Contents

	Page
Summary and recommendations	i
1. Introduction	1
2. The proposal	1
3. Issues raised in submissions from Government agencies and the public	3
4. Environmental issues and their management	3
4.1 Gas pipeline from Karratha to Port Hedland	4
4.2 The gas turbine power station at Port Hedland	5
4.3 The transmission line from Port Hedland to Newman	7
5. Conclusion	8
6. Recommended Environmental Conditions	9
Attachment 1: Proponent's list of environmental management commitments	

Figure

1. Location map showing project components 2

Appendices

1. Questions and issues raised in submissions and the proponent's response

Summary and recommendations

Pilbara Energy Limited (the proponent) proposes to establish an energy infrastructure in the Pilbara region of Western Australia (Figure 1). This proposal will provide natural gas and electric power for future industrial developments and includes:

- a 215 kilometre buried gas pipeline from Karratha to Port Hedland
- a gas turbine power station at Port Hedland
- approximately 400 kilometres of high-voltage power transmission line from Port Hedland to Newman
- a back-up generating plant at Newman, and
- closure of the existing diesel powered Power Station at Newman.

From its evaluation of the proposal, and information gained in submissions, the Authority considers that the key environmental factors for its consideration relate to construction and operational management of the gas pipeline and transmission line easements. This includes the degree of clearing that occurs within the easements, management of hydrostatic test waste waters, control of erosion at river crossings, ongoing environmental management (drainage and weed controls) and rehabilitation practices.

Issues that were considered in relation to the siting and design of the power station included flood mitigation measures (ie. design the station for a one in a hundred year flood event). Additionally, the management of fuel storage facilities and wastes discharges (noise, gases and liquids) from the power station site were addressed.

Additionally, the management of sites of ethnographic and archaeological significance have been and are continuing to be addressed by the proponent.

On the basis that the proponent has provided a proposal, including specific commitments, that addresses these concerns the Environmental Protection Authority concludes that the proposal is environmentally acceptable and recommends accordingly.

Recommendation 1

The Environmental Protection Authority concludes that the proposal to develop a new energy infrastructure in the Pilbara region of Western Australia is environmentally acceptable.

This conclusion is based on consideration of the proponent's Consultative Environmental Review, submissions received from Government agencies and the public, the proponent's responses to issues raised in submissions (Appendix 1) and the proponent's commitments (Attachment 1 to Section 6).

In reaching this conclusion, the Environmental Protection Authority identified the main environmental factors requiring consideration to be the:

- **siting, construction and ongoing operational management of the underground pipeline and overhead transmission line easements, and**
- **siting, management and operation of the power station site.**

The Authority considers that these issues have been adequately addressed and that this proposal could proceed subject to its recommendations in this report.

The proponent has developed a proposal that substantially addresses the issues of siting. National Parks in the area have been avoided and sites of ethnographic and archaeological significance have been largely avoided. The transmission line crosses a number of Aboriginal Reserves and the proponent has committed to continue its liaison with the local Aboriginal groups and comply with the requirements of the Aboriginal Heritage Act.

The construction and management of the pipeline, transmission line and power station have been addressed in the CER. Several submissions expressed the view that there was insufficient detail, but the Authority considers that the detail provided is sufficient given that such activities are not new to the Pilbara region, and have been shown to be environmentally manageable in the past. The development of an Environmental Management Programme (as proposed by the proponent in its commitments) is an appropriate mechanism to provide more detail.

The Authority's policy is that Environmental Management Programmes (EMP) be available to the public. The timing, scope and frequency can be decided by the proponent and EPA on advice of other agencies. The development, implementation, results and changes to monitoring programmes that make up the EMP should be reflected in subsequent EMP's.

The EMP for this proposal should address the following issues:

- the underground pipeline - easement access and clearing guidelines to ensure minimal disturbance, drainage management guidelines to prevent unacceptable changes to established pathways, erosion control guidelines for river crossings, hydrostatic test water disposal, vegetation monitoring and rehabilitation;
- the gas turbine power station site - the collection of periodic air quality data (noise, sulphur dioxide and oxides of nitrogen), construction and emergency response plans for hydrocarbon storage and spills/fires, ground and surface water protection, security of buffer area; and
- the transmission line - easement access and clearing guidelines to ensure minimal disturbance, drainage management guidelines to prevent unacceptable changes to established pathways, vegetation monitoring and rehabilitation.

The timeframe of the EMP will depend on its purpose as such it should be done in stages as appropriate. A pre-construction stage will have a finite life and normally be survived by an operational stage. Accordingly, it is important that all issues of a project are addressed and carefully considered to ensure the utility of the EMP. The EMP should be used as a working manual/guide to promote good on ground environmental performance by the proponent, and as an aid to regulatory auditing of a project by Government agencies.

One issue that will need to be addressed in the EMP relates to the discharge of the hydrostatic test waste waters. The particular chemical(s) that will be used in the water has not yet been identified. **Accordingly, the proponents proposal to spray the water into dry river beds after completion of the tests cannot be assessed by the EPA at this time.** It is possible that a preferred approach will be the containment of the used test waters in lined holding basins to allow evaporation. The basins would then be filled. A final decision on this issue can only be made following more detailed information from the proponent.

With reference to the power station site, the Authority considers that the provisions of Part V (Pollution Control) of the Environmental Protection Act are appropriate. Under these provisions a Works Approval application will need to be submitted to the EPA (Pollution Control Division) before construction of the power station and a Licence issued once all the conditions of the works approval have been met. There is considerable experience of gas turbine sites in Western Australia and guidance on the Authority's expectations of such plants can be seen in the approvals for the Pinjar gas turbine power station site North of Perth.

Recommendation 2

The Environmental Protection Authority recommends that the gas turbine power station site at Port Hedland be subject to the Works Approval and Licence provisions of the Environmental Protection Act. (see Section 6 - Recommended Environmental Condition 4).

Given the attention by the proponent to siting of the power station (ie away from residences) and the Authority's recent and ongoing experiences of encroaching urban development on

industrial activities, Planning authorities and the proponent should ensure the buffer area is itself protected.

The proponent should discuss with the Local Shire, Department of Planning and Urban Development and Department of Resources Development mechanisms to protect the gas turbine power station buffer area from incompatible land uses (eg. residences).

The Authority understands that a number of sites in the Pilbara are under consideration for development as sites for heavy industry. Accordingly, the consideration and decisions associated with the security of the power station buffer area may be relevant should a heavy industrial site be proposed for Port Hedland.

Based on its assessment of this proposal, and the recommendations above, the Environmental Protection Authority has developed a list of 'Recommended Environmental Conditions' (see Section 6 of this Report) to the Minister for the Environment. The Authority considers that by setting these conditions on the development and operation of the proposal, the environment would be protected.

1. Introduction

Pilbara Energy proposes to develop a major energy infrastructure in the Pilbara region of Western Australia (Figure 1). The project is an integrated project that addresses gas pipeline and transmission line routes, the development of a gas turbine power station and generating plant and decommissioning of an existing power station. The development allows for both gas and electricity to be supplied to SECWA and other private consumers, as well as BHP Iron Ore.

This proposal was referred to the EPA in March 1993 and the level of assessment was set at Consultative Environment Review. The CER was released for a 4 week public review period that began on 30 August 1993 and ended on 27 September 1993. Eleven submissions were received.

The EPA provided a list of issues raised by these agencies and the proponent's response to these are included in Appendix 1 of this report.

The key environmental issues of the project are:

Gas pipeline route

- drainage and erosion;
- access, clearing and rehabilitation both in and outside the easement; and
- treatment of hydrostatic test waste waters.

Gas turbine power station

- noise, sulphur dioxide and oxides of nitrogen emissions; and
- surface and groundwater protection.

High voltage transmission line route

- drainage and erosion; and
- access, clearing and rehabilitation both in and outside the easement.

Issues that were not considered to pose a significant environmental concern were the decommissioning of the existing Newman diesel power station, the construction of an alternative backup generating plant at Newman and construction of three electrical substations. Nonetheless, should operations at the Newman power station have resulted in site contamination then the EPA would expect a cleanup proposal to be referred to it.

2. The proposal

Pilbara Energy Limited (the proponent) referred a proposal to establish an energy infrastructure in the Pilbara region of Western Australia to the EPA in March 1993. This proposal will provide natural gas and electric power for BHP Iron Ore and future industrial developments and consists of:

- a 215 kilometre buried 355mm diameter gas pipeline from Karratha to Port Hedland within a 30 metre easement;
- a 140MW gas turbine power station at Port Hedland consisting of four open cycle turbines with a site capacity for expansion to eight turbines, a 4-5km buffer is to be established, distillate storage is required and an eighteen month construction period is anticipated;
- approximately 400 kilometres of 220kV power transmission line, 25-35m high with a span between towers of 300-400m and a 60 metre easement, from Port Hedland to Newman;
- back-up generating plant at Newman; and
- closure of the existing diesel powered Power Station at Newman.

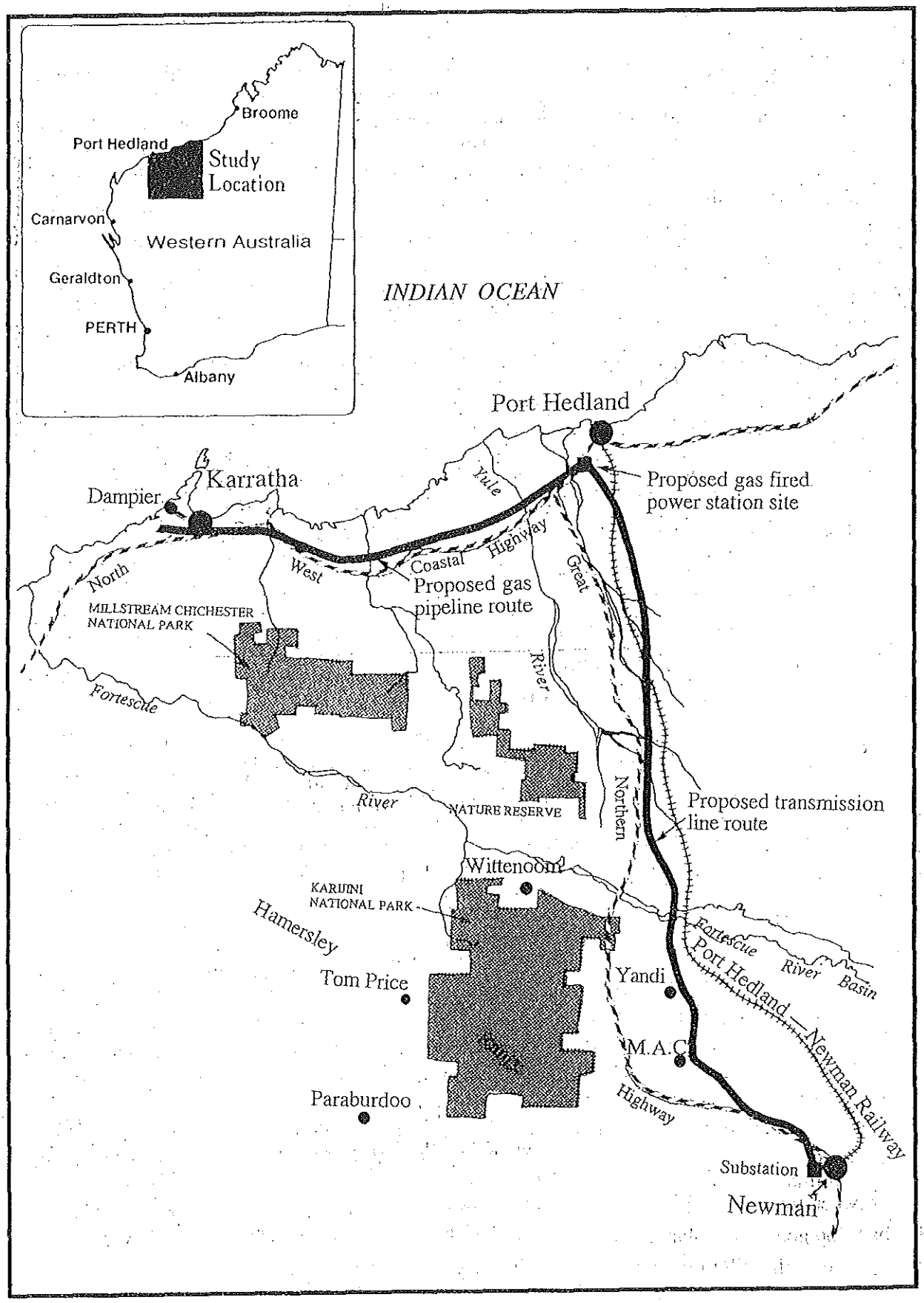


Figure 1. Location map showing project components

The project will provide power to the operations managed by BHP Iron Ore at Nelson Point, Finucane Island, Yarrie, Yandi and Newman. It will also provide power to the Newman township. Additional generating capacity could be installed as required to meet the demands of future BHP ventures in the region. The project will augment the existing energy infrastructure facilities in the Pilbara and establish a major supply of gas and generating capacity at Port Hedland, which should enhance development potential in the region.

Construction of the project is scheduled to commence in 1994 with operation to commence in 1996.

It should be noted that the proponent has identified that it will participate in a study of the proposed gas pipeline from the North-West Shelf to the Eastern Goldfields. The proponent has indicated that if it is found to be feasible to supply gas to Newman, then it would take gas from the pipeline to a new gas fired power station at Newman. The development of a gas fired power station in Newman would be the subject of a separate referral to the EPA.

The availability of gas at Newman would negate the need for the 220kV transmission line from Port Hedland to Newman described above and, possibly, reduce the initial capacity of the proposed gas fired power station at Port Hedland.

3. Issues raised in submissions from Government agencies and the public

Eleven submissions were received on the proponent's CER. Submissions were received from Chappel Research, Local Environment Affinity Force (LEAF), Roebourne-Port Hedland Land Conservation District Committee, Department of Land Administration, Hamersley Iron Pty Limited, Western Australian Museum, Pilbara Development Commission, Water Authority of WA, Department of Resources Development, Main Roads and Department of Aboriginal Sites.

The issues raised related to:

- a need to promote alternative energy options;
- a need for improved community consultation;
- the location of the proposed Port Hedland power station;
- the potential erosion of river banks;
- workforce training and education;
- alternative routes for segments of the pipeline and transmission line;
- a need to properly manage the hydrostatic test waste waters;
- access to crown and leased land;
- vegetation clearing and rehabilitation methods;
- the adequacy of flora and fauna surveys; and
- protection of water resources.

The proponent's response to these issues and others raised in submissions is included as Appendix 1 to this report.

4. Environmental issues and their management

The key environmental issues of this proposal will be discussed under the following headings:

- The gas pipeline from Karratha to Port Hedland.
- The gas turbine power station at Port Hedland.
- The transmission line from Port Hedland to Newman.

The Authority considers that the proponent has answered the environmental issues raised in submissions and that with the proper safeguards this proposal will not result in any unacceptable environmental impacts.

The proponents commitment to develop an environmental management programme for the proposal will allow the progress of this project and its performance to be monitored and judgements made on the need of otherwise to alter approved management programmes.

4.1 Gas pipeline from Karratha to Port Hedland

Issue:

Vegetation clearing in and outside the easement requires careful thought to minimise potential unacceptable impacts to flora and fauna habitats.

Proponent's response:

During the route selection and design to date, significant stands of vegetation and other known environmentally sensitive areas were avoided where possible. About 96% of the cleared easement will be rehabilitated following construction, as described in Section 5.8 of the CER.

Wherever possible, clearing will be done only to ground level and disturbance to the soil or plant rootstock will be minimised. All service areas required for actual work activities will have the top soil removed and stockpiled. (Refer to proponent Commitment 16.)

During the pipeline construction, the proponent will identify and flag areas of significant vegetation within the construction areas. Only that vegetation which is required to be removed for construction purposes will be affected, i.e.only vegetation along the pipeline. (Refer to proponent Commitment 17.)

Linear disturbances such as that which will be created by the construction of the pipeline can create barriers to movement of smaller animals and subdivide territories. In this case, the progressive nature of the pipeline construction schedule means that the area of active disturbance will be limited. Progressive rehabilitation behind the construction "front" will limit the effective length of the barrier at any one time. The majority of small Pilbara animals do not need to travel regularly to water, so the barrier effect will mostly be restricted to those territories directly impacted by clearing. The proponent will ensure that the easement is rehabilitated and will monitor the success of the rehabilitation to minimise any potential barrier effects (Refer to proponent Commitment 20).

EPA's evaluation:

The Authority considers the proponent's commitments sufficient to address this issue. It is expected that the Environmental Management Programme (Refer to proponent Commitment 15) will provide further details and management plans on this issue.

Issue:

Natural drainage channels and disturbed land areas may be susceptible to wind and water erosion following installation of the pipeline.

Proponent's response:

After laying of the pipe, the trench will be backfilled and compacted. Excess material will be mounded over the pipe with periodic breaks to allow natural surface flows. The stockpiled topsoil will then be spread over the surface. In this way, the length of time during construction that each section of the route is susceptible to wind or water erosion will be kept to about four weeks. Erosion during this time is expected to be minimal.

Wherever removal of the topsoil results in ground deterioration through vehicle usage, then suitable material will be imported to overcome the "dust-bowl" and/or "bog" problems.

A lesser amount of disturbance will be created by borrow pits that are dug to supply construction material and fill. The majority of borrow material will be river sand taken from local rivers. Wherever possible, existing sand extraction areas or active borrow pits will be used. If new sites are required, they will be developed according to the standards set out in the *BHP-Newman Guidelines and Objectives for Borrow Pit Development and Rehabilitation*, presented in Appendix E. (Refer to proponent Commitment 21.)

To minimise erosion potential clearing on river and creek banks will be kept to the absolute minimum necessary for the laying of the pipe. Within the river channels, the pipeline will be weighted down with concrete anchors or similar structures to ensure stability under flood conditions. The construction will have no effect on the flow characteristics of the streams which are normally dry, and all stream channel disturbance will be landscaped to a form similar to that which existed prior to pipe laying. The pipeline trench will have sack breakers installed at each side of the river crossing so that water entering the trench will not escape to the river causing erosion. (Refer to proponent Commitment 23.)

The river banks will be stabilised using such methods as stabilised sand bagging, rock mattresses, rip-rap or such alternatives as appropriate, to ensure protection against erosion; where required stabilised sand bags filled with soil and seed to accelerate regeneration will be used.

EPA's evaluation:

The Authority considers the proponent's commitments sufficient to address this issue. It is expected that the Environmental Management Programme (Refer to proponent Commitment 15) will provide further details and management plans on this issue.

Issue:

The proposed management strategy for disposal of the hydrostatic test waste waters into dry river beds needs to ensure that the fauna, surface or groundwaters are not likely to be unacceptably impacted.

Proponent's response:

The completed pipeline will be hydrostatically pressure-tested to verify that it is capable of withstanding a pressure beyond the proposed maximum operating pressure.

The test water will be disposed of into the riverbeds, or back into holding dams (that may be created to provide the quantity of water needed) for soakage and/or evaporation. Aeration spraying at disposal sites will be used to instigate the breakdown of the biodegradable inhibitor. (Refer to proponent Commitment 24.) Other contaminants will be non-toxic and will essentially comprise ferric oxide millscale. This will be evidenced as brown colour in the water.

Each test section will need to discharge some 7,000 cubic metres of water, which will be contained within sand bunds in the riverbed if considered necessary.

EPA's evaluation:

The Authority is not prepared to assess the proposed management strategy for this issue without further details on the chemicals to be added to the test water. These details can be provided at any time following the release of this report up to and including the submission of the Environmental Management Programme. The acceptability of the proponent's strategy or need for an alternative will be determined at that time.

4.2 The gas turbine power station at Port Hedland

Issues:

Potential construction phase noise and dust impacts together with distillate storage and air emissions (noise, sulphur dioxide and oxides of nitrogen) operation phase impacts will need to be managed.

Proponent's response:

Noise levels resulting from the construction phase of the power station will be similar to those from other industrial construction activities. Noise impacts on the nearest residences are expected to be minimal. If blasting is required, noise and vibration will be minimised by the use of careful blast design and other measures such as delayed detonation sequences. The proponent will ensure that construction activity will at all times comply with the requirements of the noise provisions of the *Environmental Protection Act 1986*. (Refer to proponent Commitment 22.)

Dust from construction activities will be minimised by the following measures:

- minimisation of clearing;
- early rehabilitation or stabilisation of disturbed surfaces;
- avoidance of unnecessary machinery movements; and
- damping down with water trucks or sprays as necessary.

These measures will be used to ensure that dust from the construction does not create a nuisance or hazard to the human or natural environment of the area. (Refer to proponent Commitment 22.)

An operations phase noise study carried out by a consultant predicted the sound contours for the proposed power station under worst-case conditions would exhibit a 35dB(A) contour at 3.5-4km from the proposed station.

Regulations currently being drafted by the Environmental Protection Authority set a limit of 40dB(A) on noise levels in residential areas at night, with a 5dB(A) penalty likely to be applied for tonal components. The noise study concluded that the proposed power station design, with large low-noise enclosures, may have difficulty complying with the draft EPA regulations at sites located within a 4km radius of noise sensitive premises under worst-case conditions.

As a result, the proponent has located the power station a sufficient distance from any noise sensitive premise so the EPA regulations will be met. A buffer zone around the site will be required to avoid potential problems with future developments.

The major air emissions from the power station will be oxides of nitrogen (NO_X), with sulphur dioxide (SO_2) also being emitted at times when the station is running on diesel fuel. The proponent commissioned a study to examine the likely quantities and impacts of air emissions from the power station. The study employed the worst-case model MAXMOD and the steady-state model AUSPLUME to predict pollutant concentrations downwind of the power station. Modelling indicated that the power station would be able to meet likely EPA emission standards. Furthermore, during operation, periodic air quality monitoring will be carried out to ensure that the air emissions comply with EPA standards. (Refer to proponent Commitment 26.) The proponent does not believe that emission control equipment will be necessary.

Stormwater drainage on the site will be designed so that runoff is directed away from areas where it could become contaminated by oils or other toxic materials (eg distillate). Runoff from any areas susceptible to contamination will be routed through interceptor pits to separate oils and other contaminants before being released. Waste oils and similar materials will be collected and removed for recycling or disposal in a Shire Council-approved disposal site. (Refer to proponent Commitment 9.)

EPA's evaluation:

The management of noise, dust, liquid and air discharges to the environment from construction and operation of a gas fired power station is best managed under the pollution control powers of the EPA. The EPA's experience of the construction and operation of the State Energy Commission of WA's Pinjar gas turbine power station will be useful in this respect.

The Port Hedland site appears to be well chosen with a history of pastoral use and no rare or significant vegetation type or fauna habitat being identified. It is sufficiently far from residences not to cause a noise impact. Accordingly, in order to manage the power station site

under the provisions of Part V of the Environmental Protection Act the following recommendation is made.

Recommendation

The Environmental Protection Authority recommends that the gas turbine power station site at Port Hedland be subject to the Works Approval and Licence provisions of the Environmental Protection Act.

With respect to the issue of noise impacts and distance to residences, it is important that the proponent is able to secure the buffer area. Failure to secure the buffer area can result in the encroachment of incompatible land uses which has in the past often led to conflict between the industrial activity and amenity of residences.

4.3 The transmission line from Port Hedland to Newman

Issue:

Vegetation clearing in and outside the easement requires careful thought to minimise potential unacceptable impacts to flora and fauna habitats.

Proponent's response:

Vegetation will be disturbed along the transmission line route to a width of approximately 10 metres widening to about 20 metres through high vegetation. Stockpiles and laydown areas will, wherever possible, be on ground already disturbed or cleared. About 80 percent of the disturbed land will be rehabilitated following construction, as described in Section 5.8 of the CER. Vegetation will be cleared to ground level, or where possible higher, and also when possible disturbance to the soil will be avoided.

Trees will be cleared from under the transmission line. Tall trees that are adjacent to, and could possible fall onto the line will be removed; this does not occur frequently, except perhaps at some major river crossings. The route of the line will be located, where possible, to minimise removal of substantial trees.

An area of approximately 15 x 15 metres will be cleared at each transmission tower for construction purposes. Care will be taken to rehabilitate and control soil erosion in the area. Rehabilitation of the transmission line will be essentially the same as other high voltage lines in the Pilbara.

No rare flora have been found that will be affected by the construction of the transmission line. The route of the transmission line has been designed to avoid areas of unusual topography where rare or significant flora species are most likely to be found. Several significant species have distributions and habitats that could include parts of the transmission line route, although none were found during the surveys. The nature of the disturbance will be such that any impacts on such species will be minor and temporary. The proponent will ensure that the area of vegetation disturbed during transmission line construction is kept to the minimum necessary.

Fauna habitat will be lost in the area cleared for transmission line construction. Some minor barrier effects and partitioning of territories may also result. These effects will cease as revegetation occurs, except to the extent necessary to maintain vehicle access.

Soil disturbance associated with transmission line construction will be minimal and confined to the drilling of holes and excavations for the tower foundations and the formation of access tracks. The potential for erosion or dust generation in these areas is minor and will decrease further following revegetation.

Where access tracks to and/or along the centre line of the transmission line become unserviceable for construction vehicles, then remediation measures will be undertaken to allow

traffic. The areas will be rehabilitated (essentially in accordance with clause 5.8) after construction; if they are not required for permanent access.

Wherever possible, existing tracks will be used for ground access to the towers. Vegetation beneath the transmission line may need to be periodically trimmed to maintain safe clearance. The maximum allowable height of vegetation beneath the line will be about two metres. This will be of significance only in areas of trees or tall shrubs.

Some Mulga woodlands occur in the transmission line easement and they are particularly dependent on surface water flow and any major disruption to these flows could result in large areas of tree loss.

The transmission line route has been selected to follow, as close as possible, any existing roads or tracks that have been established through the Mulga woodlands.

The proponent make a number of commitments with regard to construction and operation of the transmission line through Mulga woodlands. These are:

- the proponent will ensure that existing access tracks will be used wherever possible to gain access to tower bases located in Mulga woodland;
- where new access is required, the proponent will ensure that the access will be 4WD only (i.e. not formed) and will not cause any disturbance to surface water flow;
- wherever possible, clearing of vegetation through Mulga woodland will not involve the removal of root stock. It is anticipated that vehicles will be able to negotiate around individual tree stumps; and
- Mulga trees will be trimmed using mechanical methods to maintain safe clearance from the transmission line. (Refer to proponent Commitment 29.)

Long-term impacts on fauna from the transmission line are considered to be negligible, and will be limited to the small area permanently cleared for access tracks. The trimming of vegetation beneath the transmission line should have negligible effects on fauna as clearance to groundlevel will not be required.

EPA evaluation:

The Authority considers the proponent's commitments sufficient to address these issues. It is expected that the Environmental Management Programme (Refer to proponent Commitment 15) will provide further details and management plans on this issue.

5. Conclusion

The Environmental Protection Authority has assessed the potential environmental impacts of the proposal as described in the Consultative Environmental Review, and utilised additional information supplied by other Government agencies and the public together with the proponent's response to issues raised in submissions. Additionally, officers of the Environmental Protection Authority have carried out site inspections.

Given that this project will be subject to the provisions of a State Agreement Act, the Authority considers that the development of a single Environmental Management Programme for all of Government (see proponent commitment number 15) is appropriate. The importance of this approach would be to reduce duplication of reporting requirements to Government and clearly establish a reporting responsibility for advice on environmental matters to the EPA.

For the purpose of this assessment, and given the clearly different nature or geographic location of the components of the proposal (eg gas pipeline, power stations and transmission line), the EPA considers that the EMP should clearly distinguish between each component of the project. The detailed content of the EMP, its scope and staging, should be determined in consultation with the proponent and EPA on advice of other Government agencies.

Recommendation

The Environmental Protection Authority concludes that the proposal to develop a new energy infrastructure in the Pilbara region of Western Australia is environmentally acceptable.

This conclusion is based on consideration of the proponent's Consultative Environmental Review, submissions received from Government agencies and the public, the proponent's responses to issues raised in submissions (Appendix 1) and the proponent's commitments (Attachment 1 to Section 6).

In reaching this conclusion, the Environmental Protection Authority identified the main environmental factors requiring consideration to be the:

- **siting, construction and ongoing operational management of the underground pipeline and overhead transmission line easements, and**
- **siting, management and operation of the power station site.**

The Authority considers that these issues have been adequately addressed and that this proposal could proceed subject to its recommendations in this report.

The Authority considers that it could be necessary or desirable to make minor and non-substantial changes to the designs and specifications of the proposal which were examined as part of the Environmental Protection Authority's assessment. This may include for this proposal the deletion of the transmission line from Port Hedland to Newman should the proposed Goldfields Gas pipeline be able to supply gas directly to Newman. Accordingly, the Environmental Protection Authority considers that subsequent statutory approvals for this proposal could make provision for such changes, where it can be shown that the changes are not likely to have a significant effect on the environment.

Furthermore, the Authority believes that any approval for the proposal based on this assessment should be limited to five years. Accordingly, if the proposal has not been substantially commenced within five years of the date of this report, then such approval should lapse. After that time, further consideration of the proposal should occur only following a new referral to the Environmental Protection Authority.

6. Recommended environmental conditions

Based on its assessment of this proposal and recommendations in this report, the Environmental Protection Authority considers that the following Recommended Environmental Conditions are appropriate.

1. Proponents Commitments

The proponent has made a number of environmental management commitments in order to protect the environment.

1-1 In implementing the proposal, the proponent shall fulfil the commitments (which are not inconsistent with the conditions or procedures contained in this statement) made in the Consultative Environmental Review and included in the Environmental Protection Authority's Bulletin 725. (see Attachment 1 following these recommended environmental conditions.)

2. Implementation

Changes to the proposal which are not substantial may be carried out with the approval of the Minister for the Environment.

2-1 Subject to these conditions, the manner of detailed implementation of the proposal shall conform in substance with that set out in any designs, specifications, plans or other technical material submitted by the proponent to the Environmental Protection Authority

with the proposal. Where, in the course of that detailed implementation, the proponent seeks to change those designs, specifications, plans or other technical material in any way that the Minister for the Environment determines on the advice of the Environmental Protection Authority, is not substantial, those changes may be effected.

3. Proponent

These conditions legally apply to the nominated proponents.

3-1 No transfer of ownership, control or management of the project which would give rise to a need for the replacement of the proponent shall take place until the Minister for the Environment has advised the proponent that approval has been given for the nomination of a replacement proponent. Any request for the exercise of that power of the Minister shall be accompanied by a copy of this statement endorsed with an undertaking by the proposed replacement proponent to carry out the project in accordance with the conditions and procedures set out in the statement.

4. Works Approval and Licence

The gas turbine power station site at Port Hedland shall be subject to the Works Approval and Licence provisions of the Environmental Protection Act. The proponent shall apply for a Works Approval and subsequently a Licence following its acceptance of the conditions in this Statement.

5. Time Limit on Approval

The environmental approval for this proposal is limited.

5-1 If the proponent has not substantially commenced the project within five years of the date of this statement, then the approval to implement the proposal as granted in this statement shall lapse and be void. The Minister for the Environment shall determine any question as to whether the project has been substantially commenced. Any application to extend the period of five years referred to in this condition shall be made before the expiration of that period, to the Minister for the Environment by way of a request for a change in the condition under Section 46 of the Environmental Protection Act. (On expiration of the five year period, further consideration of the proposal can only occur following a new referral to the Environmental Protection Authority.)

Procedure

1. The Environmental Protection Authority is responsible for verifying compliance with the conditions contained in this statement, with the exception of conditions stating that the proponent shall meet the requirements of either the Minister for the Environment or any other government agency.

2. If the Environmental Protection Authority, other government agency or proponent is in dispute concerning compliance with the conditions contained in this statement, that dispute will be determined by the Minister for the Environment.

Attachment 1

Proponent's list of environmental management commitments

LIST OF COMMITMENTS

GENERIC COMMITMENTS

The following commitments have been developed by PEL to reduce the potential impacts of the Pilbara Energy Project. They apply to all of the project components and will be implemented at the appropriate time and to the satisfaction of the landowner and/or relevant authority.

1 - Limits of Construction

The limits of construction activities outside approved easements will be predetermined by PEL in consultation with landowners, with activities restricted to and confined within those limits. All construction vehicle movement outside the easement will be restricted where practicable to predesignated roads and tracks.

2 - Personnel Instruction

Prior to construction, all supervisory construction personnel will be instructed by PEL (or a person nominated by PEL) on the protection of cultural and ecological resources and will be briefed on all agreed commitments, including the protocol for access to pastoral land already established by PEL.

3 - Complaints Resolution

A programme for handling and resolving complaints will be established by PEL prior to commencement of construction and will be administered by a designated person in consultation with landholders, local Shires and other relevant authorities.

4 - Fire Suppression

PEL will instruct the contractor to do everything reasonably within its power to prevent and suppress fires on or near the lands to be occupied under the easement, including making available such construction and maintenance forces as may be reasonably obtainable for the suppression of such fires. PEL will also comply with Bushfire Board requirements.

5 - Restoration

PEL will instruct the contractor to build and repair such roads, fences and trails as may be destroyed or damaged by construction work.

6 - Construction Activities

PEL will instruct the contractor to build and maintain necessary and suitable crossings for all roads, trails and fences that intersect the works constructed, maintained or operated. This will be completed under PEL supervision (or a Project Manager nominated by PEL) and in consultation with affected landowners.

7 - Archaeology/Ethnography Survey

Prior to construction, PEL will ensure that the survey of archaeological and ethnographic sites within the area occupied by the project components is completed. The results of this survey will be provided to the WA Museum. For all Aboriginal sites which require disturbance, PEL will meet the requirements of the Aboriginal Heritage Act (1972-1990).

8 - Rehabilitation

PEL will ensure that all construction and designated access roads not required for subsequent operation and maintenance purposes, construction sites, and material storage sites will be rehabilitated using methods described in the CER document (Section 5.8). The method of rehabilitation will normally consist of returning disturbed areas back to their natural contour, installing cross drains for erosion control, placing drains back in the road and filling ditches. This will be done to the satisfaction of the relevant authorities.

9 - Waste Disposal

PEL will instruct the contractor to remove or dispose of waste caused by its activities in a manner satisfactory to the landholder. The term "waste" as used herein means all discarded matter, including but not limited to human waste, garbage, oil drums, petroleum products, ashes and equipment. Construction areas will be maintained in a sanitary condition at all times and garbage and refuse at these sites will be disposed of on a regular basis. Hazardous or toxic waste generated or used on-site will be disposed of in a manner consistent with health authority guidelines.

10 - Access

PEL will ensure that no new access will be constructed where existing access is available and is adequate for PEL purposes. This will minimise ground disturbance and limit unauthorised access. Landholders will be consulted on the location for new access routes.

SPECIFIC COMMITMENTS

16 - Pipeline Clearing

Wherever possible, clearing will be done only to groundlevel and disturbance to the soil or plant rootstock will be minimised. All service areas required for actual work activities will have the top soil removed and stockpiled.

17 - Pipeline Vegetation

During the pipeline construction, PEL will identify and clearly flag areas of significant vegetation within the construction areas. Only vegetation required to be removed for construction purposes will be affected.

18 - Pipeline Fauna

PEL will ensure that the contractor instructs all construction personnel about the ecological significance of the riverine vegetation.

19 - Firearms

All firearms will be banned.

20 - Barrier Effects

PEL will ensure that the easement is rehabilitated to the satisfaction of the relevant authorities and will monitor the success of the rehabilitation to minimise any potential barrier effects. All open trenches will be inspected each day and any fauna which has been accidentally trapped will be noted and released.

21 - Borrow Pits

Wherever possible, existing sand extraction areas or active borrow pits will be used. If new sites are required pits will be sited, excavated and rehabilitated according to the standards set out in the *BHP-Newman Guidelines and Objectives for Borrow Pit Development and Rehabilitation.*

22 - Dust and Noise

PEL will ensure that, in areas close to habitation, construction activities will be restricted as necessary to comply with the requirements of the neighbourhood noise provisions of the *Environmental Protection Act 1986.* Water sprays will be used to control dust as required.

11 - New Access Alignments

PEL will ensure that the alignment of any new access will take minimal gradients provided that such alignment does not additionally impact environment and social values.

12 - Transmission Line Tower Locations

PEL will ensure that tower structures will be placed so as to avoid sensitive features (e.g. rare flora, Aboriginal sites etc.) and/or to allow conductors to clearly span the features, within the limits of line structure design. This will minimise the amount of sensitive features disturbed and/or reduce visual contrast.

13 - Road Crossings

PEL will ensure that, at highway and road crossings, the transmission line will cross at a minimum angle of 60° and the tower structures are placed outside of the road reserve.

14 - Camp Sites

Camp sites will be selected in consultation with the landholder and relevant authorities to comply with the following requirements:

- no camp sites will be located in vested reserves, e.g. National Parks and Flora and Fauna Reserves; and
- wherever possible and practical, camp sites will be located adjacent to, or as close as possible to, existing access roads.

PEL will ensure that every effort will be made to establish camps in areas with the following characteristics:

- soil conditions are suitable for sewage effluent disposal;
- no excavation is required prior to camp establishment;
- some form of environmental degradation exists in the area; and
- minimal visual impact would result from the establishment of a camp site.

15 - Environmental Management Plan

PEL will prepare an Environmental Management Plan (EMP) prior to construction. This plan will provide more detail about the environmental management for the project and discuss site specific treatments including disposal of excess rock. The plan will meet the requirements of the EPA.

23 - Pipeline River Crossings

PEL will ensure that clearing on river and creek banks will be kept to the absolute minimum necessary for the laying of the pipe. Temporary stabilisation measures such as stabilised sand bags, rock mattresses or similar will be used as required to ensure erosion protection until the vegetation on the banks has regrown. All stream channel disturbance will be landscaped to a form similar to that prior to pipe laying. The pipeline trench will have sack breakers installed at each side of the river crossing so that water entering the trench does not escape to the river causing erosion.

24 - Test Water

PEL will ensure that the gas pipeline hydrostatic pressure test water will be disposed of into the riverbeds for soakage and/or evaporation using aeration spraying at disposal to instigate the breakdown of the biodegradable inhibitor to the satisfaction of the EPA.

25 - Power Station Clearing

PEL will ensure that all areas not required for permanent facilities outside the power station boundary will be revegetated to the satisfaction of the relevant authorities.

26 - Air Quality Monitoring

During operation, ambient air quality monitoring will be carried out by PEL to ensure that the air emissions comply with EPA standards.

27 - Mining Tenements and Leases

PEL will comply with the statutory requirements in regard to Mining Tenements and leases crossed by the project.

28 - Pastoral Leases

PEL will continue discussions with local land holders during the construction period and comply with statutory requirements.

29 - Mulga Communities

PEL makes a number of commitments with regard to construction and operation of the transmission line through Mulga woodlands. These are:

- PEL will ensure that existing access tracks will be used wherever possible to gain access to tower bases located in Mulga woodland;
- where new access is required, PEL will ensure that the access will be 4WD only (i.e. not formed) and will not cause any disturbance to surface water flow;
- wherever possible, clearing of vegetation through Mulga woodland will not involve the removal of route stock. It is anticipated that vehicles will be able to negotiate around individual tree stumps; and
- within the easement, Mulga trees will be lopped using mechanical methods to maintain required clearances.

30 - Weed Control

The propagation of weeds will be controlled to the satisfaction of the Department of Agriculture by the following:

- prospective borrow pit sites will be rejected if weed infestation on or near the site is apparent;
- traffic in and out of areas where weed infestation exists along the routes of the gas pipeline and transmission line will be controlled to limit spreading of the weeds; and
- the easements will be monitored for weed infestations and appropriate action taken if infestations are reported.

Appendix 1

Questions and issues raised in submissions and the proponent's response

PILBARA ENERGY PROJECT

ANSWERS TO EPA QUESTIONS RAISED ON THE C.E.R.

1.0 SITES OF CULTURAL SIGNIFICANCE

1.1 Q *What consultation has taken place with the descendants of the Kariyarra people regarding the gas pipeline route?*

A Information concerning the Kariyarra people was sought from the Department of Aboriginal Sites (Port Hedland) as well as Aboriginal individuals and community organisations by the consultant who was carrying out the Aboriginal Heritage Survey for the project. The results of this survey will be issued in a separate report to the Western Australian Museum Department of Aboriginal Sites in accordance with statutory requirements.

The CER was drafted, whilst the above survey was still in progress, and a summary of the research that was complete at that time was described in the CER. Below is a summary of the consultations that have been held with Kariyarra people (note, specific people are not identified, but referred to as "Informants).

Among Aboriginal people the Kariyarra are widely considered to be 'all finished up' and all knowledge of their traditions to be lost. Further enquiries revealed that some individuals had Kariyarra connections which however are not usually acknowledged, such a person was Informant 3 who had a relatively strong claim to Kariyarra heritage and was knowledgeable in traditional matters. Informant 3 had inherited some Kariyarra country on Woodstock Station and its environs, he and this country shared the name Tharagu. Unfortunately he died before all of this area was surveyed but did participate in the pipeline survey as far as Whim Creek. That is to say, only the western end of the proposed pipeline route where it traverses Kariyarra territory. Informant 23 has a stronger connection to Kariyarra people and has inherited country on the Yule River near Yandeearra. He participated in the inspection of Yandeearra, which is to say, the southern half of Kariyarra territory which the proposed powerline route traverses.

The Department of Aboriginal Sites to some extent confirmed the Aboriginal view of this group, however, they did recommend two men whom they believed to hold knowledge of the coastal section of Kariyarra territory. These two men are descended from Yindjibarndi but also speak Kariyarra fluently and spent much of their early life among Kariyarra people on Mundabullangana, Mallina, Sherlock and Boodarie station s (among others). One of these men was reported to

have inherited country along Balla Balla creek which is in Kariyarra territory. This man knew of an elderly woman who had inherited country near Whim Creek and three times arrangements were made with her to inspect this area. When the predetermined days arrived, however, on each occasion she was unavailable. These two men, Informants 4 and 5, assisted the inspection of the proposed pipeline route from Whim Creek east and the northern section of the proposed powerline where it traverses Kariyarra territory. That is to say, all the Kariyarra country which the proposed routes traverse.

1.2 Q *What consultation has taken place with the Ngarla Nyamal Coastal Community?*

A Information concerning the Ngarla Nyamal people was sought from the Department of Aboriginal Sites (Port Hedland) as well as Aboriginal individuals and community organisations by the consultant who was carrying out an Aboriginal Heritage Survey for the project. The results of this survey will be issued in a separate report to the Western Australian Museum Department of Aboriginal Sites in accordance with statutory requirements.

The CER was drafted, whilst the above survey was still in progress, and a summary of the research that was complete at that time was described in the CER. Below is a summary of the consultations that have been held with Ngarla Nyamal people (note, as required by law, specific people are not identified, but referred to "Informants).

The Ngarla Njamal Coastal Community is represented in the survey by its founder and leader, Informant 6. This man accompanied the on-site inspections west of the proposed power station and south along the proposed powerline as far as Kunagunarrina Pool, short distances beyond the points where he believes Ngarla and Nyamal territories to extend along the proposed routes. The Ngarla Nyamal Coastal Community were not approached as a whole, nor were they approached concerning social impact, the only issue pursued by the consultants pertained to Aboriginal heritage. Informant 6 was recommended as an informant by individuals in the surrounding community and by the Department of Aboriginal Sites (Port Hedland). He was asked to make any referrals he thought appropriate which might assist in the survey for Aboriginal sites. To this he responded that he would be the most appropriate person in the community. As the consultant had been informed by the Department of Aboriginal Sites (Port Hedland) and individual Aborigines that Informant 6 is a widely respected 'Law Man' this was considered sufficient recommendation.

In brief, individuals recommended by their communities and the Department from both these groups were consulted and participated in on-site inspections of the route where it traverses country for which they have inherited custodial rights. One exception to this is the elderly lady, however, reasonable attempts were made to facilitate her involvement.

1.3 Q. *What information is available now to show the impact of the gas pipeline on areas of known aboriginal significance?*

A A report on a survey of Aboriginal Heritage is being finalised which indicates that there are no Aboriginal ethnographic sites along the gas pipeline route, but there are archaeologic sites that would be affected by the gas pipeline.

Permission will be sought from the Department of Aboriginal Sites to disturb these archaeological sites.

1.4 Q *What protocol would be drawn up and education undertaken for construction and maintenance workers for respecting the integrity of Aboriginal sites in the vicinity of the project?*

A PEL is committed to a high standard of work and conduct for this project, and will produce a Safety Handbook for the project, which will address Aboriginal Sites and environmental matters. The exact format of these sections is yet to be developed, but it would refer to the Aboriginal Heritage Act 1972-1980, and would identify areas of Aboriginal significance that are "out-of-bounds" to construction works. Prior to commencing work, each worker would go through an induction course, which would address Aboriginal Sites.

1.5 Q *What areas of non-aboriginal cultural significance are in the vicinity of the gas pipeline and transmission line routes?*

A A search of records held by the Australian Heritage Commission and a review of tourist maps revealed no significant (recorded) areas of non-aboriginal cultural significance (CER Clause 4.9).

Whilst there are no formally recorded areas of non-aboriginal cultural significance the route for the gas pipeline and transmission line were selected to avoid important and popular locations. The route of the gas pipeline avoids being in close proximity to the centre of Roebourne, and recreation spots, such as Poonthuna Pool, were avoided.

1.6 Q *What can be done to ensure that the powerline does not impact on Capillana Pool? i.e. could the powerline cross the railway line at a point south of the East Turner River crossing?*

A Capillana Pool could not be located on the topographic maps used for this survey. However it is understood that Capillana Pool is located adjacent to and on the east side of the railway bridge SSW of Cookes Hill. The proposed transmission line route crosses obliquely and is at its nearest point about 250m from the bridge. To clear the river in flood and maximise clearance from trees and floating debris, one tower would be located close to the base of the ridge on which the microwave tower stands. Its visual impact viewed from the pool will therefore be reduced by the high ground behind it.

The next tower will be on the island mid stream and east of the bridge. Any clearing along the centre line will therefore not be on any line of sight from the pool. Construction activity will not spread to the pool area.

To cross the railway south of the bridge is constrained by the rail embankment and mining tenement E45/1353 which projects up into the area between Peerinya Well and Pingina Well. It would involve moving the line west and installing significantly higher towers to clear greater spans and hence be even more visually intrusive to people using another pool on the west side of the railway bridge. From the river crossing it would turn east and cross the railway at the Indee Road turn-off.

The proposed route maximises the use of existing access roads and tracks and, once constructed is believed to offer the minimum additional visual impact as well as the most secure river crossing available in that area other than at Poonthuna Pool.

1.7 Q *Why can't the powerline follow the old Wittenoom-Port Hedland road further, such that less new road is constructed, the viewscape of the Abydos group of granite hills is not affected, and the cultural sites of the Abydos reserve are avoided?*

A The old Port Hedland-Wittenoom Road runs parallel with and in close proximity to the BHPIO railway throughout the length of the Abydos/Woodstock reserve except for the last few kilometres from Coonarrie Creek where it heads south west to White Springs.

Reference to map 6 in Appendix 'D' of the CER demonstrates a lesser incidence of aboriginal heritage sites on the selected route compared with those which occur alongside the railway. The route has already been slightly realigned north and south of the Kangan/Abydos

boundary to avoid identified areas of special interest which are believed to coincide with the granite hills referred to in the question.

A further realignment is currently under discussion at the crossing of Coonarrie Creek to avoid a burial site. Sections of route close to the railway were considered, particularly on the Yandeearra Reserve, but not pursued because of other known sites and less favourable terrain.

Another major factor against running close to the railway is the risk from voltages induced in track signalling circuits and the adjacent Telecom coaxial cable under power line fault conditions. These voltages could be dangerous to personnel working on the circuits at the time a fault occurs, would very probably damage equipment and cause maloperation of railway signalling circuits. The consequential hazard to safe operation of the railway is significant, even though the duration of the fault induced voltages is a fraction of a second.

By maintaining an adequate separation for most of the line route this problem is avoided.

2.0 HYDROLOGICAL IMPACT

2.1 Q *How deep would the pipeline be buried in the rivers and what would be done to prevent the pipeline from becoming exposed during high water flows in the rivers (thereby creating a hazard and a possible major diversion to the flow direction of the water)?*

A Within river channels, there will be a nominal 2m depth of cover over the pipe which will be weighed down by concrete to ensure stability under flood conditions. The normal river bed material will be used as backfill in the trench to maintain continuity of soil types and densities etc., in the river bed. This is a well established and proven practice adopted for the many successful pipeline rever crossings in Australia e.g. across the Fortescue, Gascoyne, Coopers Creek.

2.2 Q *What commitment would be provided to inspect, maintain and report on channel crossing bank stability?*

A There will be routine inspection of the pipeline route, for any changing conditions that may cause damage to the pipeline, or the environment, which would include scouring in river crossings. The inspection would be made by air or vehicle, as appropriate. Initially there would be frequent inspections, at least 4 times per year for the first few years, and when the pipeline and surrounds have stabilised inspections would be nominally twice a year and after each occurrence of river flood. Maintenance would be carried out expediently where necessary.

2.3 Q *What evidence is there that burying the pipeline in the river bed will not create a damming or pooling effect to the sub-surface waters?*

A There has been no geological investigation into this occurrence at this time of design, however there are numerous pipeline crossings of similar rivers in Australia, none of which are known by Williams Brothers CMPS (gas pipeline engineering consultant to PEL) to cause a problem of this nature.

2.4 Q *Provide more information on the chemicals to be used in the cleaning and testing of the gas pipeline, including toxicity (to plants and animals), concentrations and biodegradability?*

A Chemicals are added to the water to protect the pipeline against internal corrosion during hydrostatic testing (i.e. not for cleaning). No specific product has been selected to date, it will be selected during the engineering/construction phase and will be a product approved by the EPA.

The toxicity, concentration and biodegradability of the chemicals that are ultimately selected would be similar to those approved by the EPA for use on other recent gas pipelines in WA.

Data sheets for typical inhibitors from Maxwell Chemicals in WA are attached (Refer to Commitment 24).

2.5 Q *What assurances can be provided to the Water Authority that there will be no electrical interference by the power line to the satellite communications system used for the gauging station on the Turner River near Turner's Well?*

A The potential sources of interference to satellite communications are interference with line of sight and radiofrequency noise.

The WAWA station is understood to stand on the slopes of Cooke Hill while the transmission line will be close to surrounding plain level and at the nearest point some 200-250m away.

There is therefore no possibility of interference with line of sight to a satellite and any RF noise generated on the line will be attenuated to the extent that it should have no deleterious effect on WAWA plant.

The matter will be discussed with WAWA in greater detail if concerns are still held.

2.6 Q *What ground water licences would be required to extract water for construction and test purposes?*

A It is proposed that test water would be obtained from town water supply pipelines at Yule River, Roebourne and Karratha. Alternatively use of existing station bores would be the first consideration for collection into a temporary dam.

If new ground water bores are required for construction or hydrostatic testing purposes, applications will be made in accordance with normal practice to the Water Resources Officer of WAWA at Karratha for the necessary ground water licences.

2.7 Q *What special requirements or safeguards are there for construction of the pipeline in the Yule River Water Reserve?*

A The location and crossing of water pipelines will be co-ordinated with the Operations Manager of the Water Authority of Western Australia at South Hedland, and increased depth of burial will be used for the gas pipeline where appropriate.

The storage of diesel fuel and other potential contaminants will be kept to a minimum in the vicinity of the Yule River Water Reserve.

Any spillage of fuel or chemical that may contaminate the water reserve will be promptly reported to the WAWA, as will any damage to the water pipeline or other equipment.

When completed the pipeline route will be adequately marked with warning signs to minimise the risk of damage to the gas pipeline by other parties.

2.8 Q *What consideration has been given to the recycling of hydrotest waters, or other methods of disposal to that described in the CER?*

A The normal and proven methods for disposing of hydrotest water will be adopted i.e. spraying the water at the point of disposal to expedite the biological breakdown of the chemicals and ponding in suitable permeable sand in river beds. Impervious lined evaporation ponds are not adopted due to the cost involved, and the expected benign nature of the chemicals. The water is not drained into open country where it may cause localised ponding and erosion that could be environmentally damaging.

The pipeline will probably be tested in four major sections:

SECWA pipeline to Roebourne
Roebourne to Whim Creek
Whim Creek to Yule River
Yule River to Power Station

The water would be obtained as described in 2.6 above.

For economic and environmental reasons, the water, can if possible and practical, be recycled once. The water , when sufficiently clean, would be drained from one section of pipe into the next section to be tested; it would then be disposed of.

Water is only normally recycled where water is extremely scarce. It is preferred practice to use the water for one test only, due to the accumulation of dirt and chemicals in the water.

3.0 GAS PIPELINE ROUTE OPTIONS

3.1 Q *To what extent has the stability of the highly unstable saline and sodic soils which fringe the tidal flats north and north-east of Roebourne Airport been considered? Is the proponent aware that these soils may be difficult to stabilise and revegetate once distributed, and that significant erosion could take place before effective rehabilitation takes place in the event of heavy rainfall?*

A There has not been any detailed geotechnical investigation of this area, and this will be done for the detail engineering phase of the project.

The area does have notable heaving soil characteristics but appears to be of higher sand content than many of the other similar areas.

Areas of unstable saline soils have been avoided wherever possible during the route selection process. This was done using aerial photography to map areas of tidal influence and field inspections by experienced engineers, geologist and pipeline surveyor none of whom detected any apparent particular concern for the evident features.

The only area of highly saline soil on the route is at the Harding River crossing. The route of the gas pipeline in the area has recently been inspected with representatives of the LCDC, Agriculture Department and EPA (Karratha). The pipeline route is outside the main area of concern for unstable saline soils, and the area of tidal flats to be disturbed is relatively small. Specific management techniques will be designed and implemented to minimise disturbance and to ensure adequate rehabilitation e.g. use of salt tolerant plant species. These would be described in the Environmental Management Plan (Commitment 15). Construction activity will, wherever possible, be excluded from these soils to minimise the possibility of significant erosion. (Commitments 1 and 23).

PEL will continue to have discussions with local people and other organisations who can provide positive local knowledge of the area, and may help avoid the risk of causing environmental problems in the area.

3.2 Q *Is the proponent aware that the area north and north-east of Roebourne Airport is the only known significant area of chenopod shrubland of Atriplex bunbryana in the region, and that the Roebourne Shire Council has given its support to ensure that the area is protected from incompatible land uses?*

A The proponent is aware of the chenopod shrubland and has liaised with the Shire of Roebourne (CER Clauses 6.5.1 and 6.5.2) and with the organisation referenced in 3.1 above in the recent inspection to determine the exact location of the population. The main population is over 1 kilometre south of the proposed pipeline route and will be clearly marked and excluded from construction activities. (CER Clauses 5.2.1 and 5.2.2). There is one small area of *atriplex bunbryana* on the route where special care will be taken.

3.3 Q *To what extent has an alternative <u>more</u> southerly route for the pipeline been considered (as proposed by the Roebourne-Port Hedland Land Conservation District Committee in its submission)?*

A An initial main corridor with various alternatives was identified for the gas pipeline by assessment of maps and aerial photographs and other records by experienced engineers, geologist, pipeline surveyor, environmentalist and anthropologist. An engineer, geologist and environmentalist made an aerial inspection by helicopter of the routes with a number of ground inspections, before the preferred route was selected.

Several alternatives were considered around Roebourne, which included:

1. Along the coastal plain north of Roebourne and the aerodrome.

2. South of Roebourne along a route very similar to that proposed by Roebourne - Port Hedland Land Conservation District Committee, with variations along the East Harding River, and the Jones River.

3. South East from Karratha then staying well south of Roebourne and rejoining the coastal route east of Whim Creek.

The southern route (alternative 3 above) generally went through rougher and difficult terrain, which would require blasting and the construction costs would be significantly higher than the coastal route.

The route south of Roebourne (2 above), although some 2-3km longer than the current northern route, was identified to avoid proximity to the tidal mudflats and other potential constraints along the northern route. This southern route crosses the Harding River in a mainly vegetated area and it was considered that clearing a construction corridor through this area would be environmentally unacceptable. Trees would have to be removed which would result in the loss of fauna habitat, increase potential for erosion and generally destroy the local vista. There also appears to be substantial rocky areas along the route. The route was in relatively close proximity to residential and community activities area (e.g. racecourse) of Roebourne. Also there are a number of Aboriginal archaeological and ethnographic sites recorded along the Harding River south of Roebourne.

All the alternative routes south of Roebourne were discarded due to a combination of generally hillier terrain, with potentially greater rock content, consideration for environment impact and the potential for greater impact on the whole community and on areas significant to Aborigines. The northern route was considered the best option from all points of view, technical, environmental, Aboriginal heritage, community and cost.

3.4 Q *What consultation has occurred with the Roebourne-Port Hedland Land Conservation District Committee to minimise environmental impacts in the area?*

A Extensive consultation was maintained with the local community during the preparation of the CER document (CER Clauses 6.5.1, 6.5.6, 6.5.7, 6.5.8 and 6.5.9). Included in the consultation process were the affected land holders along the route. Specific contact with the Roebourne-Port Hedland Land Conservation District Committee was not made during the CER preparation, however PEL did advertise the project widely and solicit input from local interest groups. PEL has recently had discussions and inspected a section of the route with the LCDC, to address the concerns of the LCDC. These have been essentially summarised in the preceding questions and answers.

4.0 GAS PIPELINE CONSTRUCTION

4.1 Q *What monitoring would be done to ensure that regrowth in the borrow pits is satisfactory, or is in need of remedial treatment?*

A PEL will monitor, by physical inspection using a suitably qualified person, the regrowth in borrow pits for several seasons to measure the success of the regrowth, where this is not satisfactory, remedial treatment may be carried out (Ref CER Clause 5.8.7).

4.2 Q *What protocol would be followed to ensure that the construction and operational workforce protect the environment? Specifically, what sort of staff education and induction system is proposed?*

A Specific environmental procedures for the project will be developed, based on successful procedures used for other recent BHP Iron Ore projects and for other recent pipelines in Australia, but tailored to suit the needs of this specific project. There would be an induction course for all construction and operational workforce prior to commencing work on site. The induction course will address all aspects for behaviour on site, with specific emphasis on safety, environmental constraints, and areas "out-of-bounds" due to Aboriginal sites or environmental features.

4.3 Q *What work has been done to secure sand and gravel requirements for the project, to ensure that legal access is granted in time for the commencement of the job? (The process of obtaining a mining lease can take over 6 months from the time of application).*

A No specific work has been completed to secure access to sand and gravel for the gas pipeline construction, as to date unrestricted approval to proceed with the project has not been granted. There are existing sand pits e.g. Turner River in close proximity to the pipeline which will suffice for the pipeline's needs. However the time required to obtain a mining lease to ensure legal access is noted.

4.4 Q *What are the locations of the construction camp and valve station sites, and what management of environmental impacts is proposed?*

A The need for and location of a camp has not been determined at this time and will be essentially dependent on the Contractor's approach to accommodating its workforce.

If a camp is required it would probably be located near Roebourne or Whim Creek and/or at about the Yule River (but not on the water reserve) on a site approved by the station owner and appropriate authority.

The environmental impacts and management would be stipulated in the environmental procedures.

The valve site locations are shown on the route maps 3, 5 and 7, near the Cape Lambert access road, Sherlock station and Mundabullangana station access road. The access to the sites is therefore essentially already established.

4.5 Q *What would be the impact on the Priority Flora species Acacia glaucocaesia and Brachychiton acuminatus, and what commitment can be given to ensuring that any losses are minimised?*

A Both species were not recorded along the routes, however it was noted that they may occur along the proposed routes (Appendix B, Clause B3.0). PEL has made a number of commitments to ensure that damage to vegetation along the route is minimised (Commitments 1 and 17).

Acacia glaucocaesia is classified by CALM as Priority 3 - Poorly Known Taxa. These are taxa which are known from several populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as "rare flora" but are in need of further survey. This species was found on plains near Salt Creek and Whim Creek and has been found previously near Karratha, Port Hedland and Mardie.

The kurrajong *Brachychiton acuminatus* is classified as a Priority 4 - Rare Taxa. These are taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years. One individual of this species was found in a northern Hamersley gorge near the Newman-Port Hedland railway and has previously been found elsewhere in the Hamersley Ranges as well as at Roebourne, William Range, Dampier, the Burrup Peninsula, Marandoo and in the Karijini National Park. This deciduous species typically occurs as one or two individuals in gullies or on hills and ridges. It tends to be restricted to rocky terrain and other protected habitats where soil moisture availability is higher than normal, there is good protection from fire and competition from other species is reduced. This habitat preference is reflected by the size of the populations around Dampier and the Burrup Peninsula and at "Sliding Mountain: in the Karijini National Park.

It is unlikely that the construction of the gas pipeline will impact on these Priority species as the route is designed to avoid areas of unusual topography (such as rocky outcrops) where these species are most likely to be found. The nature of the disturbance is such that any impact on these species is likely to be minor, localised and short-

term. PEL is committed to a "minimum disturbance: policy and will ensure that the area of vegetation disturbed during the construction phase is kept to a minimum (section 5.2.2 and 5.6.2). PEL will rehabilitate disturbed areas to a state the closely approximates the pre-disturbance conditions (section 5.8.1).

Sources: Tyler, J:P. (1988) *The Dampier Salt Guide to Pilbara Plans for the Garden.* Dampier Salt (Operations) Pty Ltd. CALM (1992) *Declared Rare and Priority Flora List.*

4.6 Q *What management is proposed to minimise the impact of the project on rare fauna habitat discovered during construction?*

A The occurrence of these habitats was not discovered during the survey of the route and no further habitats are expected to be evident during construction.

The route is generally flat, clear scrub and low grasses.

If discovered, they will be avoided where possible or disturbed by experienced staff to ensure no harm to the fauna.

4.7 Q *On what basis are spinifex and grass plains considered less significant to Pilbara fauna than riverine land systems?*

A The question is based on the statement made in Clause 5.2.3 of the CER which states:

> "The remaining 15km is crossing riverine vegetation which, due to greater habitat diversity, is likely to be more significant to more local fauna than the spinifex and grass covered plains."

Further to this, Clause 4.7.1 in the CER states that:

> "The highest concentrations and diversity (of fauna) tend to be found in areas of denser vegetation and higher water availability, such as near riverbeds and waterholes."

These statements were made following habitat evaluations and general observation during field surveys along the proposed routes. From the observed occurrence of river gums, old logs, river debris, occasional water, river banks, and other forms of shelter and habitat, it was concluded that the riverine units are <u>likely</u> to be more significant than the spinifex and grass covered plains.

The different components of a given habitat influence the various vertebrate groups in different ways. Though some species show distinct preferences for specific habitats, most species occupy a variety of habitats. Species composition tends to be influenced more by gross changes in the vegetation or soil types or specific features in the landscape (such as the presence of permanent water or cliff faces) than by relatively subtle changes in the vegetation. This is particularly true of aerial species. Generally speaking, those habitats with the greatest species diversity and abundance are those with dense vegetation and higher water availability.

The dense vegetation provides greater habitat types and sources of food as well as protection from predators whilst permanent water supplies are essential to the survival of many species, especially the amphibians and less mobile reptiles and mammals. More mobile species such as bats, birds and the larger mammal species also rely on permanent water supplies but may also exploit a variety of habitats. The number of species exploiting permanent water supplies will drop following rainfall events that result in temporary water holes and puddles and increase again once these temporary sources dry up.

These trends are supported by a number of studies in the Pilbara. For example, the fauna studies recently undertaken by Ninox Wildlife Consulting for the Marandoo Project ranked the survey sites in order of species richness as a simple measure of comparison. This study found that the sites with the greatest species richness were those in loamy water-gain areas and habitats with dense (though not necessarily tall) vegetation. For example, the sites located on drainage lines with dense vegetation and in the dense mulga/coolabah woodland in the Karijini National Park had the greatest species richness for birds. The gradual reduction of species over the remaining sites reflected their structural simplicity, a lack of tress or the occurrence of harsh, exposed habitats on scree slopes and ridge crests. Amphibians and reptiles preferred spinifex habitats that provided dense shelter at ground level and burrowable soils as well as the mulga/coolabah site which had a higher proportion of tree and litter dwelling species. Species richness was lowest for rocky, exposed sites and seasonally inundated areas.

A similar trend was evident in the results of the Power Transmission Line Survey for the Marandoo Project. Greatest species richness occurred in the dense hummock grasslands and mulga woodlands and in the creekline habitats. The lowest values were recorded for the open tussock grasslands and exposed scarp habitats.

Sources:

Ninox Wildlife Consulting (1992) *Marandoo Project Area, Vertebrate Fauna Assessments (1975-1991).* Prepared for Enviroscan.

Van Etten, E., Osbourne, J.M. and Finucane, S.J. (1992) *Marandoo Project Power Transmission Line Survey,* Prepared for Enviroscan.

5.0 POWER GENERATION OPTIONS

5.1 Q *How viable is wind or solar powered electricity in comparison to the gas fired system proposed for this project?*

A Wind, solar and other alternative power technologies were considered, but are either not sufficiently developed at this stage or are uneconomic to supply the size and type of electrical loads of BHP Iron Ore at Port Hedland and Newman.

5.2 Q *Is there currently surplus gas fired generating capacity in the Pilbara that could meet the needs of this project?*

A The maximum demand for the total BHPIO load is about 85MW which is forecast to increase above 100MW excluding the loads for any further processing plants that may be developed in the future. About 50% of this load is in the Newman/East Pilbara area.

We understand there is insufficient surplus generating capacity available in the Pilbara (i.e. at Dampier, Cape Lambert and Burrup Peninsula) to supply these BHPIO loads in addition to the existing loads and still maintain adequate reserve generating capacity to cover schedule and unscheduled downtime of generators. This would not guarantee the energy needs of BHP Iron Ore.

It should be noted, only the owners of the existing generators (i.e. Hamersley Iron, Robe River, SECWA and Woodside) can determine how much spare generating capacity they each have available, and how they wish to operate and develop their power stations.

5.3 Q *If the power problems experienced in the Pilbara are due to the poor capability of the existing power line from Cape Lambert to Port Hedland, why is it not the preferred option of the company to upgrade or replace this line?*

A Clarification is required of what power problems are referred to in the question, we are not aware of all power problems in the Pilbara or that they are due to the poor capability of the existing power line from Cape Lambert to Port Hedland.

However, we understand that the existing 220kV transmission line has insufficient capacity to carry the BHPIO existing and future loads, and reportedly the line also has high losses.

The upgrading and replacement of this line was not adopted, because additional generators would be required at Karratha and this configuration would not provide as reliable supply of power to BHP Iron Ore, as installing the generators in Port Hedland. This is because the Port Hedland load would be at the end of a 200km line and

Newman at the end of effectively a 600km line which would expose the loads to greater risk of power supply interruptions and quality of supply. If the line is upgraded then one of the objectives of the project of providing gas in Port Hedland for future developments would not be achieved.

Also the line from Cape Lambert belongs to SECWA, which is responsible for its operation and development.

Installation of the gas pipeline and the power station at Port Hedland also reinforces the existing north west interconnected power system, and makes gas and electrical energy available in Port Hedland for future developments (ref Clause 2.2 and Table C2).

5.4 Q *Has the upgrading of the Dampier power station to combined cycle been considered as a means of providing additional power?*

A During the last 12 years BHPIO has studied more than 36 options to meet its energy needs, including taking power from Hamersley Iron's Dampier power station. This and all other concepts, except for the current project were not developed because they were not viable. As explained in 5.2 above, Hamersley Iron own this power station, and only it can determine how the power station is operated and developed (ref Clause 2.2 and Table C2).

5.5 Q *What opportunities exist for cogeneration of power associated with future processing of iron ore?*

A If further processing of iron ore in the future produces surplus heat, then depending on the quality and quantity of this heat then it may be possible to use this to generate electricity. The opportunity for feeding this energy into the north west grid will be determined by statutory regulations, and commercial terms. It is not necessarily essential for the further processing plant to be in close proximity to the power station.

5.6 Q *Why is a combined cycle system of gas turbines and steam turbines not being considered at an earlier development stage of the project?*

A The type of configuration of gas turbines has been studied extensively for this project: the studies included investigating using waste heat for power generation in a steam turbine, or using it in a process plant or other purposes, but none were viable at this stage. The conclusion is that the station will operate in initially simple cycle mode. It will be laid out for conversion to combined cycle in the future, when the load increases or should the economics change.

5.7 Q *In what way does this project assist the Australian Government's stated objective of reducing carbon dioxide emissions by 20% by the year 2005?*

A The project will have little or no impact in reducing the existing total CO_2 emission in the region. The closure of the existing diesel power station at Newman will obviously eliminate the emission of greenhouse gas at Newman, except for the period when the emergency generator is operating.

It is difficult for PEL to accurately quantify the existing CO_2 production, primarily because it does not have control or ready access to existing generation plant data in the Pilbara.

The project does provide the opportunity for the non BHPIO load at Port Hedland to be supplied by PEL generators, which could result in some reduction of greenhouse gas emission. This is because the line losses associated with the transmission line from Cape Lambert Power Station to Port Hedland could be eliminated hence power generation at Cape Lambert to cover these losses would not be required. It must be stressed that it is not within the scope of this project to supply any non BHPIO loads (except Newman Township); SECWA is responsible for arranging the supply of power to these loads.

6.0 POWER STATION SITE

6.1 Q *Does the location of the power station affect the location of a future heavy industry site for Port Hedland?*

A The appropriate State Government Departments and Authorities have been kept fully informed on this project since its inception. We believe the power station and future heavy industry site are compatible; however, the heavy industries site is still in the development stage, and its location is yet to be confirmed. Once the heavy industries site is selected then, with future good planning, it will be possible to maximise the use of infrastructure facilities and to ensure the location of compatible industries within the heavy industries site relative to the power station.

6.2 Q *What allowance has been made for the potential power needs of the Hope Downs project and associated infrastructure, relative to the location and capacity of the proposed power station?*

A No specific allowance has been made to supply power to the Hope Down project, and statutory approval would be required before Pilbara Energy Limited could sell power to Hope Downs or any other third party. However, the proposed route for the 220kV transmission crosses the Hancock Resources exploration lease at Hope Downs. Depending on the size of the load at Hope Downs, and the spare capacity in the transmission line at that stage, it should be possible to supply the Hope Downs load, subject to a suitable commercial agreement being reached. Note, that it is relatively expensive to install a substation on a 220kV transmission line.

If Hope Downs establish their shiploading facility at Port Hedland, then power could be supplied to them subject to statutory permission and a suitable commercial agreement being reached.

6.3 Q *Provide more topographic information in the area considered for the power station, including the 100 year storm surge or flood levels.*

A The power station is about 12m AHD, which puts it above the 100 year storm surge level of nominally 7.4m on the coast. With additional fill and appropriate cut off drains the proposed site should be clear of storm water flooding.

6.4 Q *What type of site works are envisaged to avoid inundation of the power station, and what environmental impacts would be associated with this work?*

A The preferred power station site has been located on an elevated site above 10m AHD contour. As the forecast 100 year storm surge level is below 8m, the station is considered to be sufficiently inland and elevated to avoid inundation from storm surge without further major works.

In the event that the station is ever inundated by a storm surge, it can be assumed that the whole Hedland area would be a disaster area, and the rescue and safety of people would be the top priority of the Authorities. In such an event the actual electrical loads and distribution left in sound working order, that would require electricity is debatable.

Also the potential environmental damage that could be attributable to the power station, would be minimal compared with that which would be caused by an inundated Port Hedland.

The site would be graded and cleared, then the surface built up to uniform level equal to or just above the level of the surrounding land.

Surface run-off from the south west is mainly channelled into South West Creek. A 2m drain around the site has been recommended to drain the collapsing sands which typify this area. This drain would intercept such surface run off as may reach the site.

6.5 Q *What disadvantages are there to locating the power station on higher ground further to the south west?*

A A site No. 7 (refer C.E.R. Figure 2.1) which is on high ground further to the south west, was considered as a site for the power station. The main disadvantages of this site were; its relative remoteness from Wedgefield and South Hedland; it is about 15km from Wedgefield, which means longer 66kV lines to connect to the SECWA 66kV system, and greater distance for operating and maintenance personnel to travel, this will become more significant when the station is converted to combine cycle. There is also an agricultural research station in close proximity, which will impose noise constraints, and may be other environmental constraints.

An essential feature of the project is interconnection with the SECWA system at 66kV. Moving the power station further south west to near the 20m contour would lengthen that interconnection thus weakening it electrically and requiring an increase of about 7km to each of two lines into the vicinity of Wedgefield.

7.0 POWER STATION OPERATION

7.1 Q *Elaborate on the 35 dB (A) noise contour in figure 2.1 i.e. what wind conditions (times, seasons etc) does this relate to?*

A The 35dBA noise contour is drawn relative to the nearest residences i.e. principally at Bosna Lodge, the golf course and the adjacent horse racing stables. The contour shows how far away from these nearest residences that an 8 GT power station must be located to ensure the noise at the residences does not exceed 35dBA.

The 35dBA contour takes into consideration the worst combination of seasonal wind strengths and direction. Contours have been produced for all seasons for the highest typical winds prevalent in those seasons and these have been amalgamated with the outermost 35dBA contour taken as the worst case.

7.2 Q *Are there any climatic conditions during which noise and gaseous emissions are predicted to impact on residential areas? Provide modelling contours of the worst case noise scenario.*

A The closest residences to the proposed power station site are at the riding stables and golf course which are approximately 3.5 to 4km away. The residential area of South Hedland is over 5.5km from the power station.

The meteorological conditions used in the noise study are given below for each season:

	Wind Speed	Wind Direction	Temperature
Summer	6 m/s	N W	42 C
Autumn	4 m/s	SE	33 C
Winter	6 m/s	SE	30 C
Spring	2 m/s	S W	33 C

Initially, 4 GT's will be installed of which only 2 would be running for most of the time. There is provision for a total of 8 GT's to be installed on the site, although it would be expected that a maximum of 7 would run simultaneously. There is currently no programme to install 8 GT's.

The attached figures 13 and 14 show the sound propagation curve for 4 and 8 GT's operating.

Figures A1.4.1 to A4.4 show the noise contour with four GT's operating and Figures A1.6.1 to A6.4 show the contours with 8 GT's operating during summer, autumn, winter and spring. These contours are for a site on Quartz Quarry Road, which is no longer viable, but the figures are applicable to the selected power station site.

Modelling that has been carried out to date predicts that there are no climatic conditions during which noise and gaseous emission would impact on residential areas, when 4 GT's are operating. Also there should be no problem if ever 8 GT's are installed and operate simultaneously, except it may be marginal whether 35dBA would be exceeded at the riding stables adjacent to the golf course. (Refer C.E.R. Clauses 5.5.1 and 5.5.2).

It should be noted that 35dBA is very quiet, it is equivalent to a conversation in a normal domestic or office environment.

7.3 Q *What enclosures would be used to reduce noise?*

A The gas turbine units will be provided with the following noise attenuation facilities:

- Acoustic enclosures. These enclosures will be free standing structures consisting of steel framing clad with mineral wool sound insulating panels. The enclosures will be totally enclosed with internal ventilation and fire protection.

- Exhaust stack silencers. These silencers will consist of stainless steel splitter and baffles to reduce the noise levels emanating from the exhaust.

- Inlet duct silencers. Silencing splitters will be installed in the inlet ducting to reduce the noise levels from the air inlet.

- Where noise from auxiliary plant such as ventilation and cooling fans would lead to the specified noise levels being exceeded, the auxiliary plant will be fitted with noise attenuators.

The combination of the above facilities will be specified to limit noise level to 85dBA or less at one metre from any part of the enclosure or associated plant.

7.4 Q *Will the bunding of the distillate storage tanks be impervious? Are there any other fuel storage protection measures, such as above ground pipe work and a tank leak detection system, to be used?*

A Impervious lining of the fuel tank bunds will be provided by either a clay or fabricated impervious material liner under and through the floor and walls of the bund. No rain water or distillate collected in the bund will be discharged before being treated through the oily water treatment plant.

Pipe work containing distillate will be located in culverts such that pipe work can be inspected for leaks at regular intervals. As the distillate system is for emergency use only, the fuel forwarding system will not normally be operating. Fuel from the tanks will be isolated from the pipework system by normally closed motorised valves. These valves will only be opened on receipt of a signal to initiate operation on distillate fuel.

The tanks will be fitted with a leak detection system.

7.5 Q *To what standards would oil separation be carried out?*

A Oil separation would be by belt skimmer or corrugated plate with mechanical circulation. The oil separation would be specified such that less than 20ppm of oil would remain in the treated water.

The amount of oil spillage normally collected will be relatively small, as fuel oil is not the prime fuel, therefore it is not being continuously pumped around the site. Nevertheless oil collection will be installed at all oil installations, and directed to a separation facility.

7.6 Q *Would there be any discharges, such as effluent, from the site?*

A There will be no effluents or contaminated water discharged from the power station other than:

- storm water
- treated water
- exhaust emissions from the gas turbine

The only contamination liable in the water would be oil or oil products from the fuel handling and storage facilities and workshop. Oily water drains, separated from the storm water drainage will direct contaminated water to the oily water sump for subsequent treatment. Where potential for leakage of oil exists, these areas will be bunded and where appropriate drained to the oily water sump.

All separated oil from the water will be stored in a bunded tank for subsequent approved off site disposal.

As the power station will be largely operated unattended, personnel numbers will be low and generally restricted to day work maintenance. Sewage will be dealt with by septic systems complying with local regulations.

7.7 Q *Provide a figure showing the area around the power station which would require to be protected from the development of noise sensitive premises.*

A Figure 1.2 in the CER shows the predicted 35dBA noise contour around the power station with 8 GTs operating. PEL will require a 4km buffer zone to be established around the power station site to prevent developments that are sensitive to 35dBA noise from being established within the buffer zone in the future. A 65dBA buffer zone of approximately 0.5km radius will also be required, to similarly prevent developments that are sensitive to 65dBA noise from being developed within the buffer zone.

8.0 TRANSMISSION LINE CONSTRUCTION

8.1 Q *Given that past construction practices in the Pilbara may not have been as diligent as they could have been, how can the proponent ensure that its staff and contractors would comply with the commitments given, particularly in relation to the clearing of vegetation?*

A BHP, of which PEL is a member company, has a corporate philosophy of achieving excellence in safety and honouring its duty to the community. This, together with changed attitudes in the general community towards the environment, the preparation of an environmental management programme for the project, the induction of all personnel before they start work on site, the monitoring of work by on site supervisors to ensure compliance with commitments, and periodic checks by other personnel will, we believe, ensure compliance with the commitments. Even so, we recognise there will still be problems, but by adopting the above practice and procedure any non compliance should be identified earlier, and corrected before any irreparable damage is done.

The clearance of vegetation can be a significant cost in power line construction and regrowth can become a threat to its long term safe and reliable operation. The avoidance of vegetation as far as possible was therefore one of the factors taken into consideration in route selection.

Without attempting to refute the generality of inferred overclearing there are believed to be few examples on main transmission lines in the Pilbara where this has occurred.

8.2 Q *What is the capacity of the mulga to withstand heavy pruning? What would be the impact on the environment should such an ecosystem collapse? What other construction options are available which would protect the power line but not impact on the mulga trees?*

A Areas identified as having dense mulga have been deliberately avoided for the reasons given in 8.1 above. Sparse mulga is not totally avoidable due to other constraints in selecting the route, e.g. technical, topographic, Aboriginal sites, mining leases etc.

Where tree height is unlikely to pose a threat to conductors it would be adequate to clear a lesser width say 15m of the easement which represents a considerably reduced impact for access and stringing purposes.

A variety of research has been undertaken by Mulga Research Centre, and although none relates directly to the impact of heavy pruning, two published research papers present some information which can be used to predict the impact of pruning. Fox (1981,a) reported that overwood thinning by removal of large trees altered the competitive conditions within Mulga stands. Measurements indicated that removal of overstorey competition allowed vigorous, if patchy, natural regeneration to occur. Fox (*op.cit.*) also observed that there seemed to be a general relationship between the occurrence of vigorous regrowth and the absence of shade.

PEL contacted the following people to gain advice about pruning:

- Bruce Maslin - CALM botanist
- Steve van Leeuwin - CALM Senior Research Scientist in Karratha
- Tony Start - CALM Acting Head of Group and former regional manager in Karratha
- Professor John Fox - Curtin University
- John Beard - who described and mapped the vegetation of the Pilbara

All recognise that there are many morphological and ecological forms included under the name 'Mulga' and its scientific equivalent *Acacia aneura.*

Start and van Leeuwin (per comm) have observed, however, that above ground parts of mulga have been killed by hail and fire, while very hot and repeated fires have also lead to the death of underground parts that might otherwise send up new shoots. Therefore a principle concern is the damage to mulga resulting from the increased incidence of fire due to improved human access to areas currently inaccessible.

PEL have made commitments (Commitments 1, 4 and 9) to reduce the potential impacts on Mulga communities.

It is considered unlikely that such an ecosystem would collapse as a result of pruning certain individuals and any impact is likely to be localised and minimal. Even if deaths do occur as a result of pruning, these individuals will probably be replaced by natural regeneration. It is important to note that factors other than pruning may cause adverse reactions. For example, mulga, like other species of *Acacia,* is prone to insect attack which may result in the complete defoliation of the tree. Therefore, it is important to determine the cause as well as the nature of the impact.

Other linear features including roads, survey tracks, and powerlines have previously been constructed through mulga woodlands in the Pilbara without the ecosystem collapsing, providing the sheet flooding of downstream mulga is not interrupted.

PEL will undertake further discussion about the treatment of Mulga along the powerline during the preparation of the Environmental Management Plan (Commitment 15).

Sources: Fox, J.E.D. 1981(a) Stocking and Growth of *Acacia aneura* following overwood thinning. Ann.Rep. No 4 Mulga Research Centre 1981, 1-9
Fox, J.E.D. 1981(b) Changes in a stand of *Acacia aneura* caused by a hail storm. Ann.Rep. No. 4 Mulga Research Centre 1981, 49-60
Haddon, F. (1992) *Environmental Field Guide to Australia's Outback.* Simon and Schuster Australia, NSW.

8.3 Q *What is the justification for a 60 metre easement for the power line? Would a smaller easement suffice?*

A The justification for a 60 metre easement is to accommodate both the line and its access track and to allow a margin for minor variations to alignment during detailed survey and to restrict developments within close proximity to the line, which would jeopardise the safety of the line and features within the easement. It also affords a degree of transverse swing on the conductors in high winds, while remaining within the easement.

The acquisition of this width of easement does not mean that the whole width will be cleared of vegetation or used for the entire length nor does it infer sterilisation of the easement width from alternative land use once construction is complete.

8.4 Q *What weeds exist along the route of the proposed power line which are potentially damaging to the environment, but are not considered pests to the agricultural industry?*

A Nuisance weeds that may occur along the proposed power line route include the ruby dock *Rumex vesicarius*, buffel grass C *Venchrus ciliaris* and the roly-poly or prickly saltwort *Salsola kali*.. R. vesicarius is an introduced species that is widespread and ubiquitous after winter rain. It has invaded many of the disturbed road side verges and water courses in the Pilbara and is considered to be of considerable grazing importance. If not controlled, it has the potential to spread rapidly through all areas disturbed during project construction. C. *cilaris* is perennial grass introduced as a pasture grass and now naturalised in Australia. It has invaded many of the water

courses and colluvial flats in the Pilbara and has the potential to rapidly invade recently disturbed areas. Both *C.ciliaris* and *R.vesicarius* are good indicators of disturbed or modified conditions.

S.kali is an annual weed that germinates mainly in spring and flowers in summer and early autumn. Young plants are readily grazed by cattle and, to a lesser extent, horses. However, mature plants are quite prickly and so are avoided by stock. This species is one of the first to colonise bare areas following drought or disturbance but may be out-competed once other species become established.

PEL, when developing the Environmental Management Plan (Commitment 15) will ensure that appropriate hygiene measures will be instigated and all populations of *ruby dock* removed and destroyed as soon as it appears in the disturbed ground along the easement outside the established area.

Sources: Mattiske, E.M. and Associates (1992) *Flora and Vegetation, Marandoo Project Area.* Report prepared for Enviroscan.
Peirce, J. (1990) *Recommendations for the Control of Nuisance Weeds.* Agricultural Protection Board of WA Infonote 27/90.
Jessop, J. (Ed.) (1981) *Flora of Central Australia.* Reed Books, Sydney.

8.5 Q *Is the proponent aware of the extensive data published by the WA Museum in its report "Ecological Survey of the Abydos-Woodstock Reserve, Western Australia", Records of the Western Australian Museum, Supplement No. 37? (It is suggested that the proponent consult with the staff of CALM and the WA Museum to rectify any errors and omissions in the CER and its appendices).*

A Yes, PEL is aware of the extensive studies completed for the Abydos-Woodstock Reserve. Details of the report were used to ensure the route selected avoided the core area of highest ecological diversity identified by the Museum (CER Clause 6.3.4).

The Museum has advised that two additional Schedule 1 species have been recorded in the Abydos-Woodstock area, *Dasycercus cristicauda* and *Lagorchestes conspicillatus*, and may occur along the transmission line route. Other species not listed in the CER, but recorded in the Museum report are *Psudantechninus wooleyae, P. macdonnellensis, Pseudomys delicatulus, Zyzomys argurus* and *Sminthopsis youngsoni*. The impact of the transmission line on these species is expected to be minimal.

PEL also recognises that the current knowledge of fauna in the Pilbara is incomplete and has made a commitment (Commitment 20) to inspect the pipeline trench on a daily basis for trapped fauna. The results of this survey will be made available to the Museum and the opportunity for the Museum to participate in the work will be discussed in more detail with the Museum at a later date.

PEL will continue to liaise and consult, as appropriate, with the Museum and CALM during the construction and operation of the pipeline and transmission line.

8.6 Q *What reference was drawn upon for the statement that the highest concentrations and diversity of fauna tend to be found in areas of denser vegetation and higher water availability, such as near river beds and water holes?*

A Refer 4.7

MAXWELL CHEMICALS PTY LTD.
19 HALE ST, BOTANY, N.S.W., 2019
TELEPHONE (02)6668545 FAX (02)6664051
Emergency Phone (02)6665436. If no answer contact Poisons Information Centre (02)5194066

MATERIAL SAFETY DATA SHEET

IDENTIFICATION

PRODUCT NAME : NILCOR C
OTHER NAMES : NONE
MAXWELL CODE : NILCC
U.N. NUMBER : 1993
DANGEROUS GOODS CLASS : 3.2
SUBSIDIARY RISK :
HAZCHEM CODE : 2[S]
POISONS SCHEDULE :

USE : Microbiocidal corrosion inhibitor in industrial water systems.

PHYSICAL DESCRIPTION AND PROPERTIES.

APPEARANCE: Clear, light amber liquid.
BOILING POINT: Not available.
VAPOUR PRESSURE: Not available.
% VOLATILES: - 30%
SPECIFIC GRAVITY: @ 20°C. 0.94
FLASH POINT: 23°C.
FLAMMABILITY LIMITS: Not known.
AUTOIGNITION TEMPERATURE: Not known.
SOLUBILITY IN WATER: Soluble

HAZARDOUS INGREDIENTS

Component	CAS NO.	%
Methylated Spirits [Ethanol]	[64-17-5]	Med.

HEALTH HAZARD INFORMATION

HEALTH EFFECTS

SWALLOWED : Slightly toxic. Slight corrosive nature to mouth, throat and stomach.

EYE : Irritant to eyes and surrounding tissue.

SKIN : Irritating to skin on prolonged contact.

INHALED : May cause dizziness if exposed to vapours for extended length of time.

FIRST AID
SWALLOWED : Drink plenty of water or milk. Avoid alcohol. Do NOT induce vomiting. Get medical attention.

EYE : Hold eyes open, flood with water for at least 15 minutes. If irritation persists get medical advice.

SKIN : Remove contaminated clothing and wash skin thoroughly with soap and water.

INHALED : Remove from contaminated area.

ADVICE TO DOCTOR : No specific advice. Treat symptomatically.

PRECAUTIONS FOR USE

EXPOSURE LIMITS : TLV-TWA EXPOSURE LIMITS :

Not yet established for product.

VENTILATION :

Good ventilation is required. Do not use in confined spaces.

PERSONAL PROTECTION :

Safety glasses or goggles, and PVC, neoprene, or solvent resistant gloves are recommended.

FLAMMABILITY :

Flammable.

SAFE HANDLING INFORMATION

STORAGE AND TRANSPORT
Store in cool dry area away from any extremes of heat.
Product must be transported in accordance with the Australian Code for the Transport of Dangerous Goods by Road and Rail.

SPILLS AND DISPOSAL
Contain spill. Soak up with absorbent material such as diatomaceous earth or MAXWELL L4. Dispose of as industrial waste in accordance with local regulations. Small spills may be washed away with large quantities of water.

FIRE AND EXPLOSION HAZARD
In the event of a fire the product will liberate such gases as carbon dioxide, carbon monoxide and nitrogen oxides.

EXTINGUISHING MEDIA
Use foam, water spray, dry chemical or carbon dioxide.

OTHER INFORMATION

CONTACT POINT:
Mr. G. Rose, Technical Manager, Maxwell Chemicals,
Telephone (02)6668545
Issue No. 2 Date of Issue: 8 June 1990

MAXWELL CHEMICALS PTY LTD.

19 HALE ST, BOTANY, N.S.W., 2019
TELEPHONE (02)6668545 FAX (02)6664051
Emergency Phone (02)6665436, If no answer contact Poisons Information Centre (02)5184068

MATERIAL SAFETY DATA SHEET.

IDENTIFICATION

PRODUCT NAME : MAXSO-3
OTHER NAMES : NONE
MAXWELL CODE : MAX803
U.N. NUMBER : Nil
DANGEROUS GOODS CLASS : N/A
SUBSIDIARY RISK : N/A
HAZCHEM CODE : N/A
POISONS SCHEDULE : N/A

USE : Liquid catalysed oxygen scavenger.

PHYSICAL DESCRIPTION AND PROPERTIES.

APPEARANCE: Yellow liquid.
BOILING POINT: Not established.
VAPOUR PRESSURE: Not established.
% VOLATILES: Non volatile.
SPECIFIC GRAVITY: @ 20°C. 1.32
FLASH POINT: Nil
FLAMMABILITY LIMITS: N/A
AUTOIGNITION TEMPERATURE: N/A
SOLUBILITY IN WATER: Complete

HAZARDOUS INGREDIENTS

Component	CAS NO.	%
Sodium Metabisulphite	(7681-57-4)	Med.

HEALTH HAZARD INFORMATION

HEALTH EFFECTS

SWALLOWED : May be slightly corrosive to mouth, throat and stomach.

EYE : Slightly irritating to eyes and surrounding tissue.

SKIN : On prolonged contact the product will cause irritation to skin and possibly remove natural oils.

INHALED : No harmful effects via mists or vapours.

FIRST AID
SWALLOWED : Drink milk or water. Do NOT induce vomiting. Seek medical attention.

EYE : Hold eyelids open and wash thoroughly with water. Get medical attention if irritation persists.

SKIN : Remove contaminated clothing. Wash with soap and water.

INHALED : N/A

ADVICE TO DOCTOR : No specific advice. Treat symptomatically.

PRECAUTIONS FOR USE

EXPOSURE LIMITS : TLV-TWA EXPOSURE LIMITS :-

None assigned for product.

VENTILATION :

No special requirements.

PERSONAL PROTECTION :

Not normally required, but the wearing of safety goggles and rubber gloves is good industrial practice.

FLAMMABILITY :

Product is not flammable.

SAFE HANDLING INFORMATION

STORAGE AND TRANSPORT
Store in cool dry area away from strong acids. The product may produce sulphur dioxide on acid contact or if exposed to extreme temperatures such as in a fire. No special transportation requirements.

SPILLS AND DISPOSAL
Contain spill if possible, soak up with diatomaceous earth or MAXWELL L4. Small spills may be hosed away with water. Dispose of as non-hazardous industrial waste.

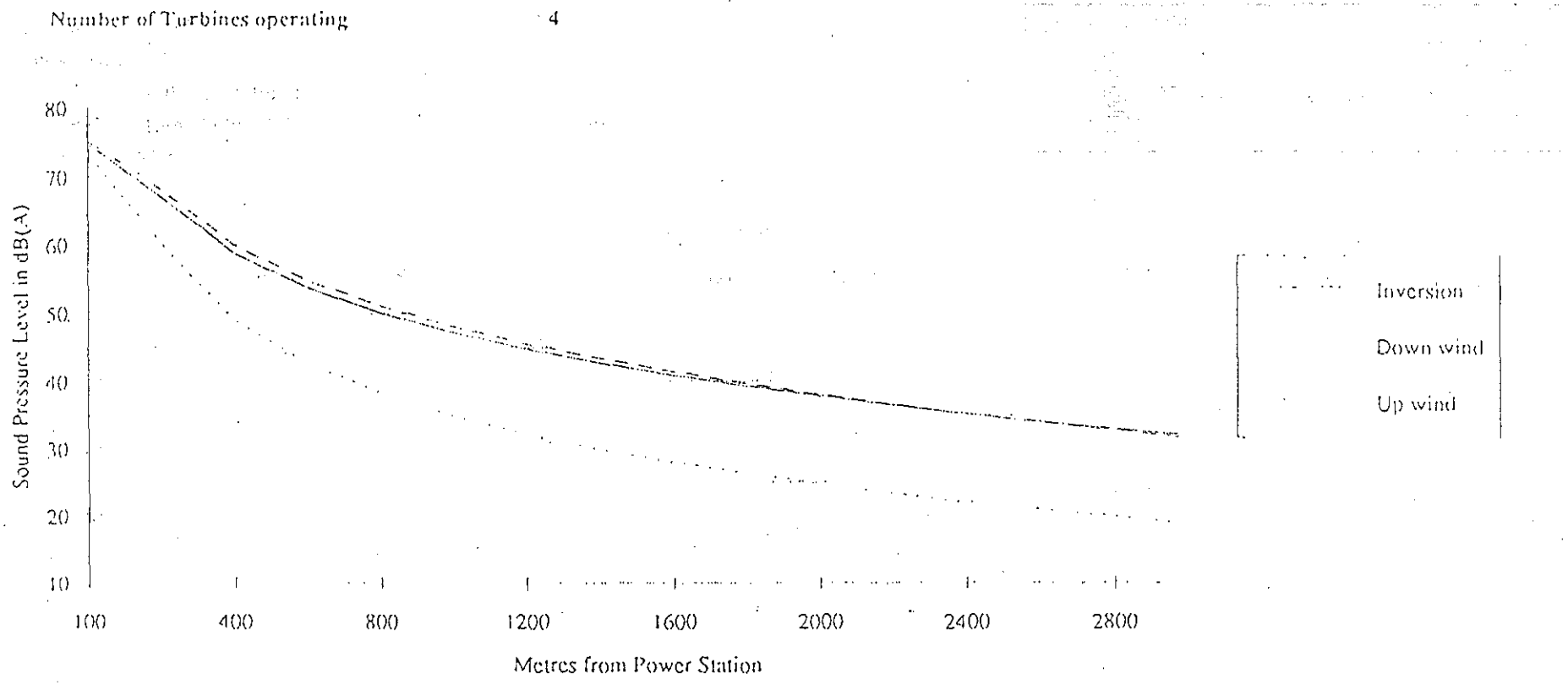
FIRE AND EXPLOSION HAZARD
Product does not burn or support combustion, however, will produce sulphur dioxide gas under fire conditions.

EXTINGUISHING MEDIA
Keep containers cool with water spray.

OTHER INFORMATION

CONTACT POINT:
Mr. G. Rose, Technical Manager, Maxwell Chemicals,
Telephone (02)6668545
Issue No. 2

Date of Issue: 8 June 1990



Client: BHPIO

Project: Environmental Noise Assessment for the Proposed Port Hedland Gas Turbine Power Station

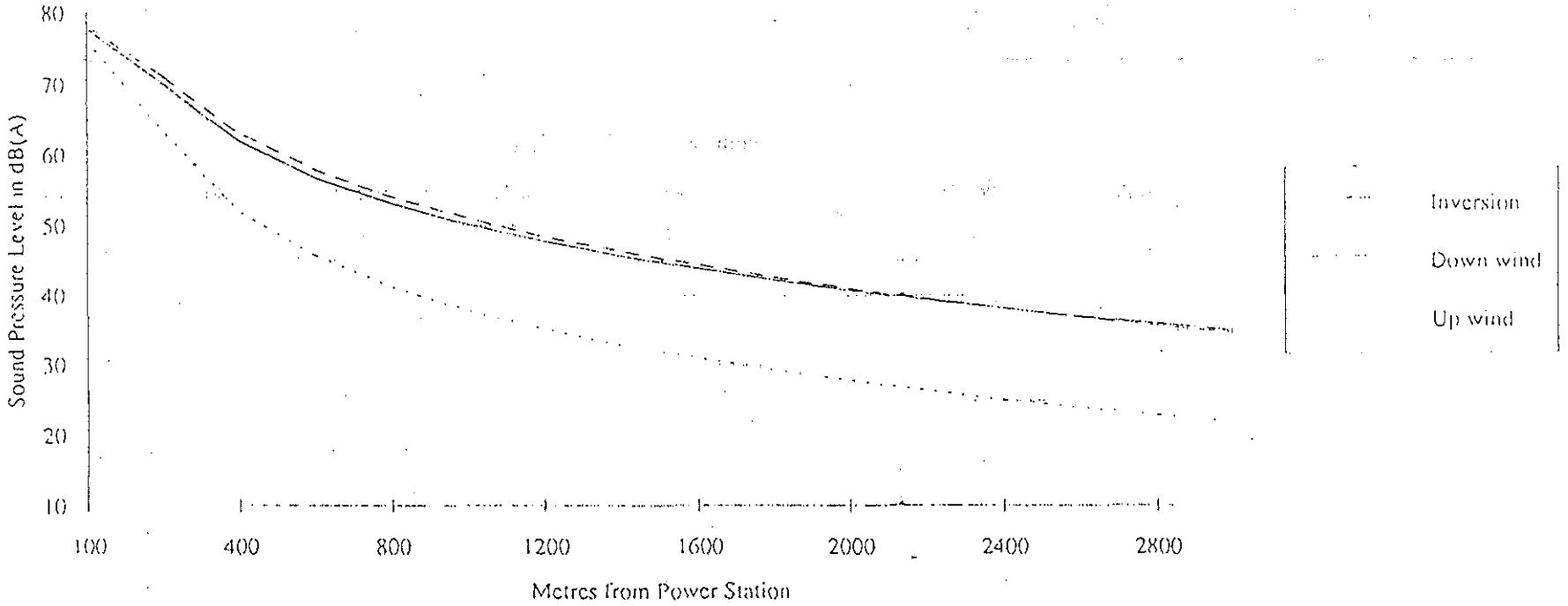
Date: 20-10-92

Comments: Large enclosure

SOUND & VIBRATION TECHNOLOGY PTY LTD
Consultant Engineers
10 MONGER ST
PERTH WA 6000
PH: (09) 227 633
FAX: (09) 227 634

Figure 13

Number of Turbines operating 8



Client: BHPIO

Project: Environmental Noise Assessment for the Proposed Port Hedland Gas Turbine Power Station

Date: 20-10-92

Comments: Large enclosure

SOUND & VIBRATION TECHNOLOGY PTY LTD
Consultant Engineers
10 MONGER ST
PERTH WA 6000
PH: (09) 227 633
FAX: (09) 227 634

Figure 14

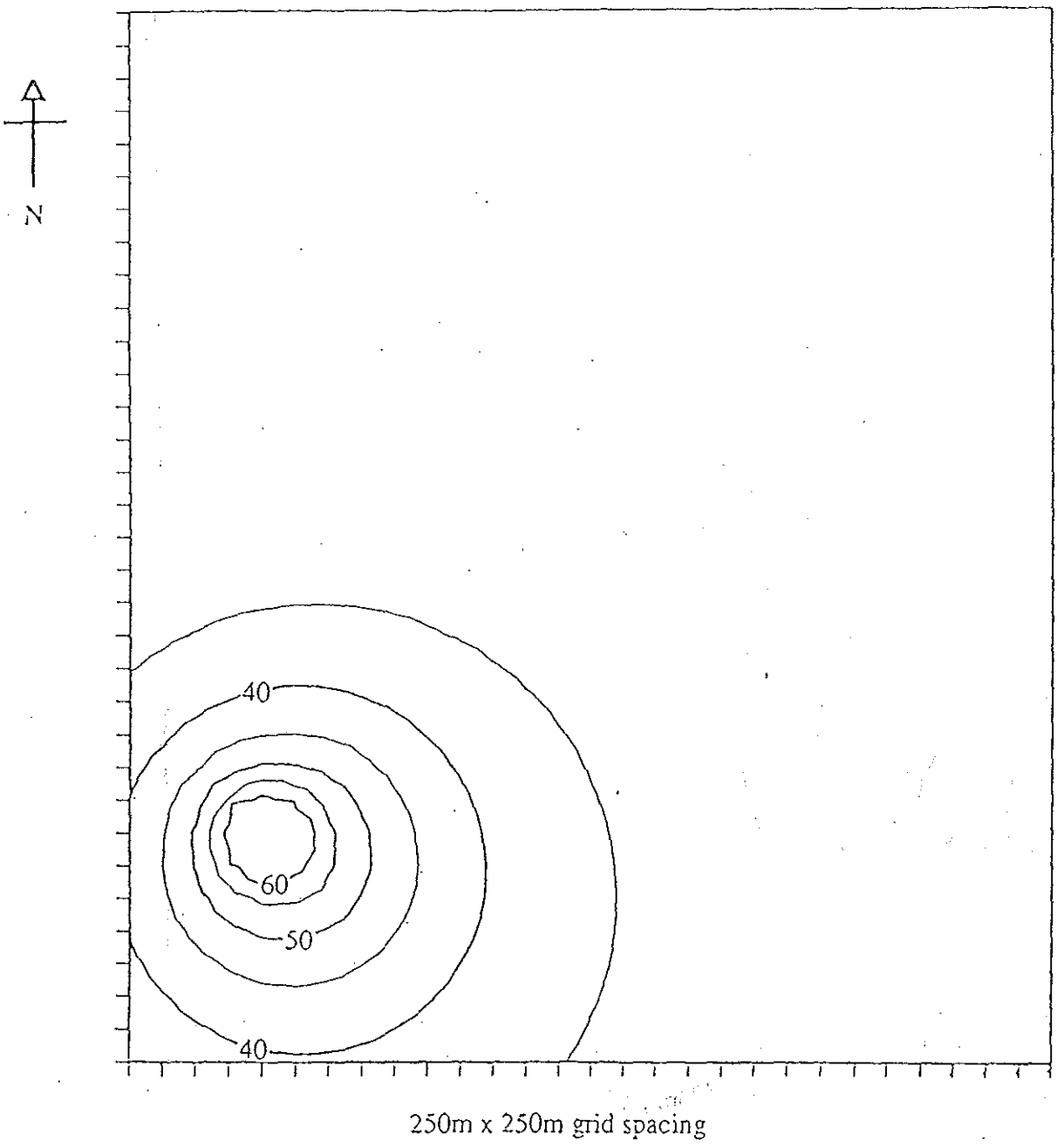


Figure A.1.4.1 Quarry Road site, Summer conditions, four Turbine operating with large enclosure

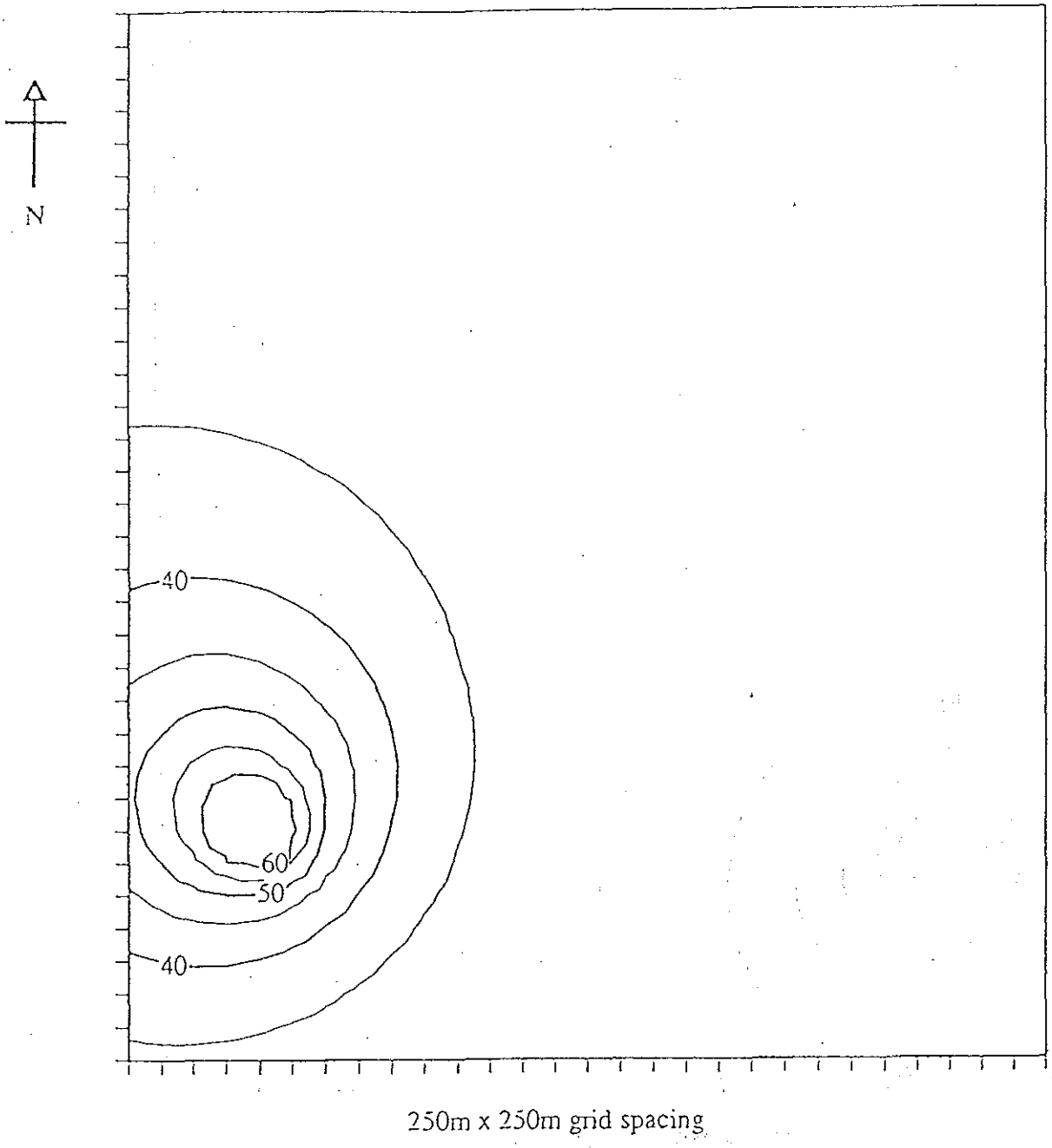


Figure A.1.4.2 Quarry Road site, Autumn condidtions, four Turbine operating with large enclosure

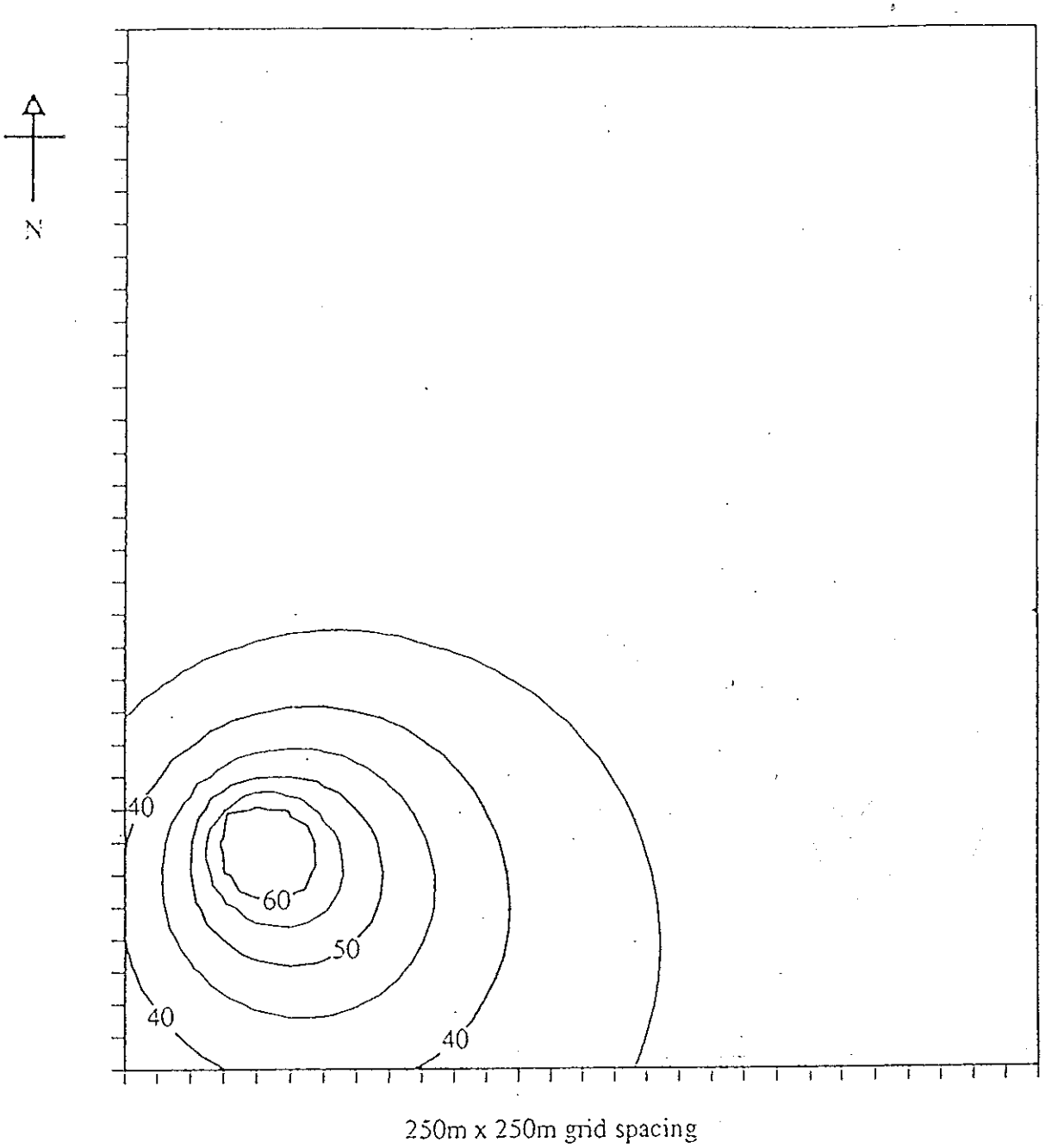


Figure A.4.3 Quarry Road site, Winter conditions, four Turbines operating with large enclosure.

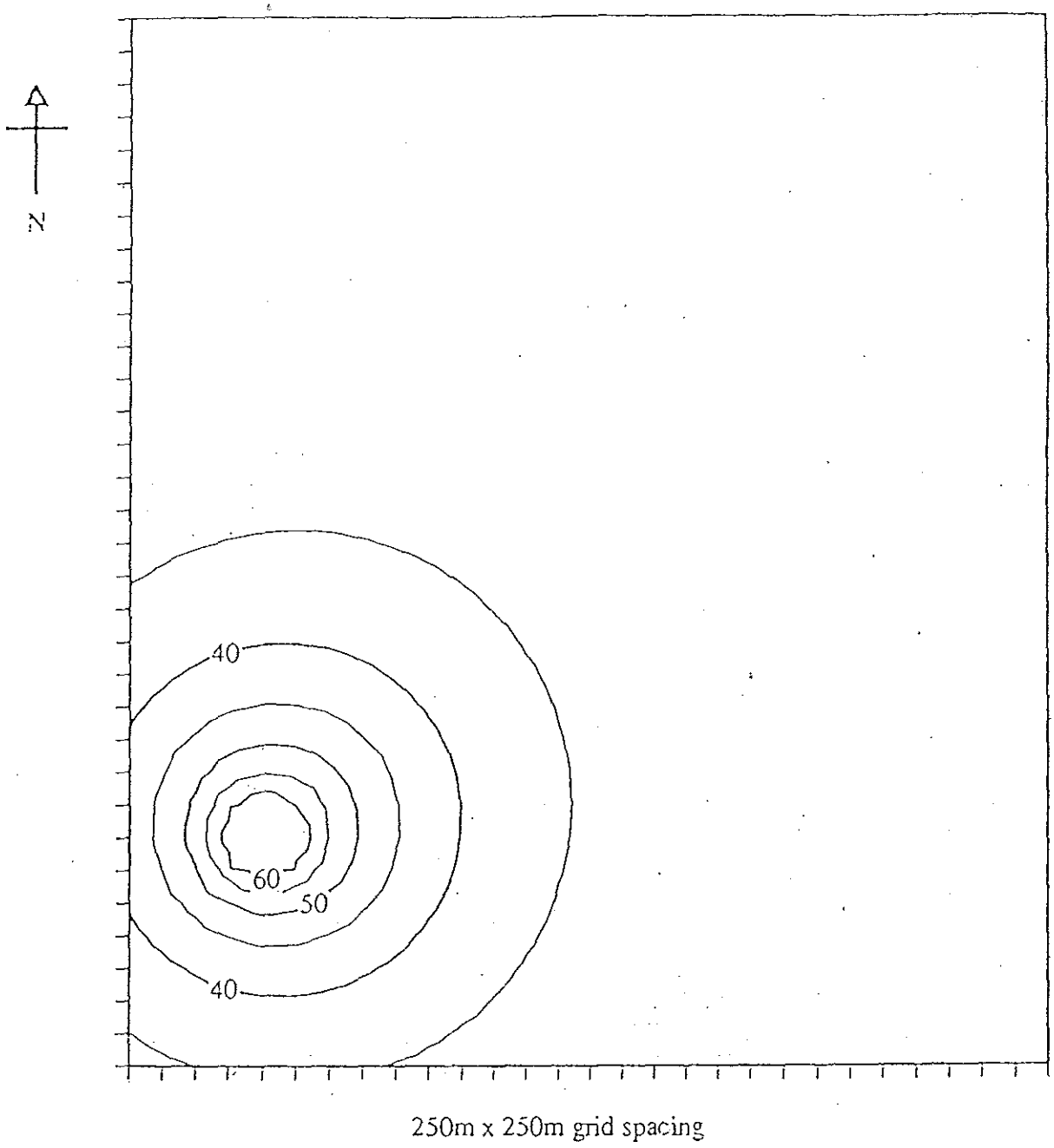


Figure A.4.4 Quarry Road site, Spring conditions, four Turbine operating with large enclosure.

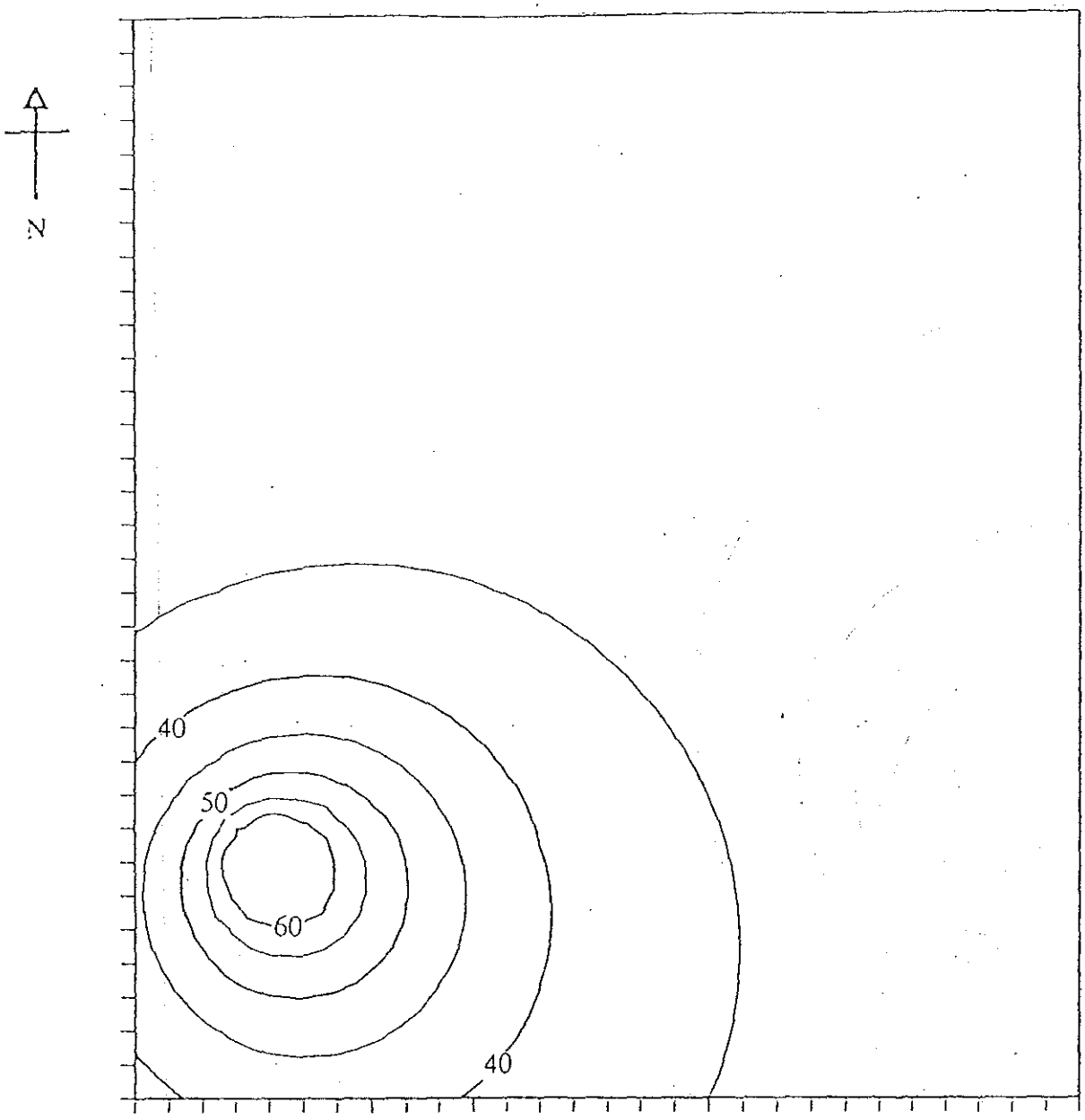


Figure A.1.6.1 Quarry Road site, Summer condidtions, eight Turbine operating with large enclosure

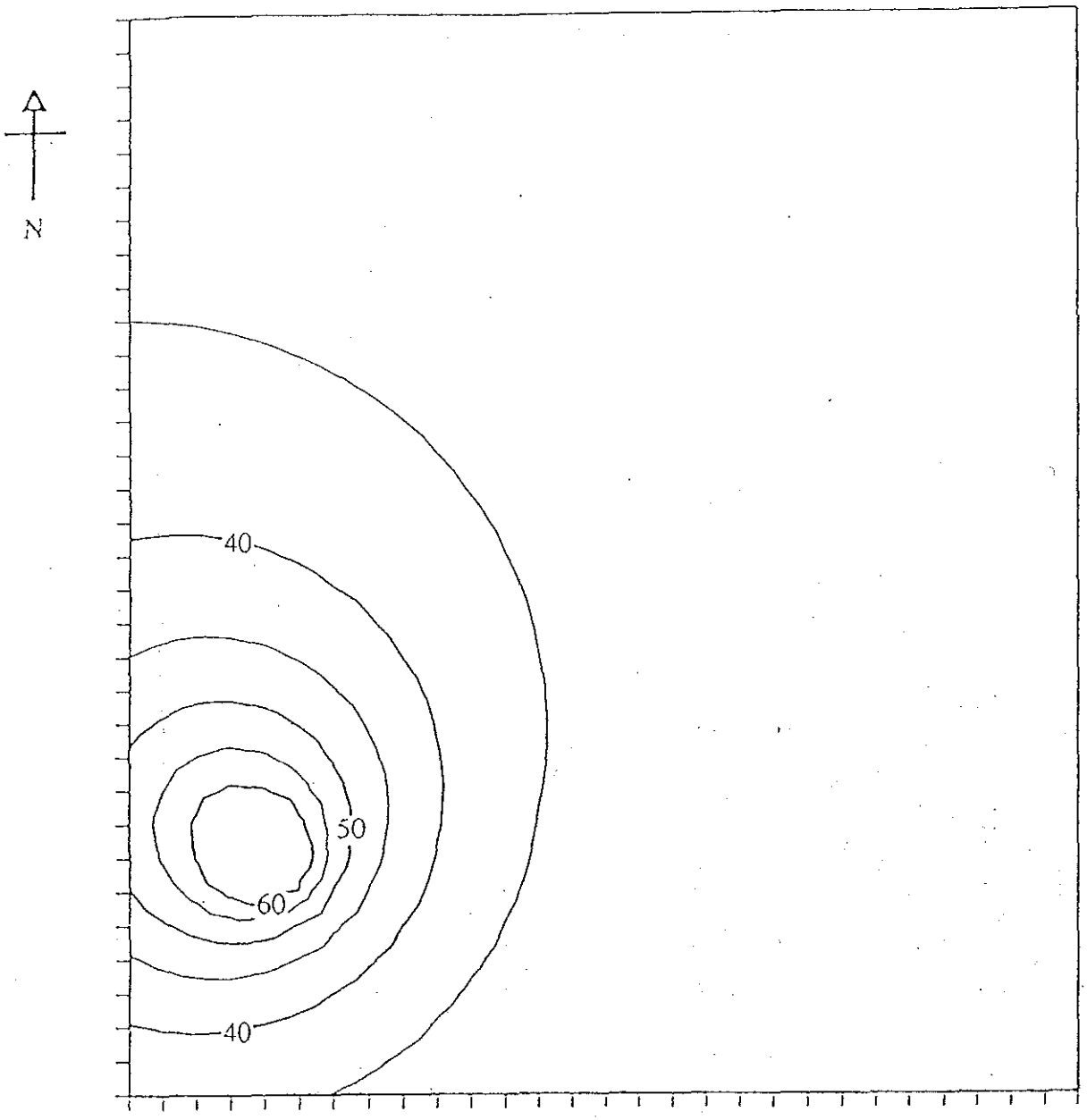


Figure A.1.6.2 Quarry Road site, Autumn condidtions, eight Turbine operating with large enclosure

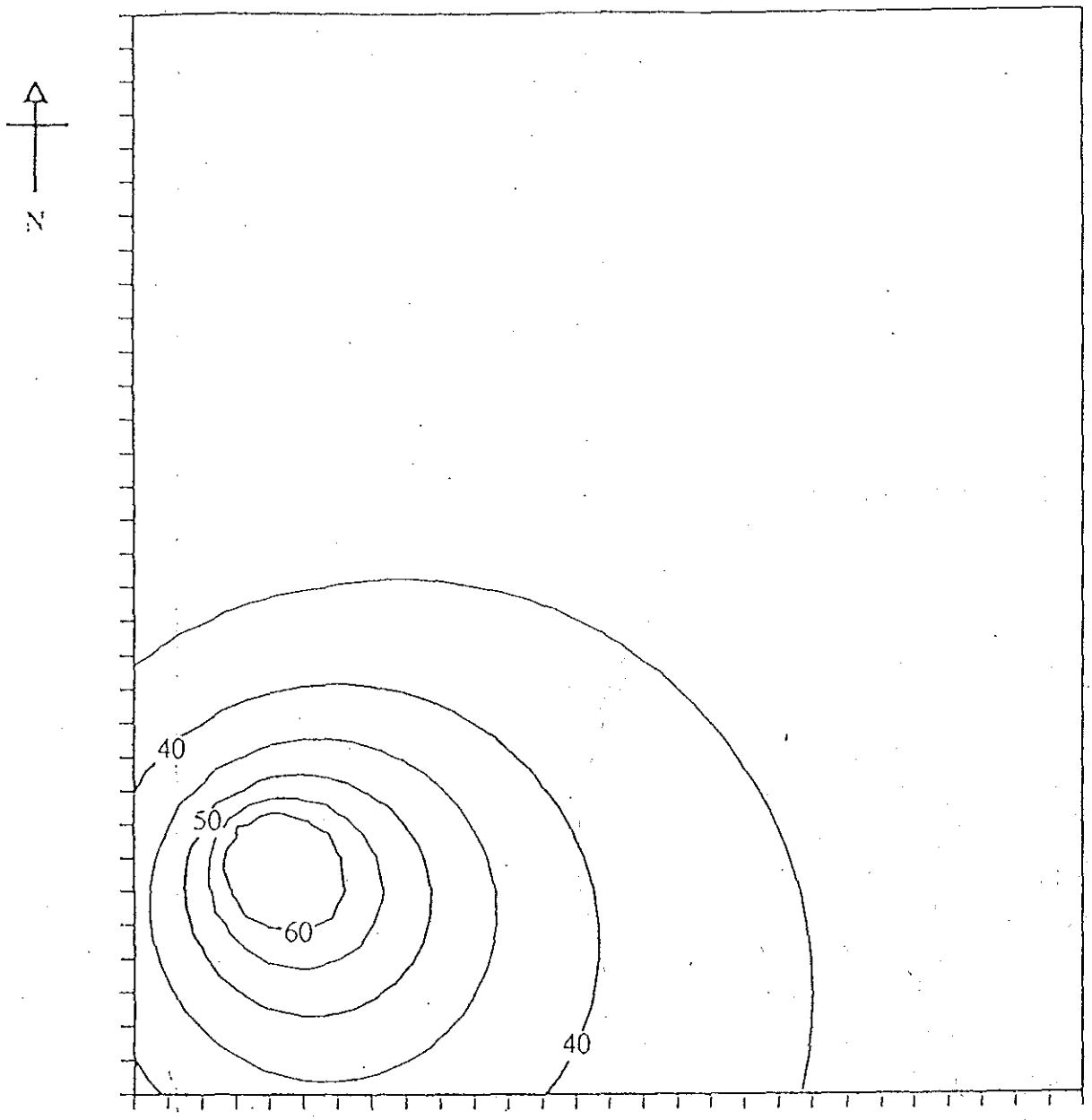


Figure A.6.3 Quarry Road site, Winter conditions, eight Turbines operating with large enclosure.

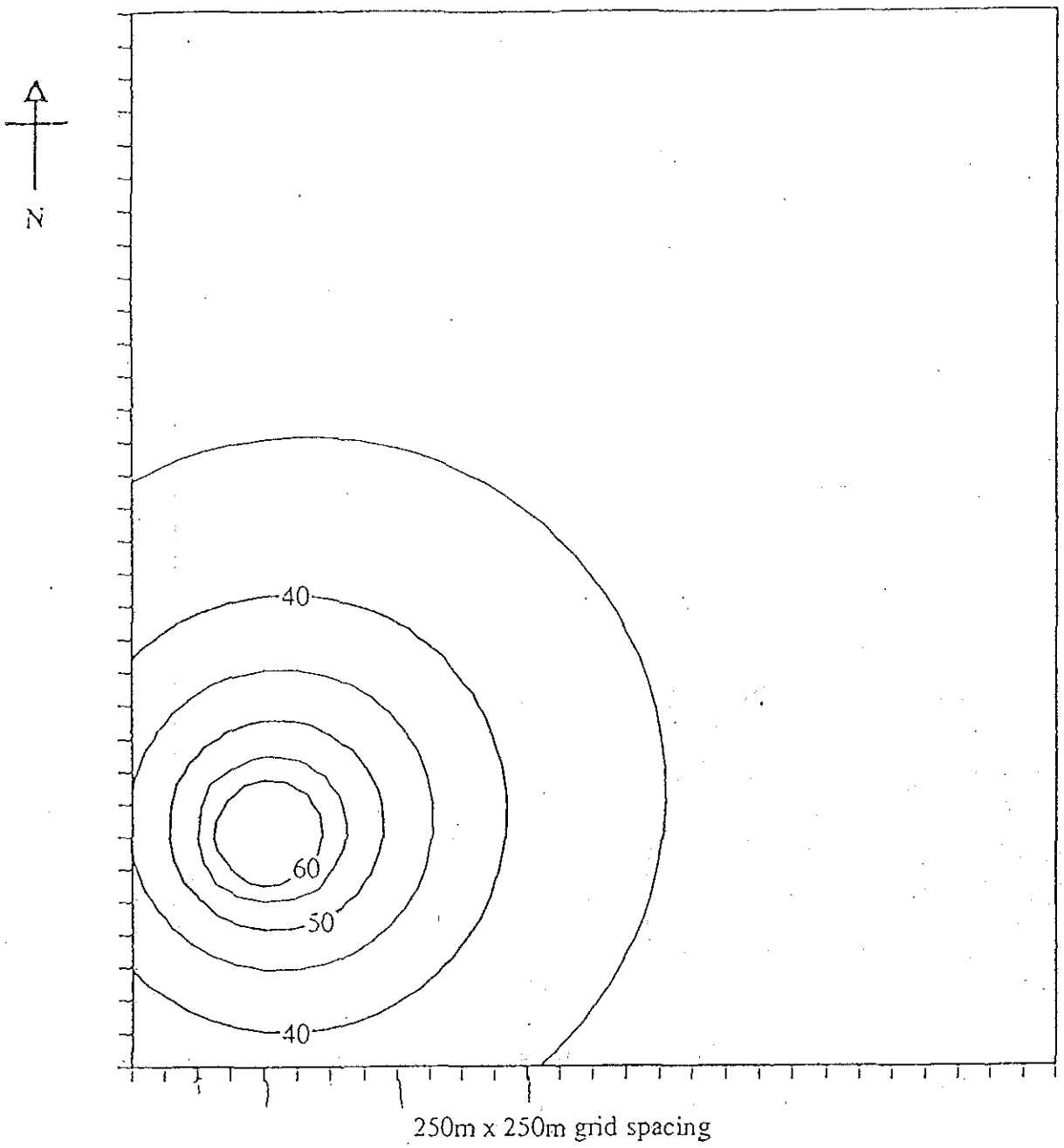


Figure A.6.4 Quarry Road site, Spring conditions, eight Turbines operating with large enclosures.