2.1).

	2001	2002	<b>2003</b> <sup>a</sup>	2004	2005	2006	2007
Capability options							
Total replacement of the nitrocellulose, propellant and solvent processes	1	1	1	1	1	1	1
Plant capacity – 360 tonnes / Surge capacity – 530 tonnes	1	1	1	1	1	1	
Plant capacity – 530 tonnes / Surge capacity – 800 tonnes							✓ <sup>b</sup>
Insensitive Munitions capability	1	1	1	1			
Administrative complex			1	1			
Decontamination and demolition of redundant buildings		1	1	1			
Heritage management				1			
Incinerator	1	1	1	1	1	1	1
Performance and safety testing facility			1	1	1	1	1
Financing options							
Private	1	1	1	1	1		
Government						1	1

Table 2.1: Mulwala Redevelopment Project scope and financing changes, 2001–07

Note a: The 2003 scope change also focused on the type of private finance, rather than the cost (see paragraph 2.8). Note b: In 2007, \$9.5 million for increased surge capacity was included in the project scope, funded from project contingency.

Source: ANAO analysis of Defence records.

2.15 After approving the expansion of the initial scope in 2003, the Government subsequently approved a reduced scope in December 2005. As the focus of the project shifted during 2005—to achieving a direct investment cost that would fit within the Government's September 2001

<sup>11</sup> The work was later transferred to the ATK division that was operating the Radford Army Ammunition Plant in Virginia, USA.

commitment of up to \$220 million—Defence adjusted the project scope to the cost envelope, by removing from the project all elements not essential to delivering a safer manufacturing capability. This approach included the removal of key requirements such as decontamination and demolition of redundant buildings. Defence noted in 2005 that the reduced scope was not its preferred option:

as this option would simply provide a modern facility for a product that has been made at Mulwala for the past 40 years, rather than equipping the plant to meet future ADF requirements.<sup>12</sup>

2.16 Defence assured the Minister in 2005 that the reduced-scope option met the intent of the Prime Minister's 2001 commitment to the local shire councils. Defence also advised the Government that an additional \$95 million was needed to upgrade the remainder of the Mulwala site to meet all current and anticipated regulations and standards to 2010, and that no such funding had been identified.

2.17 After contract signature in 2007, scope changes continued until the end of the project.

# Did Defence adequately identify and manage the risks involved in establishing a new facility?

Defence's advice to government in 2001, 2005 and 2006 did not adequately assess the risks involved in establishing a new propellant facility. In April 2006, Defence assessed the technical risk as low, but made no mention of cost and schedule risk. While the technology to be used in the new facility was long-proven, the risks involved in establishing a new chemical plant to produce hazardous materials required assessment and mitigation.

In the event, the contracted schedule was too short, provision for project/engineering staff was inadequate, and Defence did not take into account the general lack of commercial expertise in constructing propellant manufacturing facilities.

#### Advice to Government on risk

2.18 Defence's advice to Government in July 2001 was finalised within twelve days of public rallies in Benalla and Mulwala supporting the redevelopment of the Mulwala Facility, and the then Government's decision was made within five days of receiving the Defence advice. The only consideration of project risk in Defence's advice to the Government was in the context of importation of propellant and high explosives, and the need for stockpiling to avoid disruptions to munitions production at Benalla. Defence advised the Government that effective mitigation strategies were available to address most of those risks.

2.19 Defence's 2001 advice to government did not address the potential difficulties of constructing a new facility, but implied that it would be straightforward to sell the existing facility to ADI, renegotiate existing agreements that were already very favourable to ADI, and have ADI build a new facility.

<sup>12</sup> Defence ministerial submission, September 2005.

2.20 When Defence advised the Government in December 2005 about the reduced-scope options, there was a brief mention of schedule risk in obtaining a further proposal from ADI, but again there was no detailed consideration of project risk.

2.21 In April 2006, in the context of seeking Budget approval for the project, Defence's advice simply stated that:

Subject to the approval of funding, the technical risks associated with this proposal are assessed as low.

#### **Risk management**

2.22 Defence's risk management of the project began in late 2002 with a workshop to develop a risk management plan. Throughout the project, Defence maintained a risk log and conducted regular risk workshops. Defence's 2005 Risk Management Plan assessed the technical risk as follows:

The standard propellant technology and processes to be utilised are proven and in-service in other countries. The capability sought by Government is not unique and is well within the capacities and experience of the preferred tendering company.

2.23 This assessment focused on *technology risk* (the technological maturity or otherwise of the proposed capability), at the expense of the broader concept of *technical risk* (the likelihood that the system will not reach its goals because of immaturity or design, configuration and implementation aspects of the system).<sup>13</sup>

2.24 The project also lacked a formal Technical Risk Assessment by the then Defence Science and Technology Organisation (DSTO). The DSTO commenced preparation of an assessment in 2005, but subsequent advice from the Project Director indicated that it was not required. Moreover, the DSTO was not invited to review proposals for the baseline manufacturing plant or other options. Consequently, when the project office was finalising its Science and Technology Plan in mid-2010 (three years after the Lend Lease contract was signed and the DSTO was first tasked with producing this plan), the technical risks were defined in a 'rudimentary' Technical Risk Assessment before any technical risk mitigation strategies could be developed.

2.25 In January 2009, when construction was experiencing schedule slippage and significant budget underspend, Defence initiated an internal review (the Budd Review) to identify risks and provide assurance that the project was realistic and achievable. In relation to risk management, the April 2009 Review report indicated that there was no evidence that the risk management process supporting the project was working effectively.

2.26 Defence records indicate that its risk management did not take into account the general lack of commercial expertise in projects of this nature, given that propellant manufacturing facilities are constructed infrequently.

2.27 In summary, the risks associated with constructing and commissioning a plant of the nature of the new Mulwala Facility were not well understood at the commencement of the project. In particular, Defence underestimated:

<sup>13</sup> For a more detailed explanation of technology risk and technical risk, see ANAO Audit Report No.6 2013–14, *Capability Development Reform*, pp. 168–69.

- the difficulties and time required for integrating plant, process and product (propellant);
- the need to provide adequate human resources and, in particular, engineering staff; and
- the challenges involved in delivering a propellant manufacturing plant, as opposed to the construction of buildings.

2.28 Moreover, Defence acknowledges that there was an assumption that propellant produced in the new facility would be automatically incorporated into production ammunition immediately after Final Acceptance. This led Defence to focus on the stage of propellant 'qualification', allocating inadequate time to the prerequisite activity of demonstrating that the plant worked on an industrial scale.<sup>14</sup>

<sup>14</sup> Qualification refers to a formal process in which the physical, chemical, performance, sensitiveness and toxicological properties of an explosive are characterised and its safety and suitability assessed.

# 3. Establishing the new facility

#### Areas examined

- Defence's management of the Mulwala Redevelopment Project—including the construction, commissioning and completion stages, and internal reviews; and
- the final outcome of the project.

#### Conclusion

Defence's underestimate of risk and the prime contractor's inexperience in work of this nature became evident in the Mulwala Redevelopment Project's construction and commissioning phases, with delays and unrealistic scheduling. Defence's imposition of liquidated damages in March 2010 was followed by significant commercial disputes, adding to the delays. Through numerous contract alterations, Defence agreed that the original schedule had been unrealistic, committed more funding and extended the schedule. However, the contractor failed to meet multiple deadlines.

Defence's internal review processes provided useful advice on key risks and their remediation. In late 2013, after the second internal review, Defence adopted a more pragmatic approach under which overall commercial considerations would take precedence over rigid enforcement of the contract. Defence granted Final Acceptance to the contractor in April 2015. However, resolution of the last of five major defects is not expected until August 2016—more than five years after the contracted completion date.

Reflecting the delay in completion arising from the unexpected complexity of the redevelopment, costs are estimated at some \$415 million by 2017, against an approved project budget of \$371 million (inflation-adjusted). This estimate includes further work, at a cost of some \$44 million, that is still required to bring the facility up to an industrial level of production, as originally intended. Significant expenditure is yet to be budgeted for decontamination and demolition.

When completed, the Mulwala redevelopment should deliver a facility with much higher levels of safety, automation and environmental compliance than are provided by the plant built in 1942–43.

3.1 Under Defence's June 2007 fixed-price contract for the Mulwala Redevelopment Project, valued at \$263 million, Lend Lease was required to:

Design, Construct and Commission a propellant plant and support facilities that will safely, economically and reliably produce the nine propellants that have been developed and then Qualified by the Contractor.

3.2 The nine propellants to be produced and qualified in the new factory included propellants for 5.56 mm rifle ammunition, 5-inch naval shells, and mortar and artillery shells. The construction works included new nitrocellulose, solvent and propellant plants—to be built within the footprint of the existing plant, a confined burn facility, a Performance and Safety Testing Centre and a Production Process Support Facility. Construction was to begin within 12 months of contract signature, reach Practical Completion (completion of facility construction) within 33 months (March 2010), and achieve Final Acceptance (plant commissioned and specified propellants successfully qualified) within four years (June 2011).

3.3 These contract milestones were not met, and Final Acceptance was achieved in April 2015, nearly four years later than expected. Major defects were to be rectified by the end of 2015, but this target was not met.

# Did Defence manage and review the project's construction and commissioning phases effectively?

Defence did not manage the Mulwala Redevelopment Project's construction and commissioning phases effectively. The construction phase commenced late, and within a year was facing delays and unrealistic scheduling. The commissioning phase, involving the introduction of hazardous chemicals into the new facility, also experienced long delays. Defence attributed these delays to technical problems, contractor inexperience in work of this nature, and lack of Defence project office resourcing and expertise.

By 2010, Defence and the prime contractor (Lend Lease) were involved in lengthy and expensive disputes over project scope and schedule. Between 2011 and 2015, Defence negotiated five deeds with Lend Lease, providing further payments, extended deadlines and changes of scope. While the deeds contributed to better relations with the contractor, the first two deeds failed to provide enduring solutions to the technical and schedule issues affecting the project.

Defence commissioned four Gate Reviews of the project to assess progress. The reviews provided useful advice on key risks and their remediation. Following the first review, the project was placed on Defence's Projects of Concern list in December 2012. In late 2013, after the second review, Defence adopted a more pragmatic approach under which overall commercial considerations would take precedence over rigid enforcement of the contract.

3.4 Site mobilisation and construction commenced in October 2008 (three months late), but already there was concern at slow progress in design activities, with a forecast delay of 6–7 months in the 14-month design schedule.

3.5 After the first year of construction work, in October 2009, most building envelopes were essentially complete, and the first operational building in the new facility, the Performance and Safety Testing Centre, was transitioned into service. However, the contract administrator advised Defence that on-time completion of the project would be 'optimistic'.

#### The major causes of delay

3.6 The commissioning phase involved the introduction of highly concentrated acids and other energetic materials into the new facility. This was not a simple process, and delays increased, with safety incidents and failed attempts to use the new equipment. From November 2011 to May 2012, the contract administrator repeatedly reported that the project was losing a month of schedule each month. At this stage, each month of delay was costing Defence approximately \$1 million, due to the need to extend the support contracts with Thales, GHD, Qinetiq and

others.<sup>15</sup> In November 2011, the project director advised the Chief Executive Officer of the Defence Materiel Organisation that:

It is clear that commissioning of the Modernised Facility at Mulwala is proving far more difficult than originally expected.  $^{\rm 16}$ 

3.7 Delays continued as a result of emerging technical issues and the need to proceed safely. However, by late 2012 Lend Lease and ATK successfully produced three of the four required grades of nitrocellulose, and commenced initial test production of the first of the military-grade propellants that they were required to manufacture, test and qualify.

3.8 In September 2014, Lend Lease conducted a Propellant Facility Performance Test, with four full-scale production-size batches being manufactured. The test showed that the Solvent Fume Extraction system was inadequate to meet other than minimal production rates. Further, two elements of the production process—excess effluent generation and excess usage of ethanol—were identified as not meeting the contractual criteria.

3.9 Defence records indicate that the lack of an engineer in Defence's project office left Defence unable to judge issues independently when confronted with conflicting advice from external engineering organisations.

#### Defence response to the delays

#### Deeds with the contractor

3.10 In March 2010, the deadline for Practical Completion by Lend Lease passed without construction having been finished, and Defence imposed liquidated damages on Lend Lease. Eighteen days later, Lend Lease made the first of a succession of commercial claims against Defence, eventually seeking up to \$155 million for alleged additional works (157 claims of scope creep were put forward), extensions of time, and compensation for delays.<sup>17</sup>

3.11 Defence and Lend Lease were unable to resolve the dispute between them until external mediation led to preliminary resolution through a deed. Defence records indicate that there was very little collaboration or cooperation between Defence and Lend Lease during the dispute period. In all, from 2011 to 2015, Defence negotiated five deeds with Lend Lease, providing further payments, extended deadlines and changes of scope, as outlined in Box 2.<sup>18</sup>

<sup>15</sup> This sum does not take into account the cost of maintaining a capability at the existing Mulwala Facility well past its expected closure date, and the flow-on to the Defence ammunition supply chain. Defence has not sought to quantify the cost of maintaining the existing Mulwala Facility in operation. However, senior Defence managers were aware by 2011 that the extra costs would be considerable.

<sup>16</sup> Project Director monthly report to Chief Executive Officer, Defence Materiel Organisation.

<sup>17</sup> Lend Lease's initial claims for \$31.4 million in April 2010 were rejected by Defence; Lend Lease made further claims for up to \$155 million in September 2010.

<sup>18</sup> Defence's legal costs in relation to Lend Lease matters were just over \$1 million by September 2015.

#### Box 2 Post-contract deeds with Lend Lease, 2011–15

#### Deed 1, 9 February 2011, \$15.7 million Final Acceptance: 24 February 2013

- Practical Completion moved from March 2009 to February 2011;
- modified commissioning and testing regime adopted, including an additional \$10 million for commissioning and testing activities that were understated in the original contract;
- Defence to retain \$1.3 million of \$1.8 million liquidated damages;
- Dispute Resolution Board established.

#### Deed 2, 15 November 2011, \$26 million Final Acceptance: 24 February 2013

- \$16 million for additional deliverables, payable immediately;
- reduction from nine to five propellants that must be developed and qualified;
- seven new milestones created, with incentive payments totalling \$10 million;
- \$2.5 million payable at Final Acceptance for the propellants removed from the contract;
- Project Control Board established between Defence and Lend Lease to resolve emergent issues.

#### Deed 3, 6 September 2013

#### Final Acceptance: 31 March, 13, 20, 30 June 2013

To enable negotiation of Deed 4, imposition of liquidated damages was postponed four times.

#### Deed 4, 20 December 2013

#### Final Acceptance: 15 February 2015

- Defence not to pay the \$10 million incentive payments agreed under Deed 2;
- staged handover of facilities, with Defence to provide test facilities for propellant samples;
- shared operation of the Nitrocellulose Facility by Lend Lease and Thales;
- revised liquidated damages regime, expected to entitle Defence to \$4.9 million;
- scope reductions expected to reduce Lend Lease cost-to-complete by \$4.9 million, but potentially transferring \$1.9 million in costs to Defence for alternative arrangements.

#### Deed 5, 9 April 2015

#### Final Acceptance: 30 April 2015

- Lend Lease to rectify five significant defects after Final Acceptance and by the end of 2015;
- accrued liquidated damages of \$5.2 million to be deducted from \$9.4 million payable to Lend Lease at Final Acceptance, and liquidated damages to cease from 8 April 2015;
- Defence to release the Final Acceptance security to Lend Lease, but retain the Defects Liability Security until two years after completion of the five significant defects;
- requirement for 'qualified propellants' relaxed.

Note a: Figures are GST exclusive.

Note b: Liquidated damages were applied to Lend Lease from May to December 2010 (\$1.3 million for late Practical Completion), and from December 2014 to April 2015 (\$5.2 million for late Final Acceptance).

Source: ANAO analysis of Defence documentation.

3.12 While the deeds contributed to better relations with the contractor, the first two deeds failed to provide enduring solutions to the technical and schedule issues affecting the project.<sup>19</sup> The amendments of the contracted date for Final Acceptance are shown in Figure 3.1.

<sup>19</sup> For example, by late 2011, Defence considered that Deed 1 had been only partially successful in terms of a positive impact on project schedule, but had been successful in that there had been no further claims against the elements of the project that the deed covered.





Note: The revisions were effected by the deeds listed in Box 2. Source: ANAO analysis of Defence documentation.

3.13 In settling Lend Lease's initial claims through Deed 1, Defence acknowledged that the originally contracted period of 15 months for the commissioning process was too short. Defence concluded that the settlement was the best that could be achieved under the circumstances, and that it removed complex risks, avoided the project stalling, and had the potential to remove some of the antagonism from relationships with the contractor.

3.14 Lend Lease's various claims for compensation and damages were eventually settled in late 2011 through Deed 2. Defence considered the reduction in the number of propellants through this deed to be logical, because three propellants were no longer used by the ADF and one was very similar to a propellant that remained in the contract. In Defence's view, this further settlement removed risk, increased the likelihood of achieving Final Acceptance by reducing the number of propellants, clarified technical and contractual issues and established a clear process for high-level governance of any further issues.

3.15 By mid-2013, Defence believed that the reimposition of liquidated damages (contractually due from 26 August 2013) would lead to a second formal dispute with Lend Lease. Deed 3 gave time for the negotiation of Deed 4, which provided a consideration to Lend Lease in recognition of its support for a staged handover of the facility. This approach was intended to spread the acceptance of various parts of the facility over a 12-month period, and allow Thales, as Operator and Maintainer, to work towards the commencement of operations in the new facility.

3.16 The staged handover envisaged by Deed 4 occurred during late 2013 and early 2014, with operation and maintenance of a number of buildings transferred from Lend Lease to Thales.<sup>20</sup>

Internal reviews and a Project of Concern

3.17 Defence conducted four Gate Reviews<sup>21</sup> of the Mulwala Redevelopment Project. The reviews were detailed and recommended methods to assist in remediating the project, as shown in Box 3. The reviews also observed features of the contracting arrangements and approach which required attention by the parties, including the benefits of: a more commercial and pragmatic approach by Defence; and establishment of better relationships for mutual benefit.

<sup>20</sup> While Defence managed these buildings under the Mulwala Agreement, for six months the costs were funded through the Thales Support Services Contract.

<sup>21</sup> Gate Reviews are an internal Defence assurance process that involves a periodic arms-length assessment of a project, at key milestones during its lifecycle, by a Defence-appointed Gate Review Assurance Board.

3.18 Following the first Gate Review in March 2012, the project was placed on Defence's Projects of Concern list in December 2012. There was particular concern at that time over poor schedule performance to date and the adequacy of the budget to complete the project.

#### Box 3 Defence Gate Reviews of the Mulwala Redevelopment Project

**March 2012**: The review board recommended strong action to ensure acceptable contractor performance. The review also observed that risks had not been adequately assessed and the decision to have Lend Lease as the prime and ATK as its principal subcontractor had added to management complexity.

**May 2013**: The review board found that the contractor appeared to be applying suitable resources in order to work through the technical issues, but the project lacked a detailed understanding of the goal and a strategic commercial approach. This approach was considered necessary in light of the likely reimposition of liquidated damages, a tight project budget and the uncertainty being cast over transition plans by the competitive tender for operating the Mulwala and Benalla Facilities. The review board recommended the establishment of a high-level team to develop a commercial strategy. The strategy that Defence eventually adopted aimed for a more pragmatic/commercial approach, under which overall commercial considerations would take precedence over rigid enforcement of the contract.

**May 2014**: The review board concluded that the prognosis remained uncertain and of concern. Scope, cost and schedule were all under pressure, key technical issues were yet to be resolved, there were known risks and the continuing prospect of emergent unknowns, and qualification was yet to be achieved for any of the five propellants. The review praised the more pragmatic approach and attempts to establish better relations with Lend Lease. However, it also emphasised the importance of obtaining a fully functioning safe propellant plant, proven by the production of five qualified propellants, meeting environmental standards and supported by applicable documentation.

**February 2015**: The review board noted positive signs since the previous Gate Review, and 'pragmatic compromises' on what was originally intended to be achieved. The two key inputs to progress were identified as the involvement of Thales through advice and assistance to Lend Lease, and the Project Director's work to significantly improve relationships between Defence, Lend Lease and Thales.

3.19 In response to an extract from this audit report, ATK advised the ANAO in January 2016 that:

Regarding Defence Gate Reviews, ATK agrees that risks were not adequately assessed. In addition, the contracting arrangement was made more complex and indeed the ability to perform inhibited when the Government announced a competition for management of the facility. Whether intentional or not, the competition for management of the facility overlapping the redevelopment project generated conflicts when cooperation and information sharing between all the stakeholders was necessary. The environment improved dramatically after the facility competition was cancelled and the three parties, Lend Lease, ATK, and Thales worked together to achieve technical success, delivering a world class facility.<sup>22</sup>

<sup>22</sup> The competitive tender for management of the Mulwala Facility is discussed at paragraphs 4.16–4.28 below.

# Did Defence manage the completion of the project effectively?

In early 2015, Defence adopted an effective two-stage process for finalising the project, which enabled the new facility to commence the ramp-up to industrial-scale production.

As at February 2016, Lend Lease's rectification of the last of the five significant defects was expected to be completed by August 2016, more than five years after the contracted completion date of June 2011.

3.20 As shown in Box 2, the deeds between Defence and Lend Lease postponed Final Acceptance several times. In late 2014, Defence and Lend Lease discussed how the project could be concluded in a way that best suited all parties, but failed to reach agreement. Defence then directed Lend Lease to: complete propellant qualification testing, resolve major defects and offer a higher degree of confidence concerning the future operability of the new facility before Final Acceptance could be achieved. At this stage, Defence's Projects of Concern reporting was showing high risk against all aspects of the project (commercial, technical, schedule, cost and reputation).

3.21 By April 2015, Lend Lease had made significant progress: the propellant manufacturing and finishing areas and the packing area had been substantially completed, and the rest of the new facility had reached Final Acceptance and was being operated and maintained by Thales or being transferred to Thales' operational control. The five propellants still specified in the contract had been assessed as meeting the requirements for propellant performance against the contract test matrix. Further, Thales management believed that it could rectify outstanding issues, contingent on the completion of the Deed 5 rectifications and support from Defence to make a series of modifications/upgrades to enable a full product range to be produced at the required throughput rate as well as addressing outstanding plant reliability and waste-related issues.

3.22 In early 2015, Defence adopted a two-stage process for finalising the project: Lend Lease would rectify five significant defects after Final Acceptance (that is, by the end of 2015), and Thales would take over the new facility and begin the industrialisation process.<sup>23</sup> Industrialisation was expected to take two years, subject to successful completion of the Deed 5 rectifications by Lend Lease. For Defence, the key advantages in adopting the two-stage approach were that: the Thales workforce could be redeployed from supporting test activities to commencing relocation to the new facility; the facility would not be shut down for a year while the remaining defects were fixed; and the Defence project team could be disbanded. Through Deed 5, Defence granted Final Acceptance to Lend Lease on 30 April 2015. As at February 2016, rectification of the last of the five major defects by Lend Lease was expected to occur by August 2016, eight months behind the schedule agreed in April 2015, and more than five years after the contracted completion date.

3.23 As a consequence of the five deeds that amended the Lend Lease contract, and the long delay in completing the project, a number of Defence contracts had to be extended in both time and scope. In particular, the Thales Support Services Contract was extended from 1 December 2012 to 30 June 2015, and the scope was extended to include safety training for Thales

<sup>23</sup> Industrialisation involves: producing propellants at the plant's production capacity; achieving compliance with environmental protection requirements; increasing overall plant reliability; and achieving reductions in the cost of ownership.

operational staff, development of Major Hazard Facility (MHF) Comcare licensing for the redeveloped facility, and initial operation and maintenance of the Nitrocellulose Plant.

3.24 The history of the project suggests that Defence's implementation would have benefited from:

- selection of a contractor with a demonstrated track record in delivering the capability being acquired;
- a more active, and direct, relationship between Defence and the prime contractor;
- an effective Project Control Board to oversee project management; and
- more active Defence management and oversight of the engineering aspects of the project.

# Has the project delivered the agreed outcomes?

When completed, the Mulwala redevelopment should deliver a facility with much higher levels of safety, automation and environmental compliance than are provided by the plant built in 1942–43.

Defence advised the ANAO that the Mulwala Redevelopment Project would be completed within its \$371 million budget. However, this advice excludes funds used from non-project sources to pay for redevelopment costs. Further work, at an estimated cost of some \$44 million, is also required to bring the facility up to an industrial level of production. Taken together, total current and planned expenditures are estimated to be some \$415 million by 2017, with significant expenditure yet to be budgeted for decontamination and demolition.

3.25 When completed, the Mulwala redevelopment should deliver a facility with much higher levels of safety, automation and environmental compliance than are provided by the plant built in 1942–43. Verbal advice from Thales to Defence is that: the facility is more robust in nitrating nitrocellulose (at good nitration rates, with lower environmental impact through nitrous oxides output); initial production from the propellant manufacturing and finishing elements of the plant is producing good-quality product; but significant issues remain in relation to plant reliability, production rate and output of volatile organic compounds. Thales considers that qualification of propellant from the redeveloped facility will be achieved without significant issues being encountered, contingent on successful completion of the Deed 5 rectifications and continued support from Defence regarding the required modifications/upgrades. Thales has further advised Defence that it is in a position to progress qualification of a new 'flake' propellant manufactured in the new plant.

#### Finalising the modernisation

3.26 After the redeveloped facility produced propellant to satisfy initial tests and demonstrate its availability for production, there was a requirement to industrialise the facility. Defence paid

Thales an initial \$4.8 million to operate the redeveloped facility from 1 July to 30 September 2015 under the operating contract.<sup>24</sup>

3.27 In November 2015, Defence contracted Thales to further develop and operate the new facility. At that time, completion of industrialisation was scheduled for June 2017, although a staged transfer of production was intended to occur over 20 months.<sup>25</sup> The estimated cost of the industrialisation program was \$33 million, funded predominantly from Mulwala Redevelopment Project Net Personnel and Operating Costs, with supplementation from sustainment funding.

3.28 Separately, in late 2015 Defence was also preparing to fund a number of additional modifications to the redeveloped facility, mostly using Capability Realisation Program funding.<sup>26</sup> These capital projects, which are intended to ensure an industrial rate of production, plant reliability and environmental compliance, were initially costed at some \$11 million, and included:

- improvements to manufacturing processes, such as replacement of agitators, and upgrade of the conveyor system;
- environmental control in the packing building; and
- doubling of the width of 6000m of clearways, and installation of 1500m of pathways to replace the 'totally inadequate and unsatisfactory'<sup>27</sup> network provided by the Mulwala Redevelopment Project.

#### Cost summary

3.29 Defence advised the ANAO that the Mulwala Redevelopment Project would be completed within its budget of \$371 million. However, this advice excluded funds from non-project sources that have been used to pay for redevelopment costs. For example, Defence advised that some \$18 million was paid from non-project sources ('sustainment' funding) for works such as:

- adding the new facilities to the existing site-wide Major Hazard Facilities (MHF) licence;
- cost of Thales labour to operate the new facilities during Lend Lease testing and during the industrialisation period;
- removal and destruction of waste materials produced during testing;
- specialist contractor engineering support; and

<sup>24</sup> The short (three-month) timeframe was adopted because Defence considered that Thales' first offer did not represent value for money. The timeframe was later extended by a month to enable completion of negotiations.

<sup>25</sup> Approximately one third of nitrocellulose was already being sourced from the new facility, and the final processes (glazing and packing) were in the process of being brought on line for all propellant production at Mulwala (that is, these processes would no longer be undertaken in the old facility).

<sup>26</sup> One project, the remediation of clearways and pathways, was funded through the Mulwala Facilities Remediation Program, on the basis that it addressed whole-of-site safety issues. The Mulwala Facilities Remediation Program is discussed at paragraphs 5.9–5.12 below.

<sup>27</sup> Thales documentation to Defence, October 2015. Lend Lease advised the ANAO in February 2016 that: This comment (presumably arising from within the Plant's operating Company) should be noted in the context of the contracted design review process, which specifically reviewed and altered the clearways prior to construction, to the functional testing conducted to prove the plant's function including the use of its clearways at the required production rate. The original contract did not call for the integration of the new plant's clearways with the existing plant, nor did it contemplate all the interactions between the two plants the current operator apparently now plans.

• other associated costs at the new Mulwala facilities.

3.30 Further, some \$44 million of non-project funding is being spent to finalise and fully industrialise the new plant, tasks which were in the originally contracted project scope.

3.31 Notwithstanding Defence's project reporting, Table 3.1 shows that the redevelopment (as distinct from the 'project') has cost some \$371 million to date, and will have cost an estimated \$415 million by 2017<sup>28</sup>, with significant expenditure yet to be budgeted for decontamination and demolition.

		\$million		
Budget				
Mulwala Redevelopment Project budget approved by Government (inflation-adjusted to November 2015, including contingency) <sup>a</sup>		371		
Costs				
Costs to date				
Mulwala Redevelopment Project	360			
Non-project funding used for redevelopment purposes	18			
Liquidated damages paid to Defence by Lend Lease	(7)	371		
Estimated future costs				
Industrialisation	33			
Remediation of deficiencies through capital works in support of industrialisation	11	44		
Estimated cost of redevelopment to 2017 <sup>b</sup>				
Estimated overspend to 2017		44		

Note a: Excludes Defence's internal Project Office costs, which until June 2015 were funded through the separate appropriation for the Defence Materiel Organisation; Defence does not include these costs in its project reporting. Defence estimated its Project Office costs for the years 2001–16 at some \$17 million.

Note b: Significant expenditure is yet to be budgeted for decontamination and demolition.

Source: ANAO analysis of Defence records.

3.32 Two further issues relating to the Mulwala Facility have not been fully resolved:

- greater utilisation of the redeveloped facility by Defence so as to benefit from the significant investment represented by the Mulwala Redevelopment Project;<sup>29</sup> and
- decontamination and demolition of buildings made redundant by the Mulwala Redevelopment Project.<sup>30</sup>

<sup>28</sup> In this context, the ANAO has previously recommended that Defence review relevant business rules and guidance so as to clarify the internal treatment of acquisition and sustainment funding. ANAO Audit Report No.30 2014–15, *Materiel Sustainment Agreements*, April 2015, pp. 23, 79–84.

<sup>29</sup> Since the Benalla Facility's construction, the ADF has steadily decreased its purchases of munitions. In 2009, for example, the Benalla Facility supplied only 13 of approximately 830 ordnance line-items to the ADF, representing just slightly more than a quarter of Defence's total unguided-munitions purchases.

<sup>30</sup> In 2005, decontamination and demolition were specifically excluded from the project scope (see paragraph 2.15). Decontamination and demolition are discussed in detail in Chapter 5.

# 4. Delivering munitions to the Australian Defence Force

#### Areas examined

- value for money under the 1998–2015 operating agreements;
- the competitive tender for operating the Mulwala and Benalla Facilities; and
- efforts to obtain better value under the interim 2015–20 contract.

#### Conclusion

Contractor operation of the Mulwala Facility and the associated Benalla Facility since 1998 has fulfilled the ADF's domestic orders for munitions. Defence paid \$526 million for munitions produced by the facilities. Defence paid \$1.874 billion in order to build, operate and maintain the two munitions facilities. The cost of the capability to manufacture munitions in Australia has provided regional economic and employment benefits and some strategic value in terms of security of supply. Defence advised Government in 2000 and 2014 that the facilities should be closed, and also advised in 2012 that the strategic requirement to manufacture munitions in Australia is minimal. This suggests that the cost of building, operating and maintaining the facilities did not represent value for money.

Between 2009 and 2014, Defence sought to conduct a competitive tender for operation of the Mulwala and Benalla Facilities. The tender process was cancelled because of delays in the release of the Request for Tender and uncertainties arising from the unfinished Mulwala Redevelopment Project. In late 2014, Defence entered into a five-year interim contract that provides some improvement in value for money. Defence is now in a better position to advise the Government on options for the post-30 June 2020 operation of the facilities, and develop a cost-effective implementation plan.

#### Area for improvement

The ANAO has made a recommendation for Defence to advise the Government on options for the post-2020 arrangements at Mulwala and Benalla.

4.1 From July 1998 to June 2015, two interrelated contracts governed the production of propellant and high explosives at the Mulwala Facility, and the production and sale of ammunition from the Benalla Facility:

- the Mulwala Agreement—Thales was required to manufacture propellant and high explosives to be supplied to the Benalla Facility; and
- the Strategic Agreement for Munitions Supply (SAMS)—Thales was required to maintain a capability at the Benalla Facility to manufacture explosive ordnance for the Australian Defence Force.<sup>31</sup>

4.2 The two 1998 agreements were originally framed to guarantee the future of ADI (now Thales) as the 'first choice source of a specified range' of explosive ordnance to Defence. In effect,

<sup>31</sup> There was a tight linkage between the Mulwala Agreement and the Strategic Agreement for Munitions Supply. Product from Mulwala was supplied at cost to the Benalla Facility, which then included that cost in the total cost of munitions sold to Defence.

the agreements maximised the sale price for ADI's ammunition business at the cost of locking the Defence customer into high-cost/high-subsidy supply arrangements.<sup>32</sup> By 2006, Defence had recognised that both agreements were financially complex and burdensome to administer.<sup>33</sup>

# Did Defence manage the 1998–2015 operating contracts effectively and achieve value for money?

The operating contractor, Thales, has met Defence's orders for propellant, high explosives and munitions under two related contracts. For over a decade, the contracts were largely self-managed by Thales, and Defence did not manage the subsidies (capability and other payments) effectively. Recognising its longstanding contract-management shortfalls, Defence established a Strategic Munitions Contracts Directorate in 2011, and achieved some savings. This directorate successfully managed a complicated transition to the interim contract in 2015, including the acquisition of the Benalla Facility by Defence.

From 1999 to 2015, Defence paid \$526 million for munitions produced by the Mulwala and Benalla Facilities. Defence paid \$1.874 billion in order to build, operate and maintain the facilities: \$1.386 billion in capability and other payments; \$371 million in redevelopment costs; and \$117 million for environmental and facilities remediation.

In general, domestically produced munitions are more costly than similar munitions sourced internationally. A 2013 RAND review of Australia's munitions manufacturing industry observed that, if maintaining a domestic munitions industry is desirable, using the full production capacity at Benalla is the key to controlling costs. The capability to manufacture munitions in Australia has provided regional economic and employment benefits and some strategic value in terms of security of supply. Defence advised Government in 2000 and 2014 that the facilities should be closed, and also advised in 2012 that the strategic requirement to manufacture munitions in Australia is minimal. This suggests that the cost of building, operating and maintaining the facilities did not represent value for money.

#### Expenditures, production and profit sharing under the agreements

- 4.3 From 1999 to 2015, under the Mulwala Agreement and the SAMS, Defence paid:
- \$526 million to purchase munitions manufactured by Thales at the two facilities, at a variable 'unit price' representing the cost of materials and labour; and
- \$1.386 billion to maintain the capability of the two facilities to manufacture a specified amount of propellant or munitions (capability payments, indexed annually).

4.4 Mulwala's production is either: supplied to the Benalla Facility for incorporation into ammunition purchased by Defence; supplied directly to Defence as a finished product (mostly high explosives); or sold into the commercial propellant and specialty chemicals markets. During the life of the Mulwala Agreement, the Mulwala Facility produced an average of 585 tonnes of propellant per year, and annual production of high explosives ranged from 72 to 650 tonnes.

<sup>32</sup> The Government sold ADI in 1996 for \$346 million (see Table 1.1).

<sup>33</sup> In May 2006, the ANAO made several recommendations relating to the SAMS. ANAO Audit Report No.40 2005–06, *Procurement of Explosive Ordnance for the Australian Defence Force (Army)*.

Thales achieved some growth in production of propellants, and fulfilled Defence's orders for propellant, high explosives and munitions.

4.5 An average of 15.6 per cent of annual propellant production from the Mulwala Facility has been used for ADF purposes from 2005 to 2014 (Figure 4.1). By contrast, an average of 87 per cent of annual munitions production from Benalla has been sold to the ADF.<sup>34</sup> High explosives produced at Mulwala have been used almost exclusively for ADF purposes.



Figure 4.1: Mulwala and Benalla production used for ADF purposes, 2005–14

4.6 In 1998, Defence and Thales agreed on a management arrangement whereby Thales would derive no profit from the manufacture of propellant destined for Benalla for incorporation into Defence munitions. In return, Thales was given the right to exploit the Mulwala Facility for commercial production. The 1999 Strategic Review<sup>35</sup> observed that operating the two facilities for the quantities required for the ADF's peacetime needs alone would have been prohibitively expensive. As part of the overall arrangement, Defence would receive a share of the profit from commercial sales, and would use it to offset its capability payments:

- From 1999 to 2014, Defence's share of profit from the Mulwala Facility was \$26.3 million, some 25 per cent of the net profit. Defence also received from Thales a fixed rent of \$57 000 per year under a lease that accompanied the Mulwala Agreement.
- From 2001 to 2014, Defence's share of profit from commercial sales from the Benalla Facility amounted to \$6.59 million.

Source: Thales Australia.

Since 2005, rifle ammunition has comprised, on average, 97 per cent of Defence purchases from Benalla by value. However, Australia is not self-sufficient in small arms ammunition: overseas procurements of small arms ammunition in 2010–11, for example, amounted to approximately 46 per cent of the total value of small arms ammunition procured. (Senate Standing Committee on Foreign Affairs, Defence and Trade, Additional Estimates 2012–13, *Munitions Priority Industry Capability*, Question on Notice No. 137, 13 February 2013 [Internet], response available from <a href="http://www.aph.gov.au/Parliamentary\_Business/Senate\_Estimates/fadtctte/estimates/add1213/def/defenceqonsindex">http://www.aph.gov.au/Parliamentary\_Business/Senate\_Estimates/fadtctte/estimates/add1213/def/defenceqonsindex</a>, accessed 2 February 2016). Thales advised the ANAO in January 2016 that all small arms ammunition could be manufactured in Australia, but the cost associated with retaining that capability would be significant.

<sup>35</sup> See paragraph 2.2.

## Capability payments and contract management

4.7 Capability and other payments represented the subsidy provided to Thales to meet the fixed costs of production at Mulwala and Benalla. The payments were also designed to repay the ADI investment in constructing the Benalla Facility, at the Long Term Bond Rate plus 6.6 per cent. From 1999 to 2015, Defence paid capability and other payments of \$1.386 billion: \$480 million under the Mulwala Agreement, and \$906 million under the SAMS (Figure 4.2).<sup>36</sup>





#### Source: Defence.

4.8 Until 2011, the agreements had been largely self-managed by Thales, with little oversight by Defence. Due to the nature of the agreements, and decisions made by Defence to adjust the capability at Benalla without adjusting the payment model, Defence was due to pay increasing capability payments between 2006 and 2015. Recognising its longstanding contract-management shortfalls, in 2011 Defence established a Strategic Munitions Contracts Directorate to manage four strategic explosive ordnance contracts.<sup>37</sup> From 2012, Defence made a number of improvements to its contract-management methods, which directly resulted in savings:

• Under the SAMS, Defence had paid Unrecovered Prime Costs (incurred when orders fell below a certain level) totalling \$3 million in 2009–10 and 2011–12. However, Defence achieved savings of \$8.1 million from 2013 to 2015 by avoiding these costs. Thales advised the ANAO that the savings were achieved through increased commercial efforts, combined with increased flexibility in Defence's supply requirements.

Mulwala Agreement Strategic Agreement for Munitions Supply

<sup>36</sup> The SAMS payments included \$561 million of return 'on and of' the original \$148 million investment in the Benalla Facility, for an average rate of return for Thales of 11.9 per cent per annum. The payments to Thales also covered: incentive payments for on-time deliveries—\$156.7 million; repairs and maintenance at Mulwala—\$24.9 million; capability adjustments at Benalla—\$24 million; and redundancies at Benalla in 2010– 11 and 2014–15—\$5.8 million. For Thales comments on these figures, see Appendix Three.

<sup>37</sup> These included: the Mulwala Agreement; the SAMS; a pyrotechnics supply contract with Chemring Australia; and an Ammunition Container refurbishment/supply contract with Pentarch Pty Ltd.

- Both the Mulwala Agreement and the SAMS required Thales to prepare an annual Payment Basis Review that was designed to set the contract prices for munitions orders from Defence. However, due to delays by Defence in submitting orders, delays by Thales in submitting documentation, and further delays during Defence financial investigations, both parties were forced to use outdated Payment Basis Reviews to quantify costs.<sup>38</sup> From 2012, Defence cleared the backlog of SAMS Payment Basis Reviews, finalising six reviews in two years.
- A new monthly reporting template was developed during 2012–13, and systematic monthly reporting under both agreements began in mid-2012.
- Increases in the capability payments were limited to less than 1 per cent per year from 2011–12 to 2013–14 (effectively a real cost decrease), and the 2014–15 claim for capability payment was reduced by \$7.9 million.

4.9 From November 2009, as part of the Strategic Reform Program<sup>39</sup>, Defence requested that Thales achieve cost savings to the value of \$60 million by 30 June 2015. Thales advised the ANAO that it achieved savings of \$31.8 million by that date. Some of these savings were made by reducing staff at Mulwala and Benalla from an average of 665 (1999–2014) to 571 in 2015 (Figure 4.3).<sup>40</sup>



#### Figure 4.3: Staff numbers at Mulwala and Benalla, 1999–2015

Transition Out

4.10 In preparation for the expiry of the Mulwala Agreement and the SAMS, in November 2014 Defence and Thales signed a Transition Out Deed, with the objective of ensuring that all obligations of the agreements were met by 30 June 2015 and they could be closed in an orderly

<sup>38</sup> For a detailed discussion of the period 2005–10, see ANAO Audit Report No.24 2009–10, *Procurement of Explosive Ordnance for the Australian Defence Force*, pp. 148–51.

<sup>39</sup> Defence's 2009 Strategic Reform Program aimed to save \$20 billion over the decade to 2018–19.

<sup>40</sup> Defence advised the ANAO that the spike in 2012 was partly attributable to use of additional shifts so as to increase production of ADF munitions as well as commercial sales. The subsequent reduction in staff resulted from a Defence/Thales strategy to improve efficiency in preparation for a lower cost-model from 2015–16.

manner, while supporting safe and continuous operations at the Mulwala and Benalla Facilities. Notably, the deed confirmed that Defence would, on 30 June 2015, exercise its right to acquire the Benalla Facility and the Benalla site with all fixtures, fittings and equipment, for the peppercorn price of one dollar plus \$1.78 million<sup>41</sup>, as well as resuming possession of the Mulwala Facility and all Thales assets (except for Contractor Portable Corporate Assets), for an additional dollar.

4.11 In finalising the deed, Defence rejected a Thales commercial claim for \$30 million for the Benalla Facility. Instead, Defence accepted a contingent liability of \$17.5 million, in return for the ownership of all Mulwala and Benalla assets then owned by Thales that were to be used under the Strategic Munitions Interim Contract. Amortised over seven years, the liability is payable to Thales should Thales cease to be the operator at any time up to 2022.<sup>42</sup>

#### Figure 4.4: The Benalla Facility



Source: Defence.

#### Value for money

4.12 The Commonwealth Procurement Rules establish value for money as the core rule for procurement. The 2009 Defence White Paper stated that Defence should not pay a premium for local industry work, unless the costs and risks of doing so were clearly defined and justifiable in terms of strategic benefits.<sup>43</sup>

4.13 In 2014, Defence advised the Minister that the Mulwala Agreement and the SAMS significantly favoured the contractor, Thales, as they were developed in the period when ADI was being prepared for sale. As discussed in this audit report, from 1999 to 2015 Defence paid \$526 million for munitions produced by the two munitions facilities. Defence paid \$1.874 billion in order to build, operate and maintain the facilities: \$1.386 billion in subsidies (capability and other

<sup>41</sup> The adjustment of the price for Benalla reflected the depreciated book value of a Thales investment of \$3.8 million for a Multi Calibre Line, less a Defence advance of \$1.9 million as working capital for the purchase of raw materials for RDX-TNT.

<sup>42</sup> For example, Defence is liable to pay Thales \$5 million if Thales does not operate the two facilities after 30 June 2020.

<sup>43</sup> Priority Industry Capabilities were identified under the 2009 Defence White Paper as conferring an essential strategic capability advantage by being resident within Australia. The Government was prepared to intervene in the market to ensure that Priority Industry Capabilities remained healthy and available.

payments); \$371 million in redevelopment costs; and \$117 million for environmental and facilities remediation. An estimated \$44 million remains to be spent on redevelopment, and significant expenditure is yet to be budgeted for decontamination and demolition. Defence purchases of explosive ordnance from Benalla represented some 15 per cent of all Defence expenditure on explosive ordnance between 2007–08 and 2013–14. Moreover, Figure 4.5 illustrates that, while overall Defence expenditure on explosive ordnance has been declining, payments to Mulwala and Benalla increased until 2010–11 and have been constant since then.



Figure 4.5: Defence annual expenditure on explosive ordnance, and portion paid to Mulwala and Benalla Facilities

Source: ANAO analysis of Defence Annual Reports and Defence records.

4.14 The cost of buying domestically produced munitions is generally higher than the cost of similar munitions sourced internationally. A RAND review of Australia's munitions manufacturing industry, conducted for Defence in 2013, observed that 'domestic munitions may cost 145 percent as much as those available from market sources'. While direct costs were on a par with international prices, the cost premium was driven by Mulwala and Benalla's relatively high fixed overhead costs. The effect of the fixed cost diminishes proportionally as production increases. The review observed that:

if maintaining a domestic munitions industry is desirable, using the full production capacity at Benalla is the key to controlling costs.  $^{\rm 44}$ 

4.15 The capability to manufacture munitions in Australia has provided regional economic and employment benefits and some strategic value in terms of security of supply.<sup>45</sup> Defence advised Government in 2000 and 2014 that the facilities should be closed, and also advised in 2012 that the strategic requirement to manufacture munitions in Australia is minimal. This suggests that the cost of building, operating and maintaining the facilities did not represent value for money.

<sup>44</sup> RAND, Australia's Munitions Manufacturing Industry: Opportunities for the Future, April 2013, p. xxii.

<sup>45</sup> In 2010–11, an external review conducted for Defence found that the expenditure of \$305 million on the two facilities generated approximately 1300 full-time-equivalent jobs in the surrounding regions.

# Did Defence manage the competitive tender for a replacement operating contract effectively?

Between 2009 and 2014, Defence sought to conduct a competitive tender for a new operating contract to replace the 1998–2015 contracts, but did not manage the process effectively. The tender was cancelled because of delays in the release of the Request for Tender and uncertainties arising from the unfinished Mulwala Redevelopment Project. Defence's costs for the tender process were some \$24 million.

Defence had envisaged introducing improved contractual arrangements through the tender process, but the significant government assistance still required would have continued to reduce value for money for Defence.

4.16 Defence advised the then Government in 2012 that the current arrangements with Thales had delivered world-class production capabilities, but had not achieved their full commercial potential, and hence had imposed a heavy cost burden on Defence. Further, the Mulwala Agreement and the SAMS had proved to be overly complex to administer<sup>46</sup>, with little incentive for either party to invest to improve the efficiency of production, expand market opportunities or refresh the product range.<sup>47</sup>

- 4.17 On two occasions, Defence had attempted to renegotiate the agreements:
- In 2005–06, Defence established a SAMS Renegotiation Project, but 'achieved negligible concessions from Thales'.<sup>48</sup>
- In 2007–08, Defence engaged an external reviewer to conduct a commercial costbenefit analysis of terminating the agreements early, or continuing until 30 June 2015. The review indicated that, as long as Thales was in agreement and a best-case outcome could be achieved, it would be cheaper to attempt a second renegotiation or to terminate the contracts, in comparison to taking no action. Defence formed a Renegotiation Board, which was discontinued after extensive formal negotiations with Thales.

4.18 In 2008, Defence informed Thales that the two agreements would expire on 30 June 2015 and that Defence would seek arrangements better suited to the goal of increased domestic munitions manufacture.

#### The Domestic Munitions Manufacturing Arrangements

4.19 Defence established the Domestic Munitions Manufacturing Arrangements (DMMA) project in December 2009 to determine successor arrangements to the Mulwala Agreement and the Strategic Agreement for Munitions Supply. Four key goals were intended to support development of new contractual arrangements, as shown in Table 4.1.

<sup>46</sup> For similar Defence advice in 2006, see paragraph 4.2.

<sup>47</sup> Defence had conducted a competitive tender for the operation and maintenance of Mulwala and Benalla when ADI was sold in 1998–99.

<sup>48</sup> Defence ministerial submission, 2006.

Key DMMA goal	ANAO comment			
Increased capability for the ADF	ADF advice to Government on strategic requirements indicates that ADF capability is not affected by the origin of the munitions it uses.			
	However, it was known that any one tendering group could only supply a limited range of munitions. The project struggled with how to evaluate the tenders to maximise the value to the ADF.			
Lower munitions supply costs <sup>a</sup>	There was considerable uncertainty about the final capability of the facilities being delivered by the Mulwala Redevelopment Project. This could have resulted in risk premiums in the tender price and/or conditional tender responses which would have been extremely difficult to evaluate and negotiate.			
Maximise value for money	All responses to the Request for Proposal identified a need for Commonwealth assistance, in some cases similar to the value of the capability payments provided to Thales under the Mulwala Agreement and the SAMS.			
Deliver safe and sustainable production factories	Final Acceptance of the Mulwala Redevelopment Project had been extensively delayed, and the facility was not yet a proven capability.			
Defence recognised that the four key goals, including the ADF's future munitions requirements, were not clearly defined. Defence's post-project analysis stated that this lack of definition resulted in the continual evolution of the requirements, and delays in developing the procurement documentation.				

#### Table 4.1: The four key goals of the Domestic Munitions Manufacturing Arrangements, and ANAO comment

Note a: Defence intended to achieve lower costs by encouraging the new contractor to increase production, and by gaining efficiencies through integration of the facilities into the successful contractor's global supply chain.

Source: ANAO review of Defence documentation.

4.20 The DMMA Project Office designed a new two-contract structure to replace the Mulwala Agreement and the SAMS. The first was a facilities contract, for maintenance and operation of both the Mulwala and Benalla Facilities; and the second a production contract which would guarantee up to 80 per cent of the ADF's volume of munitions for an initial three-year term. The value of these contracts was estimated to be between \$1 billion and \$1.5 billion.

4.21 A 2013 report from the RAND Corporation concluded that there were three main risks with the proposed DMMA contractual framework: that the three-year production contract might result in a reluctance to invest by the contractor; that nothing prevented the contractor from raising prices after the three-year period had expired; and that contractual language guaranteeing the ADF's munitions supply would reduce what a contractor was willing to pay to operate Benalla.

## **Suspension and cancellation**

4.22 Two major factors led to the eventual suspension and cancellation of the DMMA project:

- uncertainty about the outcome of the Mulwala Redevelopment Project; and
- schedule pressure, due to delays in the release of the Request for Tender.

4.23 The DMMA project was established in December 2009, but Defence took 17 months to release the Invitation to Register Interest. The Project Office released and evaluated the subsequent Request for Proposal in general alignment with the approved schedule. However, the schedule slipped leading up to the release of the Request for Tender, which was originally planned

for April 2012 but was delayed twice.<sup>49</sup> Due to the time required for tender evaluation, contract negotiation and a suitable transition period to ensure safe operation, each delay in releasing the Request for Tender made it increasing unlikely that contract signature would occur before the existing agreements expired in June 2015.

4.24 In response to recommendations from a Defence Gate Review conducted in November 2013, the DMMA Request for Tender process was suspended in January 2014, pending Government direction on the long-term future of the Mulwala and Benalla Facilities. The reasons for the suspension included:

- extensive uncertainty surrounding the schedule and eventual capability of the Mulwala Redevelopment Project;
- insufficient time before 30 June 2015 to conduct the tender process;
- a substantial downturn in the global munitions markets; and
- many elements of the project's 2012 business case were no longer valid, and the business models outlined by industry in response to the Request for Proposal were potentially inconsistent with Government expectations for reduced subsidies.
- 4.25 Defence sought ministerial direction in April 2014, advising the Minister that:

Given the absence of a compelling strategic need to manufacture munitions in Australia, and the very high premium for doing so, Defence recommends closure and sale of Mulwala and Benalla, and the sourcing of munitions from the global market.<sup>50</sup>

4.26 In June 2014, the Minister directed Defence to prepare a proposal for interim contractual arrangements with Thales for the ongoing operation of the Mulwala and Benalla Facilities, for up to five years. In September 2014, the Prime Minister approved interim arrangements that would cancel the DMMA project.<sup>51</sup> Defence was advised of the Government decision the day before it was publicly announced. Defence subsequently implemented the Strategic Munitions Interim Contract, discussed below.

4.27 The DMMA project would have benefitted from a clearly defined schedule and risk management plan. Defence's project schedule was not well developed. This remained an issue until February 2012, when the project engaged a full-time scheduler. Defence internal reporting also indicated that there was little evidence to demonstrate that the risk manager and risk register translated into better risk mitigation or appreciable reduction of risks.

4.28 Defence advised the ANAO in November 2015 that the total cost of the DMMA project was \$2.8 million for APS project staff, and approximately \$21 million for contractor costs.<sup>52</sup>

<sup>49</sup> Some of the delay was due to a change in the DMMA Acquisition Strategy. An October 2012 Gate Review had concluded that: the DMMA team needed to be augmented with appropriate business, commercial, legal and facilities expertise; there were legacy environmental and work health and safety issues; and a change to a two-stage tender process would yield better results.

<sup>50</sup> Defence gave similar advice in 2000 and 2012 (see paragraph 2.2).

<sup>51</sup> For ATK's assessment of the effect of DMMA cancellation on the Mulwala Redevelopment Project, see paragraph 3.19.

<sup>52</sup> Contractor costs included environmental condition and environmental baseline assessments of Mulwala and Benalla, a work health and safety risk audit and baseline, and above- and below-ground infrastructure condition assessments.

## Has Defence achieved better value in the interim 2015–20 contract?

An interim operating contract for the period 2015–20 includes a performance regime and reduced government assistance, representing some improvement in value for money.

There would be significant merit in another approach to market to replace the interim contract. In doing so, Defence should learn key lessons from the first, unsuccessful, attempt. In particular, it should clearly define Defence's current and future munitions requirements, and allow sufficient time to complete the process before mid-2020.

4.29 The Mulwala Agreement and the SAMS were due to expire by 30 June 2015. In September 2013, Defence began contingency preparations for a one-year follow-on interim contract with Thales, in case of delays in the DMMA project. After the suspension of the DMMA Request for Tender process in January 2014, Defence changed the term for the possible interim contract to two years, and after consultation with Government in June 2014, to five years.

4.30 Defence signed a direct-source interim agreement with Thales on 25 November 2014. The Strategic Munitions Interim Contract runs for five years from 1 July 2015. As part of the contract, Thales is required to transition the Mulwala and Benalla Facilities from the old agreements, integrate the redeveloped Mulwala Facility, and transform the business and operations into a more self-sustaining, business-like operation, pending a Government decision on the long-term future.<sup>53</sup>

4.31 The interim contract has a value of \$436.2 million (GST inclusive) including:

- \$319.1 million in Facilities Operation Payments (on average, \$64 million per year); and
- \$117.1 million of munitions orders (on average, \$23 million per year).

4.32 The Facilities Operation Payments continue to provide government assistance for operation and maintenance of the facilities. The Facilities Operation Payments will represent a 20–37 per cent reduction in the capability payments that would have been paid if the previous agreements had been extended. The amounts are subject to escalation in accordance with agreed indices. As part of the package negotiated, Thales' efficiency obligation was increased from 1.7 per cent to 2.5 per cent, and a notional rent of \$100 000 per year for the facilities was offset against the Facilities Operation Payment.

4.33 While many sections of the interim contract mirror the arrangements in the previous agreements, the Mulwala Agreement and the SAMS were capability-based. In contrast, the interim contract is a performance-based contract that includes:

- progressive increases in performance requirements;
- incentives and Intellectual Property rights for Thales to increase sales, which in turn would reduce the Facilities Operation Payments;
- Strategic Performance Measures that align with the Company Scorecard;
- a framework to realise globally competitive pricing for all munitions supplied; and

<sup>53</sup> The Commonwealth must endeavour to give Thales written notice of any extension to the interim contract on or before 30 June 2017.

• Key Performance Indicators to be used in the calculation of Performance Deductions (after the first year, five per cent of the payment is subject to the KPI regime).

4.34 Defence has also agreed that, under the interim contract, the minimum order for munitions will be \$117.1 million, an average \$10 million per year reduction over orders made under the Mulwala Agreement and the SAMS. Defence expects its order quantities to increase, as the Minister has directed Defence to maximise use of the facilities.

4.35 The interim contract has been developed with a view to adding new or enhanced munitions to the product line. By November 2015, one additional product had been approved, and two products had been approved in principle.

## Preparing for the post-2020 arrangements at Mulwala and Benalla

4.36 Defence is now in a better position to plan for the post-2020 period. Defence should promptly advise Government on its options and related costs. These options could include whether to maintain a domestic munitions industry or source munitions from overseas. If Government decides to maintain the industry, Defence should provide advice on ownership and contract-management options that maximise value for money and the optimum Defence use of the production from Benalla.

# **Recommendation No.1**

4.37 To achieve better value from the significant investment in a domestic munitions capability to date, the ANAO recommends that, by the end of 2016, Defence:

- (a) advise the Government on options for the operation and maintenance of the Mulwala and Benalla Facilities from June 2020; and
- (b) develop a plan for the timely and cost-effective implementation of the Government's preferred option.

Department of Defence response: Agreed.

# 5. Managing the operating environment at Mulwala

#### Areas examined

- Safety and environmental compliance and remediation activities; and
- Defence's preparations for decontamination and demolition at Mulwala.

#### Conclusion

Defence has improved environmental and safety compliance at Mulwala, but the Mulwala site is still operating under some environmental waivers, mostly because of the delays in Final Acceptance of the Mulwala Redevelopment Project.

Defence is not adequately preparing for decontamination and demolition at Mulwala. Some of the soon-to-be-redundant buildings at Mulwala will become hazardous within one to two years of being decommissioned. At the time of the audit, no funding had been budgeted for decontamination and demolition. Defence should develop a risk-based implementation plan for this task, and provide timely advice of relevant risks and costs.

#### Area for improvement

The ANAO has made a recommendation for Defence to plan and fund decontamination and demolition works at the Mulwala Facility, and advise the Government on relevant risks and costs by mid-2016.

# Has Defence improved environmental and safety compliance at Mulwala since 1998?

Defence has improved environmental and safety compliance at Mulwala. The department has expended \$8.4 million of \$11.8 million allocated for groundwater decontamination at Mulwala. Defence has also expended \$108.4 million of \$154 million allocated for new Work Health and Safety and environmental requirements, but the Mulwala site is still operating under some environmental waivers, mostly because of the delays in Final Acceptance of the Mulwala Redevelopment Project.

#### Funding for remediation works

5.1 By 2000, Defence knew that the Mulwala Facility had a range of environmental issues, including: contaminated soil; groundwater contaminated with nitrates, sulphates and ammonia; the discharge of nitrate-polluted water into the Murray River; and the release of ether and other contaminants into the atmosphere.<sup>54</sup>

<sup>54</sup> The 1998 Mulwala Agreement required Defence to fund any capital investment, or repairs and maintenance of plant or equipment, where those works were necessary to comply with any Health, Safety and Environment Laws. Thales was required to maintain the infrastructure, provide a facilities management role and implement the majority of facilities upgrades.

5.2 Defence and successive Governments have considered the cost of environmental remediation of the Mulwala Facility several times:

- Late 2000: estimates to remediate pollution ranged from \$20 million to \$130 million;
- May 2001: the then Minister announced \$63 million for environmental remediation;
- September 2006: the then Minister advised the then Prime Minister that further works were required to be undertaken at Mulwala to keep the site operating effectively for the next 20–30 years, at an estimated cost of \$167 million (over and above the \$63 million already identified for environmental (that is, groundwater) remediation);
- January 2007: Defence commissioned a Financial Provision report, which recommended that the original funding of \$63 million to address groundwater contamination be amended to \$11.8 million; and
- May 2009: the Budget provided an additional \$154 million for works and maintenance tasks required to achieve legislative compliance, including \$50 million for development of an Insensitive Munitions capability.

5.3 At the time of this audit, therefore, two discrete funding streams were available for remediation work: \$11.8 million for groundwater remediation; and \$154 million, administered through the Mulwala Facilities Remediation Program, which coordinates all other works.

## Groundwater remediation

5.4 The long-term production of propellant at the Mulwala Facility has resulted in contaminated groundwater, which was first identified in 1987. This includes elevated levels of nitrate and sulphate in the groundwater, and other contaminants in the soil. In December 2000, the Government announced plans to remediate the contaminated groundwater.

5.5 A 2002 environmental audit of the Mulwala Facility found that the primary sources contributing to groundwater contamination (such as waste dumps or manufacturing areas) had been removed or had ceased operating. The secondary sources at Mulwala were contaminated soils, or materials from past practices and operations. These source zones were mapped and classified to allow for a targeted approach to future remediation works (Figure 5.1). Most of these zones were related to buildings or old waste dumps.

5.6 In July 2015, Defence advised the ANAO that Source Zones B<sup>55</sup>, C, D1, D2 and D3 had been successfully remediated through the construction of 'caps', at a cost of \$4.5 million.<sup>56</sup> The capping program was completed over the period October 2010–April 2011. The objective of capping is to limit the flow of rainwater through contaminated soils, since the rainwater can move contaminants through the soil and into the groundwater. To make a cap, contaminated soil is covered and sealed with clay (clay cap) or covered with a soaking layer and revegetated (phytocap).

<sup>55</sup> Source Zone B was a drain built in the 1940s to discharge chemical effluent into the Murray River. The soil near the effluent drain contributed to both the contamination of the groundwater and of the Murray River. In 2001, contaminated soil surrounding the drain was removed and the site was backfilled.

<sup>56</sup> Defence advised the ANAO that Source Zones A and E cannot be remediated until the overlying infrastructure has been demolished.



Figure 5.1: Source zones of groundwater contamination at Mulwala

5.7 Capping provides a significantly cheaper option than moving contaminated soil to landfill, but the caps must be monitored and maintained, because erosion reduces their effectiveness. A 2012 report noted 'significant erosion and failure' of some caps at Mulwala, caused by overgrazing, stock damage, lack of vegetative cover, stormwater runoff and rabbit burrows. A further report in 2014 also concluded that the caps had not been maintained by Thales in accordance with the relevant management plans. Defence advised the ANAO in November 2015 that it had evidence that Thales was undertaking the remediation/monitoring of the caps as recommended.

5.8 Since 2011, Defence has also been developing and testing a Hydraulic Containment System at a cost of \$3.9 million. The system pumps contaminated groundwater out of bores on the Mulwala site, decontaminates it and discharges it into the Murray River. A Defence study indicates that, even when all secondary source zones have been successfully remediated, it could take 50 to 150 years for the groundwater to meet drinking-water quality guidelines.

#### **Mulwala Facilities Remediation Program**

5.9 In 2009, a New Policy Proposal provided an additional \$154 million for the extensive capital works and maintenance tasks required between 2009–10 and 2018–19 to achieve compliance with environmental and Work Health and Safety legislation at Mulwala. This funding

Source: Defence. Source Zone B is also shown in Figure S.1.

also made a \$50 million provision for development of an Insensitive Munitions capability.<sup>57</sup> The Mulwala Facilities Remediation Program was established to administer this funding. Since 2009, the program has approved 73 projects, ranging in value from \$60 600 to \$9.06 million (the average project value is \$1.57 million). The projects are varied and have included:

- demolition and replacement of some buildings;
- major upgrades to buildings and equipment; and
- one task to remedy deficiencies left by the Mulwala Redevelopment Project.<sup>58</sup>

5.10 As at July 2015, the program had spent \$108.4 million, out of an expected total of \$114.4 million for currently approved projects (Figure 5.2). The creation of an Insensitive Munitions capability at Mulwala has not progressed, and some of the monies earmarked for this capability have been redirected to the Mulwala Redevelopment Project and other projects under the Mulwala Facilities Remediation Program.

Figure 5.2	Planned and actual	allocation (	of funds from t	ha 2000 Naw	Policy Propo	eal
Figure 5.2.	Fianneu anu actuar	anocation	Ji Tunus moni t	ne 2009 New	Folicy Fropo	501

New Policy Proposal (2 \$154 million	009)			
How the \$154 million was planned to be allocated				
<b>\$104 million</b> Mulwala Facilities Remediation Program	<b>\$50 million</b> Insensitive Munitions capability			
How the \$154 million has been allo	ocated to date			
<b>\$114 million</b> Mulwala Facilities Remediation Program	\$1.2 \$38.8 million million Not yet allocated			
	To remedy deficiencies in the Mulwala Redevelopment Project			

Source: ANAO analysis of Defence documents.

#### Defence administration of the remediation program

5.11 Defence's estate management group<sup>59</sup> was not involved in management of the Mulwala site until 2007. From 2007, infrastructure maintenance tasks were identified using a five-year Mulwala Strategic Asset Management Plan, which Thales was obliged to produce annually under the Mulwala Agreement. An Integrated Project Team was also created in late 2008 to oversee the project delivery of the capital works identified in the Strategic Asset Management Plan. Because of the highly specialised nature of the Mulwala Facility, these arrangements were confirmed in 2011. In late 2015, Defence expected to extend the arrangement to June 2020 to cover the industrialisation of the redeveloped facility and possibly the conduct of decontamination and demolition activities.

<sup>57</sup> Insensitive Munitions are munitions that have reduced vulnerability to outside stimuli and are therefore inherently safer to store, transport and use than conventional munitions.

<sup>58</sup> For discussion of one Mulwala Redevelopment Project deficiency being remedied through the Mulwala Facilities Remediation Program, see paragraph 3.28.

<sup>59</sup> The former Defence Support and Reform Group, now known as Defence Estate and Infrastructure Group, is responsible for the management and maintenance of the Defence Estate.

5.12 In 2014, a Contamination Comparison Study compared the pre-1998 contamination status of the Mulwala site to conditions in 2014. The study found that while some areas required rectification works as a direct result of Thales' site management, most of the contamination was due to Commonwealth legacy practices. In consequence, remediation work was considered to be Defence's responsibility, with assistance from Thales. As at November 2015, it was clear that Defence would need to consider alternative funding sources, as only 25 per cent of the remediation budget remained unallocated.

#### Legislative compliance at the Mulwala Facility

#### Emissions

5.13 Since August 1999, the Mulwala Facility has had an Environment Protection Licence from the NSW Environment Protection Authority (EPA). Due to several non-compliance issues, in April 2009 Thales agreed to operate the facility under a Pollution Reduction Program, which granted some emissions exemptions. The exemptions were due to expire in January 2012, but have been extended until 1 February 2017 because of the delays in Final Acceptance of the Mulwala Redevelopment Project. Under the exemptions, the EPA requires Defence to ensure that all 'reasonable and feasible measures [are] implemented to minimise emissions from the old plant'. In April 2014, the EPA noted, in relation to the old Mulwala Facility, that:

It is concerning that high concentrations of volatile organic compounds, primarily ether, continue to be emitted whilst the commissioning of the Mulwala Redevelopment Project is delayed. It is disappointing that emissions of up 6,937 mg/m<sup>3</sup> occur when the contemporary standard is less than 40 mg/m<sup>3</sup>. The EPA was originally assured that this standard would be met in late 2011 upon the completion of the Mulwala Redevelopment Project.

5.14 The licence for the Mulwala Facility was also modified by the EPA on 29 June 2010 to include the Mulwala Redevelopment Project buildings. The specified discharge limits for air emissions impose a higher level of performance on the redeveloped facilities. The EPA has also directed that the routine open burning of waste at the Mulwala Facility is to cease by 30 June 2018, with only emergency open burning permitted thereafter following notification to the EPA.

#### Hazardous materials

5.15 Major Hazard Facilities (MHFs) are sites that store, handle and process large quantities of hazardous chemicals and dangerous goods, including explosives that exceed specified threshold quantities.<sup>60</sup> Thales is responsible for applying for and retaining an MHF licence. The Mulwala Facility has had a variety of MHF licences since 2008, and now holds a full five-year licence, with three facility-specific conditions and other general conditions.

5.16 There have been two large MHF-related expenditures at Mulwala. The first was in 2008–09, when Mulwala was first classified as a Major Hazard Facility. Defence paid Thales \$4.8 million for activities necessary to obtain an MHF operating licence. The second major expenditure was between June 2012 and April 2015, when Defence approved expenditure of \$600 000 under the Mulwala Facilities Remediation Program for the work required to ensure that

<sup>60</sup> MHF licences are administered by Comcare. *Major Hazard Facilities* [Internet], available from <<u>http://www.comcare.gov.au/preventing/hazards/chemical\_hazards/major\_hazard\_facilities</u>>, [accessed 22 February 2016].

Thales could obtain the necessary MHF licence when the Mulwala Redevelopment Project was completed. These costs were paid through the Mulwala capability payments.<sup>61</sup> In total, Defence has paid \$9.5 million (GST inclusive) to Thales for the licence and associated works.

# Is Defence adequately preparing for decontamination and demolition at Mulwala?

Defence is not adequately preparing for decontamination and demolition at Mulwala. A significant amount of funding will be required for decontamination and demolition works, given the potential for spontaneous combustion of some soon-to-be-redundant buildings. At the time of the audit, no funding had been planned or approved. Due to the planning time involved and the number of planning, environmental and heritage approvals that will be required, Defence will need to commence these processes as soon as possible.

A 2014 scoping study estimated that the cost of decontaminating and demolishing redundant buildings at Mulwala would be some \$31 million. This minimum cost does not include a range of additional work, and the final clean-up of Mulwala is likely to cost considerably more.

#### Preparing for decontamination and demolition at Mulwala

5.17 The 1999 Strategic Review of the Mulwala Facility costed the total demolition of redundant buildings at \$30 million, and the works were included in the scope of the Mulwala Redevelopment Project in August 2002. Subsequently, in 2005, the then Government removed decontamination and demolition works from the project scope, for an estimated saving of \$12 million.<sup>62</sup>

5.18 Defence advised the Parliament's Public Works Committee in February 2007 that a scoping study would be developed for the heritage management and future decontamination and demolition of redundant facilities and infrastructure. Defence fulfilled this undertaking in November 2012, through the Mulwala Facilities Remediation Program. In preparing the contract proposal for this study, Thales advised Defence that:

Due to the nature of the operations conducted at Mulwala, and the materials involved in these processes, a number of the buildings represent an immediate safety hazard which makes simple abandonment or postponement of demolition of the buildings untenable.

5.19 Defence contracted Thales to undertake the scoping study to provide a 'roadmap' for future demolition works, decontamination and/or conservation for the 134 buildings that would be made redundant when the Mulwala Redevelopment Project was complete. The comprehensive scoping study was finalised in May 2014, at a cost of \$1.2 million. It assessed 134 buildings for likely contamination by energetic materials<sup>63</sup>, and ranked them on a risk basis to assist in prioritisation for subsequent decontamination and/or demolition (Table 5.1).

<sup>61</sup> In 2012, the Mulwala Agreement was amended to require Thales to maintain Major Hazard Facility licence compliance, with an increase to the Capability Payment from 2012–13 onwards.

<sup>62</sup> Except for four buildings that were demolished to clear the Mulwala Redevelopment Project footprint. For discussion of the reduced-scope decision, see paragraphs 2.15–2.16.

<sup>63</sup> The term *energetics* encompasses both the propellants and explosives manufactured at Mulwala.

5.20 Seventeen buildings were assessed as likely to become unstable within one to two years potentially resulting in spontaneous combustion—as well as having additional contamination issues, such as asbestos, lead and mercury. These buildings were assigned a very high risk rating and require attention as a matter of priority.

Rank	Definition of Risk Ranking	Buildings
Very High	Buildings will remain highly contaminated after decontamination. Energetics are likely to become unstable within 1–2 years. Buildings may require complete demolition.	17
High	Buildings will remain contaminated at a critical mass after decontamination. Energetics are likely to become unstable within 10–15 years. Buildings may require partial or complete demolition.	39
Medium	Contamination in buildings will be substantially removed by decontamination. Demolition is unlikely to be required. Residual contamination is unlikely to become unstable within 15 years.	36
Low	Building is unlikely to contain energetics contamination. Standard energetics decontamination procedures will be required.	28
Neutral	Building is highly unlikely to contain energetics contamination. Standard energetics decontamination procedures will not be required.	14

Table 5.1: Contamination of old buildings at Mulwala by propellants and explosives, 2014

Note: Other contaminants observed during the scoping study included asbestos, synthetic mineral fibres, lead, polychlorinated biphenyls (PCBs) and mercury. The scoping study is one of a number of parallel studies of Mulwala that need to be considered as a whole, such as the Asbestos Remediation Study and the 2015 Soil Contamination Report.

Source: Golder Associates, Mulwala Building Decontamination and Demolition Scoping Study, May 2014.

#### Figure 5.3: The Nitrating House at Mulwala



Note: This building has been identified as having high heritage value, but also a very high risk of spontaneous combustion within one to two years of being decommissioned unless regular maintenance and wetting of the major parts of the building are maintained.

Source: Defence.

#### Heritage value consideration

5.21 The Mulwala Facility covers approximately 1030 hectares, and is a complex site in terms of heritage values. In September 2013, the Heritage Management Plan identified the facility as a place of significant heritage for its historical role in propellant manufacturing during the Second World War, and for the buildings, machinery and structures from that period. Despite the modernisation of some buildings, most of the machinery and buildings remain unmodified.

5.22 Only one area at the Mulwala Facility (the Mulwala Homestead) is on the Commonwealth Heritage List, but the Heritage Management Plan has also given the historic core of the manufacturing facility an overall heritage significance of 'high'. In May 2013, Defence agreed to manage the Mulwala Facility as if it was on the Commonwealth Heritage List, and the Heritage Management Plan recommended that buildings assessed as having a high or moderate heritage ranking be retained and conserved, with demolition only to be considered when 'all other prudent and feasible alternatives have been explored'. Relying partly on the Heritage Management Plan, the May 2014 Decontamination and Demolition Scoping Study reported that 73 of the 134 buildings had high or moderate heritage significance (Table 5.2). Of these 73 buildings, 13 were also assessed as having a very high risk of contamination by energetic material.

		Pr	opellant and	l explosive con	tamination	
		Very high risk	High risk	Medium risk	Low risk	Neutral risk
	High value	1 <sup>a</sup>	-	1	-	1
Heritage	Moderate value	12	32	20	5	1
Value	Some value	4	7	9	20	9
	Neutral value	-	-	6	3	3

Table 5.2	Contamination risk and heritage value—number of buildings affe	ected
10010 0.2.	containination hisk and heritage value - number of buildings and	Solution

Note a: This building is shown in Figure 5.3.

Source: ANAO analysis of the Mulwala Building Decontamination and Demolition Scoping Study, May 2014.

5.23 Defence's statutory duty to reduce health and safety risks is relevant, given the potential for spontaneous combustion of some redundant buildings at Mulwala. Defence may need to deal with heritage values by archival recording and oral history, rather than by preserving buildings.<sup>64</sup>

64 The Queensland Department of Environment and Heritage Protection, for example, calls archival recording 'an essential part of conservation practice for heritage places', and the NSW Heritage Office observes that archival records are usually prepared 'before full or partial demolition of the [heritage] item'.

Queensland Department of Environment and Heritage Protection, Archival recording of heritage places. Guideline [Internet], 2013, available from <<u>http://www.ehp.qld.gov.au/assets/documents/land/</u> heritage/archival-recording-heritage-places.pdf> [accessed 18 December 2015];

NSW Heritage Office, How to prepare archival records of heritage items [Internet], Heritage Information Series, 2013, p. 1, available from <<u>https://www.environment.nsw.gov.au/resources/heritagebranch/heritage/infoarchivalrecords.pdf</u>> [accessed 18 December 2015].

#### Box 4 Why are the redundant buildings at Mulwala hazardous?

It is dangerous to leave propellant manufacturing buildings and equipment 'in place' as historic sites.<sup>a</sup> Nitrocellulose, which is the primary energetic contaminant at Mulwala, will naturally decompose over time, releasing heat and nitric acid. The nitric acid then acts to accelerate the decomposition process. Eventually, the heat causes the nitrocellulose to self-ignite, which can generate enough force to shatter the equipment or piping in which the loose nitrocellulose has gathered. Explosions of this nature have been reported in the United States and in Turkey. In regards to the buildings at the Mulwala Facility, Defence records indicate that:

There is a very high risk of spontaneous combustion within some buildings should they be left on site for an extended period. Whilst there are methodologies available to mitigate this risk, they are labour intensive, require regular (weekly) use of large quantities of potable water, present an ongoing Work Health and Safety risk to personnel involved and a risk to the greater facility in the event of a significant fire.

The United States Army has advised Defence that the processes to completely decontaminate explosives production buildings have invariably resulted in the total or near-total destruction of the building and the equipment, rendering them 'useless' as historic sites. To completely rid these buildings and their equipment of explosive hazards, they must either be burned, or be torn apart into smaller pieces for pressure washing or thermal treatment in incinerators.

Any proposal for demolition or major change to a building requires a Heritage Impact Assessment, and Defence will have to assess whether the costs associated with conserving the building for heritage value, including the decontamination process, will be given more weight than if the building is demolished for health and safety purposes. Further:

- much of the groundwater remediation work cannot be completed until the buildings above the contaminated soil have been removed;
- the degree of contamination present in the base of the buildings and the soil underneath cannot be accurately confirmed until the building is demolished; and
- the Mulwala site is not currently, and is unlikely to be in the future, open to the public.

For example, when Building 102 (the Mixed Acid Tank Farm) at Mulwala was decontaminated and demolished in 2012–13, the initial contract cost was approximately \$311 000. However, due to the discovery of asbestos-impregnated bitumen pitch, the final cost was \$709 000.

Note a: When the explosives factory at Maribyrnong (Victoria) was being demolished, TNT was found in the rafters and in the mortar between the bricks. At Mulwala, nitrocellulose has been found in cracks between floorboards and gaps between metal brackets, corrugated iron, flanges, and pipes.

#### Cost of decontamination and demolition

5.24 A cost estimate for decontamination and demolition works was prepared as part of the May 2014 Scoping Study. While it is not necessary to demolish all of the 134 soon-to-be-redundant buildings, Defence can use the cost estimate to forecast the potential financial requirements. The cost of decontamination and demolition of all buildings was estimated to be \$31.1 million, and was based on a number of assumptions:

- Decontamination and demolition works would be awarded to one Principal Contractor.
- Decontamination and demolition works would be conducted in a staged approach based on geographical operation zones, including a minimum of 20 buildings per stage.
- Approval would be given to use the existing on-site waste treatment facilities (such as the open burning ground and effluent treatment systems.
- Waste disposal costs were estimated at 2014 prices, however they were likely to increase, on at least an annual basis, and might be subject to other levies.

5.25 The cost estimate did not make provision for the purchase of a new Caustic Decontamination Facility or recommendations/requirements that may come out of Heritage Impact Assessments or Environmental Assessment Report processes—such as archival recording and preservation works.



#### Figure 5.4: The Water Dry House at Mulwala

Note: In this building, propellant is steeped in hot water to remove residual solvents. The building has a high risk of energetics contamination, moderate heritage value, and contains asbestos and other hazardous materials. The soil around the building contains excessive levels of DNT.

Source: Defence.

ANAO Report No.26 2015–16 Defence's Management of the Mulwala Propellant Facility 5.26 The February 2015 Gate Review of the Mulwala Redevelopment Project (see Box 3) expressed concern that the demolition of buildings might not be actively pursued by Defence, given that there was no current project or works to remediate the situation.

5.27 At the time of the audit, Defence was unable to confirm a source of funding for decontamination or demolition works. The remaining budget for the Mulwala Facilities Remediation Program does not provide for large-scale demolition works. In October 2014, the Defence Support and Reform Group (now the Defence Estate and Infrastructure Group) declined to take responsibility for funding the decommissioning, decontamination and demolition of redundant buildings at Mulwala, noting that the costs had the potential to reach \$100 million, and a whole-of-Defence approach was required. Defence advised the ANAO in November 2015 that the earliest any funding could be brought forward from the Major Capital Facilities Program would be 2018–19.<sup>65</sup>

5.28 Defence has already demolished 11 redundant buildings. Lessons learned from these demolitions show that it could cost from \$1000 to \$10 000 per square metre, depending on the complexity of the buildings, the contamination present, and the proximity to other production buildings that are still in operation. The total cost of decontamination and demolition works could therefore be substantially higher than \$31.1 million—Defence currently has a decontamination provision of \$60 million in its financial plans for the Mulwala Facility. Additionally, Defence's experience at the Mulwala Facility is that the longer that issues associated with contaminants such as asbestos, acids, lead and mercury remain unresolved, the higher the eventual remediation cost.

#### Box 5 Decontamination and demolition of the Maribyrnong explosives factory

The Maribyrnong explosives factory was built in 1908 and was used until 1994 for explosives and chemicals manufacture, munitions filling, waste treatment and disposal, and administration. In 2009, Defence announced that the site would be sold to the Victorian Government for the development of new residential and commercial areas. Defence is responsible for the remediation of the 127-hectare site, which contains 512 buildings. Defence anticipates that 80 per cent of the buildings and site features may need to be demolished, and extensive remediation works will be conducted.

Defence advised the ANAO in November 2015 that the Maribyrnong remediation project currently has approved funding of \$50.6 million for development work and some remediation, including stage 1 of the site. Of these approved funds, some \$47 million has been spent to date. In terms of further required expenditure, the current estimate is \$309 million. This estimate is dependent upon the final remediation option, but is the expected maximum.

Although the Maribyrnong site is much smaller than the Mulwala site, and is destined for residential use, it illustrates the uncertainties and difficulties associated with remediating former munitions sites.

<sup>65</sup> In August 2015, Defence advised the ANAO that \$250 million had been tentatively identified in the Major Capital Facilities Program for the Mulwala and Benalla sites, to be released between 2024–25 and 2026–27. The intended scope for this funding was base redevelopment including decontamination and demolition.

5.29 Large-scale closure and decommissioning of the old manufacturing facilities at Mulwala are planned to occur from mid-2017. The Scoping Study identified 17 buildings as having a very high energetics risk: within one to two years of being decommissioned, the residual energetic materials in these buildings could become unstable and spontaneously combust. This means that substantial funding will need to be available by mid-2018 to mid-2019.

5.30 Additionally, the Scoping Study estimated that decontamination and demolition of all 134 buildings would take two to three years after contract award. This period would include 6–12 months of planning, approvals and documentation of the proposed works, if the works package is awarded to a single prime contractor. Since the risk of spontaneous combustion arises within one year of decommissioning, Defence will need to commence relevant planning, environmental/ heritage approvals, and internal funding approval processes at the latest during the second half of 2016, to minimise the health and safety risk for those working on-site once the buildings have been decommissioned.

## **Recommendation No.2**

5.31 To plan effectively for the decontamination and demolition of redundant buildings at the Mulwala Facility, the ANAO recommends that Defence:

- (a) develop a risk-based implementation plan for management of the site; and
- (b) advise the Government on relevant risks and costs by mid-2016.

**Department of Defence response**: Agreed.

- I Heki

Grant Hehir Auditor-General

Canberra ACT 15 March 2016 Appendices

ANAO Report No.26 2015–16 Defence's Management of the Mulwala Propellant Facility

## Appendix 1 Department of Defence response



AF24261731

SEC/OUT/2016/28 CDF/OUT/2016/134

**Dr T Clarke** Executive Director Australian National Audit Office PO Box 707 Canberra ACT 2601

Thank you for your correspondence which contained the Report Preparation Paper for the subject audit. Attached to this letter are Defence's Proposed Amendments, Editorials and Comments (Enclosure 1), Responses to Requests for Information (Enclosure 2), the Agency Response (Enclosure 3) and the Response to Recommendations (Enclosure 4). These enclosures represent Defence's formal response to the Proposed Report.

We would like to take this opportunity to formally thank the ANAO for the time and resources they have allocated to the audit. The report's finding and recommendations will benefit Defence's current and future management of the project.

Dennis Richardson Secretary

6 February 2016

MD Binskin, AC Air Chief Marshal Chief of the Defence Force

February 2016

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**Enclosures:** 

- 1. Proposed Amendments Editorials and Comments
- 2. Responses to Requests for Information
- 3. Response to Recommendations
- 4. Agency Response

# Appendix 2 Lend Lease response



ANAO Report No.26 2015–16 Defence's Management of the Mulwala Propellant Facility



# Appendix 3 Thales Australia response



- c. Thales' view is that to compare any costs associated with the Benalla and Mulwala facilities with what could alternatively be bought with the money (such as purchasing 13 F-35A aircraft mentioned in the extract) is misleading. If the money used to pay for the Benalla and Mulwala facilities was to be used for other purposes (i.e. stop domestic munitions manufacture) then consideration of the additional costs for explosive ordnance storage requirements, increased logistics and higher inventory levels must also be factored in; and
- d. Thales is of the view that there is important information missing from the report with regard to the Mulwala Redevelopment Project for the period 1999 to 2007. An excerpt from Thales' longer commentary provided to the ANAO is:
  - i. After December 1999 Defence requested ADI to prepare a detailed proposal for the redevelopment of Mulwala. A preliminary proposal was submitted by ADI in June 2000 and estimated the cost of the redevelopment required at \$180m. Defence requested a further detailed proposal to include additional manufacturing capability with funding and site ownership options. This was submitted by ADI in April 2002. ADI's detailed proposal offered to select and integrate the world's best manufacturing technologies into the redevelopment project and offered a not to exceed maximum price of \$234m for the entire project.

Thales' view is that the Commonwealth has demonstrated strong leadership in reinvigorating the Mulwala facility through asset modernisation, environmental remediation and the establishment of the new propellant precinct – although troubled in its project execution. Further, the implementation of the Commonwealth's performance based Strategic Munitions Interim Contract (SMIC) provides a robust framework from which to implement the transition of the Mulwala and Benalla facilities into a new lower cost and higher utilisation operating paradigm with over 20% reduction in the costs to operate the facilities already realised since the implementation of SMIC.

Thales supports, here in Australia and in its international operations, the need for domestic capability to manufacture propellant, explosives and munitions; the company is fully committed to being the Commonwealth's operator of these critical major hazard facilities. This domestic capability, established in 1940's and modernised since the 1980's has provided a vital industrial capability to the Australian Defence Force and allies in times of major conflict.

Yours sincerely,

Jas

Kevin WALL Vice President

ANAO comment: In July 2002, Defence assessed ADI's April 2002 Detailed Proposal, based on private financing, as not representing value for money, and not meeting the requirement for classification as an operating lease. The Minister subsequently determined that tender-quality pricing was required before he would take the project to Government.