

# Army Presence in the North

Department of Defence

Performance Audit

Tabled 5 March 1997

Audit Report No. 27 1996-97

## Abbreviations and Glossary

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<b>AFV FFTS</b>	Armoured Fighting Vehicle Field Firing Target System - a target system for tank live-firing training
<b>ANAO</b>	Australian National Audit Office
<b>AOSI</b>	Army Office Staff Instruction
<b>APC</b>	Armoured Personnel Carrier
<b>APDC</b>	Army Program Development Committee
<b>APIN</b>	Army Presence in the North
<b>armoured reconnaissance regiment</b>	2nd Cavalry Regiment (Reconnaissance) equipped with 87 ASLAV light armoured vehicles for reconnaissance and surveillance
<b>armoured regiment</b>	1st Armoured Regiment (Tank) equipped with 53 Leopard main battle tanks.
<b>ASLAV</b>	Australian Light Armoured Vehicle - eight-wheeled vehicle - the reconnaissance variant is equipped with a 25mm gun
<b>ASRP-A</b>	Assistant Secretary Resource Planning - Army
<b>A21</b>	Army in the 21 <sup>st</sup> Century

<b>CGS</b>	Chief of the General Staff
<b>COSC</b>	Chiefs of Staff Committee
<b>CTA</b>	Close Training Area - a relatively small training area adjacent or close to a barracks, used for small-scale training activities
<b>DGAW-A</b>	Director General Accommodation and Works - Army
<b>DGFD(L)</b>	Director General Force Development (Land)
<b>DHA</b>	Defence Housing Authority
<b>FMR</b>	Field Miniature Range - a sub-calibre range for tank gunnery training
<b>FTA</b>	Field Training Area - a large training area suitable for larger scale collective training by sub-units, units and formations
<b>FYDP</b>	Five Year Development Program
<b>HQADF</b>	Headquarters Australian Defence Force
<b>LMR</b>	Laser Miniature Range - miniature range for simulated tank gunnery training
<b>mechanised infantry</b>	infantry equipped with armoured personnel carriers for mobility and protection enabling them to operate with armoured units
<b>NORFORCE</b>	Army's northern surveillance force
<b>RAAC</b>	Royal Australian Armoured Corps
<b>RASINDA</b>	HQ ADF Review of the Rationalisation of Administrative Support in the Darwin Area

**RTA**                                      Restructuring of the Australian Army initiative (see footnote 1 on page xi)

**SCMA**                                      Soldier Career Management Agency

## **Summary**

### **Army Presence in the North (APIN) Project**

1. The Army Presence in the North (APIN) Project resulted from a government decision in 1987 to increase the Army's presence in the north of Australia. This was to be achieved by initially moving an armoured reconnaissance regiment to Darwin, and subsequently by conducting detailed studies on relocation of a brigade to northern Australia. Subsequently the Minister for Defence, in announcing the 1991 Force Structure Review, confirmed that one of the Army's two regular brigades would be permanently based in Darwin in the late 1990s. The objective of APIN is to relocate a mobile formation to northern Australia to be able to conduct protracted and dispersed operations in response to credible low-level contingencies in northern Australia as identified in the 1987 Defence White Paper *Defence of Australia*.
2. APIN involves the relocation to Darwin of Army's 1st Brigade over the period 1992-2001, including approximately 2285 personnel, 200 armoured fighting vehicles (Leopard tanks, ASLAV light armoured vehicles and M113 Armoured Personnel Carriers) and 500 support vehicles, along with supporting elements. These were formerly based in Holsworthy, New South Wales, and Puckapunyal, Victoria. So far 1st Brigade's Headquarters, its signal squadron, two of its three major combat units, and some supporting elements, representing almost 60% of 1st Brigade personnel, have been relocated to Darwin.
3. The relocation requires phased construction of purpose-built barracks at Palmerston, 25 km east of Darwin, and acquisition and development of training areas sufficient to meet the brigade's manoeuvre training requirements. The cost of these facilities, which are yet to be completed, is estimated to be \$585 million (excluding cost of land acquisition). In addition 1025 married quarters, costing \$248 million, will have been bought, built or leased by the Defence Housing Authority (DHA) by the time the project is complete in 2001, when the brigade is to be fully operational in Darwin.
4. Relocation of units to Darwin causes additional costs to Army arising from relocation and infrastructure development and the higher costs of operating in northern Australia. The present funding allocation for APIN operating costs in 1996-97 is \$12.4 million rising to \$19 million in 2000-01. Army is to provide supplementary funding of \$6.0 million in 1996-97, rising to \$7.9 million in 2000-01.

### **Audit Objective and Criteria**

5. The objective of the audit was to assess the effectiveness and efficiency of Army's management of the move of 1st Brigade to Darwin. The audit criteria directly related to implementation of the project. These criteria addressed planning as well as identification and management of longer-term risks to the success of the project.

### **Overall Conclusions**

6. The APIN Project is at about the half-way stage to planned completion in 2001. Units are being relocated in accordance with Army's movement plan. Facilities have been constructed on schedule and within the construction budget. However, there have been overruns in operating costs and shortcomings in planning and coordination of APIN implementation. For example, provision of simulation and field training facilities in northern Australia has not been coordinated with the movement of Army units. As well there is a need for a strategic personnel management plan to support the force in northern Australia.

7. There are several key challenges still to be overcome before the 1st Brigade's capability can be fully achieved in a cost effective manner. Suitable training facilities have still to be provided, and the technical and human limitations of operating the armoured regiment's Leopard tanks in the high temperatures of northern Australia have yet to be overcome. Some important logistic support arrangements are still to be defined and financial aspects of APIN, in particular attribution of funds, should be managed more tightly for greater effectiveness.

8. The problems identified in this report could be potential areas of risk in similar future projects. The ANAO considers that there could be significant advantages in Army addressing the issues highlighted in this report not only for the remainder of the APIN project but also for the planning and implementation of the recently-announced Restructuring of the Australian Army (RTA) initiative <sup>1</sup>.

9. In response to the audit report Army agreed with the ANAO's recommendations. They indicated that the recommendations would assist the process of avoiding a recurrence of the planning and execution difficulties evident in the APIN project during the implementation of the Restructuring of the Army initiative.

## **Key Findings**

### **APIN planning and coordination**

10. The APIN project will be complete when all 1st Brigade units are fully operational in Darwin in 2001. So far units have moved to Darwin according to schedule. Facilities construction in developing Robertson Barracks near Darwin has generally been effective, being within budget and on schedule.

11. Successful implementation of the project requires more than building accommodation and facilities and moving units to northern Australia: for units to achieve the necessary level of operational capability cost-effectively they must be staffed in accordance with wider Army priorities, have equipment which works effectively in northern conditions, be able to train effectively and be supported by effective base and field logistic support systems. The ANAO considers that there have been shortcomings in the planning necessary to achieve this outcome, and that a project of the size and significance of APIN requires coordination through a more comprehensive and detailed plan than has been the case so far. Limitations in these respects have led to additional costs (e.g. in training, logistic support arrangements and operating the tanks).

12. The ANAO also found that logistic planning for APIN has been slow to develop. The recent Restructuring of the Australian Army initiative will demand a different approach to logistic support of Army units in northern Australia if a more effective outcome is to be achieved. Timely development of a logistic concept and accurate definition of the support

requirement for northern Australia will help to ensure that a cost-effective logistic system is developed.

13. The Restructuring of the Army initiative will affect major areas of APIN and inevitably compete with APIN issues for priority of line management attention. There is a need for Army's future management arrangements for APIN and the Restructuring initiative to be well-defined and provide effective coordination of the various activities involved.

### **Financial management**

14. Visibility of the actual cost to Army of the APIN project is a key element in the effective management of APIN. Army has had difficulty with operating cost estimation and proper attribution of expenditure throughout the project.

15. APIN operating costs are higher than Army had expected. In some cases costs have actually increased while, in others, funding of costs was previously overlooked. An example is the funding of district allowance for Army personnel in Darwin: initially the funding for this had been overlooked and the \$1.7 million required for 1996-97, rising to \$4 million in 2000-01, was only sought in mid-1996.

16. The problems of attribution stem from difficulties in allocating to APIN the additional premium of some operating costs in northern Australia (for example fuel, power and rations) compared to those in the south. In addition, difficulties were experienced in ensuring that staff attributed items of APIN expenditure accurately and consistently to the project. Accordingly, Army does not know the full extent of these higher costs due to limitations of the system by which expenditure is attributed. However, a limited review within Army has shown that in 1994-95 Army spent almost 20% (about \$2 million) more on APIN operating costs than had been originally programmed.

17. As better cost information became available as a result of that review, bids by Army sub-programs for future funding exceeded by approximately 50 per cent the initially planned funding of about \$12.4 million in 1996-97. The ANAO considers that there is still a risk that all operating costs and their funding implications may not have been identified. A more focussed review of APIN operating costs to ensure that all costs have been identified would assist the Army in ensuring an appropriate level of funding for APIN is provided, and to make appropriate decisions where there are competing priorities.

### **Development of training facilities has been slow**

18. The ability of 1st Brigade to train effectively and achieve its military preparedness objectives is central to the achievement of the objectives of the APIN project. This requires suitable training facilities to be available.

19. The tropical climate and terrain create difficulties for effective armoured training in northern Australia. Existing training areas are either not large enough or lack sufficient infrastructure development to meet 1st Brigade's current needs. A squadron of tanks has already had to return to the armoured regiment's previous training area in Victoria to train and to support southern based units. This is likely to continue until 1999 when the Bradshaw Field Training Area, purchased in 1995, should be sufficiently developed to enable its use for this purpose. Currently, effective training cannot be carried out in northern Australia to meet all training objectives and, consequently, the operational capability of the brigade is at some risk.

20. Where cost effective, simulation training, using laser devices to simulate tank gunnery, could be developed to enable more efficient programming of training throughout the year, including training during the northern wet season. Such training methods could offer financial and environmental advantages. However, only limited simulation equipment is currently available in Darwin. A possible gunnery simulator for Leopard tanks is not yet funded. An ASLAV gunnery simulator will not be in service before 1998.

21. Although 1st Brigade has a training plan, Army has no overall training strategy to address the specific challenges of training in northern Australian conditions. Detailed information on the extent to which costs of training could be reduced through simulation, and, based on a relevant cost-benefit analysis, would assist in the development of a training strategy. This should help define the role and extent of simulation training required in northern Australia.

### **Northern Australian environment has an adverse effect on Leopard tank capabilities**

22. Army has been operating its only regiment of Leopard main battle tanks in Australia for nearly 20 years and has now relocated them to Darwin as part of APIN. But, without any form of cooling in the tanks, the high temperatures in northern Australia can cause inaccuracies in the gun-sighting system and pose a high risk to crew safety from heat-related injury. Modifications to the tanks to attempt to address these risks will not begin until 1997-98, two years after the tanks' relocation to Darwin.

### **Requirement for personnel management and support in the north**

23. The relocation of 1st Brigade to Darwin means that, along with 3rd Brigade in Townsville, both full-time Army brigades will be based in the tropical north. This limits posting opportunities for soldiers in combat units. Personnel issues arising from long-term postings in the tropics have been recognised by Army as a potential risk to APIN in the longer term.

24. Although some personnel issues have been addressed, Army could develop an improved strategic personnel management and support plan to provide effective support to the force in northern Australia. Such a plan could provide for the coordinated collection of information on personnel factors. It would also allow coordinated development and implementation of appropriate solutions to possible adverse effects on morale and retention rates, and help identify the subsequent implications for Army recruiting and initial employment training.

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## **Recommendations**

*Set out below are the ANAO's recommendations with Report paragraph references and Army's abbreviated responses. More detailed responses and any ANAO comments are shown in the body of the report. The ANAO considers that Army should give priority to Recommendations Nos. 1, 3 and 4.*

Recommendation  
No. 1  
Para. 2.18

The ANAO recommends that Army develop a more comprehensive APIN plan, and integrate it into planning for the Restructuring of the Army (RTA) initiative.

### **Impact**

Effective coordination of all APIN-related activities, and integration with the planning for the RTA initiative, should minimise additional costs and ensure effective provision of personnel, training facilities and logistic support.

### **Response**

#### **Agreed.**

The ANAO recommends that Army, in developing logistic support plans for the Restructuring of the Army (RTA) initiative:

(a) define more clearly the requirements for logistic support of 1st Brigade in Darwin; and

(b) implement a cost-effective logistic system to support 1st Brigade.

Recommendation  
No. 2  
Para. 2.27

### **Impact**

Appropriate logistic support options could be developed and logistic support costs consequently could be minimised. Industry providers of logistic support activities would be able to structure better their operations with a view to providing appropriate support in the north in the longer term.

### **Response**

#### **Agreed.**

The ANAO recommends that Army put in place an effective mechanism to coordinate implementation of the remainder of the APIN project, in close coordination with planning and implementation of the Restructuring of the Army initiative.

Recommendation  
No. 3  
Para. 2.44

### **Impact**

A centralised coordination function would improve coordination and control of all APIN activities which previously were managed in isolation with attendant inefficiencies. This would ensure that all functions and facilities are provided and managed in a timely and efficient manner to achieve 1st Brigade's effective operational capability.

### **Response**

#### **Agreed.**

The ANAO recommends that Army:

(a) review all operating costs associated with planned APIN developments and their attendant priorities for consideration in the context of the allocation of the Defence budget; and

(b) seriously consider the application of life-cycle costing techniques for similar Army projects in the future, as is the case for major capital equipment procurement projects.

Recommendation  
No. 4  
Para. 3.26

### **Impact**

This recommendation would help ensure that Army achieves appropriate

funding which reflects the true ongoing cost of APIN, without needing to use funds from other sub-programs to support APIN-related activities. The effect of APIN on other Army activities may therefore be reduced, as should the risk to APIN from any future funding shortfalls. A further outcome could be to ensure that the life-cycle cost implications of the Restructuring of the Australian Army initiative are more effectively identified and planned.

### **Response**

#### **Agreed.**

The ANAO recommends that Army:

(a) conduct detailed cost/benefit analyses on the savings achievable from introduction of the range of simulators relevant to 1st Brigade (including gunnery training, driver training, and tactical engagement simulators); and

(b) develop and implement an effective training strategy, incorporating simulation, to address the range of challenges inherent in carrying out unit and formation training in northern Australia.

Recommendation  
No. 5  
Para. 4.41

### **Impact**

Appropriate training solutions would minimise costs incurred by moving units to training areas elsewhere in Australia and yield savings in ammunition and other costs. More widespread use of cost effective simulation equipment would enable units to train effectively in the wet season, improve training, morale and motivation of personnel, avoid environmental damage and yield savings in operating costs.

### **Response**

#### **Agreed.**

The ANAO recommends that Army:

(a) undertake a comprehensive personnel impact study; and

(b) develop an improved strategic personnel management and support plan in order to provide effective support to the force in northern Australia.

Recommendation  
No. 6  
Para. 6.17

### **Impact**

It is recognised that long periods of service based in Darwin or Townsville are likely to adversely affect recruitment and retention rates. A strategic personnel plan would assist Army to address personnel issues in Darwin cost-effectively by implementing coordinated initiatives at the right time, anticipating effects on recruitment and retention and identifying the operating costs.

### **Response**

#### **Agreed.**

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Announced in the Minister for Defence's Defence Policy Statement HR Hansard 15 October 1996 p5267.

## 1. Introduction

*This chapter describes the background to the Army Presence in the North (APIN) project and outlines the ANAO's audit.*

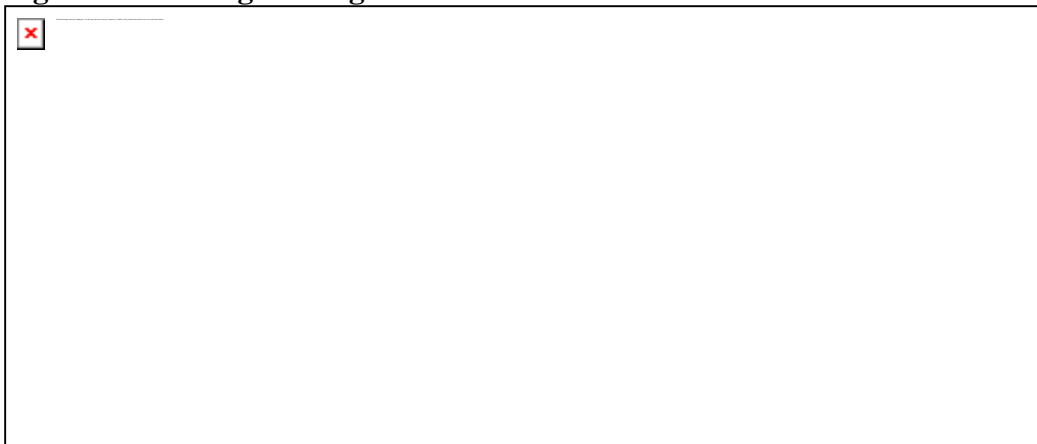
### Background to the APIN project

1.1 The Army Presence in the North (APIN) project stems from the 1987 Defence White Paper *Defence of Australia*. This called for detailed studies on the possible relocation of an Army brigade to northern Australia, including careful consideration of possible alternatives. The White Paper indicated that the Army presence in the north of Australia should be increased initially by moving an armoured reconnaissance regiment to Darwin, and later by basing a brigade there. In 1991 the then Minister for Defence, in announcing the *Force Structure Review*, confirmed that one of the Army's two regular brigades would be permanently based in Darwin in the late 1990s. The movement of 1st Brigade has become known as the APIN project.

### Movement of Units

1.2 The APIN project aims to relocate 1st Brigade and its support elements to Darwin by 2001. 1st Brigade units were formerly based in Holsworthy, New South Wales and Puckapunyal, Victoria. 1st Brigade comprises three major combat units: an armoured regiment, an armoured reconnaissance regiment, and a mechanised infantry battalion. Combat support is provided by combat engineer, artillery and helicopter reconnaissance units, and an administrative support battalion provides integral logistic support. This is shown in Figure 1.

**Figure 1 - 1st Brigade Organisation**

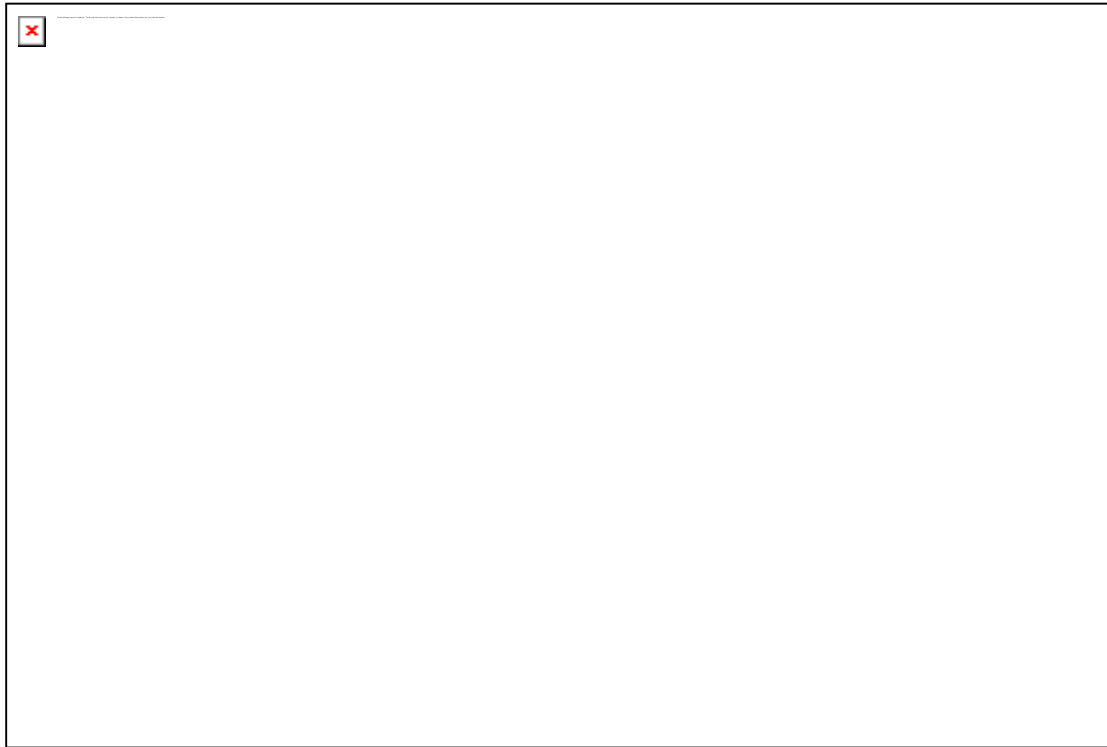


1.3 The APIN project commenced as a relocation of an armoured reconnaissance regiment in 1992. The project was subsequently expanded to include 1st Brigade and supporting elements. The project is now a little over half-way to planned completion in 2001, with nearly 60% of 1st Brigade personnel relocated to Darwin.

1.4 Figure 2 illustrates the APIN movement plan and numbers of personnel relocating to

Darwin. So far units have been relocated in accordance with the movement plan: the armoured reconnaissance and armoured regiments, along with 1st Brigade Headquarters and its signal squadron, have already relocated to the newly-constructed Robertson Barracks, Palmerston, near Darwin. In addition, some supporting elements have relocated elsewhere in Darwin including the helicopter reconnaissance squadron and elements of the engineer regiment and administrative support battalion. 1st Brigade Headquarters and Signal Squadron are to relocate by mid-1997.

**Figure 2 - APIN Movement Plan (figures indicate numbers of personnel relocated to Darwin)**



1.5 A total of 2285 personnel and approximately 2600 dependants are to be relocated by 2001. Units still to move include the infantry battalion in 1998, remaining elements of the engineer regiment and administrative support battalion, and the artillery battery in 1999.

#### **APIN objective**

1.6 The objective of moving 1st Brigade to Darwin is to locate a mobile formation so that it can:

- respond to a wide range of credible contingencies in northern Australia (as identified in the 1987 White Paper); and
- conduct protracted and dispersed operations in harsh terrain, away from logistic support centres.

1.7 Relocation to Darwin would also enable the formation to train on and become familiar with the terrain over which it is considered likely to deploy and fight. It should also aid acclimatisation and adaptation of soldiers and units to the challenges of operating in the extremes of climate and topography characteristic of northern Australia.

1.8 The Defence Sub-Committee of the Parliamentary Joint Standing Committee on Foreign Affairs, Defence and Trade recently visited Defence establishments in the north of Australia. In their report tabled in the Parliament the Sub-Committee commented that APIN is a key element of Australia's long-term defence planning <sup>1</sup>.

### **Facilities construction**

1.9 Facilities construction is a major element of the APIN project, with a total cost approved by the Parliamentary Standing Committee on Public Works of approximately \$525 million <sup>2</sup>. A greenfield site was selected near Palmerston, 25 km east of Darwin, for the construction of Robertson Barracks to house 1st Brigade.

1.10 Figure 2 outlines how the stages of facilities construction correspond to phases of the movement plan. Initial facilities were occupied by the armoured reconnaissance regiment in 1992. This was followed by further facilities construction (at a cost of \$198 million) which progressed through 1995-96 with 15 of the 19 major construction packages completed or under construction. Army expects this stage to be completed about a year ahead of schedule and \$3 million under budget. Proposals for the final stage, to cost \$264 million, were approved by the Parliamentary Standing Committee on Public Works in June 1995.

1.11 The Defence Housing Authority (DHA) is committed to providing 1025 married quarters for the Army in Darwin by 2000 through a program of construction and spot purchase, at a cost of \$248 million. This expenditure is additional to spending on the APIN project. By mid-October 1996 DHA had built or purchased about 530 married quarters in Darwin for APIN purposes.

### **Audit objective, scope and methodology**

1.12 The ANAO selected management of the APIN project for audit because APIN represents a significant change to Army's disposition of combat force. In addition, the facilities, married quarters and training areas required to support the force relocating to the north represent a significant investment exceeding \$830 million.

1.13 The objective of the audit was to assess the effectiveness and efficiency of Army's management of the move of 1st Brigade to Darwin.

1.14 The scope of the audit included:

- project planning and management;
- facilities construction;
- movement of units;
- training;
- personnel management and support;
- logistic and administrative support; and
- financial management.

1.15 The audit limited the scope of its examination of administrative and logistic support

aspects of APIN because:

- HQADF is currently undertaking a review of the Rationalisation of Administrative Support in the Darwin Area (RASINDA); and
- base repair of armoured vehicles is currently being considered for contracting out under Defence's Commercial Support Program.

1.16 The main audit criteria for assessing the effectiveness and efficiency with which APIN has been implemented were:

- the project should ensure that the full capability of the brigade is achieved in Darwin;
- planning should be coordinated across functional areas;
- units should move to Darwin in accordance with the movement plan;
- infrastructure should be developed in concert with the movement plan;
- logistic support arrangements should meet operational objectives;
- additional costs of northern basing should be minimised; and
- risks to maintenance of 1st Brigade capability should be identified and managed.

1.17 The audit focussed on areas where risk planning and management could be improved over the remainder of the project to help achieve the objectives of APIN, and to prevent unnecessary costs being incurred.

1.18 Audit fieldwork was undertaken at HQADF, Northern Command, Army HQ, commands and units, and in consultation with the Northern Territory Government. The ANAO engaged Mr Noel Sutton of Mercadier Pty Ltd to assist with analysis of information on a range of issues and activities, particularly personnel management and support aspects of APIN.

1.19 The ANAO conducted a preliminary study of APIN between September and November 1996. As a result of the study it was decided to complete the audit work as a short project performance audit. In doing so the ANAO had regard to:

- the benefits of early advice to Army on those areas of APIN where management could be improved and which are relevant to planning the Restructuring of the Australian Army initiative;
- the Defence Efficiency Review;
- HQADF's current review of the rationalisation of logistic and administrative support in Darwin; and
- Army's recent recognition of the priority of APIN funding.

1.20 The cost of the audit was \$95 000. It was conducted in conformance with the ANAO Auditing Standards.

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## 2. Planning and Project Management

*This chapter examines Army's approach to planning the APIN project and managing various aspects of project implementation which support the movement of units to Darwin. It identifies the need for better coordination of activities affecting APIN in order to provide greater assurance of effective capability.*

### **Introduction**

2.1 The APIN project will be complete when all 1st Brigade units are fully operational in Darwin in 2001. Successful implementation of the project requires more than simply building accommodation and facilities and moving units to northern Australia: for units to achieve the necessary minimum level of operational capability in Darwin they must be fully staffed, their equipment must work effectively in northern conditions, they must be able to train effectively and they must be supported by effective base and field logistic support arrangements. Coordination of such a wide range of activities demands effective planning to ensure cost-effective development of infrastructure and support elements and appropriate resourcing.

### **Initial concept**

2.2 The initial operational concept for implementation of strategic guidance was approved by the ADF's Chiefs of Staff Committee (COSC) in 1990. In February 1992 COSC agreed on the following increased Army presence in the north:

- an armoured reconnaissance regiment;
- an aviation squadron;
- a brigade headquarters;
- an armoured regiment;
- a mechanised infantry battalion;
- enhanced logistic support; and
- appropriate combat support elements.

### **Components of operational capability**

2.3 In Audit Report No.17 1995-96, *Management of Australian Defence Force Preparedness*, the ANAO identified key elements of effective management of military capability. These are shown in Figure 3.

Figure 3 - Elements of military capability



2.4 The figure illustrates the wide range of activities involved in the planning and implementation of an activity such as the APIN project. These all contribute to ensuring that the operational capability of 1<sup>st</sup> Brigade is achieved once it has been physically relocated. Within this spectrum of activity, there are five key result areas which must be successfully managed in order to achieve this operational capability. In addition to maintaining the brigade in barracks, these key result areas include:

- ensuring the technical performance of equipment in northern Australian conditions;
- provision of sufficient personnel;
- provision of suitable training facilities and resources; and
- effective logistic support arrangements.

2.5 Failure to manage effectively any one of these areas could undermine the capability of the brigade, and result in the return on the investment in relocation and facilities associated with APIN not being achieved. Figure 4 illustrates this concept:

Figure 4 - APIN Capability Development



### **APIN planning process**

2.6 The ANAO found that planning was not coordinated effectively across a number of key areas, including financial management, training, equipment management, logistic support and personnel management.

2.7 The first overall planning document relating to APIN was not developed until Director APIN (DAPIN) produced an Army Office Staff Instruction (AOSI) in 1993 (revised in 1995). It is a short document which contains the policy and movement plan for APIN. It focuses on movement of units, and its scope is limited to defining policy and the

management structure and responsibilities for implementation. It provides no guidance on coordination and timing of development activities in support of APIN units. It continues to be the only policy and planning document for APIN across Army sub-programs.

### **Lack of coordination in APIN planning**

2.8 The following are examples of lack of coordination in APIN planning and their consequences:

- Army viewed the development of training areas in the north as a separate facilities issue, not connected to APIN. Provision of a suitable brigade manoeuvre training area was planned separately from APIN planning, and has not occurred in concert with the movement plan. As a result, a suitable training area will not be available for use by the major APIN units until 1999 at the earliest. The expected costs of developing and maintaining the brigade manoeuvre training area were not included as APIN-related costs.
- Elements of the armoured regiment, which relocated to Darwin in 1995, returned in 1996 to their former training area in Victoria to conduct live-fire and manoeuvre training. They need to do so annually until a suitable training area is available in 1999.
- The Leopard tanks located in northern Australia will not have a climate control system until 1997-98. This system is critical for minimising weapon system inaccuracies induced by extreme temperatures, and reducing the high risk of heat casualties among crews. <sup>3</sup>
- 50 positions within the administrative support battalion were omitted from the APIN Movement Plan. This was due to a failure to coordinate plans for staffing logistic support units with the movement plan.
- Slow planning for logistic support facilities resulted in the final requirement for '4th line' facilities infrastructure exceeding the planned budget by \$26 million.
- Planning for relocation of a tank troop in 1992 had limitations. The personnel and funding implications for moving the tanks, and spare parts and ammunition storage needs, were not identified in good time.
- There was insufficient consultation to determine the simulation requirements for all units moving to Darwin, in particular those of the artillery battery.
- Construction of a communications centre and medical centre at Robertson Barracks was approved without plans for staffing and operating the facilities.

2.9 The ANAO therefore considers that there have been shortcomings in the planning necessary to ensure successful outcomes in all activities which contribute to 1st Brigade's operational capability. The staff instruction of 1993 went part of the way to address early limitations in planning, but it covered only some aspects of APIN and in little detail. Army thus had no means of monitoring progress of APIN other than to see whether units were moving as programmed in the movement plan. The ANAO considers that a project of the scale and significance of APIN should be coordinated by a more comprehensive and detailed plan than is contained in the staff instruction. An effective plan would draw

together and coordinate more detailed plans for discrete activities. The Restructuring of the Australian Army initiative will have many effects on APIN: there is therefore a need to redevelop the APIN plan to manage satisfactorily these results.

### **APIN Working Group**

2.10 An APIN Working Group was established in 1991 to monitor the progress of APIN and initiate corrective action where necessary. It met irregularly until 1993, then quarterly until 1996, and has now reverted to meeting only when required.

2.11 The APIN Working Group was not responsible for and did not carry out any coordinated planning. There is little reference in APIN Working Group minutes since 1991 to specific plans regarding APIN, other than reference to the Movement Plan from 1993, and no reference to the Working Group as a body developing plans to manage future aspects of APIN.

2.12 Members of the Working Group have many other matters to deal with in addition to APIN. Much of the Working Group's business related to reactive development of solutions to problems identified during the course of the project. A good deal of the work undertaken as a result of APIN Working Group meetings may not have been necessary if detailed appreciations and plans had been produced early in the project.

2.13 Army advised that the APIN Working Group is not an appropriate forum for planning. Director General Force Development (Land) (DGFD(L)) and Director General Accommodation and Works (DGAW-A) develop the force structure and facilities plans for Army and Defence committee consideration. The APIN Working Group coordinates implementation and solves problems. It could be argued that the APIN Working Group duplicated the Army Program Development Committee, which inhibited proper coordination of APIN.

### **Future management**

2.14 The ANAO considers that future management of APIN would be improved by a top-level APIN plan. This should be backed up by detailed plans for supporting activities, including personnel management and support, logistic support, and budgeting. This would need to be coordinated with plans for the Restructuring of the Australian Army initiative.

### **Planning components**

2.15 In the ANAO's view detailed planning could include:

- a clear statement of the concept of operations or activity being supported, and linkage to strategic guidance;
- development of appropriate options supported by cost-benefit analyses;
- allocation of responsibilities for relevant aspects of implementation;
- details of activities to be implemented, including clear objectives, performance measures and evaluation plans;
- identification, analysis, and establishing priorities of relevant risks, and plans for their amelioration;



- a statement of likely effects on other sub-program activities;
- cross-reference or clear linkage to other relevant plans;
- detailed cost estimates for planned activities, with statement of assumptions and methodology employed; and
- programming of funding.

2.16 Such a plan for APIN could incorporate and coordinate detailed plans for training, logistic support, personnel management and support, financial management and other activities. The plan could capture all relevant corporate knowledge on the full range of APIN activities, and be suitably documented.

2.17 Army advised that a top level APIN plan could only cover aspects which are not common to all brigades, such as the relocation schedule and discrete funding. It would be counter-productive to duplicate the Army planning process for APIN. ANAO agrees that duplication of planning processes is to be avoided, but considers that the particular challenges of military training and operations in northern Australia needs to be addressed by careful integration of planning for these specific requirements. Successful achievement of the desired capability in northern Australia requires that all risks to that capability are identified, analysed, assessed and ranked, and that planning ensures that appropriate control mechanisms are in place.

### **Recommendation No. 1**

2.18 The ANAO recommends that Army develop a more comprehensive APIN plan, and integrates it into planning for the Restructuring of the Australian Army (RTA) initiative.

### **Impact of this recommendation**

2.19 Effective coordination of all APIN-related activities, and integration with the planning for the Restructuring of the Australian Army initiative, should minimise additional costs and ensure effective provision of personnel, training facilities and logistic support.

### **Response**

2.20 Agreed. The requirement to comprehensively plan the remainder of the APIN project in conjunction with RTA is accepted. APIN requirements have been incorporated into the Army force structure plan, using a project management template to coordinate critical activities. In particular, the personnel, equipment, facilities and financial implications of all force structure changes are considered, together with the outcomes of RTA supporting studies.

## **Logistic support planning for APIN**

### **Background**

2.21 Darwin is 4000km by road from Adelaide and 4200km from Brisbane. The long lines of supply from the south and south-east pose a significant challenge (and impose additional cost) for logistic support of 1st Brigade. This is particularly the case for major repairs to armoured vehicles, as the only base repair facility for armoured vehicles is

located at Bandiana in Victoria.

2.22 The ANAO found that logistic planning in support of APIN has been fragmented and slow to develop. The following events give an indication of the progress of logistic support planning for APIN:

- a Logistic Concept for the northern region had been released in October 1992, but this was recognised in 1994 by HQ Logistic Command as requiring extensive revision;
- in 1993 the APIN Working Group noted that logistic support for APIN remained unresolved. It noted that the limited information in a 1st Brigade logistics appreciation would restrict full development of the base administrative support arrangements. The Working Group requested that HQ Logistic Command conduct an appreciation of the logistic support requirements for APIN;
- in 1994 HQ Logistic Command noted that a policy for the provision of support in the northern region was still required;
- in 1994 Defence's Management Audit Branch reported that a logistic support guideline relating to APIN had been produced as early as 1991, but that the depth of support required by 1st Brigade was never considered until HQ Logistic Command prepared a paper, *Options for Fourth Line Logistic Support to APIN* in 1994; and
- a project team was established in Darwin to report by December 1994 on a range of issues which had not previously been addressed in depth. The project team subsequently reported that:

...There is an urgent need to provide a new logistic concept for APIN and an appropriate fourth line logistics interface, before major combat elements are relocated to Darwin. It must guarantee quality, cost efficient support, and utilise single service logistic management and the civilian infrastructure to the maximum extent possible...

### **Logistic support concept and requirements still to be defined**

2.23 Two of the three major combat units are already in Darwin. However, Army's Logistic Command has been unable to secure a user-definition from Land Command of the required levels of base logistic support, and has therefore been unable to develop detailed planning to support 1st Brigade. Army has also acknowledged the limitations of the northern civil infrastructure to support APIN, and the consequent need to support northern based units from southern based logistic elements. As a result, base logistic support arrangements in Darwin have not been developed in line with the increasing dependency resulting from the move of 1st Brigade.

2.24 In spite of the previous concerns outlined at paragraph 2.22, the ANAO found that there is still no overall logistic concept supporting APIN. Army recently advised the ANAO that Logistic Command is now developing concepts for the logistic support of northern units from southern based logistic elements, although development of these concepts has been delayed by the Restructuring of the Australian Army initiative.

2.25 There are three factors which presently affect logistic planning in the north:

- the new Government's Restructuring of the Australian Army initiative;
- the proposals under the Defence Commercial Support Program (CSP) for provision of base repair for armoured vehicles; and
- the current HQADF review of the rationalisation of logistic and administrative support in Darwin.

2.26 The most significant of these is the Restructuring of the Australian Army initiative, which is likely to require substantial revision of previous field logistics planning for APIN. Notwithstanding these factors, the ANAO considers that development of an overall logistic support plan for APIN has been slow. Without an effective plan there is no guarantee that logistic support arrangements for support of 1st Brigade will be well-managed and cost-effective.

### **Recommendation No. 2**

2.27 The ANAO recommends that Army, in developing logistic support plans for the Restructuring of the Army (RTA) initiative:

- a) define more clearly the requirements for logistic support of 1st Brigade in Darwin; and
- b) implement a cost-effective logistic system to support 1st Brigade.

### **Impact of this recommendation**

2.28 Appropriate logistic support options could be developed and logistic support costs consequently could be minimised. Industry providers of logistic support activities would be able to structure better their operations with a view to providing appropriate support in the north in the longer term.

### **Response**

2.29 Agreed. The outcomes of the Army 21 (A21) Logistic Review and the A21 Task Force Trial will inform action to implement this recommendation. Specifically, the A21 Logistic Review will address the provision of base and operational logistic support to Army combat force formations which are permanently or temporarily based in northern Australia. These logistic processes include the force structure efficiencies being planned to accommodate the transfer of personnel from Logistic Command into the combat force, and the consequential outsourcing of logistic functions.

2.30 The A21 Task Force Trial will validate the logistic concepts, processes and structures necessary to support 1st Brigade, (the representative A21 Task Force). These reviews will permit the evaluation of logistic support options for both APIN and the entire combat force.

### **Management of the APIN project**

2.31 In 1991 Army noted that one of the three major lessons learnt from Air Force's establishment of a base at Tindal, NT was the need for a dedicated team to coordinate and execute the move. In the same year it was recommended to Army's Director of Plans to form such a project team at Colonel rank. However, a project team was not formed until 1993 when Directorate APIN was established. This team was subsequently disbanded in

early 1994.

2.32 Responsibility for oversight of APIN implementation has changed almost annually over the life of the APIN project. The level at which that responsibility rested also changed, as did the location of the relevant staff position. These changes are summarised in Table 1.

Table 1- Responsibility for APIN Implementation <sup>4</sup>

Period	Responsibility for APIN	Locations
Pre May 92	Lieutenant Colonel [within Directorate of Plans - Army]	Canberra
May 92 - Nov 92	Lieutenant Colonel Major	Canberra Darwin
Nov 92 - Jan 93	Major (Lieutenant Colonel retired - position not filled)	Darwin
Jan 93 - May 93	Colonel [Directorate APIN created] (assisted by Lieutenant Colonel and Major)	Canberra
May 93 - Jan 94	Lieutenant Colonel Lieutenant Colonel [Directorate APIN disbanded - responsibility transferred to Lieutenant Colonel within Directorate of Plans - Army]	Darwin Canberra
Jan 94 - Jan 95	Colonel [responsibility transferred to Directorate of Projects - Army]	Canberra
Feb 95 - Jun 96	Lieutenant Colonel	Canberra
Jun 96 - present	Lieutenant Colonel (reduced part-time responsibility) [Directorate of Projects disbanded - responsibility transferred to Directorate of Plans]	Canberra

2.33 The ANAO considers that the frequency with which responsibility for APIN changed was not conducive to continuity in coordination of APIN issues. It also served to exacerbate the turbulence arising from the normal Army posting rotation. Army's current approach of devolving responsibilities for planning to line management increases the risk of future lack of coordination in planning.

2.34 In mid-1996 the Directorate of Projects - Army was disbanded as a result of reorganisation of Army's General Staff Division. The officer with responsibility for oversight, albeit part-time, of APIN became responsible for facilities and training areas instead. This occurred at the same time as the APIN Finance Officer position was redeployed with other responsibilities.

2.35 Army advised that no aspects of Army management can be insulated from personnel

turbulence and changing priorities. Army noted that one of the weaknesses in APIN management was the attempt to isolate the project, and that line management through normal processes is more likely to achieve effective implementation.

### **Financial management of APIN**

2.36 In the early stages of the project, Army experienced difficulty in correctly attributing APIN costs. As a result, an APIN Finance Officer position was established in late 1994 within the Directorate of Projects - Army. Work undertaken in 1995-96 in an attempt to more accurately attribute funds for that year revealed that APIN was costing nearly 20% more than planned. The Finance Officer position was transferred to another branch in 1996, and was allocated higher priority tasks relating to the Commercial Support Program (CSP). This has contributed to the erosion of the practical level of oversight of APIN costs, as discussed in Chapter 3.

### **Facilities project management**

2.37 The facilities construction aspects of the APIN project generally appear to have been handled well. The second stage of Robertson Barracks facilities is estimated by Army to be ahead of schedule by one year and \$3 million under budget. Efficiencies have been achieved in some areas. An example is the design and layout of the armoured vehicle wash-down point which will reduce the time required to wash the brigade's vehicles after an exercise.

2.38 Nevertheless, there have been some difficulties created by a lack of policy or coordinated overall planning. One example is the provision of a communications centre for Robertson Barracks. The communications centre was to be built as part of a larger complex of buildings. However, it was scheduled for construction without an analysis of the user's requirement, and with no plans for staffing the facility. The APIN Working Group was unable to confirm the need, or the ability to staff it. As a result urgent work was required to resolve the issue quickly before tenders were called for design of the buildings.

2.39 A further example is the construction of the medical centre in Robertson Barracks in 1995. This was not used, because the staff positions required to operate it were not planned for and cannot be filled. Also, lack of clear and timely policy on the cabling specifications for the Robertson Barracks base area network architecture introduced delays for the APIN facilities project staffs. This was also the case for the specifications for building management systems (monitoring of fire alarms etc). As a result some of the systems have been retrofitted rather than incorporated into building design.

### **Provision of married quarters**

2.40 The ANAO noted that Army had experienced some difficulties in providing married quarters for entitled soldiers and their families. However, the Defence Housing Authority has met and in some periods exceeded the numbers of married quarters required by Defence in Darwin.

2.41 Due to the work of the HQADF review of rationalisation of administrative support in the Darwin area (RASINDA), which focussed initially on Defence provision of married quarters, the ANAO did not investigate this issue in detail. However, there is scope for Defence to improve its management of married quarters in Darwin and thereby reduce the

relatively high married quarter vacancy rate (in August 1996 the vacancy rate was 9%). This would reduce reliance on high-cost temporary rental accommodation. The ANAO understands that Defence, through RASINDA, is examining the scope for jointly managing, inter alia, the provision of housing to all eligible Service personnel posted to the Darwin area.

### **Conclusion**

2.42 Planning and management of facilities construction for APIN have generally been effective, with facilities constructed on schedule and within overall budget so far. Units have moved to Darwin in accordance with the movement plan. However, there are many other supporting activities on which the success of APIN depends which require close coordination. There have been shortcomings in the planning and coordination of some significant activities. These include provision of adequate training facilities, development of logistic support arrangements and resolution of technical problems of operating tanks in northern Australia. These shortcomings have resulted in additional cost to Army.

2.43 The Restructuring of the Army initiative will affect major areas of APIN (including force structure/composition, logistic support etc). It will inevitably compete with APIN issues for priority of line management attention. In the light of Army's experience in managing APIN, the ANAO suggests that future management arrangements for APIN and the Restructuring of the Army initiative will need to be well-defined and provide effective coordination of the various activities involved.

### **Recommendation No. 3**

2.44 The ANAO recommends that Army put in place an effective mechanism to coordinate implementation of the remainder of the APIN project, in close coordination with planning and implementation of the Restructuring of the Army initiative.

#### **Impact of this recommendation**

2.45 A centralised coordination function would improve coordination and control of all APIN activities which previously were managed in isolation with attendant inefficiencies. This would ensure that all functions and facilities are provided and managed in a timely and efficient manner to achieve 1st Brigade's effective operational capability.

### **Response**

2.46 Agreed. APIN activities have been integrated into Army's overall force structure and program planning for RTA. Specific developments which have occurred, that will ensure that APIN issues are more comprehensively addressed, include the transfer of planning responsibility into the Plans and Programs Branch of Army Headquarters, the review of Army's committee structure, the management of tasks through the Army Plan and the promulgation of the Chief of Army's Directive for the implementation of RTA.

2.47 Restructuring activities include the completion of the A21 Logistics Review and the designation of 1st Brigade as the A21 Task Force Trial Brigade. The Trial objectives include the identification of collective training requirements, the validation of logistic concepts, processes and structures, evaluation of full-time and part-time personnel integration requirements and the evaluation of the affordability of an A21 Task Force. The outcomes of the logistic review and trial will incorporate previous APIN planning and

ensure that finalisation of the project is correctly planned.

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1

Defence Sub-Committee report *Defence Sub-Committee Visit to Queensland and the Northern Territory 5-8 August 1996*, October 1996.

2

This figure is for three stages of facilities construction (\$64 million, \$198 million and \$264 million). It does not include cost of land acquisition or development of training areas.

3

This issue is discussed in Chapter 5.

4

Derived from Army records.

### **3. Financial Management**

*This chapter outlines shortcomings in cost estimation, attribution, and programming of funds in the financial planning and management of APIN and proposes remedies.*

#### **Introduction**

3.1 Relocation of 1st Brigade to Darwin and the development of suitable training areas represent the creation of a substantial additional capability in the north. However, departmental savings in property operating expenses in the south will not occur to the extent originally envisaged. Other units are moving into the accommodation originally occupied by 1st Brigade units in the south, and the costs associated with maintenance of these barrack and training areas will continue. Only limited revenue will result from sale of older assets originally occupied by these units. Training areas in the south will need to be retained for southern units, particularly part-time units. Thus the additional costs to Army incurred by the move of 1st Brigade are not solely due to the additional expense of operating in the north, but also to an overall increase in facilities and training areas.

3.2 Army has been provided with some supplementary funds from within the Defence Portfolio for costs associated with the relocation of units to Darwin under APIN. This seeks to provide for both relocation and capital costs of the move, and for the additional operating costs required to maintain units in the new location.

#### **APIN funding 1996-97 to 2000-01**

3.3 In 1991 Army estimated that the APIN project would lead to additional annual operating costs of \$4 million in 1991-92, rising to \$25 million in 2000-01. Army was initially allocated funding for APIN operating costs in 1990-91. The present funding allocation for 1996-97 is \$12.4 million. The current planned allocation for 2001 is \$19 million.

#### **Costs of APIN**

3.4 Relocation of units to Darwin causes additional costs to Army both in terms of the once-only costs of relocation and removals, facilities construction etc, and in higher operating costs in northern Australia. It has been estimated by Army that to base a soldier in Darwin costs Army approximately \$15 000 - \$16 000 per soldier per year more than basing a soldier in the south <sup>1</sup>.

### **Factors contributing to higher operating costs**

3.5 The factors which contribute to these higher operating costs, include (but are not limited to):

- higher unit cost of consumables (electricity, water, food/rations etc) in the north;
- increased maintenance costs due to climatic and terrain conditions, and lack of local maintenance infrastructure;
- increased consumption in comparison with southern basing (eg electricity for year-round airconditioning; fuel/transport costs to move units to more distant training areas; higher freight costs; higher removal costs on posting);
- additional freight costs associated with transport of armoured vehicles to Victoria for repair and (pending availability of a suitable training area) for training; and
- additional allowances for personnel (eg District Allowance <sup>2</sup>, Remote Location Leave Travel allowance, and the option of a full removal on posting resulting from a Ministerial decision in 1995).

### **APIN cost planning, estimation and attribution**

3.6 Visibility of the actual cost to Army of the APIN project is a key element in the effective management of APIN. Cost estimation and attribution of expenditure have been a continuous challenge for Army over the life of the APIN project, both in terms of initial cost estimation in the early and subsequent planning stages, and later in attribution of actual costs incurred by Army.

3.7 As noted in Chapter 2, cost estimation and budgeting for APIN were poorly coordinated early in the project. In attempting to further develop APIN costings, the then Director-General of Coordination and Organisation - Army noted in 1991 that:

...the absence of cost estimates relating to Army's move to the north in recent Sub-Program Five Year Defence Plan Submissions has highlighted the hitherto lack of concise planning details available to Sub-Programs...

3.8 An APIN Costing Instruction issued in 1993 noted that some of the responses to the first attempt at the costing process:

...were scant in detail, which left Army Office to make some arbitrary determinations on sub-Program resource forecasts and allocations.

3.9 Logistic Command was also unable to determine the maintenance costs of some types of equipment belonging to APIN units because cost capturing procedures were inadequate.

3.10 As noted in other planning areas, the management of corporate knowledge has been



poor in that current managers can neither locate nor check original cost estimates, and still have no effective guidance on the methodology to be applied in attributing APIN costs. The problems of attribution stem from difficulties in allocating to APIN the additional premium of some operating costs in northern Australia (for example fuel, power and rations) compared to those in the south, as well as difficulties in ensuring that a wide range of staff across Army units and sub-programs attribute items of expenditure to APIN accurately and consistently to the project.

3.11 Policy on financial management, including attribution procedures, was not issued until 1993. Some unit and command staff, through a lack of knowledge and training, did not adhere to the relevant procedures. This issue was raised frequently at APIN Working Group meetings, but no significant improvement occurred until an APIN Finance Officer position was established.

### **Attribution of APIN funds**

3.12 Until the APIN Finance Officer began a program of assistance and education in 1995 to relevant managers, Army units and sub-programs were not attributing APIN-related costs correctly. Army does not know the full extent of this non-attribution.

3.13 This had been recognised within Army earlier in the project, but policy direction to ensure that correct procedures were followed was not consistently adhered to across sub-program areas. Many additional costs have also remained hidden due to the lack of clear guidance on attribution of the extra costs in the north compared to the cost of like items in the south. Army is unable to distinguish easily the costs of relocation of units moved under APIN from the additional operating costs of being based in Darwin.

3.14 Defence's Management Audit Branch commented in 1994 that Army's inability to track APIN expenditure had put APIN estimating procedures at risk. As a result, the Army Program Steering Group directed that options be developed to improve the tracking of APIN expenditure. Subsequently an APIN Finance Officer position was established in order to improve attribution.

### **APIN cost overrun**

3.15 Within Army it was acknowledged in mid-1996 that some operating costs had increased beyond expectations. The increases were due not only to actual increases in costs, but also to poor budgeting in the early stages of the project and better visibility of previously hidden costs achieved through improved attribution. The operating costs which are higher than expected are:

- removals;
- allowances;
- additional project staff;
- rations;
- backloading, repair and maintenance of armoured vehicles;
- freight and cartage;

- additional tools to support the Leopard tank fleet in two locations; and
- staff visits to Darwin.

3.16 Some of these increases have resulted from inadequate budgeting early in the project. In spite of the attempts in 1991 and more recently in 1995-96 to identify APIN costs, some APIN operating costs had been overlooked in the bidding process. Examples are District Allowance and facilities operating costs for Robertson Barracks. These were only identified and funding requested in mid-1996. Baseline funding for environmental maintenance costs and communications requirements associated with Bradshaw Field Training Area have only recently been included in the relevant Major Capabilities Submission seeking budget approval.

3.17 The establishment of the APIN Finance Officer position in 1995 has allowed more accuracy in determining APIN costs. This position was established in an effort to redevelop an APIN costing model and address the difficulties of attribution of APIN costs. In 1996 an APIN Finance Committee was formed with the same aim. By 1996 the APIN Finance Officer had made some headway in ensuring that APIN costs were correctly attributed. This was achieved through a process of review and manual attribution of financial records and education of responsible staff in relevant units. As discussed at paragraph 2.36, this work revealed that expenditure on APIN had exceeded funding by almost 20% in 1995-96. APIN was therefore costing significantly more than Army had estimated.

3.18 As sub-programs began to realise what APIN was costing, their bids for funding increased. Table 2 shows plans for APIN funding for the five years 1996-97 - 2000-01 compared with combined 1996-97 sub-program bids for APIN funds to meet additional costs of APIN, and final allocation of funds to sub-programs after adjustment.

3.19 The bids made in 1995-96 for funds for 1996-97 - 2000-01 to meet these additional costs of APIN<sup>3</sup> exceeded the planned APIN funding by an average of more than 40%. In 1997-98 bids for additional APIN funds were about 50% more than planned funding. Final funding allocations were substantially higher than planned funding by an average of about 30% but still insufficient to meet all costs anticipated by sub-programs

**Table 2 - Bids for additional APIN funds for 1996-97 - 2000-01 to meet cost increases**

	<b>FY 96-97 (\$m)</b>	<b>FY 97-98 (\$m)</b>	<b>FY 98-99 (\$m)</b>	<b>FY 99-00 (\$m)</b>	<b>FY 00-01 (\$m)</b>
<b>Army's planned funding for APIN 1996-97</b>	12.339	15.218	20.178	22.177	22.177
<b>Bids for additional APIN funds made in 1996-97</b>	18.329	22.997	29.047	28.666	30.123
<b>Final funding allocation after adjustment made in 1996-97</b>	<b>15.313</b>	<b>21.747</b>	<b>27.227</b>	<b>27.228</b>	<b>28.685</b>

**Cost increases could affect funds available for training**

3.20 In recent years the increases in operating costs have exceeded APIN funding allocations and have been met by other Army sub-programs. For example, Logistic

Command has met some of the additional costs of maintaining training areas in northern Australia from its base funding allocation with no corresponding transfer of APIN funds. Since 1991-92 essential operating costs required just to maintain units in barracks have accounted for an increasing percentage of APIN cash allocations. These essential funding requirements are estimated by Army to consume 97% of the funding allocation of \$12.3 million for 1996-97. When the forecast for 1996-97 was made in 1995-96, these operating costs accounted for only 69% of the total APIN funding.

3.21 Within Army it has been recognised that a reduction in funds for other activities (including training) from 31% to 3% renders unworkable the APIN plan as outlined in the Army staff instruction on APIN. Such a lack of flexibility would restrict the ability of Army to manage APIN and could seriously reduce the level of capability of 1st Brigade by restricting the funds available for training. This potentially undermines the purpose of basing 1st Brigade in northern Australia.

3.22 The ANAO notes that in September 1996 the position of Finance Officer was subsumed back into the Resource Planning - Army (ASRP-A) branch. The ANAO considers that correct attribution of APIN funds is a critical management tool. Without continued improvements in procedures and staff training which had been achieved by the Finance Officer, the attribution problems of the earlier years are likely to recur.

3.23 Army commented on the draft of this report that responsibility for accurate attribution of APIN related expenditure has been impressed upon Sub-Program managers, who have recognised the benefits of accuracy. Army expects that steps will be taken to ensure accurate attribution to support future bids.

## **Conclusion**

3.24 Army has had difficulty with operating cost estimation and attribution of expenditure throughout the project. APIN operating costs are higher than Army had expected. Army does not know the full extent of this additional cost, due to limitations of the system by which expenditure is attributed. However, a limited review within Army has shown that in 1994-95 Army spent almost 20% more on APIN than had been originally programmed. As better cost information became available, bids by Army sub-programs for future funding exceeded by approximately 50% the initially planned funding of about \$12.4 million in 1996-97. The ANAO considers that there is still a risk that operating costs and their funding implications may not all have been identified. A review of APIN operating costs to ensure that all costs have been identified would assist the Army in ensuring an appropriate level of funding for APIN is provided, and to make appropriate decisions where there are competing priorities.

3.25 There is also a risk that ongoing operating costs identified during the course of the project will not be funded to the extent required to ensure full achievement of 1st Brigade's capability. This highlights the importance of planning and setting of priorities by Army as a basis for absorbing the funding pressures. It also reinforces the value of comprehensive life-cycle costing methodology and funding arrangements, not only for this project but for similar projects in the future.

## **Recommendation No. 4**

3.26 The ANAO recommends that Army:

a) review all operating costs associated with planned APIN developments and their attendant priorities for consideration in the context of the allocation of the Defence budget; and

b) seriously consider the application of life-cycle costing techniques for similar Army projects in the future, as is the case for major capital equipment procurement projects.

### **Impact of this recommendation**

3.27 This recommendation would help ensure that Army achieves appropriate funding which reflects the true ongoing cost of APIN, without needing to use funds from other sub-programs to support APIN-related activities. The effect of APIN on other Army activities may therefore be reduced, as should the risk to APIN from any future funding shortfalls. A further outcome could be to ensure that the life-cycle cost implications of the Restructuring of the Australian Army initiative are more effectively identified and planned.

### **Response**

3.28 **Agreed.** Procedures to predict and evaluate personnel, training, equipment, logistic support and facilities operating costs are being further refined. Specifically, the outcomes of the A21 Task Force Trial Objective 7 (evaluation of affordability) will permit a reassessment of APIN resource requirements and operating costs. Property operations costs have been incorporated into Army Five Year Development Program (FYDP) planning for current and future facilities projects. This has resulted, for example, in Army being allowed to bid for supplementation for the operating costs of the new Bradshaw Field Training Area.

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## **4. Limitations on Training in Northern Australia**

*This chapter identifies limitations in planning for and availability of Army training facilities in northern Australia and discusses the financial and environmental benefits that would arise from simulation training.*

### **Introduction**

4.1 The ability of 1st Brigade to train and achieve its military preparedness objectives is central to the effective achievement of the objectives of the APIN project. This requires suitable areas for live-fire and manoeuvre training to be available. Currently, risks to 1st Brigade training include:

- a lack of suitable training areas in northern Australia;
- the growing reluctance of Northern Territory property owners to allow tracked vehicles on their land;
- a prohibition on live-firing on non-Commonwealth land;
- a 50% reduction in available training time due to the effect of the northern wet season on training involving armoured vehicles;
- a lack of simulators; and

- limited funds available for training.

## **Planning**

4.2 Army's planning for provision of training areas associated with APIN has not been carried out in concert with plans for moving units. There was concern in 1992 that late definition of training area requirements by Land Command might delay preparation or purchase of appropriate training areas. Provision for procurement of a Northern Australia Training Area in the proposal for the final stage of APIN facilities was considered in 1993, but Army decided to keep it separate as it was considered to be a property acquisition rather than a facilities project.

4.3 The availability of areas for live firing and manoeuvre training adequate for a brigade underpins the APIN project. The timing of this capability needed to be synchronised with the movement plan, specifically to be available for the armoured regiment as a critical planning point. This was also noted by Defence's Management Audit Branch in 1994 <sup>4</sup>. However, this training facility is not yet available and the armoured and armoured reconnaissance regiments are limited in their ability to train effectively, with implications for operational effectiveness and operating costs.

4.4 The ANAO considers that the procurement of suitable training areas to meet 1st Brigade requirements (at all stages of the movement plan) was not identified early enough as a key risk to the project and, as a result, hasty procurement action was required to secure a training area. This was achieved by Defence's opportunity purchase of Bradshaw Station in 1995 as a brigade manoeuvre training area.

4.5 The lack of an effective and timely plan for procurement of a suitable training area has also resulted in additional costs to Army in transporting tanks to appropriate training areas elsewhere in Australia. These costs will continue to be incurred until sufficient live-fire and manoeuvre facilities have been developed on Bradshaw Field Training Area, planned for 1999. These costs will increase with the relocation of the infantry battalion to Darwin in 1998.

4.6 1st Brigade has a training plan, but Army has no overall training strategy to address the challenges of training in northern Australian conditions.

## **Training areas in northern Australia**

4.7 There are three main military training areas in northern Australia under development for use by 1st Brigade. They are Mt Bunday Training Area, Bradshaw Field Training Area, and a close training area (CTA) adjacent to Robertson Barracks, at Palmerston near Darwin. These (except Palmerston CTA) are shown in Figure 4. Yampi training area is also shown, but is unsuitable for use by APIN units due to its distance from Darwin and the nature of its terrain.

## **Figure 5 - Principal Military Training Areas in northern Australia**



4.8 Mount Bunday training area (MBTA) is located some 150 km from Darwin and has only limited infrastructure. Bradshaw Field Training Area, about 600 km from Darwin, is considerably larger. However, the infrastructure of Bradshaw Field Training Area (roads, bridges, camps, ranges etc) is not yet developed for Army training, and the training area will not be available for use until 1999.

4.9 The Robertson Barracks CTA is not suitable for sub-unit manoeuvre training: it is effectively limited to low-level individual and vehicle crew training. The nearest live-firing range on which Australian Light Armoured Vehicles (ASLAVs) and Leopard tanks can be used is at Mount Bunday, but environmental restraints severely limit training. Careful environmental management of training areas is required because of the damage caused by large numbers of armoured vehicles. Measures include provision of roads and bridges in areas where high water runoff compounds erosion caused by vehicles, and rotation of areas of usage within a training area to allow vegetation to recover.

4.10 Army continues to retain Yampi training area in Western Australia, which costs about \$120 000 a year to maintain. It is used only for limited special forces training. Since acquiring it in 1978, Defence has spent about \$2 million in running costs on Yampi training area. As the ANAO has noted in previous reports, this represents a significant outlay for such a rarely-used asset<sup>5</sup>. Army told the ANAO that Yampi is not likely to be used by any Darwin-based units. The ANAO is of the view that Army should reassess the benefits of disposing of Yampi in the light of planned levels of use.

4.11 Army advised that the utility of Yampi would be considered in the light of the Morgan Study and expectations of future additional requirements to host training by foreign armed forces.

### **Limitations of existing training areas**

4.12 Army noted in 1991, 1994 and again in 1996 that Mount Bunday was inadequate as a manoeuvre training area for 1st Brigade. Mount Bunday was purchased in 1989, and the original user-requirement and environmental impact statement were based on the needs of the North West Mobile Force (NORFORCE) and the armoured reconnaissance regiment. The need to revise these documents to accommodate 1st Brigade needs was noted in 1996. Such a revision had not been programmed and was not included in APIN bids for 1996-

97.

4.13 Mount Bunday is very limited in its capacity to handle sub-unit manoeuvre training, principally due to the effects of armoured vehicles on the environment and infrastructure. The armoured and armoured-reconnaissance regiments are also unable to conduct key aspects of their live-fire training due to limited range facilities.

4.14 Army recognised these limitations in its Northern Australia Training Area Study of 1994. As a result of this study, Army is seeking government approval to develop Bradshaw Field Training Area at a cost of about \$54 million.

4.15 A proposal to transfer half of the Armoured Fighting Vehicle Field Firing Target System (AFV FFTS) from the armoured regiment's former training area at Puckapunyal in Victoria was also initiated in June 1995. The aim was to install the system at Mount Bunday by June 1996. Army has not yet funded this system for Mount Bunday, and the armoured regiment must return to Puckapunyal to use the system there. Development of a moving target range at Mount Bunday, along with wet weather access, would be of important training benefit to APIN units but would nevertheless not meet all the manoeuvre training needs of the armoured regiment.

4.16 As a result, the armoured regiment has already had to transport a squadron of tanks to its former training area at Puckapunyal in order to carry out live fire and manoeuvre training. The cost of this relocation is unavailable. The arrangement is not entirely satisfactory since the Puckapunyal training area is different from northern Australian terrain and conditions.

4.17 Army advised that 1<sup>st</sup> Armoured Regiment returns to Puckapunyal:

- to support southern-based units, such as 5/7 Royal Australian Regiment;
- to use the AFT target system, which is yet to be funded for Mount Bunday training area; and
- when northern training areas are not available.

#### **Other possible limitations on training areas**

4.18 The development of Bradshaw Field Training Area, planned for completion by 1999, should provide sufficient capacity for all 1st Brigade units. However, it has been foreshadowed by a Ministerial announcement, following Australian-US ministerial discussions in July 1996, that training areas in northern Australia are to be used by other Army units or units from foreign defence forces. As a result, it is unclear whether 1st Brigade units will have sufficient access to achieve their training objectives within the limited dry-season: this is discussed more fully at paragraph 4.21.

4.19 A further issue specific to training areas is that Army has not yet programmed the operating finance which will be required to support the new Bradshaw Field Training Area. Defence's Force Structure Policy and Programming Committee has however noted Army's intention to bid for supplementary funding. Operating costs for Bradshaw Field Training Area are estimated by Army to be about \$5.5 million per year. This figure is likely to change once more accurate information on the costs of environmental maintenance becomes available.

## **Northern wet season effects on training**

4.20 The distance to, capacity of, and environmental fragility of training areas in the north limit the training opportunities available to armoured units, particularly the armoured regiment. Mechanised training (ie with Leopard tanks, M113 armoured personnel carriers and ASLAV Armoured Fighting Vehicles) is usually permissible in the north of Australia only within the dry season from early June to early October<sup>6</sup>. During the remainder of the year the environmental damage from tracked and wheeled armoured vehicles on the ground is usually unsustainable north of Tennant Creek. Bradshaw Field Training Area and Mount Bunday training areas are both so affected.

4.21 Consequently, the 1st Brigade training cycle must be compressed into about half the time that was available in southern Australia. The ANAO considers that both the availability and capacity of Mount Bunday training area present a risk to satisfactory achievement of individual, crew, sub-unit and unit training objectives and therefore to operational readiness.

## **Dry season effects**

4.22 Some benefits of acclimatisation to the extremes of temperature experienced in the northern dry season are evident. For example, the armoured reconnaissance regiment, which has been in Darwin for three years, reports improved acclimatisation of personnel to the heat. The evidence for this is fewer heat casualties and less water consumption per soldier while on exercise in comparison with southern-based personnel. In addition, the armoured regiment reports a significant reduction in engine changes required due to modified servicing procedures.

## **Effects of extreme temperatures on tank operation**

4.23 However, the extreme temperatures also pose challenges to effective armoured training. The Leopard tanks are particularly affected by extreme temperatures: in the north they are operated more frequently at or beyond the upper end of their systems design parameters than was the case in southern Australia. The effects of extreme temperatures on the crews, ammunition stability and on the accuracy of the tank's 105mm gun and coaxial machine-gun are discussed in Chapter 5.

## **Simulation**

4.24 The risk posed by the limited dry season training window could be mitigated by the provision of appropriate simulation<sup>7</sup>. This would allow more efficient programming of training throughout the year. Provision of gunnery simulators could allow a large portion of gunnery training to be done in barracks or outside designated training areas. Worthwhile training could occur during the wet season with little or no environmental damage.

4.25 Simulation of some of the training activities would allow the capability of units to be maintained and would also reduce training costs. Simulation is also likely to improve training levels overall and the effectiveness of live-fire training.

4.26 Army advised that the lack of experience of the impacts of the wet season and fragile terrain on training, particularly for tracked vehicles, prevented correct deductions about the increased importance of simulation for Darwin based units.



## Benefits of simulation

4.27 Simulation is unable to expose soldiers to many key aspects of combat situations and can never replace all field training. However use of simulation to replace some elements of field training can reduce risks to personnel, enable maximum value to be extracted from expensive field training exercises and offers savings on:

- ammunition;
- fuel;
- transportation of armoured vehicles to training areas;
- vehicle maintenance; and
- repair of environmental damage to training areas.

## Simulation of gunnery training

4.28 Gunnery training provides a good example of the reductions in ammunition costs alone that can be made through simulation of some training activities. 1st Brigade's armoured regiment uses approximately 5200 rounds of tank ammunition per year in live gunnery training, at a cost of about \$800 per round. Table 3 shows the possible reductions in ammunition costs achievable through replacing some elements of live gunnery training with simulation. Army estimates that ammunition costs could be reduced by about \$1.6 million per year by introduction of a Gunnery Training Simulator (Leopard)<sup>8</sup>, at a capital cost of \$10.5 million. The ANAO estimates that Army could recoup its investment on the Leopard simulator in less than ten years, based on possible savings in ammunition alone (the Leopard will be in service until 2010).

**Table 3 - Possible annual reduction in ammunition costs achievable through tank gunnery simulation<sup>9</sup>**

Tank Gunnery Training Level	% current ammunition allocation	% could be simulated	% reduction in ammunition usage	No of rounds saved per year	\$ reduction in ammunition costs p.a. (rounds x \$800 )
Crew (one vehicle)	50	60	30	1560	\$1 248 000
Troop (three vehicles)	25	20	5	260	\$208 000
Squadron (14 vehicles)	14	20	3	156	\$124 800
Other	11	0	0	0	0
<b>TOTAL</b>	<b>100</b>		<b>38</b>	<b>1976</b>	<b>\$1 580 800</b>

## Possible savings from simulation on environmental maintenance and other costs

4.29 Army does not yet have sufficient information from which to estimate the costs of environmental maintenance. It is therefore not yet clear what savings in environmental maintenance costs may result from simulation, as Army is still assessing the longer term effects of tracked vehicles on the environment in their first year of training in the north.

4.30 Army's experience at Shoalwater Bay Training Area in Queensland indicates that road maintenance alone costs \$2500-3000 per kilometre per year. Army estimates that there will be about 340 km of roads on Bradshaw Field Training Area requiring maintenance, costing about \$1 million to maintain annually. There is insufficient information available on potential savings on fuel, vehicle maintenance and transportation which could result from increased use of simulation. Although better information is required before an estimate of savings resulting from simulation can be made, it is clear that the benefits could be substantial.

#### **Provision for simulation equipment**

4.31 The need to include simulation requirements in APIN facilities user-specifications was recognised in 1991. However, with the exception of a Laser Miniature Range (LMR), there are currently no simulation facilities available in Robertson Barracks, although acquisition of a Field Miniature Range (FMR) is proposed.

4.32 An ASLAV gunnery simulator will not be in service before 1998, three years after the introduction into service of ASLAV. The \$10.5 million required for the Gunnery Training System (Leopard) is not yet funded, and the acquisition is now proposed for 1999-2000. Funding for this and other minor capital equipment projects (including a tactical training simulation capability) is currently subject to normal programming considerations.

4.33 Army told the ANAO that any savings accrued due to increased simulation can be directed to improving combat capability or reducing operating costs. However, Army also noted that the time frame for development and introduction of a simulation capability of the scale implied by the report, is likely to exceed the life of the APIN project, due to the high costs and long delivery lead times of sophisticated land combat simulation.

4.34 Army considers that whereas the relatively simple air and sea environments can be realistically simulated, the complex land environment cannot. Further, the conduct of effective land combat owes as much to the physical and emotional endurance of the troops as to their proficiency with equipment and procedures, which is less the case with air and naval forces. It is not possible to simulate the conditions needed to develop or exercise such endurance.

4.35 Army also noted that the simulation described is funded from within the Program without supplementation. Army is already sacrificing lower priority activities due to funding constraints. Significant additional expenditure on simulation will be difficult to fund from the Program because the high initial costs must be amortised over many years.

4.36 The ANAO agrees that aspects of the land environment are difficult and expensive to simulate, and that field exercises are an essential part of Army training. However, the relocation of Army combat capability to northern Australia is a long-term project. The climatic limitations on training there are such that the wider application of simulation, although expensive, can improve the economy, efficiency and effectiveness of Army training overall. The ANAO therefore considers that greater emphasis on simulation in northern Australia would benefit Army's training strategy there.

#### **Other training initiatives**

4.37 Army's Training Command has recognised the challenges of individual training of

Army personnel across a range of dispersed locations. One initiative relevant to APIN is Project RAAC <sup>10</sup> 2000. This project is investigating technologies (e.g videoconferencing, multimedia) suitable for conducting a range of individual training by distance education methods for the bulk of Armoured Corps personnel stationed in Darwin. It offers savings in travel costs in the longer term. It would also reduce periods of separation for Army families which would otherwise occur with soldiers travelling to the School of Armour at Puckapunyal to attend courses.

4.38 The ANAO also notes that Army is undertaking a review of land force training areas across Australia with a view to rationalisation.

## **Conclusion**

4.39 The tropical climate and terrain create difficulties for effective armoured training in northern Australia. Existing training areas are either not large enough or lack sufficient infrastructure development to meet 1st Brigade's current needs. A squadron of tanks has already had to return by tank transporter to the armoured regiment's previous training area in Victoria to train. This situation will continue, exacerbated by the relocation of the infantry battalion in 1998, until 1999, when the Bradshaw Field Training Area, purchased in 1995, should be sufficiently developed to enable its use for this purpose. Currently, effective training cannot be carried out in northern Australia to meet all training objectives, and, consequently, the operational capability of the brigade is at some risk.

4.40 Where cost effective, simulation training offers financial and environmental advantages. However, only limited simulation equipment is currently available in Darwin. Simulation training using laser devices to simulate tank gunnery could be developed to enable more efficient programming of training throughout the year, including training during the northern wet season. A possible gunnery simulator for Leopard tanks is not yet funded, and an ASLAV gunnery simulator will not be in service before 1998. Although 1st Brigade has a training plan, Army has no overall training strategy for addressing the challenges of training in the tropical north. Detailed information on the extent to which costs of training could be reduced through simulation, and a relevant cost-benefit analysis would assist in the development of a training strategy.

## **Recommendation No. 5**

4.41 The ANAO recommends that Army:

- a) conduct detailed cost/benefit analyses on the savings achievable from introduction of the range of simulators relevant to 1st Brigade (including gunnery training, driver training, and tactical engagement simulators); and
- b) develop and implement an effective training strategy, incorporating simulation, to address the range of challenges inherent in carrying out unit and formation training in northern Australia.

## **Impact of this recommendation**

4.42 Appropriate training solutions would minimise costs incurred by moving units to training areas elsewhere in Australia and yield savings in ammunition and other costs. More widespread use of cost effective simulation equipment would enable units to train effectively in the wet season, improve training, morale and motivation of personnel, avoid

environmental damage and yield savings in operating costs.

## **Response**

4.43 **Agreed.** Army is developing a simulation policy which will identify options for the application of simulation, and the establishment of priorities based on capability and cost benefit requirements. A combat training centre capability, for the practice and assessment of collective training, is under development.

4.44 Future individual and collective training requirements, for 1st Brigade and other formations, will be assessed in the A21 Task Force Trial Objective 3 (identify individual and collective training requirements for an A21 Task Force). This assessment will be assisted by Defence Science and Technology Organisation (DSTO) operational analysis, and will incorporate previous training requirements identified for 1st Brigade in the Bradshaw Field Training Area project. Army's total training area requirement is being developed in a separate study (the review by V.A. Morgan and Associates of the Army's long term facilities and training area requirements).

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## **5. Leopard Tank Performance in Northern Australia**

*This chapter identifies risks of inaccuracy of the Leopard tank's gun caused by the extreme temperatures of northern Australia.*

### **Introduction**

5.1 The scope of this audit did not include detailed examination of technical performance of Army's equipment in the extremes of climate in northern Australia, nor of general operating capability. Nevertheless, discussions with armoured corps soldiers and officers indicated that the climatic conditions pose a high risk both to the tank crews and to the capability sought in deployment of Leopard tanks to northern Australia.

5.2 The ANAO did not undertake a detailed investigation of the extent to which high temperatures were considered as a factor in the original procurement of these tanks, or of the effect of extreme temperatures on other equipment deployed in northern Australia. However, the seasonal factors of dust, moisture, and high temperature tend to reduce the life of some systems and components, particularly electrical components.

### **Background**

5.3 The variant of the Leopard tank in service with the Australian Army was designed and manufactured in Germany for operation in European conditions and in armoured warfare against the Warsaw Pact threat of the Cold War years.

5.4 Army has operated the Leopard tank since 1977. 1st Brigade's armoured regiment and the School of Armour at Puckapunyal in Victoria are the only units which operate the tank. Prior to relocating to Darwin, the armoured regiment was co-located with the School of Armour.

### **Crew safety is at risk in extreme temperatures**

5.5 In northern Australia temperatures inside the tank turret can be 30% higher than the maximum recommended working level identified in Australian Defence Instructions.

(These instructions direct that at or above 32.5°C commanders should restrict crew activity to a work/rest cycle of 10 minutes of work to 50 minutes of rest per hour. In enclosed areas such as the turret of a tank, work should be restricted to the same cycle if the temperature reaches 26.9°C.)

5.6 During Army's *Exercise Northern Predator 95*, ambient turret temperatures of 54°C were recorded, with hot spots up to 63°C. (The tank gunner sits with his legs directly abutting a component called the turret pump block motor, which is a major cause of heat in the turret. Temperatures of 63°C have been recorded on the surface of this component, which has no cooling system.) In this exercise, the armoured regiment suffered 57 heat casualties (20% of the unit's total strength), most of which were directly attributable to the high turret temperatures. The effect of heat casualties on the unit's capability is disproportionate to their number because the removal of even one crew member substantially reduces the ability of the crew to operate their tank.

5.7 Within Army it has been acknowledged that crew safety could be further at risk from equipment failure and ammunition instability. This is because 105mm tank ammunition is proofed at 56°C. Army is uncertain about its stability at higher temperatures and is undertaking further research on ammunition performance at extreme temperatures. There are therefore risks to both the crew and the operational efficiency of units under these conditions which have yet to be resolved.

### **Tank gun accuracy is affected by high temperatures**

5.8 The extremes of temperature experienced in the northern dry season also pose a significant risk to the capability of the Leopard tank by affecting the gun-sighting system and ammunition for the 105mm main gun.

5.9 In the north the Army's tanks are operated more frequently at or beyond the upper end of their system design parameters (the Leopard was designed to operate from -50°C to +50°C). In northern Australia, temperatures inside the tank turret frequently exceed the maximum for which the systems are designed. Such temperatures are caused by tank components generating heat (the engine, electronic equipment in the turret, and the main gun and machine gun after firing) as well as through solar radiation.

5.10 Extreme temperatures can render the tank's weapons inaccurate due to limitations in the measurement range of sensors in the fire control system. The maximum temperature range of the two key computer sensors which are part of the fire control system is -40°C - +52°C. If it is hotter than this, the sensor reverts to a standard reference setting of +15°C.

5.11 Thus ambient turret temperatures higher than 52°C may cause sighting errors. At longer ranges this can result in a round missing the target, even though the gunner had correctly performed the engagement sequence. This inaccuracy represents a significant risk to the capability of the tank, and may waste ammunition during training.

5.12 Further weapon system inaccuracies may be introduced if ammunition is not handled or stored correctly. For example, the gunner may fire a round of newly-replenished ammunition which is hotter or colder than the turret temperature as measured by one of the sensors. This could occur if the ammunition has been stored in shade or direct sun. In this situation, the fire control system will not compensate for the temperature difference. This will cause an unexpectedly higher or lower burn rate of the propellant and thus a variation in the round's trajectory and subsequent point of impact.

5.13 Tank crews are able to calibrate the main gun and thus compensate for some of these variables by firing a round of ammunition at a target and making relevant adjustments to the sighting system. However, this is not a practical solution under operational conditions.

### **Proposed cooling system**

5.14 Army proposes to install a 'climate control system' for the Leopard tank to address these problems. It recently issued a request for tender and the expected date of introduction into service is in 1997-98. In view of previous funding slippage for this project, the ANAO considers that the technical risks associated with tank operations in northern Australia could have been reviewed much earlier. The climate control system could have been programmed to coincide with the relocation of the armoured regiment. In other words, planning for APIN should have addressed this at an earlier stage. An effective solution to temperature control in tanks should remain a high priority to mitigate the risk both to personnel and the operational capability of the tank.

### **ASLAV**

5.15 The reconnaissance variant of the Australian Light Armoured Vehicle (ASLAV) being introduced into service with 1st Brigade's armoured-reconnaissance regiment was procured with operations in northern Australia in mind and is equipped with a climate control system. No technical risks to its operation in northern Australia were identified during the audit.

### **Conclusion**

5.16 Army has been operating Leopard tanks in Australia for nearly 20 years, and has now relocated them to Darwin as part of APIN. But the high temperatures in northern Australia can cause inaccuracies in the Leopard tanks' gun-sighting system, and pose a high risk to crew safety. Modifications to the tanks to reduce these risks will not begin until 1997-98.

### **Army comment**

5.17 The Leopard fleet was purchased as a training capability to maintain armoured tactical skills. At that time it was the most advanced tank in service in the world. It became expedient to accept Leopard as the operational tank capability, rather than face the cost of a system better suited to northern Australia. However, even if the environmental impacts of the northern climate had been fully appreciated, it is doubtful that the relocation of the armoured regiment could have been deferred until solutions were introduced.

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## **6. Personnel management and support**

*This chapter examines Army's approach to managing the unique conditions of service in Darwin and identifies the lack of a comprehensive personnel plan for the north as an issue of concern.*

### **The Darwin environment**

6.1 Darwin's climate and remoteness are more demanding than Army's other main basing areas. This has a major effect on Army personnel in the military operating environment in terms of the physiological effects of high temperature and humidity, and the long

distances over which units need to deploy for training.

6.2 There is also a significant disadvantage for Army personnel and their dependants: Darwin is isolated from Army's main recruiting areas and therefore from the majority of family support networks. This separation is exacerbated by the demands on personnel during the short and intense dry-season training period which removes soldiers from their families over the main Northern Territory school holiday period. The extremes of climate in wet and dry season and the effect on physical comfort and psychological attitude have been well documented [11](#).

6.3 Other factors that can be negative influences on career planning for many Army personnel include the high cost of living relative to other capital cities, limited facilities in comparison with other larger urban areas and the distance of Palmerston from Darwin.

6.4 Army has been sensitive to the social effects of the APIN project, due in part to the lessons learned from the relocation of Army units to Townsville in the 1960s. Army conducted an APIN Sociological and Economic Impact Study in 1993. The main recommendations of this report focussed on continued monitoring of soldier and family attitudes to the range of issues associated with relocation to Darwin.

6.5 Conditions of service in Darwin provide for remote locality leave and district allowances. This also increases the cost of basing personnel there. District allowance alone for 1st Brigade personnel will consume about \$4 million each year by 2000.

### **Posting and recruiting implications**

6.6 As a result of the relocation of 1st Brigade, a majority of regular Army postings will be to units in Darwin and Townsville (ie north of the Tropic of Capricorn). 65% of all Armoured Corps established postings are in 1st Brigade in Darwin and 3rd Brigade in Townsville. This means that young Armoured Corps soldiers could spend 8-10 years in one location, and a large portion of their career in either Darwin or Townsville. Likewise many junior Armoured Corps officers are likely to spend 5-6 years in Darwin.

6.7 Infantry soldiers, along with other Corps, will face a similar prospect. By 1998 one of the Army's four full-time battalions will be in Darwin and two in Townsville. The remaining battalion based in the south-east is a specialised parachute unit. Long-term postings to tropical Australia will thus become the norm.

6.8 Army accepts that the prospect of long periods based in Darwin or Townsville may be a disincentive for young people to join and stay in the Army. In particular some increase in separation rates might be expected in the medium to longer-term. This could have significant consequences for longer-term staffing of senior non-commissioned officer and warrant officer positions within 1st Brigade combat units. There may also be an adverse effect on the level of recruiting because people in the south-east lack visibility of Army units.

6.9 Army is aware of the potential effects on retention rates and recruiting of the factors discussed above. All commanders and staff consulted during the audit noted this as the most significant issue likely to affect the success of APIN.

6.10 The Chief of the General Staff (CGS) noted in his report on the 1991 CGS Exercise:  
...the higher cost of living, the different climatic conditions of extreme heat and wet, and the distance from

extended families in the Southern states. These challenges can be overcome by: good accommodation, both in barracks and housing, supportive leave and regional facilities, good recreational facilities, and a program to fully integrate members and their families into the civilian community... This may require changes in policy such as: an electricity allowance for air conditioning, examination of removal entitlements, increases to married quarter specifications, and leave entitlements. Aspects such as family health, continuity for children's education and career opportunities for members' spouses are areas that also need to be considered. Other aspects of policy such as posting tenure for junior soldiers may also have to be adjusted as a greater proportion of the combat force is based in areas such as Darwin...

## **Current personnel planning**

6.11 Army has taken some steps to gather information on the potential effects on retention arising from longer postings in the north. Army's posting procedures also take into account the demands of service in northern Australia. However, the ANAO found no evidence of coordinated planning to manage the outcomes in the longer term.

6.12 Army engaged consultants to undertake a major survey of soldiers and their families in 1993. This survey was useful, but limited due to its low response rate (about 35%) and narrow target population. It was not used to develop a strategy to address potential personnel management issues. Collection of information since then has been ad hoc and not based on any strategic plan designed to identify changing trends in potential risk factors.

6.13 Further sociological studies have been planned, but recent funding pressures have forced the cancellation of at least one such study. The Soldier Career Management Agency (SCMA) attempts to monitor soldier attitudes through formal exit interviews with Army personnel on discharge. However, these are of limited use as the reasons for discharge are not always given. In addition, most discharge information is based on location of discharge and not on location of last posting. As most soldiers elect to be discharged in locations other than Darwin, information can be misleading.

6.14 More effective procedures could be implemented to gather information on the extent to which conditions of service in northern Australia affect separation rates. Planning to develop appropriate measures and the criteria by which to initiate their implementation would serve to address these risks in a coordinated fashion.

6.15 Some planning has been undertaken to attempt to establish a limited number of respite postings, and to enable wider use of cross-skilling to open up a greater range of employment to soldiers who might otherwise face long periods of service in Darwin. However, there is a risk that the priority for key aspects of APIN funding is likely to be at the expense of other APIN activities as well as other Army sub-program areas. For example, in 1996 a follow-up APIN sociological study was cancelled due to funding limitations. Army's Soldier Career Management Agency has identified the risk that priority of funding for essential APIN costs could affect the availability of funding for respite postings or other personnel initiatives intended to help retention of personnel in the north.

## **Conclusion**

6.16 Personnel issues arising from long-term postings in the tropics have been recognised by Army as a potential risk to APIN in the longer term. Although some personnel issues have been addressed, Army could develop an improved strategic personnel management plan to support the force in northern Australia. Such a plan could call for coordinated



collection of information on personnel factors, and coordinated development and implementation of appropriate solutions to possible effects on morale and retention rates, and help identify the subsequent implications for Army recruiting and initial employment training.

### **Recommendation No. 6**

6.17 The ANAO recommends that Army:

- a) undertake a comprehensive personnel impact study; and
- b) develop an improved strategic personnel management and support plan in order to provide effective support to the force in northern Australia.

### **Impact of this recommendation**

6.18 It is recognised that long periods of service based in Darwin or Townsville are likely to adversely affect recruitment and retention rates. A strategic personnel plan would assist Army to address personnel issues in Darwin cost-effectively by implementing coordinated initiatives at the right time, anticipating effects on recruitment and retention and identifying the operating costs.

### **Response**

6.19 **Agreed.** Effective personnel are fundamental to Army preparedness and personnel management is a high priority activity. Army has strategic personnel management policies which include capability requirements, career and lifestyle considerations. Personnel posted to Darwin have a range of additional benefits such as tax zone rebate, remote locality leave travel and flexible removal entitlements. Adjustment of conditions of service would require an ADF approach.

6.20 The ongoing employment of full-time, part-time and civilian personnel in different areas of Australia will be studied and reviewed during RTA through revitalisation of the Army Reserves, and A21 Trial activities. Trial Objective 6 (personnel integration) will assess impacts on full-time and part-time personnel. The wider implications of military service in northern Australia, comprising career and lifestyle impacts, are recognised in the Manpower Required in Uniform (MRU) assessments. Army is finalising the MRU assessment based on the RTA personnel requirements for consideration by HQADF in December 1997.



Canberra ACT  
5 March 1997

P. J. Barrett  
Auditor-General

Army briefing to Defence Sub-Committee of the Joint Standing Committee on Foreign Affairs, Defence and Trade: Defence Sub-Committee report *Defence Sub-Committee Visit to Queensland and the Northern Territory 5-8 August 1996* (October 1996), para 4.12. Army advised in February 1997 that the estimate is under review and that the Army 21 Task Force Trial should further improve estimates.

2

In June 1996 Army noted that eligibility of personnel posted to Darwin under APIN had been overlooked in the bidding process. The liability of APIN for this allowance is \$2.265 million in 1996-97 rising to \$3.99 million in 2000-01.

3

Bids made in 1996-97 for the five years 1996-97 - 00-01 are in constant 1996-97 dollars.

4

Management Audit Branch Report on Move to the North, Report No. 1994/95-96 December 1994.

5

Audit Report No.38 1991-92 *Management of Army Training Areas* and Audit Report No.2 1994-95 *Follow up Audit - Management of Army Training Areas*.

6

This is shorter than the generally accepted period of the dry season in northern Australia: additional time must be allowed for the ground to dry out before armoured vehicles can be used with minimum environmental damage.

7

Simulation refers to training by means of equipment which enables more efficient and effective training through a significant reduction in resources and/or training time. Examples relevant to Army are driver training simulators, tank gunnery simulators, and computer-based wargames.

8

An eye-safe laser mounted on a tank, along with laser detectors to enable crews to simulate live engagements during field training.

9

Source: Army's Director Armoured Corps.

10

Royal Australian Armoured Corps.

11

One measure used to assess this is the Relative Strain (RS) Index: an RS index of 0.3 means that a 'standard person' is uncomfortable due to effects of temperature and humidity and shows some signs of distress. In Darwin, the RS index is greater than 0.3 at 3pm on an average of 200 days per year. In no State capital does the index exceed 0.3 on more than 25 days per year. Townsville has an RS index of 0.3 on 50 days per year. (Source: Army briefing material, 1994).

## **Appendix 1 - Performance Audits in the Department of Defence**

*Set out below are the titles of the reports of the main performance audits by the ANAO in the Department of Defence tabled in the Parliament in the past three years.*

Audit Report No.5 1993-94

*Explosive Ordnance*

Audit Report No.11 1993-94

*ANZAC Ship Project - Monitoring and Contracting*

Audit Report No.19 1993-94

*Defence Computer Environment*

*Supply Systems Redevelopment Project*

Audit Report No.27 1993-94

*Report on Ministerial Portfolios, includes:*

*US Foreign Military Sales Program (Follow-up audit)*

*Explosives Factory Maribyrnong*

Audit Report No.2 1994-95

*Management of Army Training Areas (Follow-up audit)*

*Acquisition of Additional F-111 Aircraft*

Audit Report No.13 1994-95

*Australian Defence Force Housing Assistance*

Audit Report No.25 1994-95

*Australian Defence Force Living-in Accommodation*

Audit Report No.29 1994-95

*Energy Management in Defence*

*ANZAC Ship Project Contract Amendments*

*Overseas Visits by Defence Officers*

Audit Report No.31 1994-95

*Defence Contracting*

Audit Report No.8 1995-96

*Explosive Ordnance (Follow-up Audit)*

Audit Report No.11 1995-96

*Management Audit*

Audit Report No.17 1995-96

*Management of Australian Defence*

*Force Preparedness*

Audit Report No.26 1995-96

*Defence Export Facilitation and Controls*

Audit Report No.28 1995-96

*Jindalee Operational Radar Network Project*

Audit Report No.15 1996-97

*Management of Food Provisioning in the Australian Defence Force*

Audit Report No.17 1996-97

*Workforce Planning in the Australian Defence Force*