Parliamentary Standing Committee on Public Works

REPORT

relating to the

JINDALEE OVER-THE-HORIZON-RADAR

(Twelfth Report of 1990)

THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA
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MEMBERS OF THE PARLIAMENTARY STANDING COMMITTEE

ON PUBLIC WORKS

(Thirtieth Committee)

Mr Colin Hollis MP (Chairman)
Mr William Leonard Taylor MP (Vice-Chairman)

Senate	**House of Representatives**
Senator Bryant Robert Burns	Mr Ewen Colin Cameron MP
Senator Paul Henry Calvert*	Mr Lloyd Reginald O'Neil MP
Senator John Robert Devereux	Mr Russell Neville Gorman MP
	Mr Bruce Craig Scott MP

* Appointed on 24.8.90 following the retirement of Senator Dr Glenister Sheil

Inquiry Staff: Mr Peter Roberts (Secretary)
Mr Patrick Regan
Mrs Jackie McConnell

EXTRACT FROM THE VOTES AND PROCEEDINGS OF THE HOUSE OF REPRESENTATIVES

NO. 12 DATED THURSDAY, 23 AUGUST 1990

20 **PUBLIC WORKS COMMITTEE - REFERENCE OF WORK - JINDALEE OVER-THE-HORIZON-RADAR:** Mr Beddall (Minister representing the Minister for Administrative Services), pursuant to notice, moved - That, in accordance with the provisions of the *Public Works Committee Act 1969*, the following proposed work be referred to the Parliamentary Standing Committee on Public Works for consideration and report: Jindalee Over-The-Horizon-Radar.

Mr Beddall presented plans in connection with the proposed work.

Debate ensued.

Question - put and passed.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS

JINDALEE OVER-THE-HORIZON RADAR

By resolution on 23 August 1990, the House of Representatives referred to the Parliamentary Standing Committee on Public Works for consideration and report on the proposal for Jindalee over-the-horizon radar.

THE REFERENCE

1. The Federal Government has announced a commitment to defence self-reliance and the development of a defence force capable of meeting the unique strategic demands of Australia. A significant aspect of defence self-reliance is the ability to detect and prevent an attack by aggressors through air and sea approaches. Due to its extensive coastline, the Federal Government regards Australia as being extremely vulnerable. It has therefore placed a high priority on the development of an extensive radar network capable of broad area surveillance of these vast air and sea approaches. The Jindalee Operational Radar Network (JORN) using over-the-horizon radar (OTHR) will provide a cost effective way to achieve the required surveillance.

2. The present phases of the project will involve major installations in the Goldfields area of Western Australia (WA) and near Longreach in Queensland (Qld). The network is estimated to cost in excess of $500m and will significantly enhance the ability of the Australian Defence Force (ADF) to monitor effectively air and sea movements across Australia's remote northern approaches. Referral to the Committee was based on an agreed ceiling price of $125m for the public works aspects of the project.

THE COMMITTEE'S INVESTIGATION

3. The Committee received a written submission from the Department of Defence (Defence) and took evidence from its representatives at public hearings in Kalgoorlie (WA) on 30 October 1990 and Longreach (Qld) on 1 November 1990.

4. The Committee also received submissions and took evidence from:

Kalgoorlie

- Shire of Leonora
- Goldfields-Esperance Development Authority
- Kalgoorlie-Boulder Chamber of Commerce.

Longreach

- Longreach Shire Council
- Longreach Tourist Promotion Association Inc.
- Barcoo Shire Council
- Councillor Mr John Beattie
- Mr Timothy Butler
- Mr Ian William Button
- Mr Peter Howell Clark
- Pastor Barry Arthur Cole-Clarke
- Mr Bruce Foster Emmott
- Mrs Heather Margaret Harding
- Mr William Arthur Harding
- Mr William Arthur Baker
- Mr John Richard Milne
- Dr Tom Murphy
- Mr Robert James Nilon
- Mr Kevin Leonard James O'Hanlon
- Mr Timothy John Pulsford
- Miss Lisa Ann Rayner
- Mrs Claire Frances Scarr
- Mr Graham Edward Scott

- Mr Jorgen Them Themsen
- Mr Lloyd Norman Ernest Walker
- Mr Mark Albert Walker.

5. Written submissions and expressions of support for the project were also received from a number of other persons and organisations and these are incorporated in the Minutes of Evidence.

6. In addition to the public hearings, the Committee carried out a number of inspections:

- at a possible transmitter site on "Pinnacles" Station in the Leonora area of Western Australia on 29 October 1990

- at the existing Jindalee receiver and transmitter facilities near Alice Springs (JFAS), Northern Territory on 31 October 1990

- at the preferred transmitter site near Longreach (Qld) on 1 November 1990.

7. A list of witnesses who appeared at the public hearings is at Appendix A. The Committee's proceedings will be printed as Minutes of Evidence.

BACKGROUND

Development of OTHR Technology

8. OTHR, as with any other radar, is based on the well-known concept of a signal being transmitted, illuminating a target and the return signal being received and analysed. In the case of OTHR, however, the transmitted signal, rather than travelling in a 'line of sight', is reflected off the ionosphere before illuminating a target area on the earth's

surface. Objects in the target area scatter the incident radar illumination in all directions. Most will be forward scattered from the ground or sea with a very small amount returning, via an ionospheric reflection path, to a receiver.

9. Use of the ionosphere in this way enables the radar to 'see' over the horizon. The concept is depicted at Appendix B.

10. There are, however, some very significant difficulties in adapting such a concept to a useful long range surveillance tool. Overcoming these difficulties and developing an operational OTHR capability has only resulted after some 20 years of research by the Defence Science and Technology Organisation (DSTO), together with the advent of high powered computers which have enabled the technology to be exploited. JFAS has been developed over this period as a 'test bed' for the DSTO research.

THE NEED

Decision to Establish the Jindalee Operational Radar Network (JORN)

11. The Review of Australia's Defence Capabilities, March 1986, accorded high priority in defence planning to intelligence and surveillance capabilities, in the light of Australia's strategic circumstances. It proposed, *inter alia*, a strategy of denial. That is, a strategy which seeks to deny any possible enemy successful military operations in the sea and air gap surrounding Australia. Such a strategy requires the capacity to conduct effective surveillance up to about 2000km from Australia's northern coastline and, as such, the Review judged that three operational OTHRs could be justified in a network configuration across the continent.

12. In October 1986, following Cabinet's consideration of OTHR, the then Minister for Defence announced agreement in principle to the establishment of a network of up to three OTHRs for wide area surveillance.

13. The Policy Information Paper: The Defence of Australia, 1987, subsequently concluded that a range of force developments which included OTHR would form the basis of Australia's security into the next century. The Paper confirmed that the Government had given high priority to the design and development of the OTHR network.

14. The Committee was informed that the alternatives to the JORN are too costly for Australia to establish and operate. The alternatives are:

- satellite surveillance
- a fleet of airborne early warning and control aircraft
- a network of microwave radars along the northern shoreline supported by air and sea units
- a network of tethered radar balloons supported by air and sea units.

15. If the JORN was not established it would mean foregoing an important defence capability, with the result that Australia would remain largely unaware of the majority of ship and aircraft movements in the northern approaches. Defence believes that the JORN represents the only technically viable and cost effective means of providing the surveillance capability required.

16. In February 1989, Cabinet approved funds for site acquisition for the first two radars, in Central Queensland and the Goldfields region of Western Australia.

COMMITTEE'S CONCLUSION

17. There is a need to establish the Jindalee Operational Radar Network to provide the capacity to carry out effective surveillance of ship and aircraft movements up to 2000 kilometres from Australia's northern coastline.

THE PROPOSAL

18. The JORN will consist of radars in the Longreach region of Qld and the Leonora region of WA, the JORN Co-ordination Centre (JCC) at RAAF Base Edinburgh in South Australia and a number of very small remote beacons and sounders. Depending on the tenderer selected and the options adopted, 10 to 12 beacons and sounders will be required.

19. A network, rather than a single radar, is required to enable radar coverage of the full extent of areas of strategic interest. This cannot be achieved with a single radar.

20. The system is expected to be operational by the mid-1990's and, in addition to its major defence role, will have other significant applications. For example, it should be able to provide a deterrent to illegal immigration and drug smuggling from South East Asia, as well as providing valuable weather information and assistance in aircraft safety and search and rescue operations.

21. Phased over five years, the project will involve not only the erection of sophisticated radar equipment but also construction of facilities to house the equipment and operations centres at each radar location and the JCC to be located at RAAF Base Edinburgh.

22. Information from the radars will be processed and analysed at the JCC which will be linked to the ADF command and control network. This will enable the radar network to be tasked for particular missions and allow processed information about aircraft and ship tracks to be available to the ADF and, in turn, to other agencies.

23. The JCC building will also accommodate facilities required for specialised training of Jindalee radar operators and a software support facility for the network. The software support activity, which will be undertaken by industry, involves the progressive development and updating of the complicated computer programs which are vital to the operation of the network.

24. Each radar will consist of two facilities - a transmitter and a receiver - separated by a distance in the order of 100 to 150km. The separation is required to provide electromagnetic isolation so that the signal from the high powered transmitter does not interfere with the very sensitive receiver.

Project Delivery Method - The Turnkey Option

25. Traditionally, Defence and other Commonwealth works have been built using a design and construct approach. With design and construct procedures, the requirements of the buildings and works are specified, separately from equipment, by Defence in conjunction with Australian Construction Services (ACS). The buildings and works are then designed by ACS, constructed by a contractor and delivered to the Commonwealth under the

supervision of ACS. The Commonwealth then provides the building to the prime equipment contractor as furnished facilities for the installation of equipment.

26. The design and construct process has major disadvantages for a project such as JORN where the primary equipment systems are much more complex than the buildings and works in which the equipment system will be housed. Defence believes it would complicate the project by adding a difficult design, schedule and contractual interface between a contractor and the Commonwealth. The Committee was advised at the public hearings of such difficulties which arose during the recent upgrading of the JFAS.

27. Additionally, JORN includes elements (the antennas) which are defined as 'works' for the purposes of the *Public Works Committee Act 1969* but must in practice be designed and provided as an integral part of the primary equipment.

28. Defence has sought to overcome these potential problems and complications by adopting a 'turnkey' approach to project delivery. Under this approach, all works will be provided by the prime equipment contractor as an integral part of building the radar and all the services that go with the prime contract. The prime contract will also include responsibility for operating the network for a period of time after its completion.

29. The functional design requirement and certain specific design needs for the works have been specified by Defence, along with functional requirements and performance specifications for the remainder of the system to be provided by the prime contractor.

30. Defence's Jindalee Project Office will be responsible for the overall management of the project. Design requirements included in the specifications have been prepared by Defence in consultation with ACS. Defence proposes to engage ACS as a consultant to oversight construction.

Implications for Project Cost

31. Due to the adoption of the turnkey contract approach, there are no final sketch plans or limit-of-cost estimate on which to base referral to the Committee. Referral was therefore based on an agreed ceiling price of $125m for both the Queensland and Western Australian radars and the JCC. This amount was determined as a realistic upper price limit, based on the content of tenders sought and received in a competitive environment from the tenderers, AWA and Telecom. At the public hearing in Kalgoorlie on 30 October 1990, the Committee was advised that, based on revised tendering, the cost estimate had been revised to $95m. This was made up of $40m for each of the radar facilities, $10m for the JCC and $5m for the remote beacons and sounders.

32. Under the cost incentive provisions of the contract, the contractor is to absorb increases due to coordination problems and other unforseen design and construction difficulties.

33. The only cost increases which will be granted by the Commonwealth will be those specifically defined in the contract, for example, where provisional quantities are given, and increases reflecting general price movements in the construction industry. These arrangements are inherent in the turnkey philosophy and contributed to Defence's decision to adopt it. It was estimated that the turnkey approach will result in a cost saving of approximately $8m over the traditional delivery method.

COMMITTEE'S RECOMMENDATION

34. The Committee recommends that the Department of Defence provide it with an analysis of the effectiveness of the turnkey approach at the completion of the project. This analysis should concentrate on cost, co-ordination and timing aspects compared with traditional project delivery systems.

PROPOSED WORKS

35. Because of the nature of the turnkey approach, design information about the proposed works is not available, at this stage of the project, to the level of detail which normally applies for projects handled under traditional procedures. Tendering firms have provided some information about building layouts, based on the project specification and knowledge of the JFAS. Defence indicated at the public hearing in Longreach that it would provide the Committee with the facilities' design details when these are finalised - possibly 12 to 18 months after the awarding of the contract.

36. Indicative layouts of transmitter and receiver sites are illustrated at Appendix C. These layouts do not represent the particular proposal of any tenderer.

37. The JCC will be accommodated in a proposed new building at RAAF Base Edinburgh but will rely on the existing base infrastructure for power supply and general engineering services. Facilities at transmitter and receiver sites will include:

Transmitter - transmitter building
transmitter antenna
power house/fuel storage
workshop building
grounds equipment shed
dormitory building

amenities building
pump building
housing
access roads
sewerage treatment facility.

Receiver - receiver building
receiver antenna
power house/fuel storage
engineering workshop
grounds equipment shed
dormitory building
amenities building
pump room
housing
access roads
sewerage treatment facility
equipment rooms.

38. Work at all sites will include carparking, fencing, landscaping and reticulation of all services. Due to their remote location, the transmitter and receiver facilities will need a high degree of self sufficiency. This is particularly the case with power and water supplies.

39. In response to a request from the Committee about the cost of power from diesel generators compared with the cost of supply from state grids, Defence provided the following information:

- annual power requirements will be approximately 12.7m units per radar

- to meet this requirement, the diesel generators would consume approximately 3.2m litres of fuel per radar

- at the current price of 53 cents per litre for diesel fuel the cost would be approximately 13 cents per unit compared with approximately 11 cents per unit for power supplied from a state grid

- connection to a state grid could result in operating savings of approximately $0.25m per annum per radar.

40. However, Defence also pointed out that:

- for technical reasons, related to the requirement for the transmitter power load to be switched on and off very rapidly and the consequent flickering caused to local lighting systems, connection to a state grid is not currently possible

- there would be increases in overall capital costs due to extensions required to state grids

- much of the equipment required for self generation of power would still be required as backup to a grid supply.

41. The Committee is concerned about the consumption of 3.2m litres of diesel fuel per radar per year. This is a very high use of a non-renewable resource which will also result in additional atmospheric pollution and is at odds with the Government's commitment to reduce greenhouse gases by 20% by the year 2005.

42. The Committee is aware that because of the nature of the Queensland electricity grid, which uses predominantly coal-fired, base-load stations, approximately one third more energy is generated than consumed. There is therefore surplus capacity which could be used to supply power to the radar in the Longreach area. Connection to the Queensland state grid could also provide an incidental but worthwhile benefit to the

local community, as landholders might be connected to the grid at a lesser cost than would otherwise apply. It may also be possible for a cost sharing arrangement to be worked out which could reduce costs to Defence.

43. The Committee believes that technical problems relating to interference with the local electricity supply in the Longreach area can be overcome and suggests that Defence pursue a solution as a matter of priority. The Committee has also noted that Defence will discuss with the successful tenderer the possible application of solar power in the project. In addition, the Committee believes that Defence should keep itself abreast of alternative energy developments with the aim of reducing fossil fuel consumption as much as possible.

44. The Committee understands that there is little possibility of connection to the WA state grid near Kalgoorlie.

COMMITTEE'S RECOMMENDATION

45. The Committee recommends that the Department of Defence give a high priority to overcoming technical problems preventing connection to the state power grid to provide power for the Longreach radar. The Committee further recommends that the Department of Defence fully investigate the application of alternative energy sources, particularly solar energy, to the project. The Committee also recommends that the Department of Defence consult with adjoining landowners regarding connection to the state power grid.

46. The most significant visual feature of the sites will be the antennas. At the transmitter the antenna will probably be about 450m long. The receiver antenna will probably be about 3 km long. In each case the antenna will be located on a earth mat covering about 50 hectares. It is anticipated that the

antennas will be very similar in appearance to those at the JFAS.

47. All facilities are to be designed to enable 24 hour operation. They are also to be designed to ensure that they can be expanded, should the need arise in the future, with minimal disruption to ongoing operations.

48. It is also a requirement that the design and configuration of buildings at each site shall be complementary and that the layout, form, colouring and landscaping of each site shall complement its environs.

49. In the light of the Newcastle earthquake experience, the Committee believes that Defence should clarify the earthquake risk in the Longreach and Leonora regions as soon as possible.

SITING

General Locations of Radars

50. Radar locations are determined primarily by the areas over which surveillance is required and by the characteristics of radar performance. The radar sweeps across an angle of 90 degrees with an effective range which starts at about 1000 kilometres and extends to about 3000 kilometres from the antenna. These distances are indicative only because the precise range is determined by the condition of the ionosphere which varies over time. The radar is unlikely to detect targets less than about 1000 kilometres from the antenna, the so called 'skip distance'.

51. Given the radar characteristics and the geography of the northern approaches, it has been determined that radars located in the general areas of Longreach and Leonora will provide the best coverage, including overlapping coverage of some areas. Targets in the area of overlapping coverage can be

tracked by both radars, resulting in greater precision in the tracking process.

Location of JORN Coordination Centre

52. Whilst the JCC will provide information to military command centres (and, when appropriate, to organisations such as Customs, Coastwatch, Immigration etc) there are no particular advantages to be gained by collocating it with any of these other centres. A location on an existing Defence base will provide security and some economy in the shared use of supporting services. Location near a capital city is also seen to be an advantage in attracting and retaining suitable, skilled staff. A particular advantage which led to the choice of RAAF Base Edinburgh is its close proximity to the Defence Research Centre at Salisbury which will continue to provide expert assistance to the project.

Radar Sites

53. The choice of particular sites in the Longreach and Leonora areas has been the subject of extensive study, analysis and consultation. There are very stringent selection criteria relating to the physical characteristics of sites; in particular, they must be extremely flat over a considerable distance to maximise antenna efficiency.

54. Another essential criterion is the separation and relative orientation between the transmitter and receiver of each radar. Ideally the transmitter and receiver should be separated by a distance that is just sufficient to prevent the transmitter signal from interfering with the receiver. The separation distance, in the order of 100 to 150 kilometres, is dependent upon the electrical properties of the soil.

55. The final site selection process in WA showed that the physical separation of the two originally preferred sites was in excess of that required to achieve the necessary electromagnetic isolation. Defence has sought to identify a site to match with one of the earlier preferred sites, to optimise physical and electrical isolation. A site to the north-east of Laverton has been identified and an investigation to confirm its availability and suitability is underway.

56. In Queensland negotiations are continuing with landholders at the sites preferred by Defence: receiver site near Stonehenge (150 kilometres south-west of Longreach) and transmitter site 30 kilometres south of Longreach. Of the six landholders involved in the Queensland sites, one has indicated opposition to the sale of any of his land. While Defence indicated that it would prefer to acquire property by negotiation, it has not excluded compulsory acquisition should that be necessary.

57. In Queensland the Commonwealth will seek to acquire approximately 3200 hectares at the transmitter site and 5000 hectares at the receiver site. In Western Australia the areas are approximately 2500 and 5000 hectares respectively. However, if it is decided to develop a radar in WA with a 180° arc of coverage, more land would be required at both sites.

Alternative to Longreach Location

58. At the public hearing in Longreach, a number of witnesses questioned why the Queensland facility needed to be sited close to Longreach and suggested that alternative, less populated areas should be investigated.

59. Defence pointed out that the general locations of the radars had been determined primarily by the location of the areas over which surveillance is required and the

characteristics of radar performance. Given the radar characteristics and the geography of the northern approaches, Defence advised the Committee that radars located in the general areas of Longreach and Leonora will provide the best coverage. Defence also stressed that it was constrained by technical parameters and did not have the flexibility in siting that might be imagined.

60. The Queensland OTHR site search area determined in April 1988 covered the whole of the shires of Longreach, Flinders, Aramac and Ilfracombe, the majority of the shires of Dalrymple, Richmond, Winton, Isisford and Barcaldine. Small parts of the shires of Barcoo, Jericho, Blackall, Belyando, Etheridge, McKinlay and Hinchinbrook were also examined.

61. The site selection process adopted was to reduce the search area initially by successively applying the following criteria and eliminating those parts of the search area which did not comply:

- flatness - extremely flat terrain is necessary
- flood plains - excluded
- proximity to towns - close areas were excluded because of the potential for electromagnetic interference; distant areas were excluded because of commuting difficulties
- commercial power availability - required within about 60km for transmitter site and about 20km for receiver site
- proximity to good access roads - required within 25km

- black soil - excluded because of higher acquisition costs and construction difficulties caused by its expansive nature.

62. This process led to a number of potentially suitable sites being identified. However, a refinement of the broad search area was carried out at this point in the light of better knowledge of radar performance characteristics and how they would affect radar coverage of areas of strategic interest. This led to the decision that the radar should be in the vicinity of Longreach.

63. The critical factor affecting site selection from this point was soil type. The Longreach region is typified by black soil plains. This soil is termed 'expansive', that is it expands and contracts greatly as it gets wet and dries. As it dries large raised cracks form in its surface.

64. This causes two potential problems for the construction of the radar. Precise alignment of antenna elements is critical and there would be a definite cost premium for appropriate foundation works in expansive soils to ensure that this alignment is maintained. Secondly, the raised cracks which form as the soil dries would constantly move the earth mat in the radar reflection zone in front of the antenna and distort the smoothness of the reflection zone. Stability of the earth mat is important to consistent radar performance.

65. These problems would be of greater magnitude for a radar receiver than a transmitter because of the greater length of its antenna and its greater sensitivity to reflection zone smoothness.

66. Site selection therefore concentrated on identifying a suitably large flat area of red soil on which to site a receiver. Only one suitable site was located, near Stonehenge to the south of Longreach. It was located using topographical

and soil maps and by visits to the region for inspections and consultation with landowners.

67. Knowledge of intersite direction and separation requirements then directed attention to suitable areas for a transmitter site. Two were identified using topographical maps, both on black soil.

68. The site potential in the Ilfracombe area, some 30kms east of Longreach, was rejected because the greater separation distance from the receiver site at Stonehenge would result in a performance penalty.

69. Topographic suitability of both the receiver site and the preferred transmitter site at Fernhurst were then confirmed. Intersite separation suitability was confirmed by undertaking measurements of electrical isolation between the sites.

70. Because of OTHR's strategic importance and cost, it is important that it be sited in a location which provides optimum radar performance. Defence stressed that the Longreach area provides the best prospect for this result.

COMMITTEE'S CONCLUSION

71. The Committee accepts that to provide the optimum radar performance the Queensland and Western Australian radars need to be located in the Longreach and Leonora areas.

BUFFER ZONES

72. Certain controls need to be applied to areas of land around transmitter and receiver installations. Some land surrounding the installations will be purchased so that the Commonwealth can effectively control activities that could threaten safety in respect of the transmitter or cause

interference in respect of the receiver. A detailed description of these buffer zones is provided at Appendix D.

73. The Committee raised concerns about controlling access to the buffer zones. In particular, the need to ensure that no unauthorised explosive devices are permitted into the buffer zones. Defence indicated that this matter would be given further consideration during design development.

74. Land holders affected by the buffer zones will be compensated under the provisions of the *Land Acquisition Act 1969*. The amount of compensation for purchase of any land would be a matter of negotiation between the landholders and the Australian Property Group (APG). The Committee believes that APG should commence negotiations with landowners affected by the buffer zones as soon as possible. The Committee was advised that the Commonwealth would grant a long term lease to any former landholder.

ENVIRONMENTAL CLEARANCE

75. The Queensland, South Australian and Western Australian elements of the JORN have been separately assessed for environmental impact to enable separate joint assessments of the project to be made with the appropriate State Government. There is no environmental link between the elements which would require consideration of the environmental impact of the JORN as a whole.

Environmental Clearance in South Australia

76. Defence advised the Committee that in its view the JCC does not present any significant adverse environmental impact. It is located at RAAF Base Edinburgh, where significant similar development already exist. It is essentially an office building containing specialised electronic equipment.

77. Environmental assessment has been carried out by Defence and clearance of the JCC has been granted under delegated authority from the appropriate Minister.

Environmental Clearance in Queensland

78. A Notice of Intention (NOI) for the Queensland radar, prepared in accordance with the requirements of the *Environment Protection (Impact of Proposals) Act 1974* was forwarded to the Department of the Arts, Sport, the Environment, Tourism and Territories (DASETT) in December 1989. DASETT subsequently provided copies to the Australian Heritage Commission (AHC) and the Queensland Department of Environment and Heritage (QDEH) for assessment and comment.

79. No significant environmental issues were identified and DASETT advised Defence of environmental clearance in May 1990.

80. In doing so, DASETT made the following recommendations concerning development of the radar:

- that Defence implement all environmental protection measures outlined in the NOI

- that Defence undertake archaeological/ anthropological and flora/fauna surveys of the sites for infrastructure development with the aim of avoiding areas of high archaeological/ anthropological value or areas supporting rare or endangered flora/fauna species (Defence advised the Committee that earlier Commonwealth Scientific and Industrial Research Organisation studies commissioned by it for inclusion in the NOI indicate that the presence of such areas is unlikely.)

- that the Land Management Plan for the facility be open to review by DASETT, QDEH and other interested parties

- that Defence investigate measures to prevent erosion of bare earth areas, rather than relying entirely on monitoring and rehabilitation

- that, on completion of the project, Defence advise DASETT of

  - actual effects on the environment of construction, including a comparison of predicted and actual impacts

  - Defence's success in implementing the DASETT recommendations

  - any feedback from the community or specific interest groups concerning the project.

81. Defence has confirmed to DASETT that these recommendations are accepted. A mechanism to ensure monitoring of environmental aspects of the development is currently under consideration by Defence and DASETT.

Environmental Clearance in Western Australia

82. The NOI for this element of the JORN was completed and forwarded to DASETT in March 1990 and subsequently forwarded by DASETT to the AHC and the WA Environment Protection Authority (EPA).

83. In the AHC's view, the preparation of neither an Environmental Impact Statement nor a Public Environment Report (PER) was warranted.

84. The EPA, however, sought the preparation of a PER to investigate potential socio-economic impacts on the region and, in the biophysical environment, the effect on vegetation of disrupted surface water flows.

85. The need for a formal environmental impact study was discussed at length between Defence, DASETT and the EPA. However, as the State authority maintained its position, DASETT recommended to its Minister the preparation of a PER in accordance with the *Environment Protection (Impact of Proposals) Act 1974*. The report is to be assessed jointly by DASETT and the EPA under the Commonwealth-Western Australian Government agreement for co-operation in environmental analysis of proposals. Defence advised that it would have preferred the project to have had environmental clearance in WA prior to referral to the Committee. However, the unexpected WA request for a PER could not be accommodated prior to the Committee conducting its investigation.

Public Environment Report in Western Australia

86. Guidelines for the PER, which are being prepared by a professional environmental consultant under contract to Defence, have been formulated by Defence/DASETT/EPA.

87. Biophysical concerns are largely being addressed by reference to the model provided by the JFAS. Biophysical environmental conditions are sufficiently similar to enable the effectiveness of protection and management measures proposed in Western Australia to be demonstrated by their effectiveness at JFAS.

88. Socio-economic conditions at JFAS are relevant to the Western Australian situation but not sufficiently similar to provide a valid base for assessment of the potential socio-economic impacts of the new radar. Information necessary for this assessment is being derived from a Community Consultation

Program (CCP). This Program has involved a two-way flow of information between Defence and the Goldfields community to ensure adequate public knowledge of the project and adequate Defence knowledge of the community, its infrastructure and possible community concerns about the radar.

89. The format of the CCP was agreed with the EPA and the Social Impact Unit prior to its execution. An outline of the CCP is at Appendix E. It is additional to the consultation which had previously taken place with shire councils, landowners and interested members of the community at public meetings. Defence is confident therefore that adequate consultation has taken place.

90. It should be noted that areas of the PER concerning manning and socio-economic impacts on the region are dependent on the contractor. Decisions regarding determination of staff numbers, where staff will be recruited from, where staff will live, etc, are not likely to be determined for some time.

91. To enable the PER to be finalised a matrix of solutions will be presented where options on manning exist. Each manning option will be addressed, likely resulting socio-economic impacts identified and appropriate management plans or actions determined. DASETT, EPA and the Social Impact Unit have all indicated the acceptability of this process and have agreed that environmental clearance can be granted on this basis.

92. To ensure that all likely manning options are addressed in the PER, Defence has had discussions with both tendering companies to ascertain their intentions.

93. When finalised, the PER will be followed by a six week period for public review and comment, and subsequent joint assessment by DASETT and the EPA of the document, any written public comment and Defence's response thereto. Environmental clearance is expected in March 1991.

ELECTROMAGNETIC RADIATION

Introduction

94. The issue of possible harmful effects from electromagnetic radiation (EMR) associated with the JORN was of considerable concern to a number of people in the Longreach area. In view of these concerns the Committee requested Defence to provide it with detailed information on this issue. This information is summarised below.

Background

95. All radio and radar transmitters produce 'non-ionising' electromagnetic fields. There is an important distinction between 'ionising' radiation associated with nuclear substances and processes, and 'non-ionising' fields which exist everywhere resulting from both natural sources such as the sun and the earth's magnetic field as well as man-made sources such as industrial applications and communications. It should be stressed that the JORN radar installations do not produce any nuclear radiation. Radio waves in the frequency range used by the Jindalee radar have been used for short wave broadcasting since the 1930's. Experience in their use and research findings have led to various codes of practice related to personal and environmental health and safety.

Safety Standards

96. The safety standards which apply to all communications transmitter installations in Australia are governed by Australian Standard AS2772.1.1990(AS) - Radio Frequency Radiation Part 1:Maximum Exposure Levels - 100kHz to 300GHz. This Standard has been prepared by a panel of experts and is based on the latest scientific research.

97. The AS takes a position generally in line with the 1988 guidelines of the International Non-ionising Radiation Committee of the International Radio Protection Association (IRPA). IRPA forms part of the World Health Organisation (WHO) under the auspices of the United Nations Environment Program.

98. The IRPA guidelines include an overview of the available Standards, recent evaluations of the health effects of human exposure to non-ionising radiation in view of the re-evaluation of instrumentation and measurements made on all known sources and applications of such radiation.

99. The AS specifies maximum exposure levels for both 'occupational' and the 'non-occupational' situations. The occupational levels apply to people exposed to electromagnetic fields as a result of their employment. The non-occupational levels (specified at one fifth of the occupational levels) apply to the general public on the basis of continuous exposure.

Electromagnetic Fields Associated with Jindalee Radar

100. Defence advised the Committee that, in the immediate vicinity of the transmitters, areas where field levels exceed the non-occupational maximum exposure levels specified in the AS will be contained within a safety zone of approximately 100 hectares. This will be fenced and signposted to prevent entry of humans or stock.

101. Beyond the safety zone, field levels diminish rapidly as distance from the antenna increases. At 5 Megahertz (MHz), where any given field or power level extends the greatest distance, the power is reduced to 1/1000 of the maximum exposure level within 6.5 kilometres, 1/10000 at 11 kilometres, and 1/100,000 at 17 kilometres. The signal level contour diagram at Appendix F relates to signal strengths at

ground level around the proposed transmitter site at Fernhurst Station near Longreach.

102. The signal level contours were calculated and then verified by on-site measurements at the Fernhurst site in early October 1990 using a portable transmitter. Defence advised the Committee that they represent the maximum possible signal levels that could be experienced when the transmitter is at maximum power and the ground is wet. Defence stressed that in practice, the transmitter will often operate at partial power. In addition in dry ground conditions, when the ground is less conductive, the signal levels will be reduced. It should also be noted that when averaged over time, signal levels will be significantly less than shown at Appendix F, as the radar scans in various directions across its 90 degree arc of operation. Defence pointed out that, in the Longreach area, of all the inhabited locations which are either permanently or periodically occupied the woolshed at Strathmore, some 8 kilometres from the proposed transmitter site, will experience the strongest field strength. This is expected to be some 350 times smaller than the maximum value allowed under the AS for non-occupational exposure. Defence indicated that the figure had been confirmed by recent measurements.

103. Expert advice provided by Defence indicates that there is a significant difference between the frequency of emissions from high voltage power lines and the Jindalee transmitters. Power line emissions are at 50 Hertz (Hz), while the Jindalee radar operates between 5 and 30MHz (ie 5 000 000 and 30 000 000Hz).

104. The primary effect of electromagnetic radiation in the high frequency band (3 to 30MHz) is molecular agitation which produces heat in human and animal tissues.

105. At low levels of intensity the heat produced is accommodated by the natural thermo-regulatory system in the

body affected and does not constitute a hazard. Under prolonged exposure to sufficiently high intensities the body's regulatory capability may be inadequate to compensate for the effects and exposure may lead to thermal distress or damage.

106. At frequencies below 100Hz (ie, including power transmission frequencies) the mechanisms for affecting the human body are not well understood. Evidence suggests a possible relationship between these low frequency emissions and some biological effects. There will be no emissions in this frequency band from a JORN transmitter

107. At the Longreach public hearing several witnesses raised the fact that a number of homesteads were within a 25 km radius of the transmitter. This point was raised because there was some misconception, caused by a Defence pamphlet explaining the OTHR project, that the transmitter had to be located 25 km or more from the nearest town for safety reasons. Defence indicated to the Committee that the decision not to site the transmitter within 25 km of towns was based on a judgement that that distance would minimise any inconvenience which might result from electrical interference to domestic appliances. It was in no way connected to any potential for dangerous field strengths to exist to that range and has absolutely no relevance to any danger to exposure to electromagnetic fields. Any such interference, if it occurs, can be attended to and eliminated. It would be uneconomic, however, to do this for built up areas.

108. Defence believes that, as design standards are being rigorously adhered to, there is no known reason to believe that there will be ill effects to health and the environment.

109. While the Committee accepts the advice of Defence that the AS and design standards are being applied, it is of the view that Defence faces a credibility problem in the Longreach area. To overcome this, the Committee believes that an

independent assessment of the electromagnetic effect of a Jindalee transmitter situated at Fernhurst should be undertaken.

110. Specifically, this independent assessment would:

- confirm the validity of Defence's methodology and the calculations which were used to produce the electromagnetic field strength contours previously supplied to the Committee and Longreach residents

- confirm the validity of the modelling methods used by Defence to simulate transmitter operation on the Fernhurst site using a low powered transmitter.

COMMITTEE'S RECOMMENDATION

111. The Committee recommends that the Department of Defence arrange as a matter of urgency an independent assessment of the likely electromagnetic effect of a Jindalee transmitter situated at Fernhurst Station near Longreach.

CONSULTATION

112. Action to develop radars in Queensland and Western Australia was preceded by correspondence from the Prime Minister to each State Premier. The Prime Minister proposed the establishment of Joint Consultative Committees of Commonwealth and respective State officials to identify matters requiring consultation and coordination between the Commonwealth and State Governments. This was agreed by both Premiers.

113. Meetings of the Joint Consultative Committees subsequently identified all State authorities with an interest in the development of the radars. Liaison with these authorities has been maintained as appropriate, particularly

with the State Premier's Departments which are the principal points of formal contact.

114. Defence advised the Committee that there had been a significant level of liaison and co-operation between Defence and State authorities at a working level, particularly in respect of site selection and, in Western Australia, environmental clearance.

115. However, there was considerable criticism expressed at the Longreach public hearing of the consultation process undertaken in Qld. Criticism centred on health and safety issues, concern regarding conflicting information provided by Defence, confusion regarding benefits to the Longreach region, the number of staff to be employed and inadequate procedures to contact or notify interested persons and organisations of the OTHR project.

116. Defence believes that there has been adequate consultation in the Longreach area and pointed to contact with State and local government and members of the public. Information about the project had been featured in the local media. In addition, three public meetings had been held at the Longreach Council Chambers and Defence had had numerous discussions with landholders and others over a period of more than a year.

117. Although it does not doubt the good intentions of Defence, it is clear to the Committee that there is a perception among some people in Longreach that the consultation process has been inadequate.

118. With the benefit of hindsight it is unfortunate that Defence did not undertake a structured CCP in Qld as was undertaken in WA as an integral part of the PER process. The Committee notes that at the public hearing on 1 November 1990, Defence indicated that it would continue the consultation

process in the Longreach area. The Committee welcomes this initiative but believes that any future consultation in the Longreach area should be based on the CCP undertaken in WA.

COMMITTEE'S RECOMMENDATION

119. The Committee recommends that the Department of Defence carry out a Community Consultation Program in the Longreach area based on that undertaken in the eastern Goldfields area of Western Australia as part of the Public Environment Report process.

LONGER TERM PLANNING

120. To ensure that future options for developing JORN are not ruled out, the procurement specifications stipulate that the potential must exist for the radars to be upgraded to a wider directional coverage. To test this option tenderers have also been requested to prepare offers for the development and construction of a radar with 180° coverage in Western Australia.

Provision of a Third Radar

121. A third radar, probably located in Central Australia, is being considered as a longer term development of JORN. It is unlikely that this option will be considered by Defence within the next two years; should it proceed, the associated works would be referred to the Committee separately.

Timing

122. Defence aims to have both Ministerial and Cabinet approval prior to the end of 1990 with contract negotiations completed by March 1991. Construction activity is likely to commence approximately two years after the letting of a

contract for the network. It is planned that the first radar will become operational sixty months after the contract date.

Cost Estimate

123. As indicated in paragraph 2, referral to the Committee was based on an agreed ceiling price of $125m for the Qld and WA radars and the JCC. At the public hearing in Kalgoorlie this was revised to $95m, comprising:

	$m
WA radar	40
Qld radar	40
JCC	10
Beacons/sounders	5
	95

124. The Committee sought information from Defence regarding the cost split between the antennas and other facilities. Defence has advised the Committee that this split is not available from the documentation provided by the tenderers. In view of the current status of the tendering process, Defence does not wish to request such specific information from the tenderers until a contract has been awarded.

COMMITTEE'S RECOMMENDATIONS

125. The Committee recommends that it be advised of the cost split between the antennas and other facilities following the awarding of the Jindalee Operational Radar Network contract.

126. The Committee recommends construction of the Queensland, West Australian and South Australian sections of the Jindalee over-the-horizon radar at an agreed ceiling price of $95m for the public works aspects of the proposal.

CONCLUSIONS AND RECOMMENDATIONS

127. The conclusions and recommendations of the Committee and the paragraph in this report to which each refers are set out below:

		Paragraph
1.	THERE IS A NEED TO ESTABLISH THE JINDALEE OPERATIONAL RADAR NETWORK TO PROVIDE THE CAPACITY TO CARRY OUT EFFECTIVE SURVEILLANCE OF SHIP AND AIRCRAFT MOVEMENTS UP TO 2000 KILOMETRES FROM AUSTRALIA'S NORTHERN COASTLINE.	17
2.	THE COMMITTEE RECOMMENDS THAT THE DEPARTMENT OF DEFENCE PROVIDE IT WITH AN ANALYSIS OF THE EFFECTIVENESS OF THE TURNKEY APPROACH AT THE COMPLETION OF THE PROJECT. THIS ANALYSIS SHOULD CONCENTRATE ON COST, CO-ORDINATION AND TIMING ASPECTS COMPARED WITH TRADITIONAL PROJECT DELIVERY SYSTEMS.	34
3.	THE COMMITTEE RECOMMENDS THAT THE DEPARTMENT OF DEFENCE GIVE A HIGH PRIORITY TO OVERCOMING TECHNICAL PROBLEMS PREVENTING CONNECTION TO THE STATE POWER GRID TO PROVIDE POWER FOR THE LONGREACH RADAR. THE COMMITTEE FURTHER RECOMMENDS THAT THE DEPARTMENT OF DEFENCE FULLY INVESTIGATE THE APPLICATION OF ALTERNATIVE ENERGY SOURCES, PARTICULARLY SOLAR ENERGY, TO THE PROJECT. THE COMMITTEE ALSO RECOMMENDS THAT THE DEPARTMENT OF DEFENCE CONSULT WITH ADJOINING LANDOWNERS REGARDING CONNECTION TO THE STATE POWER GRID.	45
4.	THE COMMITTEE ACCEPTS THAT TO PROVIDE THE OPTIMUM RADAR PERFORMANCE THE QUEENSLAND AND WESTERN AUSTRALIAN RADARS NEED TO BE LOCATED IN THE LONGREACH AND LEONORA AREAS.	71

5. THE COMMITTEE RECOMMENDS THAT THE DEPARTMENT OF DEFENCE ARRANGE AS A MATTER OF URGENCY AN INDEPENDENT ASSESSMENT OF THE LIKELY ELECTROMAGNETIC EFFECT OF A JINDALEE TRANSMITTER SITUATED AT FERNHURST STATION NEAR LONGREACH. 111

6. THE COMMITTEE RECOMMENDS THAT THE DEPARTMENT OF DEFENCE CARRY OUT A COMMUNITY CONSULTATION PROGRAM IN THE LONGREACH AREA BASED ON THAT UNDERTAKEN IN THE EASTERN GOLDFIELDS AREA OF WESTERN AUSTRALIA AS PART OF THE PUBLIC ENVIRONMENT REPORT PROCESS. 119

7. THE COMMITTEE RECOMMENDS THAT IT BE ADVISED OF THE COST SPLIT BETWEEN THE ANTENNAS AND OTHER FACILITIES FOLLOWING THE AWARDING OF THE JINDALEE OPERATIONAL RADAR NETWORK CONTRACT. 125

8. THE COMMITTEE RECOMMENDS CONSTRUCTION OF THE QUEENSLAND, WEST AUSTRALIAN AND SOUTH AUSTRALIAN SECTIONS OF THE JINDALEE OVER-THE-HORIZON RADAR AT AN AGREED CEILING PRICE OF $95M FOR THE PUBLIC WORKS ASPECTS OF THE PROPOSAL. 126

Colin Hollis
Chairman
15 November 1990

LIST OF WITNESSES

BEATTIE, Mr John David, Councillor, 91 Falcon Street, Longreach, Queensland

BRENNAN, Air Commodore Maxwell James, Director General, Jindalee Project, Department of Defence, Anzac Park West Offices, Constitution Avenue, Reid, Australian Capital Territory

BUTLER, Mr Timothy Bruce, Duck Street, Longreach, Queensland

BUTTON, Mr Ian William, Chairman, Barcoo Shire Council, Jundah, Queensland

CLARK, Mr Peter Howell, Grazier, 'Leander', Longreach, Queensland

COLE-CLARKE, Pastor Barry Arthur, Uniting Church Minister, 146 Crane Street, Longreach, Queensland

DAVEY, Mr Leslie Allen, Director, Jindalee Facilities, Department of Defence, Anzac Park West Offices, Constitution Avenue, Reid, Australian Capital Territory

DEECKE, Wing Commander Terrence Edward, Staff Officer, Jindalee Project Requirements, Department of Defence, Anzac Park West Offices, Constitution Avenue, Reid, Australian Capital Territory

EMMOTT, Mr Bruce Forster, 'Noonbah', Longreach, Queensland

GOLLEY, Dr Malcolm George, Research Leader, Jindalee Operational Radar Network, HF Radar Division, Department of Defence, Salisbury, South Australia

HANRICK, Mr Richard Howard, President, Longreach Tourist Promotion Association, Eagle Street, Longreach, Queensland

HARDING, Mrs Heather Margaret, Grazier, 'Whitehill', Longreach, Queensland

HARDING, Mr William Arthur Baker, Grazier, 'Whitehill', Longreach, Queensland

HILL, Mr Peter Thomas, Project Officer, Jindalee Facilities, Department of Defence, Anzac Park West Offices, Constitution Avenue, Reid, Australian Capital Territory

JACOBS, Mr Wilhelm, Shire Clerk, Shire of Leonora, PO Box 56, Leonora, Western Australia

JOHNSTON, Mr David Albert Lloyd, Deputy President, Kalgoorlie-Boulder Chamber of Commerce, 124 Hannan Street, Kalgoorlie, Western Australia

JONES, Mr Peter Vincent, Senior Planning Officer, Department of Premier, Economic and Trade Development, Brisbane, Queensland

MILNE, Mr John Richard, 'Loongana', Longreach, Queensland

MURPHY, Dr Tom, Medical Practitioner, 104 Ibis Street, Longreach, Queensland

NILON, Mr Robert James, 116 Crane Street, Longreach, Queensland

O'HANLON, Mr Kevin Leonard James, Solicitor, 117 Eagle Street, Longreach, Queensland

PULSFORD, Mr Timothy John, National Parks and Wildlife District Ranger, Central West, PO Box 202, Longreach, Queensland

RAYNER, Miss Lisa Ann, Fernhurst Station, Longreach, Queensland

SCARR, Mrs Claire Frances, PO Box 276, Longreach, Queensland

SCOTT, Mr Graham Edward, Business Person, 19 Brolga Street, Longreach, Queensland

TAWTON, Mr Robert William, Director, Jindalee Project Planning, Department of Defence, Anzac Park West Offices, Constitution Avenue, Reid, Australian Capital Territory

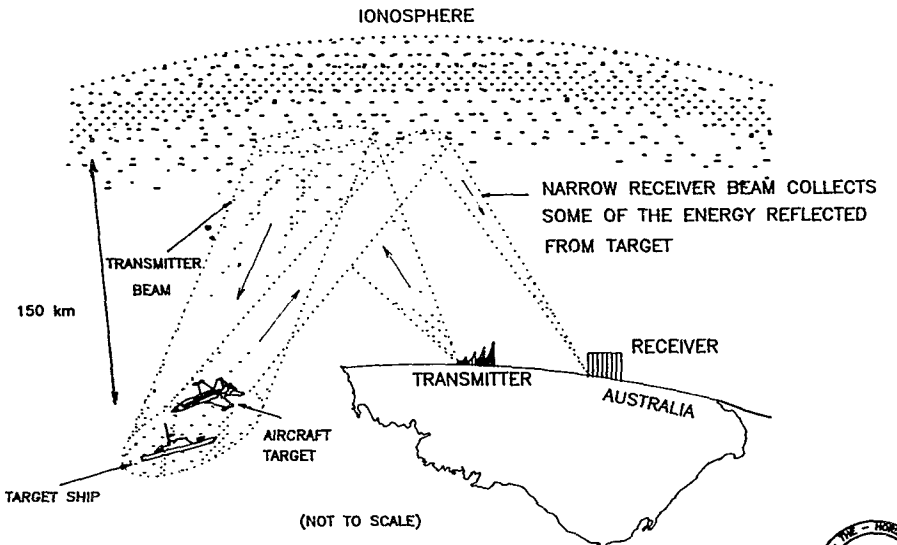
THEMSEN, Mr Jorgen Them, Shire Engineer, Shire Council of Longreach, 96A Eagle Street, Longreach, Queensland

WALKER, Mr Lloyd Norman Ernest, Senior Representative, Walker Family, 'Strathmore', Longreach, Queensland

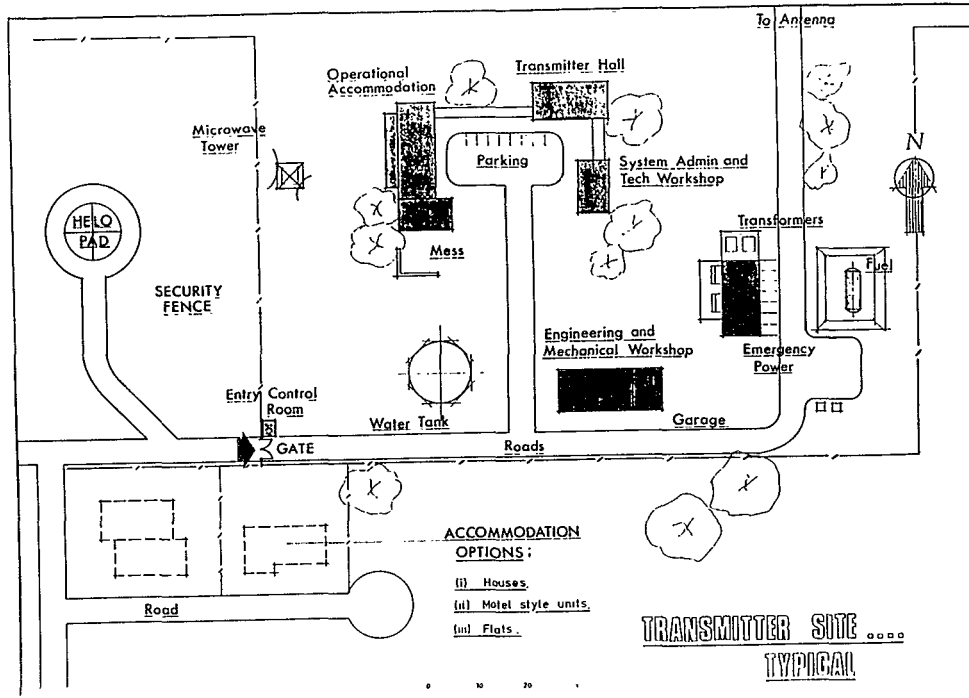
WALKER, Mr Mark Albert, Grazier, 'Rosedale', Longreach Queensland

WALSTER, Mr Robert John, Acting Director, Goldfields-Esperance Development Authority, 20 Boulder Road, Kalgoorlie, Western Australia

PROJECT JINDALEE



PRINICIPLE OF OPERATION OF JINDALEE OVER–THE–HORIZON RADAR



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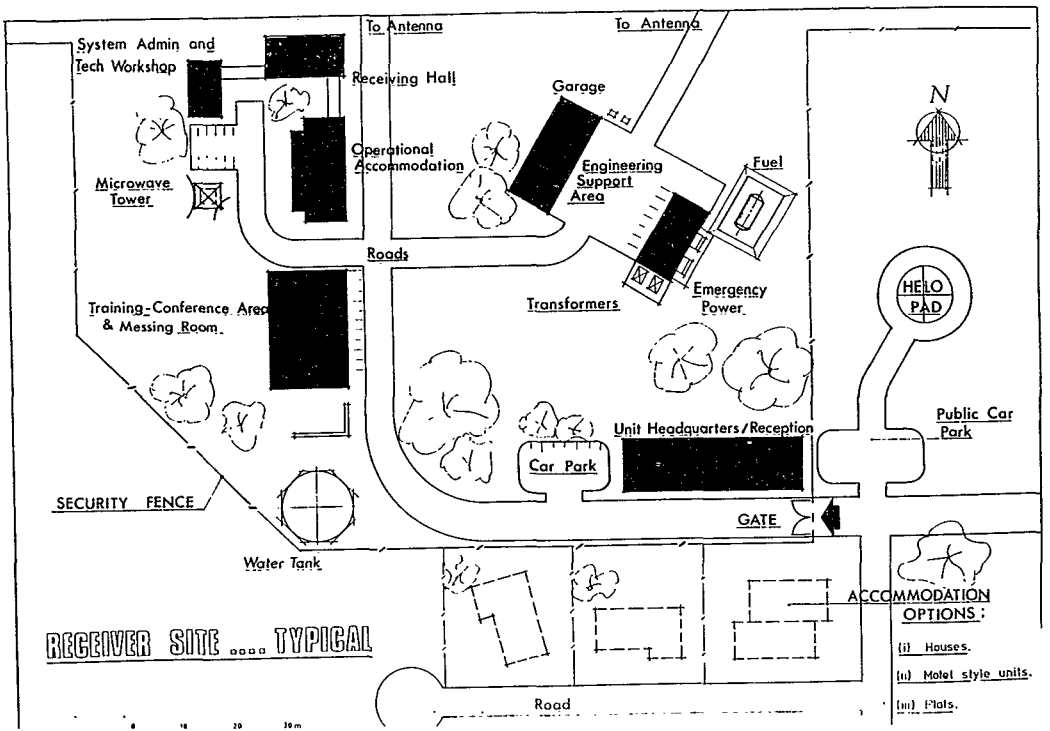
APPENDIX C


System Admin and Tech Workshop
To Antenna
To Antenna
Receiving Hall
Garage
Operational Accommodation
Engineering Support Area
Fuel
Microwave Tower
N
Roads
Training-Conference Area & Messing Room
Transformers
Emergency Power
HELO PAD
Public Car Park
Unit Headquarters/Reception
Car Park
SECURITY FENCE
GATE
Water Tank
ACCOMMODATION OPTIONS :
(i) Houses.
(ii) Motel style units.
(iii) Flats.
RECEIVER SITE .... TYPICAL
Road
0 10 20 30m

C2

BUFFER ZONES

Note: Distances and areas etc are indicative only; actual dimensions will vary with particular sites.

Reference Documents

1. The following reference documents have been used in defining buffer zones:

a. CCIR Recommendation 368-4, Ground Wave Propagation Curves for Frequencies between 10 kHz and 30 Mhz.

b. BS6657:1986 - British Standard Guide to prevention of inadvertent initiation of electro- explosive devices by radio-frequency radiation.

c. BS6656:1986 - British Standard Guide to prevention of inadvertent ignition of flammable atmospheres by radio-frequency radiation.

d. AS1044:1987 - Limits of Electromagnetic Interference for Electrical Appliances and Equipment.

e. AS2064:1986 - Limits of Electromagnetic Interference Generated by Industrial, Scientific, Medical and Similar Radio-Frequency Equipment.

f. AS2772:1985 - Australian Standard Maximum Exposure Levels - Radio Frequency Radiation - 300 kHz to 300 GHz.

g. AS3516.1-1988 Australian Standard Siting of Radiocommunication Facilities Part 1 - LF, MF and HF Transmitting and Receiving Facilities.

Transmitter Antenna Buffer Zone

2. The buffer zone can be divided into two broad areas as follows:

a. Radiation Hazard Zone

This is an area of about 100 ha in the immediate vicinity of the antennas in which electromagnetic radiation levels resulting from the high powered transmitters preclude the occupation by people or

stock. This area will be fenced off to prevent access.

b. Flammable Atmosphere and Electro-explosive Devices Hazard Zone

The conditions will relate to the use of flammable liquids and gases and electro-explosive devices (ie detonators) which, because of the characteristics of the radar transmissions, can be accidentally detonated by the radar.

The likelihood of accident is very small in any event but reduces to effectively zero if some precautions are taken. The Commonwealth wishes to purchase this area to ensure that people using it (ie the lessee) only do so in safety by being made aware of the precautions which have to be taken.

This area, comprising the balance of 2500 ha and surrounding the radiation hazard zone, will continue to be available to its previous owner for continued pastoral use under certain conditions.

3. The areas of each zone will be calculated in accordance with appropriate Australian or British Standards documents.

4. The radio frequencies which the Commonwealth can use for the radar are controlled by the Department of Communications to prevent disruption to other users of the electromagnetic spectrum. In the event of interference being caused by the radar, the Department of Communications would manage the problem by reallocating frequencies or requiring the Commonwealth to modify equipment. The Commonwealth is no different in this regard to any other user.

Receiver Antenna Buffer Zone

5. This buffer zone is required in order to protect the sensitive receiver from interference from extraneous man made radio frequency noise. Three areas can be defined within the overall buffer zone, as follows:

a. Zone A - rectangle of 4.5km wide x 2.0km deep (900 ha), not containing any source of man made radio noise.

b. Zone B - approximately rectangular about 9.5km wide x 6.5km deep (6175 ha) encompassing Zone A, with the following conditions:

(1) no industrial/scientific/medical (ISM) or other radio frequency equipment such as used by industry, research facilities or hospitals;

(2) all domestic and other non-radio frequency appliances shall comply with AS 1044;

(3) no electrical traction systems (such as tramways)

c. Zone C - approximately a 90 degrees fan-shaped area extending out about 20km and about 30 km wide (35,000 ha), encompassing Zones A and B, with the following conditions:

(1) all industrial/scientific/medical (ISM) equipment shall comply with AS 2064;

(2) no electrical traction systems.

6. Ownership of Zone B is sought. This area would be available for continued pastoral activity. Conditions which have to be imposed on the use of the area are considered unlikely to interfere with normal pastoral activities in any substantive way.

7. As developments likely to breach the requirements of Zone C are a remote possibility in the areas in which the receivers are sited, ownership of this large outer zone is not proposed.

OUTLINE OF COMMUNITY CONSULTATION PROGRAM
NORTH EASTERN GOLDFIELDS REGION OF WA

13 July 90 — Telephone discussions with Kalgoorlie media, outlining plans for consultation with the community and the media.

16-20 July 90 — Newsletter distributed to all postal addresses in the North Eastern Goldfields (Leonora, Laverton and Leinster), providing an overview of the Jindalee Project and advising that Defence Officials will be travelling through the region seeking to provide information and obtain comment on the radar proposal. Copy at Annex 1.

18 July 90 — Media release to Goldfields and metropolitan WA media concerning the public consultation process being embarked upon.

20-23 July 90 — Public Notice in 'Kalgoorlie Miner' newspaper advising when and where Defence Officials will be available for consultation in the coming week. Copy at Annex 2.

23 July 90 — Media briefing in Kalgoorlie for electronic and print media covering the Goldfields.

24 July 90	Attendance in Laverton for consultation with the community.
25 July 90	Attendance in Leonora for consultation with the community.
26 July 90	Attendance in Leinster for consultation with the community.
27 July 90	Discussions with Goldfields-Esperance Development Authority.
	Discussions with Kalgoorlie-Boulder Chamber of Commerce.
	Attendance in Kalgoorlie for consultation with the community.

Environmental Protection Authority (WA-EPA). The WA-EPA has asked that a key component of the report and plan be an assessment of the social and economic effects of the Jindalee project on communities in the North Eastern Goldfields.

Public Consultation Program. A public consultation program is required for the preparation and assessment of the report and plan. This newsletter is part of that program.
Over the next two months Department of Defence personnel working on the Jindalee project will be visiting your area for discussions with Local Government Authorities, pastoralists, business people, community groups and other members of the public.

Should you wish to participate in the consultation program you can:

- talk with Jindalee project staff when they are in your town;
- seek more information on the Jindalee project from the Department of Defence;
- make a submission to DASETT when the report and plan are released for public comment.

You will be notified of dates of visits to your area in the *Kalgoorlie Miner* and over local radio. The dates of the release of the environment report and management plan will also be notified.

FOR FURTHER INFORMATION ON THE JINDALEE OVER THE HORIZON RADAR PROJECT CONTACT:

CANBERRA
Mr. Les Davey
Director
Jindalee Facilities
Department of Defence
PO Box 33
CANBERRA ACT 2600

Telephone (06) 2666370
Facsimilie (06) 2666059

PERTH
Mr. Ian Waterston
Project Officer
Regional Secretary's Office
Department of Defence
PO Box D173
PERTH WA 6001

Telephone (09) 3237264
Facsimilie (09) 3254721

POSTAGE PAID

TO THE HOUSEHOLDER

AUSTRALIA

Important information for residents of the North Eastern Goldfields about

JINDALEE OVER THE HORIZON RADAR

Department of Defence
PO Box 33
CANBERRA ACT 2600

JINDALEE OVER THE HORIZON
RADAR PROJECT

NEWSLETTER - JULY 1990

This newsletter contains information about a major event in your region - the installation of a key section of Australia's new Jindalee Operational Radar Network. We at the Department of Defence will try to answer all your questions as the project continues, through meetings, news releases and publications such as this newsletter. If we miss anything out of special interest to you, contact us at one of the addresses on the back.

The Project. The Department of Defence is proceeding with the development of the Jindalee over the horizon radar network. The Jindalee system is capable of detecting ships and aircraft at ranges of up to 3000 kilometres. This is a major addition to the range of surveillance measures available to the Government, not only for Defence, but also in the war against drug running, illegal fishing and illegal immigration. Benefits also include improved national weather forecasting and, at the local level, a stimulus to the economy.

Two radars and a Co-ordination Centre will be developed initially. The radars, each with a separate transmitter and receiver site, will be located near Longreach in Queensland and in the North Eastern Goldfields in Western Australia. The Co-ordination Centre is to be built at RAAF Base Edinburgh, near Adelaide, South Australia. A radar in central Australia will be developed in the future

The Operator. Jindalee facilities will be built, equipped and operated by a private contractor. The Department of Defence is currently evaluating the tenders for the project. A decision on who will provide and operate the network should be made by late 1990.

The Location. To meet operational requirements the transmitter and receiver will be some 150 kilometres apart. The sites currently being examined for the facilities in the North Eastern Goldfields are:

- 80 kilometres southwest of Leinster, for the transmitter; and
- 55 kilometres northwest of Laverton for the receiver station.

Land Ownership and Land Use. Both the transmitter and receiver locations are on pastoral leases. Total land requirements will be about 2500 hectares at the transmitter site and 5000 hectares at the receiver. These buffer zones are required around all high frequency transmitting and receiving facilities. When developed the transmitter will only occupy some 150 hectares and the receiver 50 hectares.

The Commonwealth Government will buy the freehold title of the land from the Western Australian Government. Apart from the areas set aside for the transmitter and receiver, the rest of the land can continue to be used for pastoral purposes, under leasing arrangements.

The Environment. Locations proposed for the siting of Jindalee facilities are relatively flat, semi-desert areas. Both the transmitter and the receiver sites are in areas with similar geology, topography, land forms and drainage.

The Department of Defence, in consultation with the Western Australian Department of Mines, has examined sites for the facilities which have neither mineral exploration nor mining potential.

Research by the CSIRO Division of Wildlife and Ecology found that the plants and animals at the proposed transmitter and receiver sites are common to the region. The environment at both sites has already been affected by grazing activities.

Personnel and Housing. About 35 people will operate the WA facilities - 12 at the transmitter and 23 at the receiver. Housing may be provided at the facilities and in nearby towns. Decisions are still to be made on the staffing levels and the location of housing.

Environmental Assessment. Before the Jindalee facilities can be constructed in Western Australia, the Department of Defence must prepare a Public Environment Report and Environmental Management Plan. This is required under the Commonwealth Environment Protection (Impact of Proposals) Act 1974. The environmental report and management plan will be jointly assessed by the Department of the Arts, Sport, the Environment, Tourism and Territories (DASETT) a[illegible] Western Australian

PUBLIC NOTICE PLACED IN 'KALGOORLIE MINER'
20-23 JULY 90

JINDALEE OVER THE HORIZON RADAR PROJECT

PUBLIC CONSULTATION PROGRAM

Public comment on the Jindalee radar proposed for the North Eastern Goldfields region is being sought by the Department of Defence.

Officials from the Department will be available in the region for consultation as follows:

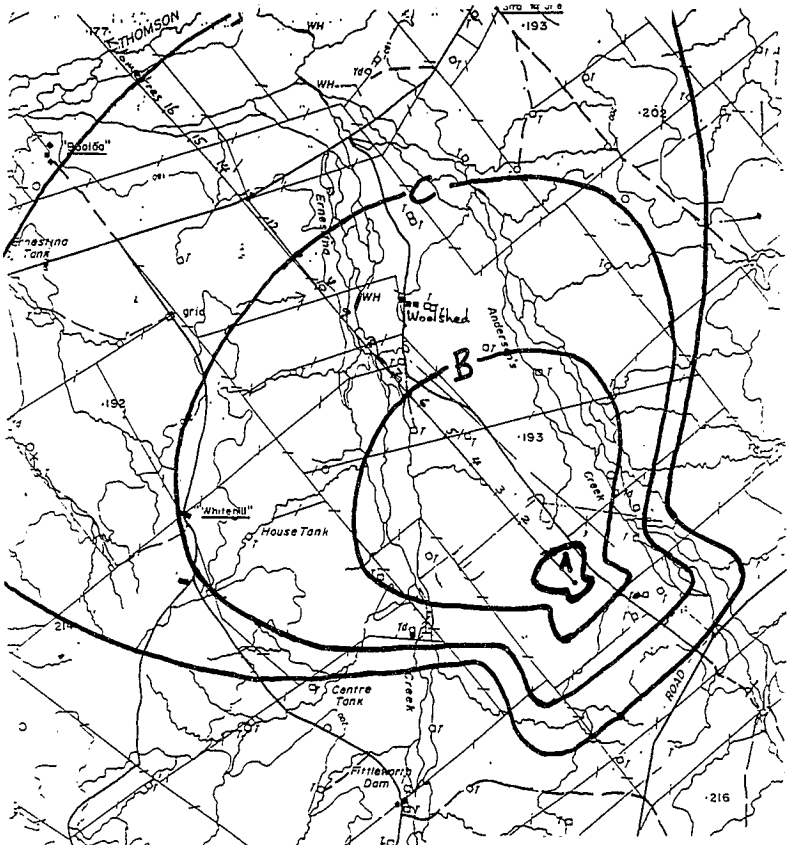
LAVERTON
Tuesday 24 July 1990
Shire Offices (Phone 090-311202)
11.00am-4.00pm, 6.00-8.00pm

LEONORA
Wednesday 25 July 1990
Shire Offices (Phone 090-376044)
11.00am-4.00pm, 6.00-8.00pm

LEINSTER
Thursday 26 July 1990
Leinster Lodge Motel
(Telephone 090-379005)
11.00am-4.00pm, 6.00-8.00pm

KALGOORLIE
Friday 27 July 1990
Goldfields Esperance Development
Authority Office
(Telephone 090-911166)
2.00-5.00pm

Members of the community are encouraged to raise any issued concerning the proposed Jindalee Radar.



APPENDIX F
JINDALEE OTHR TRANSMITTER

SIGNAL LEVEL CONTOURS AT 5 Mhz

Scale: 1:100,000

CONTOUR	ELECTRIC FIELD (Volts/metre)	POWER (milliwatts/sq cm)	
A	87	2.0	(See note)
B	2.8	0.002	
C	0.89	0.0002	
D	0.28	0.00002	

(Note: Levels at contour A are equivalent to the maximum safe exposure level specified in Australian Standard 2772-1990)