Yakabindie Nickel Project — Change to environmental conditions

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Dominion Resources Pty Ltd

Report and recommendations
of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
Bulletin 827
July 1996

THE PURPOSE OF THIS REPORT

This report contains the Environmental Protection Authority's environmental assessment and recommendations to the Minister for the Environment on the environmental acceptability of the proposal.

Immediately following the release of the report there is a 14-day period when anyone may appeal to the Minister against the Environmental Protection Authority's report.

After the appeal period, and determination of any appeals, the Minister consults with the other relevant ministers and agencies and then issues his decision about whether the proposal may or may not proceed. The Minister also announces the legally binding environmental conditions which might apply to any approval.

APPEALS

If you disagree with any of the contents of the assessment report or recommendations you may appeal in writing to the Minister for the Environment outlining the environmental reasons for your concern and enclosing the appeal fee of $10.

It is important that you clearly indicate the part of the report you disagree with and the reasons for your concern so that the grounds of your appeal can be properly considered by the Minister for the Environment.

ADDRESS

Hon Minister for the Environment
12th Floor, Dumas House
2 Havelock Street
WEST PERTH WA 6005

CLOSING DATE

Your appeal (with the $10 fee) must reach the Minister's office no later than 5.00 pm on 16 August 1996.

Environmental Impact Assessment Process Timelines

Date	Timeline commences from receipt of full details of proposal from proponent for public review	Time (weeks)
15/12/95	Proponent Document Released for Public Comment	5
19/1/96	Public Comment Period Closed	
20/2/96	Issues Raised During Public Comment Period Summarised by EPA and Forwarded to the Proponent	4
29/3/96	Proponent Response to the Issues Raised	1
2/8/96	EPA Reported to the Minister for the Environment	9

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Summary

The Environmental Protection Authority (EPA) has received a proposal from Dominion Resources Pty Ltd to alter the existing environmental conditions set on its Yakabindie Nickel Project to accommodate the following three changes:

- Extension of the eastern waste rock dump into a section (Six Mile Well block) of the Wanjarri Nature Reserve under an arrangement with the State which involves the permanent addition of a similar area of land to the nature reserve and eventual return of the Six Mile Well Block to the Wanjarri Nature Reserve.
- Establishment of a downstream hydrometallurgical processing plant within the currently approved concentrator area.
- Integration of the tailings dam with the Goliath North waste dump so as to form a single operating unit.

The EPA identified the main environmental issues requiring consideration as:

- impact on locally and regionally significant vegetation associations, Declared Rare and Priority flora;
- changes to landforms;
- surface water management;
- groundwater;
- rehabilitation;
- tailings containment;
- gaseous emissions; and
- the Wanjarri Nature Reserve land utilisation arrangement.

The proposed extension of the eastern waste rock dump and resultant reduction in the size of the western dump will reduce the impact of this project on a large sub-population of a species of Declared Rare Flora. Vegetation lost due to the waste rock dump extension is well represented elsewhere within the Wanjarri Nature Reserve and the proposed addition to the reserve and therefore will not decrease the conservation value of the reserve.

Extension of the eastern waste rock dump into the Wanjarri Nature Reserve will result in the loss the Montague landform from the nature reserve. Conversely, addition of the Mt Pasco block to the nature reserve will increase the representation of a number of landform units which are presently poorly represented within the nature reserve. The proponent will also enter into a Section 16A Joint Management agreement with CALM for the protection of an area of the Montague landform unit near the project area. The EPA also recommends that an area of the Montague landform unit be included in a secure reserve (Recommendation 7).

Surface water management with regard to the general project area has been considered by previous assessments of this project and is subject to a number of Environmental Conditions. These conditions will be maintained. Surface water management within the Wanjarri Nature Reserve would also be adequately addressed by the existing conditions, however, as an Environmental Management Programme (EMP) is to be prepared for the Six Mile Well block, the EPA considers that surface water management for the Six Mile Well block should be addressed separately in this EMP (Recommendation 3).

Groundwater resources may be affected by the additional water requirements of the hydrometallurgical processing plant. The demonstrated yield of the project borefield is sufficient to provide the additional water and the proponent has previously made a number of commitments to monitor and safeguard the groundwater resource.

Closer proximity of the project to the Wanjarri Nature Reserve (as a result of proposed boundary changes) requires that early consideration be given to the final land forms and completion criteria for the rehabilitation of the project area. The EPA therefore recommends preparation of a decommissioning plan within five years of project commencement (Recommendation 5). Rehabilitation of the Six Mile Well block should be addressed separately in an EMP for this area (Recommendation 3). As the EPA does not have any historical data on the type of tailings which will be generated by this project, the EPA recommends 5-yearly reporting of the tailings facility to monitor progress and collect data (Recommendation 4).

Groundwater resources could be affected by potential seepage of saline water from the tailings dam. It is predicted that the new location for the tailings dam will reduce seepage. These predictions will be confirmed by additional geotechnical work prior to construction of the dam.

The project will generate emissions of sulphur dioxide and oxides of nitrogen. The levels of emission are estimated to be below recommended levels and will be regulated by licences under Part V of the Environmental Protection Act. There will be increased emissions of carbon dioxide and in accordance with the EPA's provisional policy on greenhouse gases the proponent will be required to report on measures taken to limit greenhouse gas emissions (Recommendation 2).

The Wanjarri Nature Reserve land utilisation (WNRLU) arrangement involves (in the short term) excising an area of the reserve and replacing it with another. Assessment of the arrangement indicates there is a net environmental benefit to the Wanjarri Nature Reserve and therefore the EPA supports this arrangement (Recommendation 6).

Following the assessment of this proposal, and the modifications and management commitments made by the proponent, the EPA finds the project can be managed to meet the EPA's objectives.

Recommendation No.	**Summary of recommendations**
1	The proposal can be managed to meet the EPA's objectives, subject to the proponent's revised environmental management commitments and the EPA's recommended conditions and procedures.
2	The proponent should include consideration of greenhouse gas emissions in Performance and Compliance Reports.
3	An Environmental Management Programme (EMP) for the Six Mile Well block should be prepared in consultation with CALM and the NPNCA, and subsequently implemented. The EMP shall address at least the following topics: dust, surface water management (erosional runoff), groundwater (leaching), rehabilitation, and decommissioning.
4	After five years the proponent should report on the development of the tailings dam to the EPA.
5	Within five years, the proponent should be required to prepare and implement a plan which describes the process for decommissioning and rehabilitation of the project area including the development of a 'walk away' solution.
6	The EPA supports the incorporation of the Wanjarri Nature Reserve of the Mt Pasco block area as part of the Wanjarri Nature Reserve land utilisation arrangement.
7	CALM should investigate and implement, where possible, means to ensure the representation of the Montague land unit type under protected management, by including areas containing this land unit type within a secure conservation reservation.

1. Introduction and background

1.1 Purpose of this report

The Environmental Protection Authority (EPA) was requested by the Minister for the Environment to report on the proposed changes to the environmental conditions for the Yakabindie Nickel Project under Section 46 of the *Environmental Protection Act 1986*. The changes are required as a result of the Dominion Resources Pty Ltd proposal to make three substantial changes to the project.

This report and recommendations provides the EPA's advice to the Minister for the Environment on the environmental acceptability of the proposed changes to the project and consequent changes to the statement of approval.

1.2 Background

The Yakabindie Nickel Project was originally assessed in 1990 at the level of a Consultative Environmental Review. The Minister for the Environment gave approval with Environmental Conditions in December 1990.

Since the original approval the project has been modified three times by changes to the environmental conditions under Section 46 of the Environmental Protection Act. These modifications are listed below and illustrated further in Figures 1, 2, and 3.

1. March 1991 (EPA assessment 352)	Relocation of concentrator, tailings dam, and waste dumps.
2. December 1992 (EPA assessment 765)	New open pit (Goliath North) and associated waste dump area, and an expansion of the original pit (Six Mile).
3. June 1995 (EPA assessment 957)	Extension of environmental approval for another three years.

The key environmental issues identified by the EPA in the previous assessments of this project and changes to the environmental conditions associated with this project were:

- location of the facilities such as waste dumps, processing plant and the tailings dam;
- the environmental impact on the Jones Creek system;
- impacts on the Wanjarri Nature Reserve;
- rehabilitation of the operation and the pit itself as a permanent feature;
- the impact of utilising groundwater for processing; and
- cumulative impacts such as transport and water supply associated with the proposed Mount Keith Nickel Project.

The Environmental Conditions applied to the Yakabindie Nickel Project address these issues. A copy of the Minister's Statement of Conditions for this project is included as Appendix 2.

In 1992 the project was put on hold after a fall in price of nickel. Since that time a number of factors have changed, indicating the likelihood of project development in the near future. At this time the project has not substantially commenced.

The company seeks changes to the Environmental Conditions to incorporate three distinct changes to the currently approved project. The first change is to use a section (Six Mile Well block) of the Wanjarri Nature Reserve for the extension of a waste rock dump under an arrangement with the State which involves the addition of a similar area of land to the nature reserve and eventual return of the Six Mile Well Block to the Wanjarri Nature Reserve. The second change is to relocate the tailings dam and substantially reduce its size, while the third change is the addition of a hydrometallurgical processing plant to process nickel concentrate into nickel metal and a cobalt by-product.

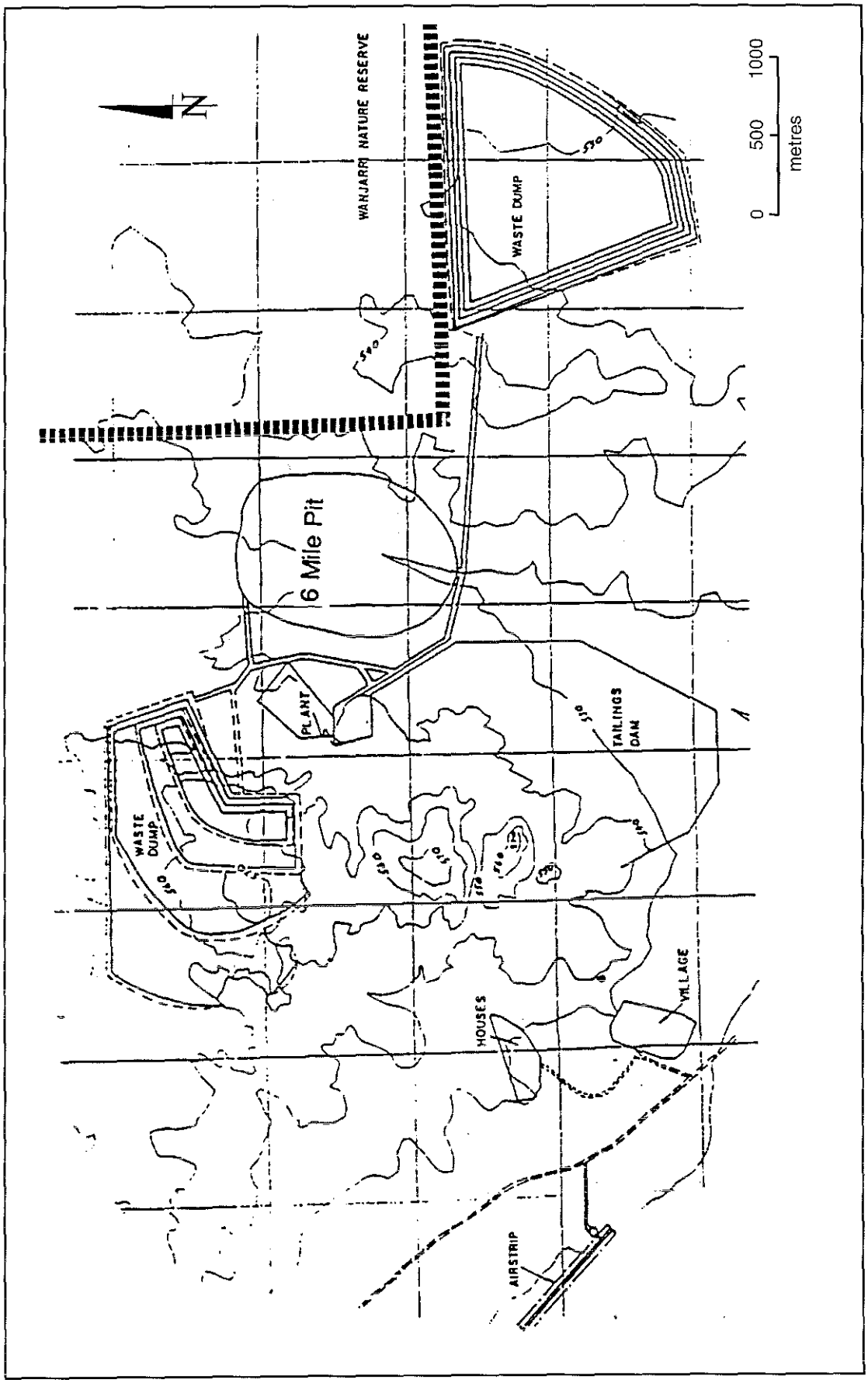


Figure 1. Proposed developments for the Yakabindie Nickel Project — initial proposal, April 1990.

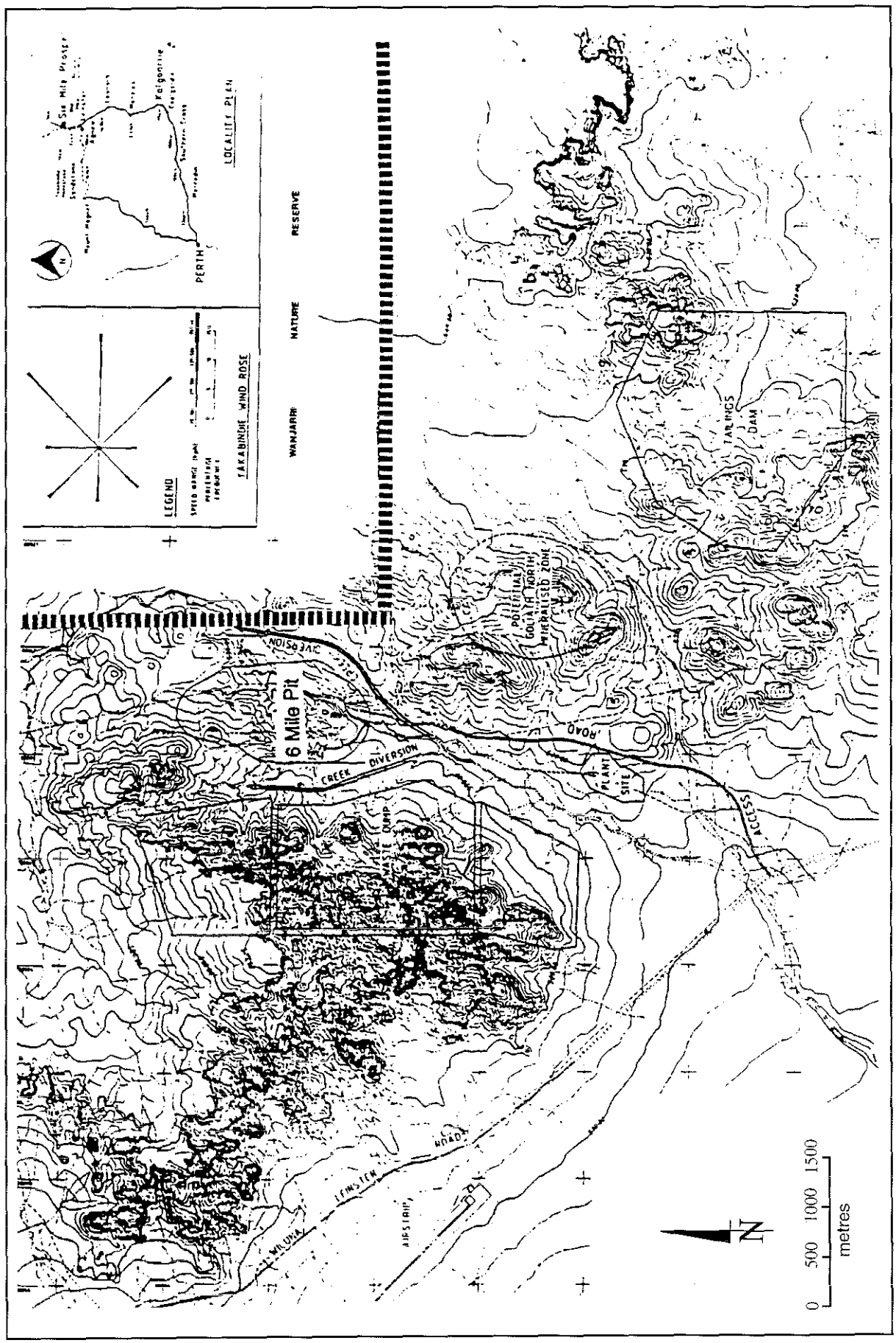


Figure 2. Changes to location of facilities — revised proposal, March 1991.

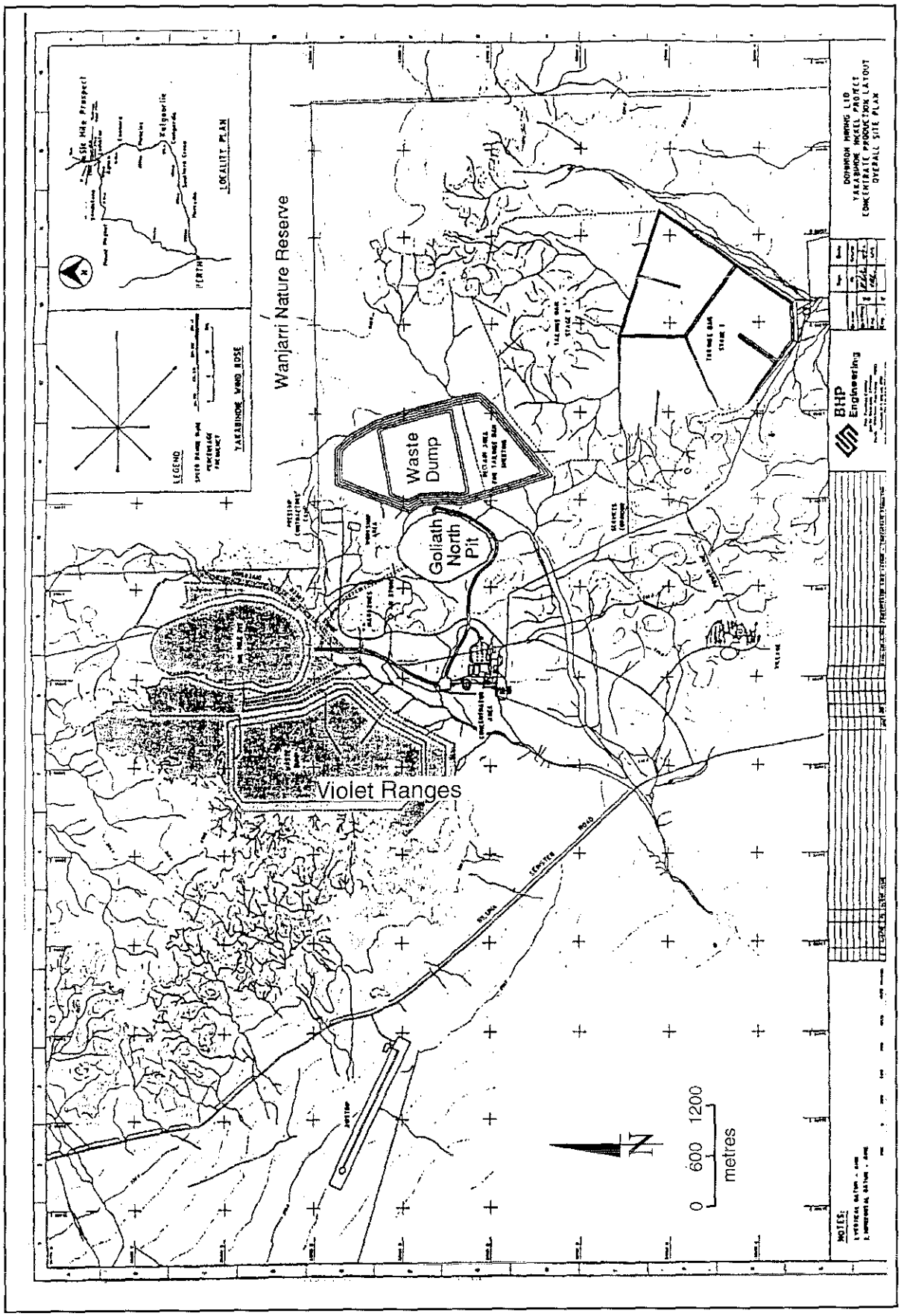


Figure 3. Revised proposal for Yakabindie Nickel Project, December 1992.

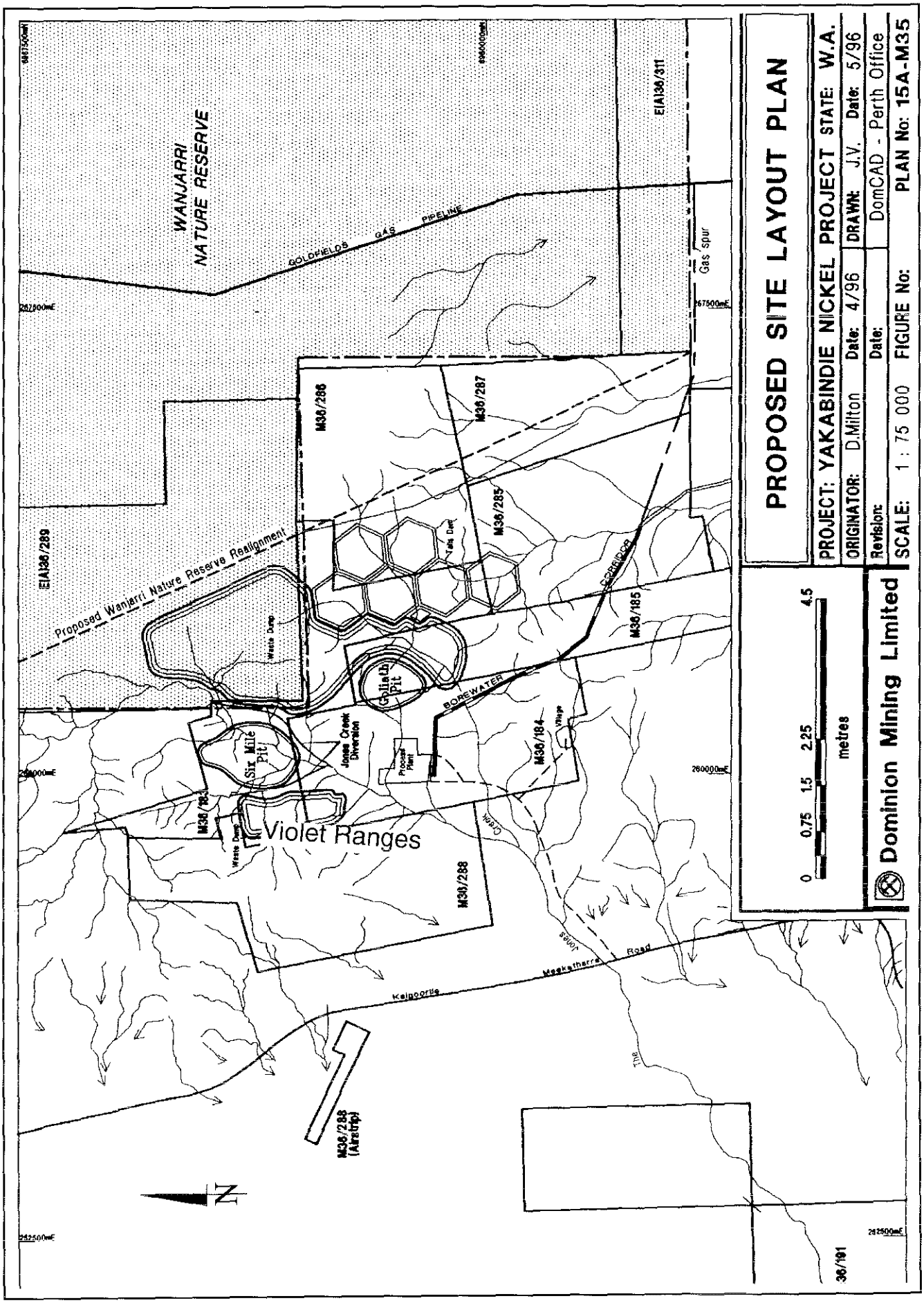


Figure 4. Proposed changes to Yakabindie Nickel Project 1996.

1.3 Structure of the report

This document has been divided into eight sections.

Section 1 describes the historical background to the project and its assessment, and describes the structure of this report. Section 2 briefly describes this present proposal (more detail is provided in the proponent's proposal document [Dominion Resources 1995]) and the approved project. Section 3 provides a review of the environmental topics and an analysis of public submissions in order to determine issues which require further EPA evaluation.

Section 4 sets out the evaluation of key environmental issues associated with the proposal. Each subsection includes, the objectives of the assessment, the likely effect of the proposal, the advice to the EPA from submissions, and the proponent's response to submissions. Then the adequacy of the response by the proponent is considered in terms of project modifications and environmental management commitments in achieving an acceptable outcome. The EPA's analysis and recommendations with respect to the identified issues are contained in this section. Where inadequacies are identified, recommendations are made to achieve the environmental assessment objective.

Section 5 examines changes made to environmental conditions and commitments.

Section 6 summarises the conclusions and recommendations. Section 7 describes the recommended environmental conditions. References cited in this report are provided in Section 8.

2. Summary description of proposal

2.1 Approved project

The Yakabindie Nickel Project is located in the Yakabindie Pastoral Station lease area approximately 65 km north of the Leinster township. The project which has environmental clearance as of 20 July 1995 involves mining an average of 31 million tonnes of ore and waste rock per annum for the 20 year lifetime of the mine. This rate of extraction would vary from year to year and is expected to peak at 41 million tonnes per annum. Ore would be mined via an open pit extraction method from two pits to a depth of around 350 m. Conventional large-capacity diesel powered earthmoving equipment would be used for the extraction of ore and waste rock. Waste rock would be left in two waste rock dumps located adjacent to each pit (see Figure 3). The final height of each dump would be approximately 40 m. From the pit ore would be carted to the concentrator plant to be crushed, ground, and conditioned before being separated into concentrate and tailings by conventional flotation methods. Flotation tailings would be directed to a tailings dam south-west of the pits which would have a final size of 700 ha. The nickel concentrate would then be packaged for transportation by road at the rate of 120 000 tonnes per annum and exported to a toll smelter for further processing into nickel metal.

Saline water for the processing plant would be provided by two borefields 30 km to the south of the mine pits. Power for the processing plant would be produced by a diesel fuel power station producing 25 MW of electrical power.

Development of this project is at an early stage. Productive mining has not commenced, the processing facility has not been constructed, and the mine pits have not been opened.

2.2 Proposed changes

Dominion Resources Pty Ltd is seeking changes to the environmental conditions applicable to this project which will accommodate the following three changes to the project:

- Extension of the eastern waste rock dump into a section (Six Mile Well block) of the Wanjarri Nature Reserve under an arrangement with the State which involves the permanent addition of a similar area of land to the nature reserve and eventual return of the Six Mile Well Block to the Wanjarri Nature Reserve.
- Establishment of a downstream hydrometallurgical processing plant within the currently approved concentrator area.
- Integration of the tailings dam with the Goliath North waste dump so as to form a single operating unit.

Each of these changes is described under separate headings below.

Wanjarri Nature Reserve Land Utilisation (WNRLU)

Dominion Resources wish to use a portion of the Wanjarri Nature Reserve as an extension of the eastern waste rock dump. This will reduce the size of the waste rock dump located on the Violet Ranges which is a visually attractive and ethnographically important feature of the region. In exchange for the temporary loss of area to the nature reserve, the proponent will give to the State an equivalent area of land for permanent inclusion into the Wanjarri Nature Reserve.

The section of the Wanjarri Nature Reserve to be used as a waste rock dump is a triangular area of 600 ha immediately to the east of the Six Mile Pit (Figure 4). This area will be referred to in this report as the Six Mile Well block. (Note: the definitions of the Six Mile Well block and the Mt Pasco block used in this report may vary slightly from the definitions implied in other references.) The waste rock dump will cover an area of 410 ha within the Six Mile Well block and will have a 200 m buffer between the nature reserve and the edge of the dump. Fencing will be erected along the boundary between the Six Mile Well block and the Wanjarri Nature Reserve.

The area of land to be given to the State for inclusion into the Wanjarri Nature Reserve is a triangular area to the east of the Goliath Pit and contiguous with the nature reserve (Figure 4). This area will be referred to in this report as the Mt Pasco block. The Mt Pasco block has an area of 610 ha and will be fenced to separate it from the project area.

Implementation of the WNRLU arrangement will require excision of the Six Mile Well Block from the Wanjarri Nature Reserve. As the Wanjarri Nature Reserve is a Class A Nature Reserve this excision will require the support of both Houses of the State Parliament. Upon satisfactory completion of rehabilitation of the waste rock dump, the Six Mile Well block will be returned to the Wanjarri Nature Reserve.

Metals Plant

Dominion Resources Pty Ltd propose the addition of a hydrometallurgical processing plant (Metals Plant) which will produce nickel metal and a cobalt carbonate by-product at a maximum rate of 23 000 tonnes/annum (t/a) and 2 300 t/a respectively. This change will significantly reduce the amount of road transport involved with the project from 120 000 t/a to 22 000 t/a. The hydrometallurgical process is also perceived by the proponent to be a substantial environmental improvement on nickel production via conventional smelters as it produces less gas emissions and more inert tailings.

The hydrometallurgical process to be used at Yakabindie involves fine grinding of the nickel sulphide concentrate followed by low pressure oxidative leaching. The leach residue is then combined with the flotation tailings from the concentrator plant and stored in the tailings dam. The pregnant liquor solution containing nickel and cobalt is then treated using a combination of solvent extraction, precipitation, and electrowinning processing techniques, to produce a cobalt carbonate by-product and nickel metal.

The Metals Plant will be located within the confines of the approved processing plant area. Addition of the Metals Plant requires an increase in the size of the project power station to 4 4.5 MW. Dominion Resources Pty Ltd proposes to use gas from the Goldfields Gas Pipeline

instead of diesel as fuel for the larger power station. This will involve the construction and maintenance of a 12 km gas spur pipeline from the Goldfields Gas pipeline to the project area.

Operation of the Metals Plant will increase the use of sub-potable water from the project borefields from 46 m^3/h to 174 m^3/h. In addition, the plant will also require the use and/or transport of an increased number of chemicals which include: hydrated lime, sulphuric acid, ammonia, oxygen, soda ash, limestone, and organic solvent.

Tailings dam relocation

Dominion Resources Pty Ltd proposes to relocate the tailings dam approximately 1–2 km north and integrate it with the Goliath North waste dump. Relocation and changes to the design of the tailings dam will also significantly reduce its area from 700 ha to 420 ha. The presently approved location for the tailings dam is approximately 2.5 km southeast of the Goliath North pit (Figure 3) and covers an area of 700 ha. The proposed new location is just to the east of the Goliath pit, adjacent to the waste rock dump (Figure 4), and covers an area of 420 ha. The new location avoids breakaways which would have been buried by stage 2 of the approved tailings dam.

3. Identification of environmental issues

3.1 Method of assessment

The purpose of the Section 46 process in relation to changing previously set environmental conditions is to determine if the changes are environmentally acceptable or not, or, whether modifications to the proposed changes would make them environmentally acceptable. The administrative procedures to implement the method of assessment of the proposed changes in conditions are shown in the flow chart in Appendix 1. Appendix 2 contains the current conditions set on 20 July 1995.

The first step in the method is to identify the environmental topics to be considered in relation to the proposed changes. These topics are then considered by the proponent in its Section 46 report. The proponent's report is checked to ensure that each topic has been discussed in sufficient detail prior to release for government agency and public comment. The submissions received are summarised by the Department of Environmental Protection (DEP) on behalf of the Environmental Protection Authority (EPA). This process can add environmental topics that need to be considered in terms of the acceptability of potential environmental impact.

Proponents are invited to respond to the topics raised in submissions. Appendix 3 contains a summary of public submissions and the proponent's response to those submissions. A list of submitters is provided in Appendix 4.

This information, ie the proponent's report, the submissions, and the proponent's response, are then subjected to analysis by the EPA. Each environmental topic is reviewed to determine if it represents an issue requiring further evaluation by the EPA. For each environmental issue, an objective is defined and an appropriate evaluation framework identified.

The expected environmental impact of the proposal, with due consideration to the proponent's commitments to environmental management (refer Appendix 5), is then evaluated against the assessment objective. The EPA then determines the acceptability of the environmental impact. Where the proposed changes to conditions has unacceptable environmental impacts the EPA can either advise the Minister for the Environment against the changes or make recommendations to ensure environmental acceptability of the proposal.

Limitation

This evaluation has been undertaken using information currently available. The information has been provided by the proponent through preparation of the Section 46 report (Dominion Resources 1995), by Department of Environmental Protection officers utilising their own expertise and reference material, by utilising expertise and information from other State government agencies, information provided by members of the public, and by contributions from EPA members.

3.2 Public and agency submissions

Comments were sought on the proposal from the public and local and State government agencies. Copies of the proposal (Dominion Resources 1995) were sent to the relevant government agencies. Four submissions were received from the following organisations:

- Department of Resources Development;
- Department of Conservation and Land Management;
- Department of Minerals and Energy; and
- National Parks and Nature Conservation Authority.

The EPA has considered the submissions along with the proponent's responses to the submissions as part of the assessment procedure.

3.3 Review of topics

3.3.1 Identification of topics

Eleven topics were raised during the environmental assessment process. The topics are as follows:

Biophysical impacts

- impact on locally and regionally significant vegetation associations, Declared Rare and Priority flora;
- impacts on Threatened and Priority fauna species and animal habitats;
- changes to landforms;
- surface water management;
- increase in the use of groundwater;
- rehabilitation of areas disturbed by the project;

Pollution potential

- dust from project operations;
- gaseous emissions
- process tailings;
- tailings containment;

Social surroundings

- risks and hazards; and
- Wanjarri Nature Reserve land utilisation arrangement.

The EPA has evaluated the above topics and considers that a number of them require further evaluation by the EPA while the others can be managed by the proponent in accordance with

their environmental management commitments and in compliance with Department of Environmental Protection regulations and guidelines or through approvals required from other agencies (see Table 1). Each topic is discussed below in order to identify those issues warranting further evaluation by the EPA.

3.3.2 Identification of issues requiring EPA evaluation

Biophysical Impacts

Impact on locally and regionally significant vegetation associations, Declared Rare and Priority flora

Extension of the eastern waste rock dump will involve the removal of approximately 400 ha of low open *Eremophila* shrubland and low open *Acacia* woodland. This is offset by a reduced impact upon a large sub-population of *Grevillea inconspicua*, a Declared Rare species. Changes to the location and design of the tailings dam will decrease the area of the dam from 700 ha to 420 ha with a corresponding decrease in the impact upon flora and vegetation. Construction of a 11.9 km gas pipeline will result in some additional clearing outside of the immediate project area.

Submissions from CALM and the NPNCA stated that an Environmental Management Programme would be required for the area within the Wanjarri Nature Reserve, and sought assurances that adequate buffer zones between the project and the nature reserve would be established.

This topic has been identified as an issue requiring evaluation by the EPA.

Impacts on Threatened and Priority fauna species and animal habitats;

The Mulgara *Dasycercus cristicauda*, a small marsupial which is a declared "rare and endangered" species, has been recorded in the Six Mile Well area. From recent captures of the Mulgara its habitat is presumed to be the Sandplain - spinifex landform - vegetation type. The waste rock dump will be 3 km to the west of the nearest known Mulgara habitat and the addition of the Mt Pasco block to the Wanjarri Nature Reserve will increase the representation of the Mulgara's habitat within the nature reserve.

Further evaluation of this topic by the EPA is not required.

Changes to landforms

Extension of the eastern waste rock dump will result in the loss of the Montague landform unit from the Wanjarri Nature Reserve. The Montague landform unit is reasonably extensive outside the nature reserve, representing approximately 5% of the region, and is included in an area designated for joint management between the proponent and CALM. Addition of the Mt Pasco block will increase the representation within the Wanjarri Nature Reserve of a number of landform types which are presently poorly represented.

Changes to the design and location of the tailings dam will reduce that area of the dam from 700 ha to 420 ha and will avoid breakaway landforms which are of ethnographic and conservation importance.

After the initial presentation of the proposed changes the Department of Environmental Protection expressed concerns about the regional representation of the Montague land unit in protected reserves.

This topic has been identified as an issue requiring evaluation by the EPA.

Surface water management

The proposed relocation of the tailings dam moves it from the catchment and creek system flowing into Lake Miranda and into the upper reaches of the Jones Creek. The tailings dam was originally to be located adjacent to the Jones Creek (Figure 1) and the original proposal was assessed and found to be acceptable by the EPA on this basis. In 1991 the proposed location was changed, via a Section 46 assessment, to the south-west and out of the Jones Creek catchment (Figure 2). The presently proposed changes moves the tailings dam back into the upper reaches of the Jones Creek (Figure 4), significantly reduces the size of the dam, and integrates it into the structure of a waste rock dump.

Extension of the eastern waste rock dump into the Six Mile Well block puts the dump adjacent to Wanjarri Nature Reserve. Therefore, there now exists the potential for erosional runoff from the waste dump to enter the Wanjarri Nature Reserve and have an adverse impact upon the vegetation and flora of the reserve.

This topic has been identified as an issue requiring evaluation by the EPA.

Increase in the use of groundwater

The addition of a Metals Plant to the project requires an increase in the use of sub-potable water by 128 m^3/h. Other uses of groundwater within the region are water for stock and process water for other mine operations.

This topic has been identified as an issue requiring evaluation by the EPA.

Rehabilitation of areas disturbed by the project

Most of the proposed changes to the project involve the relocation of structures or the building of new plant upon land which is within the existing project area. These changes will therefore not significantly change the proposed strategies for rehabilitation. The exception to this is the extension of the eastern waste rock dump into the Six Mile Well block. As this area will be returned to the Wanjarri Nature Reserve on completion of mining, the rehabilitation and decommissioning of this area may require different completion criteria and methods of rehabilitation to that of the general project area, in order to accommodate this different final land use.

This topic has been identified as an issue requiring evaluation by the EPA.

Pollution Potential

Dust from project operations

Grinding and milling facilities located within the processing plant have the potential to generate dust as do more general mining activities associated with the large scale movement of rock and soil. Extension of the eastern waste rock dump into the Six Mile Well block puts potential dust generating activities adjacent to the Wanjarri Nature Reserve.

Dominion Resources Pty Ltd has previously made a commitment to establish dust suppression programmes to comply with Mines Department Regulations and minimise dust pollution of the project area and adjacent nature reserve through the following procedures and commitments:

- minimise clearing of land by staging clearing works and keeping clearing to the minimum for essential use consistent with safe and efficient operations (Commitment 12);
- fencing off areas not to be disturbed by the project (Commitment 13);
- limiting development of tracks and roads to essential requirements (Commitment 14);

- damping haul roads and plant roads with low salinity water when available (Commitment 15);
- carrying out trials with dust suppressant materials (enzymes) mixed with water to assist with dust suppression (Commitment 16);
- progressive rehabilitation of tailings dam and waste dumps (Commitment 17);
- covering the side slopes and upper surfaces of the tailings dam and waste dumps with rock to prevent wind erosion and dust formation (Commitment 18);
- controlling dust on roads to the waste tip face using water carts (similar to elsewhere on lease) (Commitment 19); and
- rehabilitating the northern and easterly face of each dump lift early in the life of the Eastern Waste dump, and paddock dumping will occur in a southerly direction to reduce the chance of dust impact further (Commitment 20).

Fugitive dust containment will be incorporated into the design of the Metals Plant. Operation of the processing plant will require a licence from the Department of Environmental Protection under Part V of the Environmental Protection Act. Allowable dust levels and dust monitoring requirements will be included in this licence.

The EPA therefore considers that potential impacts due to the generation of dust will be managed by plant design, the proponent's commitments, and conditions imposed by licences from the Department of Environmental Protection.

Further evaluation of this topic by the EPA is not required.

Gaseous emissions

Gaseous emissions of environmental concern related to this project are, oxides of nitrogen and sulphur dioxide, both of which will be produced by the gas-fired power station. An increase in the emission of the greenhouse gas carbon dioxide will also occur as a result of an increase in the size of the power station and the use of calcrete in the Metals Plant.

This topic has been identified as an issue requiring evaluation by the EPA.

Process tailings

Solid waste generated by the Metals Plant will be mixed with flotation tailings and stored in the tailings dam. The Metals Plant solid waste will be in the form of a slurry and will comprise of iron oxyhydroxides, gypsum and magnesium silicates, and small amounts of elemental sulphur and pyrite. The long term management of waste stored in the tailings dam is considered as part of the issue of Rehabilitation in Section 4.5 of this report.

This topic has been identified as an issue requiring evaluation by the EPA and is addressed under the issue of Rehabilitation in Section 4.5 of this report.

Tailings containment

As the tailings dam will contain tailings and saline process water, there is the potential for seepage of the saline water from the tailings dam and into the groundwater resource. This potential exists regardless of the location of the tailings dam, however its significance is affected by the design of the dam and the structure of the underlying earth. The proposed new site for the tailings dam is expected to reduce seepage.

CALM and the NPNCA in their submissions stated that their acceptance of the proposal is subject to the completion of a detailed geotechnical survey of the tailings dam area.

This topic has been identified as an issue requiring evaluation by the EPA.

Social Surroundings

Risks and hazards

Fuel for the power station will be taken from the Goldfields Gas Pipeline via a 11.9 km long gas spur line. The hazards associated with flammable gas at high pressure will be managed by constructing and operating the pipeline in accordance with applicable government Acts and Regulations, and by erecting warning signs along the pipeline route. In addition, the use of gas as a fuel reduces the transport of liquid fuel to the site and hence reduces hazards associated with road transport.

Process reagents for the Metals Plant will be transported to the site by road. A number of these reagents are hazardous substances. Transportation of hazardous substances and dangerous goods will be carried out in accordance with the Australian Code for the Transport of Dangerous Goods by Road and Rail. General road transport risks to the public are reduced by the proposed changes, as the number of road movements is greatly decreased by the processing of the ore into metal prior to transport.

The Metals Plant will contain gases under pressure in both the oxygen plant and the autoclaves.

In accordance with the Mine Safety and Inspection Act, Dominion Resources Pty Ltd will prepare a Notice of Intent which will include risk analysis for the oxygen plant and components of the process plant. The Act requires that as risks are identified appropriate plans are formulated for safely dealing with each of those issues to minimise:

(i) the potential for injury or loss of life to employees.

(ii) impacts to the surrounding environment.

Dominion Resources Pty Ltd has previously made a commitment that transportation, storage and handling of dangerous substances will be in accordance with the appropriate regulations. (Commitment 51)

The above qualitative analysis indicates there is no significant change to the level of risk associated with this project as a result of the proposed changes. Hazards which have been identified will be adequately managed by other legislation and through compliance with the proponent's commitments.

Further evaluation of this topic by the EPA is not required.

Wanjarri Nature Reserve land utilisation arrangement

The WNRLU arrangement involves using part of the Wanjarri Nature Reserve, the Six Mile Well block, as a waste rock dump during the life of the mine, and eventual return of this area to the Wanjarri Nature Reserve upon completion of mining. In exchange for this temporary loss of land to the reserve, the proponent will give to the State the Mt Pasco block for inclusion into the Wanjarri Nature Reserve.

The Six Mile Well block has an area of approximately 600 ha, of this 410 ha will be used for the waste rock dump. The remaining area will be a buffer between the waste rock dump and the Wanjarri Nature Reserve. This buffer will be at least 200 m wide.

The Mt Pasco block has an area of 610 ha and will be fenced by the proponent to separate it from the project area.

Aspects of the impact of the Wanjarri Land Utilisation arrangement are also discussed under the appropriate environmental topics and issues. The adequacy of representation of flora, fauna, and landforms within the Wanjarri Nature Reserve as a result of the WNRLU arrangement, are dealt with separately in Sections 4.1, 3.3.2, and 4.2 respectively.

This topic has been identified as an issue requiring evaluation by the EPA.

3.3.3 Summary

Table 1 summarises the process used by the EPA to evaluate the topics raised during the environmental impact assessment process. The table identifies the topics, the relevant proposal characteristics, and comments received from government agencies. If a topic is considered environmentally significant it becomes an issue and is further evaluated by the EPA (as summarised in Table 5). Section 4 of this report provides this evaluation.

The issues identified in Table 1 as requiring further evaluation by the EPA are:

- impact on locally and regionally significant vegetation associations, Declared Rare and Priority flora;
- changes to landforms;
- surface water management;
- groundwater;
- rehabilitation;
- tailings containment;
- gaseous emissions; and
- Wanjarri Nature Reserve land utilisation arrangement.

4. Evaluation of key environmental issues

4.1 Impact on locally and regionally significant vegetation associations, Declared Rare and Priority flora

Objective

To protect Declared Rare and Priority Flora and ensure no significant loss of locally and regionally significant vegetation associations and plant habitats.

Policy information

To meet the requirements of the *Wildlife Conservation Act 1950* and maintain biodiversity in the State (EPA, 1996).

Declared rare or priority flora are protected by the requirements of the *Wildlife Conservation Act 1950* which places restrictions on the taking of protected flora.

To ensure that an adequate representation is maintained within the Wanjarri Nature Reserve of regional vegetation and flora. In particular, that the Wanjarri Nature Reserve Land Utilisation arrangement does not significantly reduce representation within the nature reserve.

Also relevant is the National Strategy for the Conservation of Australia's Biological Diversity to which Western Australia is a signatory.

Technical information

Flora surveys have been conducted by *ecologia* Environmental Consultants of the general project area and the areas involved in the Wanjarri Nature Reserve Land Utilisation arrangement. The results of these surveys were reported in the CER document (Soil & Rock Engineering 1990, Appendix C5) and in an environmental assessment of the WNRLU

Table 1. Identification of issues requiring Environmental Protection Authority evaluation.

TOPICS	PROPOSAL CHARACTERISTICS	GOVERNMENT AGENCY'S COMMENTS	IDENTIFICATION OF ISSUES
Biophysical impacts			
Impact on significant vegetation associations and rare flora	WNRLU Extension of the eastern waste rock dump will involve the removal of low open *Eremophila* shrubland and low open *Acacia* woodland. Removes the need to impact approximately 350 plants of *Grevillea inconspicua*, a declared rare species. Tailings relocation Reduction in area from 700 to 420 ha. Metals plant Gas pipeline will disturb ground outside the project area.	WNRLU NPNCA: An EMP would be required by CALM and NPNCA for this section of the reserve. A commitment should be made to protect the buffer zone from disturbance. The area should be rehabilitated to the satisfaction of CALM. Tailings relocation CALM: Buffer between tailings dam and reserve boundary should be maximised to allow for monitoring and potential remedial programmes.	Requires EPA evaluation.
Impacts on threatened and priority species and animal habitats	WNRLU The Mulgara has been recorded in the Six Mile block vicinity. The waste rock dump will be located 3 km to the west of the nearest known Mulgara habitat.		Proposal does not affect Mulgara habitats. No further EPA evaluation required.
Changes to landforms	WNRLU Increased representation of Blackburn, Falconer, and Nuendah units in the Wanjarri NR. Loss of all the Montague land unit contained in the Wanjarri NR. Tailings relocation Tailings dam footprint will be reduced from 700 to 420 ha. Breakaway landforms to the north of stage 1 tailings dam in the approved plan will be largely maintained.	DEP: Concerned about the regional representation of the Montague unit.	Requires EPA evaluation.
Surface water management	WNRLU Proposal locates a waste rock dump within the Wanjarri NR. Erosional runoff could affect adjacent native vegetation. Tailings relocation Proposal relocates the tailings back into the upper reaches of Jones Creek.		Requires EPA evaluation.
Groundwater (quantity)	Metals plant The use of sub-potable water will increase by 128 m^3/h.		Requires EPA evaluation.

Table 1. Identification of issues requiring Environmental Protection Authority evaluation. (cont'd)

TOPICS	PROPOSAL CHARACTERISTICS	GOVERNMENT AGENCY'S COMMENTS	IDENTIFICATION OF ISSUES
Rehabilitation of areas disturbed by the project	WNRLU Waste rock dump within the Wanjarri NR will need to be rehabilitated for a final land use as part of the nature reserve.	NPNCA: NPNCA support is conditional upon the rehabilitation of the General Purpose Lease area [six Mile Well block within the Wanjarri NR] to the satisfaction of CALM.	Requires EPA evaluation.
Pollution potential			
Dust from project operations	WNRLU The proposal puts potential dust generating activities within the Wanjarri NR. Metals plant Grinding and milling has the potential to generate dust.		Managed through design of plant and existing commitments. Dust will also be monitored and regulated by licences issued under Part V of the Environmental Protection Act. No further EPA evaluation required.
Gaseous emissions	Metals plant Emission from the expanded power station will be: NO_2 < 50 mg/m^3 (calc. @ STP) SO_2 < 1.00 µg/m^3 The proposal increases the production of CO_2 from 176 000 tonnes/annum to 237 000 tonnes/annum		Emissions regulated under Part V of the Environmental Protection Act. Greenhouse gases require EPA evaluation.
Process tailings	Metals plant The solid waste generated will comprise of iron oxyhydroxides, gypsum and magnesium silicates, small amounts of elemental sulphur, and small amounts of pyrite.		Further EPA evaluation required. Considered under issue 5. (Rehabilitation) and issue 6. (Tailings containment) of Table 5.
Tailings containment	Tailings relocation There is potential for seepage of saline water to contaminate the groundwater resource.	CALM & NPNCA: Acceptance of the proposal is subject to the completion of a detailed geotechnical survey of the tailings dam area.	Requires EPA evaluation

Table 1. Identification of issues requiring Environmental Protection Authority evaluation. (cont'd)

TOPICS	PROPOSAL CHARACTERISTICS	GOVERNMENT AGENCY'S COMMENTS	IDENTIFICATION OF ISSUES
Social surroundings			
Risks and hazards	Metals plant Fuel for the power station will be taken from the Goldfields Gas Pipeline via a 11.9 km gas spur line. Process reagents will be transported to the site by road. A number of the reagents are hazardous substances. The overall volume of road transport is reduced by this proposal. The Metals plant will contain gases under pressure in both the oxygen plant and the autoclaves.		Qualitative analysis indicates no significant change to the level of risk associated with the project. Hazards will be managed by DME requirements. No further EPA evaluation required.
Other			
Wanjarri Nature Reserve Land Utilisation	A portion of the Wanjarri Nature Reserve will be used for the location of a waste rock dump. The total area involves approximately 600 ha. In compensation for the temporary loss of land to the reserve, a similar area of land suitable for inclusion within the reserve, will be handed to the State.	CALM & NPNCA have given conditional support to the Wanjarri Nature Reserve Land Utilisation arrangement.	Adequacy of representation of flora, fauna, and landforms as a result of the WNRLU arrangement, dealt with as separate topics: Flora, Fauna, and Landforms. Requires further EPA evaluation.

arrangement (*ecologia* 1995). A summary of the findings of these surveys and the effects upon flora and vegetation due to the proposed changes follows:

General Project area

The general project area is composed of low open Acacia woodland and shrublands with a severely degraded understorey. Two broad scale vegetation types occur within the project area.

1. Mulga Shrubland and low woodland, associated with lower plain, granite hills, and valleys. These area are dominated by *Acacia*, particularly *A. aneura*.
2. Halophyte communities which include *Acacia*, *Eremophila* and *Cassia chenopodiaceous* woodland and shrubland vegetation.

The area contains a number of sub-populations of *Grevillea inconspicua*, a declared rare species.

The Metals Plant and tailings relocation components of the proposed changes are both located on areas which have been part of the currently approved proposal. The Metals Plant will be located within the confines of the approved concentrator facility. Changes to the tailings dams result in a reduction in size, from 700 ha to 420 ha, and relocation to a site which has previously been approved for use as a waste rock dump or a tailings dam.

Extension of the eastern waste rock dump into the Wanjarri Nature Reserve, as part of the WNRLU arrangement, obviates the need to remove a large sub-population of *Grevillea inconspicua* (350 plants) in the currently approved location for the waste rock dump.

Installation of the gas spur line between the project area and the Goldfields Gas Pipeline will disturb vegetation along its length. The length of the gas spur line is 11.9 km, of which 6.3 km will be in the service corridor for the water pipelines to the borefields.

Dominion Resources Pty Ltd has obtained a permit to take *Grevillea inconspicua* from the project area. This permit is subject to a number of conditions which include limiting the number of plants taken and the establishment of a long-term monitoring programme.

Dominion Resources Pty Ltd has endorsed a memorandum of understanding between itself and the Department of Conservation and Land Management, for joint land management in the Yakabindie pastoral lease area.

WNRLU area (Six Mile Well Block and Mt Pasco Block)

Vegetation of the Six Mile Well block consists of eight vegetation communities with the largest being: open mulga shrubland over moderately dense *Eremophila* shrubland; sparse Eucalypts over open *Acacia* woodland/shrubland and *Triodia basedowii*; open Mulga/mixed *Acacia* over *Eremophila* shrubland; and moderately dense mixed *Eremophila* shrubland. The area is relatively species poor, containing 115 species, and does not contain any declared rare or priority flora.

Vegetation of the Mt Pasco Block consists of ten vegetation communities with the largest being: mosaic of mulga shrubland and sparse Chenopod dominated herb fields; scattered *Acacia quadrimarginea* / mulga over sparse low *Eremophila* shrubland; mixed *Acacia* shrubland over dense *Triodia basedowii*; and sparse Eucalypts over open *Acacia* shrubland and *Triodia basedowii*. The area contains 98 flora species including a Priority 1 species, *Calytrix uncinata*. This area also contains breakaway landform units which are the habitat of the Priority 3 species, *Acacia balsamea*.

The WNRLU arrangement would result in the removal of low open *Eremophila* shrubland and low open *Acacia* woodland from the Six Mile Well block, and the incorporation of the vegetation and priority species of the Mt Pasco Block into the Wanjarri Nature Reserve.

Comments from key agencies/interest groups

The National Parks and Nature Conservation Authority (NPNCA) stated that an Environmental Management Plan for the area of the WNRLU arrangement would be required and that the proponent should make a commitment to protect the buffer zone (between the waste rock dump and the nature reserve) from disturbance.

The Department of Conservation and Land Management commented that the buffer between the tailings dam and the nature reserve boundary should be maximised to allow for monitoring and potential remedial programmes.

Response from proponent

Dominion Resources Pty Ltd will enter into a Section 16A Joint Management Agreement with CALM (in conjunction with, and in the spirit of, the already signed Memorandum of Understanding) for the protection of a *Grevillea inconspicua* population and an area of the Montague landform unit near the project area (Commitment 3).

Dominion Resources Pty Ltd will protect a buffer zone (a zone of approximately 200 m established between the limit of the waste dump and the Wanjarri Nature Reserve) from disturbance as agreed with the NPNCA (Commitment 61).

Dominion Resources Pty Ltd will bury the gas pipeline and rehabilitate the ground surface over the pipeline following construction (Commitment 43).

EPA evaluation

Of the proposed changes to this project the one which has greatest potential for impact on the vegetation and flora is the proposed WNRLU arrangement. The other changes involve areas which have either been evaluated before or have little potential impact. The proponent's commitments, the requirements of the *Wildlife Conservation Act 1950*, and the MOU between CALM and the proponent (and its planned extension) will ensure the conservation of regionally significant flora within the existing project area. Extension of the project area into the Wanjarri Nature Reserve through the WNRLU arrangement, needs separate consideration to ensure the conservation values of the nature reserve are maintained (see Section 4.8).

Use of the Six Mile Well block as a waste rock dump only requires the destruction of vegetation which is well represented elsewhere in the Wanjarri Nature reserve and in the Mt Pasco block. Addition of the Mt Pasco block to the Wanjarri Nature Reserve will increase the population or habitat of two priority species of flora and will eventually result in an increase in area of the reserve.

The Environmental Protection Authority (EPA) considers that the proposal meets the EPA's environmental objectives in relation to the management of potential impacts associated with this issue.

4.2 Changes to landforms

Objective

Ensure there is no significant loss of locally and regionally significant landform types.

Technical information

A description of the landforms within the approved project area and within areas associated with the proposed changes, are described in Appendix C5 of the proponent's CER (Soil & Rock Engineering Pty Ltd 1990) and the environmental assessment of the WNRLU

arrangement (*ecologia* 1995). Below is a summary of the landform types occurring in these area and the landform units which would be affected by the proposed changes.

General project area

Within the project area the following five landform units occur:

- breakaway (bluffs 3-4 m high, gravelly loams on scree slope, area 7%);
- hills, granite (greater than 30 m high, gravelly skeletal soils, exposed rock, area 35%);
- undulating plain, greenstone (greenstone belt and joining colluvial flats with cert ridges 2-3 m high, area 28%);
- drainage line (Jones Creek, eroded earth banks, 1-3 m high, sandy gravel bed, semi-permanent water, area 10%); and
- broad valley (relief less 20 m, sandy colluvium overlying granite, area 20%).

Extension of the eastern waste rock dump into the Wanjarri Nature Reserve, as part of the WNRLU arrangement, will reduce the impact upon an extensive breakaway system west of the Jones Creek.

Reduction in size of the tailings dams from 700 ha to 420 ha will reduce impact on landforms. Relocation of the tailings dam avoids breakaways to the north of the current tailings dam and has a smaller impact on the breakaway country than the currently approved project.

A number of landscape features of the project area have been identified by Aboriginal people as having cultural significance (P. Moore and J. Pope 1991). These features include a number of small hills and breakaways.

WNRLU area (Six Mile Well Block and Mt Pasco Block)

Six Landform/soil units are found within the Six Mile Well block. These are:

- Nuendah unit (granite outcroppings and red clayey sands, area 25%);
- Montague unit (low greenstone hills, area 20%);
- Bullimore unit (sandplain, area 15%);
- Juliet unit (alluvial plains, area 17%); and
- Falconer (margins of breakaways) and Marloo (breakaway slopes) units which occupy the remaining area.

The landform/soil units which occur in the Mt Pasco block are (in order of decreasing area):

- Marloo, breakaway slopes;
- Blackburn, low granite hills with gritty sands;
- Falconer, margins of breakaways;
- Bullimore unit, sandplain; and
- Nuendah, granite outcroppings and red clayey sands.

Comments from key agencies/interest groups

The Department of Environmental Protection was concerned about the regional representation of the Montague land unit.

Response from proponent

The Montague landform unit is widespread throughout the region and comprises around 5% of the region by area. In the vicinity of the Yakabindie Nickel Project the unit is well represented in the greenstone belt and underlies the area designated for Section 16A joint conservation

management of the *Grevillea inconspicua* population. (Dominion Resources Pty Ltd 1995, Appendix D)

The proponent will enter into a Section 16A Joint Management Agreement with CALM (in conjunction with, and in the spirit of, the already signed Memorandum of Understanding) for the protection of a *Grevillea inconspicua* population and an area of Montague landform unit near the project area. (Commitment 3)

EPA evaluation

Extension of the eastern waste rock dump into the Wanjarri Nature Reserve, as part of the WNRLU arrangement, will result in the loss of the Montague landform unit from the Wanjarri Nature Reserve as this landform only occurs in a small (< 1%) area of the reserve which will be buried by the waste rock dump. Addition of the Mt Pasco block to the nature reserve will result in an increased representation of the Blackburn, Falconer, and Nuendah landforms which are poorly represented elsewhere in the Wanjarri Nature Reserve.

The breakaway landforms within the project area are of ethnographic and conservation importance. Therefore the changes to the proposal which reduce the impact on these areas are considered by the EPA to reduce the environmental impact of the proposal.

In regard to changes in the representation of landforms within the Wanjarri Nature Reserve as a result of implementation of the WNRLU arrangement, the EPA accepts that incorporation of the Mt Pasco block into the Wanjarri Nature Reserve will increase the representation of landforms within the reserve which are presently poorly represented, and therefore supports the inclusion of the Mt Pasco block into the nature reserve (Recommendation 6). Extension of the eastern waste rock dump into the Wanjarri Nature Reserve will result in the loss of the Montague landform type from the nature reserve resulting from its burial by the waste rock dump. The Authority supports the proponent's commitment to establishing a joint management agreement with CALM for an area containing the Montague landform, as a means of conserving this landform type. However, the Authority believes that, as this landform type is presently poorly represented in the Wanjarri Nature Reserve and would be lost to the reserve should this proposal be implemented, additional efforts should be made by CALM to ensure the representation of this landform within a secure conservation reservation (Recommendation 7).

4.3 Surface water management

Objective

Ensure no adverse changes to the existing drainage systems, vegetation/land systems, and dependent fauna.

Technical information

The current statement of approval for this project (Appendix 2) contains two environmental conditions related to surface water management. Condition 3 requires preparation and implementation of a Drainage Management Programme, to ensure drainage does not unacceptably affect vegetation on the site and environs or the quality of water in Jones Creek. Condition 4 requires that the design and construction of the Jones Creek diversion maintains downstream water flows in the long term.

A number of commitments given by the proponent for the currently approved project also relate to the management of surface water. These commitments, which will apply to the present proposal, include the installation of silt traps and monitoring of water quality in Jones Creek during the life of the project (Commitments 44 and 8).

Dominion Resources has produced both a Drainage Management Programme (Soil & Rock Engineering Pty Ltd 1991a) and a Jones Creek diversion plan (Soil & Rock Engineering Pty Ltd 1991b) which fulfil the requirements of Environmental Conditions 3 and 4 and were accepted by the Minister for the Environment on 30 December 1991. Due to the proposed changes, this programme and plan will be updated by the proponent (Commitment 47). The accepted Drainage Management Programme addresses the drainage of the process plant area, village area, tailings dam, waste dumps, haul roads, and access roads and service corridors. Short term structures have silt traps designed to absorb a 1-in-20 year 6-minute storm event, and long term structures are designed to accommodate a 1-in-100 year 10-minute storm event. The Jones Creek diversion plan is designed to cope with 1-in-100 year flood events.

When the Yakabindie Nickel Project was first proposed, in 1990, the tailings dam was located adjacent to the Six Mile Pit and the Jones River (Figure 1). In 1991 the proposed location of the tailings dam moved to the southeast and out of the catchment area of Jones Creek (Figure 2). The present proposal involves relocating the tailings dam to the north and reducing its area from 700 ha to 420 ha. This relocation puts the dam back into the catchment of the Jones Creek, upstream of a waste rock dump and the Goliath Pit (Figure 4).

The WNRLU arrangement includes locating a waste rock dump on land which is presently in the Wanjarri Nature Reserve but which is to be temporarily excised from the reserve. Any erosional runoff from the waste rock dump will have to be effectively managed to prevent impact upon flora and vegetation of the reserve.

EPA evaluation

The relocation of the tailings dam places it back into the upper reaches of the Jones Creek and near the proposed new boundary of the Wanjarri Nature Reserve. These potential disadvantages are offset by a significant reduction in the size of the tailings dam and by integration of the dam with a waste rock dump, which will produce a more compact mine site. In addition, as the nature of the tailings dam is largely unchanged, the existing environmental conditions and commitments related to surface water management are sufficient to ensure there are no adverse changes to the existing drainage systems, vegetation/land systems, and dependent fauna.

While surface water management for the WNRLU area could be adequately addressed through the existing environmental conditions and commitments, it is preferable for a number of reasons (which are discussed in Sections 4.5 and 4.8), for an Environmental Management Programme specific to this area to be prepared and implemented. It is therefore appropriate that surface water management of this area be included in this programme (Recommendation 3). This programme should include measures to quickly stabilise the waste rock dump to reduce erosional runoff, and to prevent any erosional runoff from entering the Wanjarri Nature Reserve.

4.4 Groundwater

Objective

Prevent any change to the level of groundwater resulting from this proposal which would disadvantage other users of this resource.

Policy information

Groundwater use is subject to the Rights in Water and Irrigation Act 1914. Under this Act the project borefield will require licences from the Water and Rivers Commission.

Technical information

Groundwater use in the region is limited to use in the mining industry as process water and use on pastoral leases for watering stock. Impact of the approved project on other groundwater uses was investigated as part of the initial proposal (Soil & Rock Engineering Pty Ltd 1990, vol. 1, p.22) and predicted to be negligible. Nevertheless, Dominion Resources has made commitments to monitor the ground water resource at a number of locations and to provide additional stock watering points where wells are affected by project dewatering (Commitments 9 & 64).

Water for the project will be extracted from a borefield approximately 25 km south of the mine and a few additional bores closer to the project area. The water requirements of the Metals Plant will increase the use of sub-potable water by 128 m^3/h. This brings the total sub-potable water usage of the proposal to 174 m^3/h compared to the demonstrated operational borefield yield of 220 m^3/h.

EPA evaluation

Addition of a Metals Plant to the project will result in increased usage of water and will therefore necessitate a greater rate of extraction from the project borefield. As the increased rate of extraction is within the demonstrated yield of the borefield, additional groundwater sources will not be required and no other users of groundwater will be disadvantaged. The proponent has made a number of commitments to monitor and safeguard the groundwater resource. The interests of other users of groundwater are also protected by the requirements of the Rights in Water and Irrigation Act 1914.

The EPA considers that the EPA's objective in relation to the environmental impacts of this issue can be met through compliance with the proponent's commitments and through compliance with the Rights in Water and Irrigation Act 1914.

4.5 Rehabilitation

Objective

To ensure an acceptable rehabilitation and decommissioning programme is put in place which incorporates a "closure strategy" agreed to by the Western Australian Government.

Policy information

Past assessment by the EPA of a range of mining proposals provide a policy framework for consideration for rehabilitation and decommissioning of the project, and the expectations of the EPA. For rehabilitation to be most effective it needs to implemented as early as possible and in accordance with post-mining land uses determined in the decommissioning plan. It is therefore necessary for an integrated rehabilitation and decommissioning plan to be developed early in the project's life.

Rehabilitation and decommissioning of the Six Mile Well Block area of the WNRLU arrangement, will need to be compatible with its final land use as a Class A Nature Reserve.

Technical information

The proponent has previously made a number of commitments related to rehabilitation and decommissioning. The general strategy is to carry out progressive rehabilitation of the waste dumps and tailings dam embankments, and rehabilitate the project area to the level of the existing land use in accordance with the rehabilitation programme (Commitment 22). Specific subjects dealt with by commitments include:

- vegetation and topsoil salvage (Commitments 23 & 24);
- waste dumps (Commitments 25–8);
- open pit (Commitment 29);
- tailings dam (Commitments 30–7); and
- support facilities (Commitments 38–42).

An additional commitment has been made to bury the gas pipeline and rehabilitate the ground surface over the pipeline (Commitments 43).

The current statement of approval for this project requires the preparation of a rehabilitation plan within six months of project commissioning (Appendix 2, Condition 5-1), and preparation of a decommissioning and final rehabilitation plan at least twelve months prior to decommissioning (Appendix 2, Condition 6-1).

The materials confined within the tailings dam will comprise flotation tailings mixed with Metals Plant waste at a ratio of 730 t: (flotation) : 30 t (Metals Plant). Metals Plant waste will typically comprise of iron oxyhydroxides, gypsum and magnesium silicates, and small amounts of elemental sulphur and pyrite. Although pyrite and sulphur will be deposited in the tailings dam, there is considered to be no potential for acid generation as the acid neutralising abilities of the flotation tailings far exceeds the acid generating potential of the Metals plant residue. This is currently being confirmed by testwork. (Dominion Resources Pty Ltd 1995, pp 13–14)

Upon completion of mining, the Six Mile Well Block will be returned to the Wanjarri Nature Reserve. As this land use is potentially different to the final land use of the remaining project area, it will require a distinct rehabilitation and decommissioning plan which contains completion criteria appropriate for a Class A Nature Reserve.

Comments from key agencies/interest groups

NPNCA support for the proposed changes is conditional on rehabilitation of the General Purpose Lease area [Six Mile Well Block within the Wanjarri Nature Reserve] to the satisfaction of CALM.

EPA evaluation

The nature of, and need for, progressive rehabilitation of the project area is largely unaffected by the proposed changes. Relocation of various parts of the project will require changes in the detail of any rehabilitation plan, but will not require change to the general methods and strategies described by the proponent in its commitments and elsewhere. The EPA therefore reiterates its support of the proponent's general outline for rehabilitation, and the EPA's previous recommendation for the preparation of on-going rehabilitation plans within six months of project commissioning. However, the scale of the project coupled with its closer proximity to the Wanjarri Nature Reserve requires that early consideration be given to final land forms and completion criteria, to ensure development of both the project and rehabilitation is consistent with these aspects of the decommissioning plan. The EPA therefore recommends that the existing condition related to decommissioning (Appendix 2, Condition 6) be superseded by a condition which requires the following:

"That within five years of commissioning the project, the proponent prepare and subsequently implement a plan which:

- describes the process for decommissioning and final rehabilitation of the project area;
- provides for the long term stability of the surface water systems, in particular the Jones Creek diversions;
- provides for the long term management of ground and surface water systems affected by the tailings dam; and

- provides for the development of a 'walk away' solution for the decommissioned mine pits, the process plant, tailings dam, and associated infrastructure. (Recommendation 5)"

On the basis of existing information, the EPA notes the proponent's assertion that the material stored in the tailings dam is unlikely to be a source of pollution and therefore that rehabilitation of the dam will be possible. However, these types of tailings disposal facilities are new to the area and the EPA has requested five-yearly reporting from similar facilities (EPA 1996b) to monitor progress and accumulate data on this type of facility. The EPA therefore recommends that the proponent should provide an updated report on the progress of the tailings dam development after five years of operation, and thereafter the EPA should determine follow-up reporting requirements. (Recommendation 6)

As the Six Mile Well Block will eventually be returned to the Wanjarri Nature Reserve, it will require a separate rehabilitation and decommissioning plan in recognition of this different final land use. CALM, as manager of the Wanjarri Nature Reserve, should be involved at all stages of the preparation and implementation of this plan to ensure that, upon return to the Wanjarri Nature Reserve, the area is compatible with the form and function of adjacent areas of the reserve. To facilitate CALM involvement and eventual return of this area to the Wanjarri Nature Reserve, an Environmental Management Programme for the area should be prepared and implemented to the requirements of the EPA on the advice of CALM and the NPNCA. This programme should include rehabilitation and decommissioning of the area, and be prepared before any disturbance of land within the area. (Recommendation 3)

4.6 Tailings containment

Objective

Prevent any change to the quality of groundwater which would disadvantage other users of this resource.

Technical information

In the proposal document (Dominion Resources Pty Ltd 1995) Dominion Resources identified a number of benefits and drawbacks to the relocation of the tailings dam. Those related to groundwater are summarised below.

Benefits

- The smaller surface area of the dam coupled with the coarse grind of the ore will assist in maximising water recovery from the tailings and therefore minimise seepage losses.
- Higher water returns from the dam will reduce the draw from borefields and subsequent salt load to the tailings system.
- The proposed site for the tailings dam overlies granitic rock as opposed to a combination of basaltic and granitic rock for the existing dam site. The granitic rock is less likely to contain permeable zones and therefore will be less conducive to seepage transmission.
- The presence of greenstone rocks, extending up to 3 km to the west of the proposed tailings dam site is likely to prevent any seepage from the proposed dam site flowing in a westerly direction.
- There are no existing pastoral bores or wells downstream of the proposed tailings dam site.
- The overburden thickness in the proposed tailings dam site is likely to be less than at the existing site. This will facilitate the construction of a more efficient seepage cutoff beneath the embankments.

- The proximity of the proposed site to the Goliath North pit will result in groundwater depression developing adjacent to the pit as a result of dewatering associated with mining activities. Any seepage from the dam is likely to be drawn towards these dewatering bores.

Drawbacks

- Given the positioning of the waste dump, some technical difficulties may be encountered in constructing and maintaining groundwater monitoring and/or seepage recovery bores, if required, however these difficulties are expected to be resolved once the results of the geotechnical studies are evaluated.
- The eastern edge of the proposed tailings dam will be within 100-200 m of the revised boundary of the Wanjarri Nature Reserve. However, because the boundary is up-slope of the tailings dam, the likelihood of leakage is less at this site than the currently approved site.

The Department of Minerals and Energy will require preparation of a tailings dam design in accordance with the requirements of the document titled "Draft Guidelines on the Safe Design and Operating Standards for Tailings Storage".

Comments from key agencies/interest groups

CALM and the NPNCA stated that their acceptance of the proposal is subject to the completion of geotechnical studies referred to in the proposal document. In the proposal document it was stated that the proponent would conduct a detailed geotechnical survey of the proposed tailings dam area to assess hydrological conditions under the site (Dominion Resources Pty Ltd 1995, p. 18).

Response from proponent

Additional studies of the hydrological and geotechnical aspects of the tailings dam site will proceed and be submitted to the relevant authorities for licensing prior to construction (Commitment 50).

EPA evaluation

Relocation of the tailings dam has a number of environmental benefits and few, if any, drawbacks. The drawbacks are: greater difficultly in the installation of monitoring and recovery bores; and closer proximity to the Wanjarri Nature Reserve as a result of both the dam relocation and extension of the reserve as part of the WNRLU arrangement. Technical difficulties with bore installation are expected to be resolved and do not in any case absolve the proponent of its commitments to groundwater monitoring and protection. Studies carried out to date, indicate that the closeness of the dam to the Wanjarri Nature Reserve will not increase the impact on the reserve, due to better sealing underneath the dam and the direction of seepage flow. The results of these studies will be confirmed by further detailed studies and reported to the appropriate authorities.

The EPA considers that the proposal and the commitments made by the proponent achieve the EPA's objective in relation to potential impacts on groundwater quality arising from relocation of the tailings dam.

4.7 Gaseous emissions

Objective

To ensure that gaseous emissions, including greenhouse gases and odours, both individually and cumulatively, do not cause an environmental or human health problem in the area

surrounding the proposed processing plant. The proponent should use all reasonable and practicable measures to reduce the discharge of wastes, including gases (EPA, 1996a).

Policy information

The EPA has promulgated two Environmental Protection Policies (EPPs) for atmospheric pollutants for the Kwinana and Kalgoorlie areas. The EPA uses the Kwinana EPP standards and limits as guidelines for the assessment of new industrial projects (where there are no existing sources) and for existing industrial plants which are seeking approval for modifications (EPA, 1992).

In the Kwinana EPP, a limit is defined as "a concentration not to be exceeded" and a standard is defined as "a concentration which it is desirable not to exceed". The standard is interpreted as the value which the ground level concentration must be below for 99.9% of the time.

The standards and limits for sulphur dioxide and particulates used in the EPP for the Kwinana policy area are summarised in Table 2 below.

Table 2. Standards and limits used in the EPP for the Kwinana Policy Area

Species	Area	Averaging Period	Standard ($\mu g/m^3$)	Limit ($\mu g/m^3$)
Sulphur Dioxide	Industrial Estate	1 hour	700	1400
		24 hour	200	365
		Annual	60	80
	Residential	1 hour	350	700
		24 hour	125	200
		Annual	50	60
Particulates PM_{10}	Residential	24 hour	-	120
		Annual	-	40

The National Health and Medical Research Council (NH&MRC) guidelines require that the ambient concentration of nitrogen dioxide (NO_2) does not exceed 0.16 ppm or 320 $\mu g/m^3$ (as a one hour average, and not to be exceeded more than once a month).

Guidelines for maximum concentrations of oxides of nitrogen (NO_x) emissions from stacks and vents may also apply to industrial plants in addition to guidelines for ground level concentrations of NO_x emissions. The relevant (NH&MRC) guideline figure which is applicable to the proposed power station exhaust stacks (ie, for gas turbines greater than 10 MW), is 0.07 g/m^3 (at 15% O_2 reference level, at STP, dry). Gas burners with low levels of NO_X production are available commercially.

Carbon dioxide (CO_2) is a greenhouse gas and worldwide industrial emissions are considered to be a major contributor to global warming. The Federal Government, in accordance with international agreements, has announced an intention to stabilise carbon dioxide emissions in Australia by the year 2000. The Commonwealth has urged a program of co-operative agreements between industry and the government to reduce greenhouse emissions.

The EPA recently considered greenhouse gas emission policies in general, including the approach taken by the Commonwealth government and the review undertaken by the DEP into the status of WA's approach.

The EPA has adopted the following provisional policy in relation to the assessment of individual energy intensive projects which are likely to emit significant quantities of greenhouse gases. This will enable the State to address the issue of anticipated industrial expansion and

substantial increase in greenhouse gas emissions in the next few years. Accordingly, the EPA considers that a proponent should, in their proposal documents:

1. calculate the greenhouse gas emissions associated with their proposals (using the methodology developed for Australia);
2. indicate the specific measures adopted to limit greenhouse gas emissions for that project;
3. as appropriate, whether on a project-specific basis, company-wide arrangement or within an industrial grouping, enter into the National C21 'Greenhouse Challenge' voluntary agreement programme for the estimation, reporting and auditing of greenhouse gas emissions; and
4. estimate as appropriate, the global emission credit (greenhouse gas offsets) achieved through implementation of the proposal.

Technical information

The generation and escape of dust from the project was considered in Section 3 of this report and no further evaluation of this topic is required by the EPA.

The nearest residences to the project will be in the project village which is to be located 2.5 km from the plant site.

Comments from key agencies/interest groups

The DEP requested additional information on the quantities of emissions expected to be caused by the proposed changes.

Response from proponent

The proponent will specify emission criteria in tender documents for the supply of equipment for the Plant. Compliance testing will be carried out during commissioning of the Plant to confirm that the emissions from equipment are within the specified limits. (Commitment 54)

Emissions from this project will include SO_2, NO_x, and CO_2.

SO_2 Emissions

The only emissions of SO_2 will be from the gas-fired power station. Compared with conventional technology for the downstream processing of nickel sulphide concentrates, the hydrometallurgical process proposed is simple and clean. All acid requirements are generated autogenously within the autoclave with no intermediate generation of gaseous SO_2.

Sulphur dioxide (SO_2) emission concentrations, at the point of discharge, are expected to be less than 1.00 $\mu g/m^3$

NO_x Emissions

The gas requirement is estimated at 10.5 TJ per day with expected atmospheric emission per turbine of 600 000 m^3/h @ 90°C with 6 grams per second NO_2 (equivalent). From these figures the estimated emission of NO_2 is calculated to be < 0.05 g/m^3 (STP) at the source.

The project proposes to use gas turbines fitted with water/steam injection for the purposes of increased energy efficiency and reduced emission of nitrogen oxide type gasses in the waste gasses.

CO_2 Emissions

The change from a power station run on bunker fuel to a gas-fired power station will result in less greenhouse gas emissions per unit of power generated. Overall, the proposed changes increase the production of CO_2 from 176 000 tonnes/annum (t/a) to 237 000 t/a. This increase comes from an addition of 44 000 t/a due to enlargement of the power station, and an addition

of 16 700 t/a from the use of calcrete in the Metals Plant. Using the results of the 1991/92 audit of greenhouse gas emission (Greenhouse Coordination Council 1994) the contribution of this project to Western Australia's total greenhouse emissions will be less than 0.7% of the total, and the contribution due to the proposed changes less than 0.2% of the total.

EPA evaluation

The expected emissions of sulphur dioxide and nitrogen oxides are less than the limits specified in EPA policies and guidelines used by the EPA. Gaseous emissions are also regulated by licence conditions set under Part V of the Environmental Protection Act, which detail the monitoring, reporting, and maximum levels applicable to various emissions. The Authority therefore considers that gaseous emissions from changes to the proposal are manageable through licences issued under Part V of the Environmental Protection Act, and through commitments made by the proponent.

The generation of CO_2 from this project equates to approximately 10.3 tonnes of CO_2 per tonne of nickel metal product, which compares favourably with similar proposals such as the Cawse Nickel Project with 7.1 tonnes of CO_2 per tonne of nickel and the Murrin Murrin Project with 22.2 tonnes of CO_2 per tonne of nickel. However, the EPA notes that the project when considered in isolation will add 0.7% to Western Australia's total greenhouse gas emissions. The EPA considers that the cumulative effect of this and other proposals upon Western Australia's total greenhouse gas emissions should be measured through periodic audits of the State's greenhouse gas emissions, in order to monitor the effectiveness of present policies in meeting the Federal Government's objective of stabilising CO_2 emissions by the year 2000.

In view of its provisional policy position for greenhouse gases, the EPA considers that Recommendation 2 is appropriate.

4.8 Wanjarri Nature Reserve land utilisation arrangement

Objective

To ensure the Wanjarri Nature Reserve land utilisation (WNRLU) arrangement is compatible with the functions of the Wanjarri Nature Reserve as a Class A Nature Reserve.

Policy information

The EPA considers there should be representative land systems set aside for the conservation of flora and fauna.

Technical information

The WNRLU arrangement involves using part of the Wanjarri Nature Reserve (the Six Mile Well block) as a waste rock dump during the life of the mine, and eventual return of this area to the Wanjarri Nature Reserve upon completion of mining. In exchange for this temporary loss of land to the reserve, the proponent will give to the State the Mt Pasco block for inclusion into the Wanjarri Nature Reserve.

The Six Mile Well block has an area of approximately 600 ha, of this 410 ha will be used for the waste rock dump. The remaining area will be a buffer between the waste rock dump and the Wanjarri Nature Reserve. This buffer will be at least 200 m wide.

The Mt Pasco block has an area of 610 ha and will be fenced by the proponent to separate it from the project area.

In order to implement the WNRLU arrangement, the approval of both Houses of State Parliament will be required to adjust the boundary of the Wanjarri Nature Reserve.

Table 3 below contains a summary of the advantages and disadvantages of the proposed WNRLU arrangement which have been presented by the proponent in support of the proposal and considered by CALM in making its decision on the acceptability of the proposal.

Table 3. Summary of the benefits of the Wanjarri Nature Reserve land utilisation arrangement.

ADVANTAGES	DISADVANTAGES
• Increased conservation area (610 ha)	• Portion of existing Nature Reserve temporarily lost to the conservation estate (600 ha)
• Increased representation of landforms currently poorly represented in the reserve, particularly the Blackburn, Falconer, and Nuendah units, comprising breakaway complexes.	• Loss of some landforms, particularly Montague unit, within reserve.
• Extension within the reserve of an area of sandplain habitat known to support Schedule 1 rare fauna species, the Mulgara *Dasycercus cristicauda.*	
• Increased representation within the reserve of conservation significant species (Priority 1, *Calytrix uncinata;* Priority 3, *Acacia balsamea*).	
• Impact on the largest sub-population in the area of the Declared Rare Flora species Cue Grevillea *Grevillea inconspicua* (containing 350 plants) is avoided.	
• Impact on the western tributary of the Jones Creek system is reduced.	
• Potential for joint management between the proponent and CALM of areas outside of the nature reserve.	
• Creation of a physical buffer zone (of at least 200 m) between the nature reserve and the mining project.	

Comments from key agencies/interest groups

CALM and the NPNCA have given conditional support to the WNRLU arrangement. Acceptance of the proposal is subject to the completion of the appropriate geotechnical work, and management systems and plans to protect the reserve.

EPA evaluation

On the advice of CALM and the NPNCA and from the information provided by the proponent the EPA considers that there will be a net environmental benefit to the Wanjarri Nature Reserve as a result of the proposed Wanjarri Nature Reserve land utilisation arrangement. In coming to this conclusion the EPA has satisfied itself that an adequate representation of flora, fauna, and landforms will be maintained in the Wanjarri Nature reserve. Other environmental impacts of the WNRLU arrangement which include dust, surface water management, groundwater, and

rehabilitation, have been evaluated and found to be manageable provided appropriate management programmes are prepared and implemented.

As the Six Mile Well block is presently under CALM management and is to be returned to CALM management upon completion of mining, the EPA considers that CALM should have significant input into the management of this area during the interim period of mining, when the proponent will be responsible for management. Also, as the requirements for management and rehabilitation of the Six Mile Well block are likely to differ from those of the general project area, a separate management programme for this area should be prepared and implemented. The EPA therefore recommends that the proponent should prepare and implement an Environmental Management Programme for the Six Mile Well block in consultation with CALM, which would address at least the following topics: dust, surface water management (erosional runoff), groundwater (leaching), rehabilitation, and decommissioning. (Recommendation 3)

5. Changes to Environmental Conditions and Commitments

As a result of this assessment and from recommendations made in this report, a number of changes are proposed to the Environmental Conditions and Commitments relating to this project.

Of the seven recommendations of this report only four result in new or altered Environmental Conditions. The existing condition related to decommissioning will be replaced by new condition (Recommendation 5) and three new conditions are added: Six Mile Well block condition (Recommendation 3); Greenhouse gas emissions (Recommendation 2); and Reporting (Recommendation 4). These changes are summarised in Table 4 and a full list of the recommended environmental conditions is included in Section 7.

Of the 59 existing Environmental Commitments made by the proponent, all but one are retained without alteration, and 12 new commitments are added. The new commitments and the one alteration are included in Table 4 and a complete list of consolidated commitments is contained in Appendix 5.

6. Advice to the Minister for the Environment

The EPA has assessed the proposal of Dominion Resources Pty Ltd to:

- relocate the Wanjarri Nature Reserve boundary to allow for the extension of the eastern waste dump;
- establish a downstream hydrometallurgical processing plant within the currently approved concentrator area; and
- integrate the tailings dam with the Goliath North waste dump so as to form a single operating unit.

In undertaking its assessment the EPA has reviewed the proponent's Section 46 document, the issues raised in the public submissions, advice received from government departments, relevant literature, and the proponent's revised environmental management commitments.

Table 4: Relationship between:
existing Environmental Conditions and recommended Environmental Conditions; and
existing Commitments and list of Consolidated commitments.

Original Condition or Commit-ment N^{o}	Requirements (summarised)	Evaluation	New Condition or Commitment Number	New Condition or Commitment Text
Environmental Conditions				
1	Fulfil commitments	Modified to include the present changes to environmental conditions and commitments.	1	1-1 In implementing the proposal as reported on in Environmental Protection Authority Bulletin 444 and subsequently modified and reported on in Environmental Protection Authority Bulletins 509, 668 and 827, the proponent shall fulfil the relevant commitments; provided that the commitments are not inconsistent with the conditions or procedures contained in this statement. The list of consolidated environmental management commitments was included in Environmental Protection Authority Bulletin 827 (Appendix 5) and a copy is attached.
2	Implement the proposal as described.	No change	2	
3	Prepare and implement a Drainage Management Programme.	Wording changed to recast condition into contemporary format.	3	
4	Design and construct the Jones Creek diversion.	Wording changed to recast condition into contemporary format.	4	

Original Condition or Commit-ment N°	Requirements (summarised)	Evaluation	New Condition or Commitment Number	New Condition or Commitment Text
	Prepare and implement an Environmental Management Programme for the Six Mile Well block.	New condition	5	5-1 The proponent shall manage the Six Mile Well block in a manner compatible with its eventual return to the Wanjarri Nature Reserve. 5-2 Prior to the disturbance of any land within the Six Mile Well block, to achieve the objective of condition 5-1, the proponent shall prepare an Environmental Management Programme for the area in consultation with the Department of Conservation and Land Management, and the National Parks and Nature Conservation Authority. This programme shall include, but not be limited to the following topics: 1 dust, 2 surface water management (erosional runoff), 3 groundwater (leaching) 4 rehabilitation, and 5 decommissioning; and be prepared to the requirements of the Environmental Protection Authority on the advice of the Department of Conservation and Land Management, and the National Parks and Nature Conservation Authority. 5-3 The proponent shall implement the Environmental Management Programme required by condition 5-2.

Original Condition or Commit-ment N°	Requirements (summarised)	Evaluation	New Condition or Commitment Number	New Condition or Commitment Text
	Greenhouse gas emissions reporting	New condition	6	6-1 At appropriate times, the proponent shall address, in the Performance and Compliance Reports required by condition 12, the following additional matters relating to greenhouse gas emissions: 1 calculations of the greenhouse gas emissions associated with the proposal, using appropriate methodology developed for Australia; 2 noting governments' desire to stabilise greenhouse gas emissions by the year 2000 and progressively reduce them thereafter. Also noting the Revised Greenhouse Strategy for Western Australia 1994 and the United Nations Framework Convention on Climate Change (FCCC); and 3 employment of best endeavours to comply with the position noted in 2 above and the FCCC Convention on greenhouse gas emissions, with reporting on progress, to the requirements of the Environmental Protection Authority on advice of the Department of Environmental Protection.
5	Prepare a rehabilitation plan within six months of project commissioning and subsequently implement the plan.	Changed to more accurately reflect Recommendation 3 of Bulletin 444. This recommendation required review of the rehabilitation plan every three years.	7	In addition to waste dumps, ore stockpiles and tailings dams, other project areas will need to be properly rehabilitated. 7-1 Within six months following commissioning, the proponent shall prepare on-going rehabilitation plans to the requirements of the Department of Environmental Protection on advice of the Department of Minerals and Energy. 7-2 The proponent shall submit the plans required by condition 7-1 to Department of Environmental Protection for review every three years. 7-2 The proponent shall implement the rehabilitation plans required by condition 7-1.

Original Condition or Commit-ment N⁰	Requirements (summarised)	Evaluation	New Condition or Commitment Number	New Condition or Commitment Text
	Submit report on the operations of the tailings dam.	New condition	8	8-1 Within five years following the commencement of the operation of the tailings storage facility, the proponent shall submit a report which includes, but is not necessarily limited to the following: 1 description of the development of the tailings storage facility; 2 details of the operation of the facility and issues arising from and variations required to its operation; and 3 monitoring results, to the requirements of the Environmental Protection Authority. The reporting required by this condition shall be repeated thereafter at five-yearly intervals to the requirements of the Minister for the Environment. Note: The Environmental Protection Authority will advise the proponent on the need for subsequent five-yearly reports.

Original Condition or Commit-ment N^{0}	**Requirements (summarised)**	**Evaluation**	**New Condition or Commitment Number**	**New Condition or Commitment Text**
6	Prepare a decommissioning plan at least twelve months prior to decommissioning and subsequently implement the plan.	Changed to require preparation of a decommissioning and final rehabilitation plan within 5 years which provides for the development of a 'walk away' solution.	9	9-1 The proponent shall achieve the satisfactory decommissioning of the project, removal of the plant and installations and rehabilitation of the site and its environs, leaving the site in a sustainable condition in the long term. 9-2 Within five years following commissioning, or at such later time considered appropriate by the Minister for the Environment on advice of the Department of Environmental Protection, the proponent shall prepare a plan which: 1 describes the process for decommissioning and final rehabilitation of the project area; 2 provides for the long term stability of the surface water systems, in particular the Jones Creek diversions; 3 provides for the long term management of ground and surface water systems affected by the tailings disposal area; and 4 provides for the development of a 'walk away' solution for the decommissioned mine pits, process plant, tailings dam, and associated infrastructure, to the requirements of the Environmental Protection Authority on advice of the Department of Environmental Protection, the Department of Minerals and Energy and the Water and Rivers Commission. Note: A "walk away" solution means that the site shall either no longer require management at the time the proponent ceases operations, or if further management is deemed necessary, the proponent shall make adequate provision so that the required management is undertaken with no liability to the State. 9-3 The proponent shall implement the plan required by condition 9-2.
7	No change of proponent without approval by the Minister for the Environment	No change	10	

Original Condition or Commit-ment N°	Requirements (summarised)	Evaluation	New Condition or Commitment Number	New Condition or Commitment Text
8	Project to be commenced within 3 years or the approval shall lapse and be void.	Project to be commenced within 2 years of issuing of statement of approval.	14	The environmental approval for the proposal is limited. 11-1 If the proponent has not substantially commenced the project within two years of the date of this statement, then the approval to implement the proposal as granted in the statement of 29 November 1990 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 two years referred to in this condition shall be made before the expiration of that period to the Minister for the Environment. Where the proponent demonstrates to the requirements of the Minister for the Environment on advice of the Department of Environmental Protection that the environmental parameters of the proposal have not changed significantly, then the Minister may grant an extension not exceeding three years.
9	Compliance auditing.	No change	12	
Proponent's Commitments				
2.3.3.6	Waste oils combined for fuel for power station. Waste grease transported off site.	Modified due to the change from diesel to gas-fired power station.	52	52 Waste oils and grease will be collected and transported off site for recycling.
	Section 16A joint management with CALM	New commitment	3	3. The proponent will enter into a Section 16A Joint Management Agreement with CALM (in conjunction with, and in the spirit of, the already signed Memorandum of Understanding) for the protection of a *Grevillea inconspicua* population and an area of the Montague landform unit near the project area.
	Gas pipeline (Rehabilitation)	New commitment	43	43. The proponent will bury the gas pipeline and rehabilitate the ground surface over the pipeline following construction.
	Updates of drainage management programme and Jones Creek Diversion plan.	New commitment	47	47. The proponent will update the Drainage Management Programme and the Jones Creek Diversion plan, required by Environmental Conditions 3-1 and 4-1 (of the statement published on 20 July 1995), to incorporate changes made to the proposal.
	Tailings dam studies	New commitment	50	50. Additional studies of the hydrological and geotechnical aspects of the tailings dam site will proceed and be submitted to the Department of Minerals and Energy, the Department of Conservation and Land Management, the Water and Rivers Commission, and the Department of Environmental Protection.

Original Condition or Commit-ment N°	Requirements (summarised)	Evaluation	New Condition or Commitment Number	New Condition or Commitment Text
	Hazardous substances and dangerous goods register.	New commitment	53	53. A hazardous substances and dangerous goods register will be prepared that will detail the following procedures: (i) Transportation, handling and storage practices. (ii) Safety and hazard management. (iii) Maintenance, testing and audit procedures. (iv) Contingency, cleanup and disposal procedures. (v) Personnel training procedures.
	Emissions	New commitment	54	54. The proponent will specify emission criteria in tender documents for the supply of equipment for the Plant. Compliance testing will be carried out by the proponent during the commissioning of the Plant to confirm that the emissions from the plant equipment are within the specified limits. This commitment will be implemented to meet the requirements of the DEP.
	Safety - gas pipeline	New commitment	55	55. The proponent will construct and operate the gas pipeline in accordance with applicable Government Acts and Regulations.
	Gas pipeline warnings	New commitment	56	56. The proponent will erect signs along the pipeline route at intervals such that at least one sign is visible from any position on the pipeline route to warn of the presence of a high pressure gas pipeline.
	Safety - process plant	New commitment	57	57. The proponent will construct the process plant in accordance with applicable Australian Standards and International Standards, as appropriate.
	Process plant - NOI	New commitment	58	58. The proponent will operate the process plant in accordance with operational and safety procedures as prepared for the NOI (in respect to the operational safety issues as they relate to the new Mine safety Inspection Act) and other Government Acts and Regulations.
	Nature reserve buffer zone	New commitment	61	61. The proponent will protect the buffer zone (a zone of approximately 200m established between the limit of waste dump and the Wanjarri Nature Reserve) from disturbance as agreed with by NPNCA.
	Nature reserve fencing	New commitment	62	62. The proponent will fence the area designated for inclusion into the Wanjarri Nature Reserve and protect the area of the excised nature reserve while active in this area by methods agreed with CALM.

Table 5. Summary of Environmental Protection Authority recommendations.

ISSUES	OBJECTIVE	EVALUATION FRAMEWORK	PROPONENT'S COMMITMENT	EPA RECOMMENDATION
1. Impact on significant vegetation associations and rare flora	Protect rare and endangered species. Minimise the loss of locally and regionally significant vegetation associations.	Wildlife Conservation Act. National Strategy for the Conservation of Australia's Biological Diversity. Adequacy of representation as a result of the WNRLU arrangement. Dominion Resources and CALM have a memorandum of understanding with regard to joint land management on the Yakabindie pastoral lease area. Dominion has obtained a permit to take *Grevillea inconspicua.*	Bury the gas pipeline and rehabilitate the ground surface over the pipeline following construction (Commitment 43) Buffer zone of 200m between waste dump and Wanjarri Nature Reserve (Commitment 61). The proponent will give the Mt Pasco block to the State for inclusion into the Wanjarri Nature Reserve.	That the Mt Pasco Block be incorporated into the Wanjarri Nature Reserve (Recommendation 6).
2. Changes to landforms	Minimise the loss of locally and regionally significant landform units.	Adequacy of representation as a result of the WNRLU arrangement.	The proponent will enter into a Section 16A Joint Management Agreement with CALM an area of the Montague landform unit near the project area (Commitment 3).	That the Montague land unit type be protected by inclusion within a secure reservation in the region (Recommendation 7). That the Mt Pasco Block be incorporated into the Wanjarri Nature Reserve (Recommendation 6).

Table 5. Summary of Environmental Protection Authority recommendations. (cont'd)

ISSUES	OBJECTIVE	EVALUATION FRAMEWORK	PROPONENT'S COMMITMENT	EPA RECOMMENDATION
3. Surface water management	Ensure no adverse changes to the existing drainage systems, vegetation/land systems, and dependent fauna.	A drainage management programme for the project has been prepared by the proponent and accepted by the Minister for the Environment. The design of the Jones Creek diversion has been prepared by the proponent and accepted by the Minister for the Environment. Both the management programme and the diversion design will require updating to incorporate the proposed changes.	Monitor water quality of Jones Creek during the life of the project (Commitment 8). Install silt traps to collect runoff from roads, waste dumps and tailings dam (Commitment 44) The proponent will update the Drainage Management Programme and the Jones Creek Diversion plan, required by Environmental Conditions 3-1 and 4-1 (of the statement published on 20 July 1995), to incorporate changes made to the proposal (commitment 47).	Surface water management for the tailings relocation is adequately addressed by existing conditions and commitments. That surface water management for the WNRLU area be included in an EMP for WNRLU area (Recommendation 3).
4. Groundwater (quantity)	Prevent any change to the level of groundwater which would disadvantage other users of this resource.	Usage of groundwater by the Metals plant is less than the demonstrated yield of the borefield. Subject to Rights in Water and Irrigation Act.	Carry out a baseline groundwater quality survey as soon a possible prior to the commencement of construction downstream of the tailings dam and in the borefields areas (Commitment 5). Monitor groundwater resources (quality and levels) in the borefields and pastoral well at Miranda, Paddy's Knob, Townsend and Henry Wells and pit dewatering , and evaluate the extent and depth of drawdown (Commitment 9). Provide additional stock watering points where wells are affected by project dewatering (Commitment 64)	Not considered necessary as the issue can be manage through compliance with the proponent's commitments and the Rights in Water and Irrigation Act 1914.

Table 5. Summary of Environmental Protection Authority recommendations. (cont'd)

ISSUES	OBJECTIVE	EVALUATION FRAMEWORK	PROPONENT'S COMMITMENT	EPA RECOMMENDATION
5. Rehabilitation of areas disturbed by the project	Ensure rehabilitation of WNRLU is consistent with the areas final land use as a Nature Reserve.	NPNCA support is conditional upon rehabilitation of the WNRLU area to the satisfaction of CALM.	Carry out progressive rehabilitation of the waste dumps and tailings dam embankments and rehabilitate the project area to the level of existing land use in accordance with the rehabilitation programme (Commitment 22)	Dominion Mining should prepare a EMP for the WNRLU area which addresses rehabilitation of the area. The EMP should be prepared and implemented to the requirements of the EPA on the advice of CALM and NPNCA. (Recommendation 3) Dominion Mining should report on the operation of the tailings disposal facility to the Minister for the Environment at five-yearly intervals. (Recommendation 4) Modify existing rehabilitation condition to include preparation of a walk away solution within five years. (Recommendation 5)

Table 5. Summary of Environmental Protection Authority recommendations. (cont'd)

ISSUES	OBJECTIVE	EVALUATION FRAMEWORK	PROPONENT'S COMMITMENT	EPA RECOMMENDATION
6. Tailings containment an its effects on groundwater	Prevent any change to the quality of groundwater which would disadvantage other users of this resource.	Additional studies of the hydrological and geotechnical aspects of the tailings dam site will proceed, and be submitted to the relevant authorities for licensing prior to construction.	Monitor groundwater levels and groundwater quality immediately downstream of the tailings dam on a weekly basis (Commitment 6) In the event of adverse groundwater quality changes being detected, a recovery bore or seepage trench system will be installed , alternative tailings disposal techniques investigated or an alternative tailings disposal site will be considered (Commitment 37) Additional studies of the hydrological and geotechnical aspects of the tailings dam site will proceed and be submitted to the relevant authorities for licensing prior to construction (Commitment 50)	Proponent's commitments are considered adequate.

Table 5. Summary of Environmental Protection Authority recommendations. (cont'd)

ISSUES	OBJECTIVE	EVALUATION FRAMEWORK	PROPONENT'S COMMITMENT	EPA RECOMMENDATION
7. Gaseous emissions	To ensure that gaseous emissions, including greenhouse gases and odours do not cause an environmental or human health problem in the area surrounding the proposal.	The maximum one hour average of SO_2 should not exceed 350 $\mu g/m^3$ at the nearest residence (WHO). The maximum one hour average of NO_2 should not exceed 320 $\mu g/m^3$ at the nearest residence (WHO). EPA provisional policy with respect to greenhouse gases.		SO_2, NO_2 and other noxious gases will be regulated by licences issues under Part V of the Environmental Protection Act. That the annual environmental report include the following information related to greenhouse gas emissions: • calculations of greenhouse gases associated with the proposal; • note the Governments' desire to stabilise greenhouse gas emissions by the year 2000 and progressively reduce them thereafter; and • employment of best endeavours to comply with the Government position and FCCC Convention on greenhouse gas emissions with reporting on progress. (Recommendation 2)
8. Wanjarri Nature Reserve land utilisation arrangement	To ensure the Wanjarri Nature Reserve land utilisation (WNRLU) arrangement is compatible with the functions of the Wanjarri Nature Reserve as a Class A Nature Reserve.			The proponent shall prepare and implement an Environmental Management Programme for the Six Mile Well block in consultation with CALM (Recommendation 3).

6.1 Factors relevant to the proposal

The EPA identified the principal environmental factors relevant to the proposal as follows:

a) the impact on locally and regionally significant vegetation associations, and Declared Rare and Priority flora;

b) the representation of landforms affected by the proposal in the conservation reserve;

c) the effect of project facilities on surface water flows;

d) the effect of groundwater extraction on aquifer yield;

e) rehabilitation after mining to achieve a walk away solution;

f) the containment of tailings to ensure groundwater quality is not affected;

g) the discharges to the atmosphere of nitrogen oxides, sulphur dioxides, and carbon dioxide; and

h) the effect upon the Wanjarri Nature Reserve.

The EPA advises that:

- the general project area contains a number of sub-populations of *Grevillea inconspicua*, a declared rare species;
- although widespread in the region the Montague land unit is not well represented in conservation reserves;
- the tailings dam has been relocated back into the upper reaches of Jones Creek;
- the proposed site for the tailings dam overlies granitic rock compared to the currently approved site which overlays basaltic and granitic rock;
- the eastern edge of the proposed tailings dam will be within 100-200 m of the revised boundary of the Wanjarri Nature Reserve;
- the proposed groundwater extraction is increased by 128 m^3/h to 174 m^3/h compared to the demonstrated operational borefield yield of 220 m^3/h;
- the rehabilitation and decommissioning of the Six Mile Well Block area will need to be compatible with its final land use as a Class A nature reserve;
- the main emissions comprise sulphur dioxide (less than 1 $\mu g/m^3$ at the point of emission compared to a one-hour ambient standard of 700 $\mu g/m^3$), nitrogen oxides (less than 0.05 g/m^3 at source compared to an emission guideline of 0.07g/m^3 as a best practice level), and carbon dioxide (generated at approximately 10.3 tonnes per tonne of nickel metal); and
- there will be a net environmental benefit to the Wanjarri Nature Reserve as a result of the revised boundary.

6.2 Recommendations

Noting the conclusion reached, the EPA submits the following recommendations to the Minister for the Environment on the conditions and procedures to which the proposal should be subject if it is implemented:

Recommendation 1

The Minister for the Environment note that the EPA has concluded that the proposal can be managed to meet the EPA's objectives, subject to the

proponent's revised environmental management commitments and the EPA's recommended conditions and procedures.

Recommendation 2

The Performance and Compliance Reports required under condition 9 of the existing statement should include the following information to the requirements of the Environmental Protection Authority on the advice of the Department of Environmental Protection:

Greenhouse gas emissions:

- calculation of the greenhouse gas emissions associated with their proposals (using the methodology developed for Australia);
- an indication of the specific measures adopted to limit greenhouse gas emissions for the project;
- the extent to which the proponent has entered into the National C21 'Greenhouse Challenge' voluntary agreement programme for the estimation, reporting and auditing of greenhouse gas emissions; and
- an estimation as appropriate of, the global emission credit (greenhouse gas offsets) achieved through implementation of the proposal.

Recommendation 3

Prior to any disturbance of land which is part of the WNRLU and within the Wanjarri Nature Reserve, an Environmental Management Programme (EMP) for the area should be prepared by the proponent in consultation with CALM and the NPNCA, and subsequently implemented to the requirements of the EPA on the advice of CALM and the NPNCA. The EMP shall address at least the following topics:

- dust,
- surface water management (erosional runoff),
- groundwater (leaching),
- rehabilitation, and
- decommissioning.

Recommendation 4

Within 5 years following commencement of the operation of the tailings disposal facility, the proponent should submit a report which includes, but is not necessarily limited to the following:

- a description of the development of the tailings disposal facility;
- details of the operation of the tailings disposal facility and issues arising from and variations required to its operations; and
- monitoring results,

to the requirements of the Environmental Protection Authority. The reporting required by this condition should be repeated thereafter at five-yearly intervals to the requirements of the Minister for the Environment.

Note: The Environmental Protection Authority will subsequently advise the Minister for the Environment on the need for further five-yearly reports.

Recommendation 5

Within five years of commissioning the project, or at such later time considered appropriate by the Minister for the Environment on advice of the Department of Environmental Protection, the proponent shall prepare a plan which:

- **describes the process for decommissioning and final rehabilitation of the project area;**
- **provides for the long term stability of the surface water systems, in particular the Jones Creek diversions;**
- **provides for the long term management of ground and surface water systems affected by the tailings disposal area; and**
- **provides for the development of a 'walk away' solution for the decommissioned mine pits, process plant , tailings dam, and associated infrastructure,**

to the requirements of the Environmental Protection Authority on advice of the Department of Environmental Protection, the Department of Minerals and Energy and the Water and Rivers Commission.

Note: A "walk away" solution means that the site shall either no longer require management at the time the proponent ceases operations, or if further management is deemed necessary, the proponent shall make adequate provision so that the required management is undertaken with no liability to the State.

The EPA also recommends that:

Recommendation 6

The Minister for the Environment note that the EPA supports the incorporation of the Wanjarri Nature Reserve of the Mt Pasco block area as part of the Wanjarri Nature Reserve land utilisation arrangement.

Recommendation 7

CALM investigate and implement, where possible, means to ensure the representation of the Montague land unit type under protected management, by including areas containing this land unit type within a secure conservation reservation.

7. Recommended environmental conditions

Based on its assessment of this proposal and the recommendations in this report, the Environmental Protection Authority considers that the following Recommended Environmental Conditions are appropriate for the Yakabindie Nickel Project:

The implementation of this proposal is now subject to the following conditions which replace all previous conditions:

1 Proponent Commitments

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

1-1 In implementing the proposal as reported on in Environmental Protection Authority Bulletin 444 and subsequently modified and reported on in Environmental Protection Authority Bulletins 509, 668 and 827, the proponent shall fulfil the relevant commitments; provided that the commitments are not inconsistent with the conditions or procedures contained in this statement.

The list of consolidated environmental management commitments was included in Environmental Protection Authority Bulletin 827 (Appendix 5) and a copy is attached.

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.

2-2 Where, in the course of the detailed implementation referred to in condition 2-1, the proponent seeks to change the designs, specifications, plans or other technical material submitted to the Environmental Protection Authority 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 Drainage Management Programme

Detailed plans for the management of drainage are required.

3-1 The proponent shall ensure that drainage does not unacceptably affect vegetation on the site and its environs, nor the quality of water in Jones Creek.

3-2 Prior to the commencement of productive mining, to achieve the objective of condition 3-1, the proponent shall prepare a Drainage Management Programme. This programme shall include, but not be limited to:

1 drainage of the waste dumps,
2 ore stockpiles,
3 processing plant, and
4 tailings dam,

to the requirements of the Minister for the Environment on advice of the Department of Environmental Protection in consultation with the pastoral lessee.

3-3 The proponent shall implement the Drainage Management Programme required by condition 3-2.

4 Jones Creek Diversion

4-1 The proponent shall ensure that the diversion of Jones Creek maintains downstream water flows in the long term.

4-2 Prior to undertaking work for the diversion of Jones Creek, to achieve the objective of condition 4-1, the proponent shall design the diversion to the requirements of the Minister for the Environment on advice of the Department of Environmental Protection and the Department of Minerals and Energy.

The design shall be prepared in consultation with the pastoral lessee giving regard to historical information on local flood heights of Jones Creek.

4-3 The proponent shall implement the design required by condition 4-2.

5 Six Mile Well block

5-1 The proponent shall manage the Six Mile Well block in a manner compatible with its eventual return to the Wanjarri Nature Reserve.

5-2 Prior to the disturbance of any land within the Six Mile Well block, to achieve the objective of condition 5-1, the proponent shall prepare an Environmental Management Programme for the area in consultation with the Department of Conservation and Land Management, and the National Parks and Nature Conservation Authority. This programme shall include, but not be limited to the following topics:

1 dust,
2 surface water management (erosional runoff),
3 groundwater (leaching)
4 rehabilitation, and
5 decommissioning;

and be prepared to the requirements of the Environmental Protection Authority on the advice of the Department of Conservation and Land Management, and the National Parks and Nature Conservation Authority.

5-3 The proponent shall implement the Environmental Management Programme required by condition 5-2.

6 Greenhouse Gas Emissions

6-1 At appropriate times, the proponent shall address, in the Performance and Compliance Reports required by condition 12, the following additional matters relating to greenhouse gas emissions:

1 calculations of the greenhouse gas emissions associated with the proposal, using appropriate methodology developed for Australia;

2 noting governments' desire to stabilise greenhouse gas emissions by the year 2000 and progressively reduce them thereafter. Also noting the Revised Greenhouse Strategy for Western Australia 1994 and the United Nations Framework Convention on Climate Change (FCCC); and

3 employment of best endeavours to comply with the position noted in 2 above and the FCCC Convention on greenhouse gas emissions, with reporting on progress,

to the requirements of the Environmental Protection Authority on advice of the Department of Environmental Protection.

7 Rehabilitation

In addition to waste dumps, ore stockpiles and tailings dams, other project areas will need to be properly rehabilitated.

7-1 Within six months following commissioning, the proponent shall prepare on-going rehabilitation plans to the requirements of the Department of Environmental Protection on advice of the Department of Minerals and Energy.

7-2 The proponent shall submit the plans required by condition 7-1 to Department of Environmental Protection for review every three years.

7-2 The proponent shall implement the rehabilitation plans required by condition 7-1.

8 Reporting

8-1 Within five years following the commencement of the operation of the tailings storage facility, the proponent shall submit a report which includes, but is not necessarily limited to the following:

1 description of the development of the tailings storage facility;
2 details of the operation of the facility and issues arising from and variations required to its operation; and
3 monitoring results,

to the requirements of the Environmental Protection Authority.

The reporting required by this condition shall be repeated thereafter at five-yearly intervals to the requirements of the Minister for the Environment.

Note: The Environmental Protection Authority will advise the proponent on the need for subsequent five-yearly reports.

9 Decommissioning

9-1 The proponent shall achieve the satisfactory decommissioning of the project, removal of the plant and installations and rehabilitation of the site and its environs, leaving the site in a sustainable condition in the long term.

9-2 Within five years following commissioning, or at such later time considered appropriate by the Minister for the Environment on advice of the Department of Environmental Protection, the proponent shall prepare a plan which:

1 describes the process for decommissioning and final rehabilitation of the project area;
2 provides for the long term stability of the surface water systems, in particular the Jones Creek diversions;
3 provides for the long term management of ground and surface water systems affected by the tailings disposal area; and

4 provides for the development of a 'walk away' solution for the decommissioned mine pits, process plant, tailings dam, and associated infrastructure,

to the requirements of the Environmental Protection Authority on advice of the Department of Environmental Protection, the Department of Minerals and Energy and the Water and Rivers Commission.

Note: A "walk away" solution means that the site shall either no longer require management at the time the proponent ceases operations, or if further management is deemed necessary, the proponent shall make adequate provision so that the required management is undertaken with no liability to the State.

9-3 The proponent shall implement the plan required by condition 9-2.

10 Proponent

These conditions legally apply to the nominated proponent.

10-1 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.

11 Time Limit on Approval

The environmental approval for the proposal is limited.

11-1 If the proponent has not substantially commenced the project within two years of the date of this statement, then the approval to implement the proposal as granted in the statement of 29 November 1990 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 two years referred to in this condition shall be made before the expiration of that period to the Minister for the Environment.

Where the proponent demonstrates to the requirements of the Minister for the Environment on advice of the Department of Environmental Protection that the environmental parameters of the proposal have not changed significantly, then the Minister may grant an extension not exceeding three years.

12 Compliance Auditing

To help determine environmental performance and compliance with the conditions, periodic reports on the implementation of the proposal are required.

12-1 The proponent shall submit periodic Performance and Compliance Reports, in accordance with an audit programme prepared by the Department of Environmental Protection in consultation with the proponent.

Procedure

1 Unless otherwise specified, the Department of Environmental Protection is responsible for assessing compliance with the conditions contained in this statement and for issuing formal clearance of conditions.

2 Where compliance with any condition is in dispute, the matter will be determined by the Minister for the Environment.

Note

1 The Drainage Management Programme and the design of the Jones Creek diversion, required by conditions 3 and 4, will need to be updated to incorporate the present changes.

2 The proponent is required to apply for a Works Approval and Licence for this project under the provisions of Part V of the Environmental Protection Act.

8. References

Environmental Protection Authority 1992, *Development of an environmental protection policy for air quality at Kwinana*, Bulletin 644, Environmental Protection Authority, Perth, Western Australia.

Environmental Protection Authority 1996a, *Narrikup export abattoir: Report and Recommendations of the Environmental Protection Authority*, Bulletin 808, Environmental Protection Authority, Perth, Western Australia.

Environmental Protection Authority 1996b, *Mt Keith Nickel Project: Tailings storage upgrade: Report and Recommendations of the Environmental Protection Authority*, Bulletin 812, Environmental Protection Authority, Perth, Western Australia.

Soil & Rock Engineering Pty Ltd 1990, *Yakabindie Nickel Project: Feasibility Study: Consultative Environmental Review*, Dominion Mining Limited, West Perth, Western Australia.

ecologia Environmental Consultants 1995, *Yakabindie Nickel Mine Project: Six Mile Well - Mt Pasco Block: Environmental Assessment*, Dominion Mining Limited.

Dominion Resources Pty Ltd 1995, *Application to Amend Existing Yakabindie Nickel Project Environmental Approvals (Bulletin 781)*, Dominion Resources Pty Ltd.

P. Moore and J. Pope 1991, *Ethnographic Survey of Yakabindie Nickel Project*, Centre for Prehistory, The University of Western Australia, Crawley, Western Australia.

Soil & Rock Engineering Pty Ltd 1991a, *Drainage Management Plan: Yakabindie Nickel Project*, Dominion Mining Limited, West Perth, Western Australia.

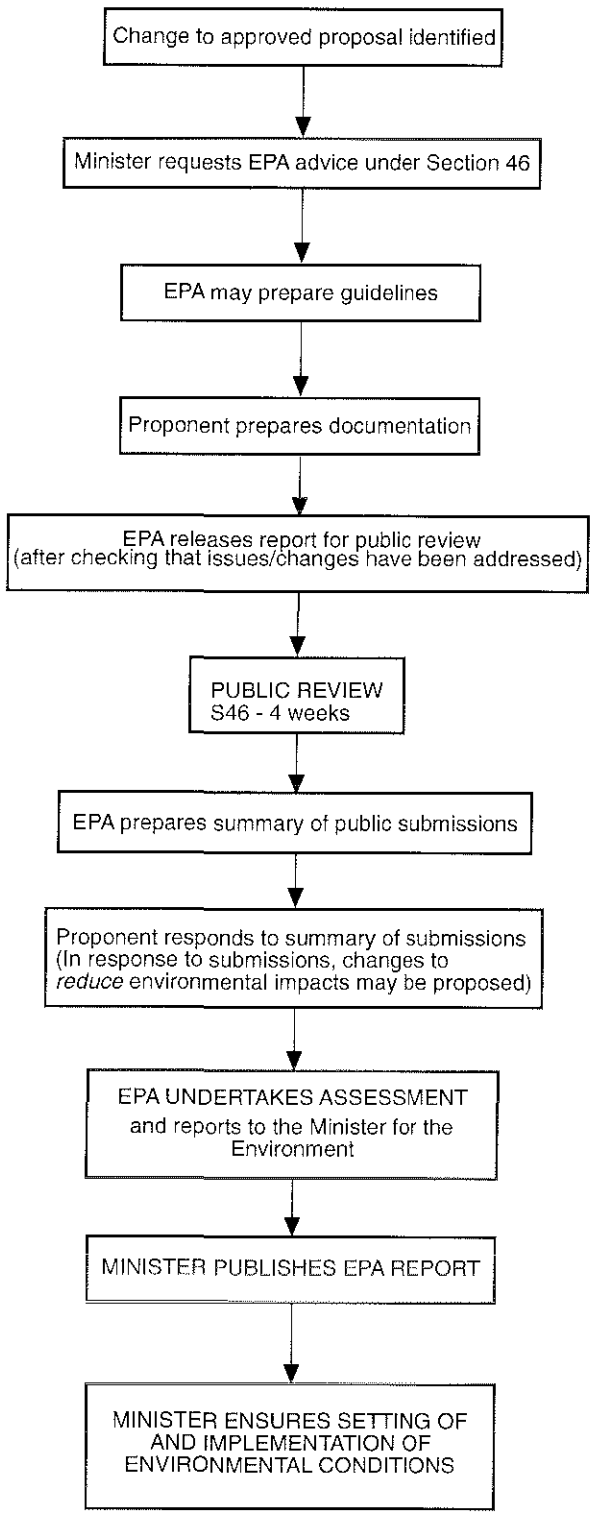
Soil & Rock Engineering Pty Ltd 1991b, *Creek Diversion Channels: Yakabindie Nickel Project*, Dominion Mining Limited, West Perth, Western Australia.

Greenhouse Coordination Council 1994, *A Revised Greenhouse Strategy for Western Australia 1994*, Environmental Protection Authority, Perth, Western Australia.

Appendix 1

Environmental Impact Assessment flow chart

EIA PROCESS FLOW CHART



There is no right of appeal on this request

EPA usually completes summary in 2-3 weeks

Report release often 3-5 weeks after receipt of response to submissions

Any body may appeal on EPA report to Minister within 14 days. Minister may remit to EPA or take appeal into consideration when setting conditions

Proponent may appeal on conditions within 14 days of issue

Appendix 2

Statement of conditions of approval (20 July 1995)

Ass # 957
Bull # 781
State # 388

WESTERN AUSTRALIA

MINISTER FOR THE ENVIRONMENT

STATEMENT TO AMEND CONDITIONS APPLYING TO A PROPOSAL (PURSUANT TO THE PROVISIONS OF SECTION 46 OF THE ENVIRONMENTAL PROTECTION ACT 1986)

PROPOSAL:	YAKABINDIE NICKEL PROJECT, LEONORA (352 / 352-1 / 765 / 957)
CURRENT PROPONENT:	DOMINION RESOURCES PTY LTD
CONDITIONS SET ON:	29 NOVEMBER 1990
CONDITIONS AMENDED ON:	24 MAY 1991 2 FEBRUARY 1993

The implementation of this proposal is now subject to the following conditions which replace all previous conditions:

1 Proponent Commitments

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

1-1 In implementing the proposal as reported on in Environmental Protection Authority Bulletin 444 and subsequently modified and reported on in Environmental Protection Authority Bulletins 509 and 668, the proponent shall fulfil the relevant commitments, provided that the commitments are not inconsistent with the conditions or procedures contained in this statement.

The list of environmental management commitments to be audited by the Department of Environmental Protection was included in Environmental Protection Authority Bulletin 781 (Appendix 1) and a copy is attached.

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.

Published on

20 JUL 1995

12th FLOOR, DUMAS HOUSE, 2 HAVELOCK STREET, WEST PERTH, 6005 TELEPHONE (09) 321 2222 FAX (09) 322 5149

2-2 Where, in the course of the detailed implementation referred to in condition 2-1, the proponent seeks to change the designs, specifications, plans or other technical material submitted to the Environmental Protection Authority 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 Drainage Management Programme

Detailed plans for the management of drainage are required.

3-1 Prior to the commencement of productive mining, the proponent shall prepare a Drainage Management Programme, to include drainage of the waste dumps, ore stockpiles, processing plant and the tailings dam, to the requirements of the Minister for the Environment on advice of the Department of Environmental Protection in consultation with the pastoral lessee. This programme shall ensure that drainage does not unacceptably affect vegetation on the site and environs or the quality of water in Jones' Creek.

3-2 The proponent shall implement the Drainage Management Programme required by condition 3-1.

4 Jones' Creek Diversion

Diversion of Jones' Creek should be designed to ensure that downstream water flows are maintained in the long term.

4-1 Prior to undertaking work for the diversion of Jones' Creek, the proponent shall design the diversion to the requirements of the Minister for the Environment on advice of the Department of Environmental Protection and the Department of Minerals and Energy. The design shall be prepared in consultation with the pastoral lessee giving regard to historical information on local flood heights of Jones' Creek.

4-2 The proponent shall implement the design required by condition 4-1.

5 Rehabilitation

In addition to waste dumps, ore stockpiles and tailings dams, other project areas will need to be properly rehabilitated.

5-1 Within six months following project commissioning, the proponent shall prepare on-going rehabilitation plans to the requirements of the Department of Environmental Protection on advice of the Department of Minerals and Energy.

5-2 The proponent shall implement the rehabilitation plans required by condition 5-1.

Note: The plans required by condition 5-1 will be made available for review by the Department of Environmental Protection.

6 Decommissioning

6-1 The proponent shall satisfactorily decommission the project, remove the plant and installations, and achieve the final rehabilitation of the site and its environs.

6-2 At least twelve months prior to decommissioning, the proponent shall prepare a decommissioning and final rehabilitation plan to achieve the objectives of condition 6-1. This plan shall ensure the stability of the site in the long term with particular reference to drainage.

6-3 The proponent shall implement the decommissioning and final rehabilitation plan required by condition 6-2.

7 Proponent
These conditions legally apply to the nominated proponent.

7-1 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.

8 Time Limit on Approval
The environmental approval for the proposal is limited.

8-1 If the proponent has not substantially commenced the project within three years of the date of this statement, then the approval to implement the proposal as granted in the statement of 29 November 1990 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 three 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 three year period, further consideration of the proposal can only occur following a new referral to the Environmental Protection Authority.)

9 Compliance Auditing
To help determine environmental performance, periodic reports on progress in implementation of the proposal are required.

9-1 The proponent shall submit periodic Progress and Compliance Reports, in accordance with an audit programme prepared by the Department of Environmental Protection in consultation with the proponent.

Procedure

1 Unless otherwise specified, the Department of Environmental Protection is responsible for assessing compliance with the conditions contained in this statement and for issuing formal clearance of conditions.

2 Where compliance with any condition is in dispute, the matter will be determined by the Minister for the Environment.

Note

The proponent is required to apply for a Works Approval and Licence for this project under the provisions of Part V of the Environmental Protection Act.

Peter Foss

Hon. Peter Foss, MLC
MINISTER FOR THE ENVIRONMENT

19 JUL 1995

Proponent's Environmental Management Commitments

to be audited

by the Department of Environmental Protection

June 1995

YAKABINDIE NICKEL PROJECT LEONORA

(352 / 352-1 / 765 / 957)

DOMINION RESOURCES PTY LTD

Appendix 1
Yakabindie Nickel Project
Summary of proponent's commitments

1.0 Introduction

Reference should be made to the Consultative Environmental Review document for a detailed understanding of project and the environmental monitoring and management programmes planned by the proponents.

2.0 Commitments

Dominion undertakes to fulfil the following commitments to protect the environment and public during the life of the Yakabindie Project from commitment to proceed with the project to decommissioning following the completion of mining, and while ever Dominion holds the leases on which project activities have been undertaken.

2.1 Government acts and regulations

- Comply with the requirements of all applicable Acts and Regulations.

2.2 Environmental Officer

- Appoint a Project Environmental Officer prior to the commencement of construction whose duties include:
  - (i) environmental impact assessment and monitoring of project activities;
  - (ii) design and implementation of the progressive rehabilitation programmes including research activities associated;
  - (iii) establish fauna monitoring programmes in consultation with CALM;
  - (iv) establish feral animal eradication programmes in consultation with CALM and the APB;
  - (v) liaise and report to Government Departments as required in relation to environmental matters;
  - (vi) act as an honorary warden for the Wanjarri Nature Reserve;
  - (vii) Set up an educational programme as part of the site induction of employees for the protection of the Wanjarri Nature Reserve and areas surrounding the project;
  - (viii) obtain the appropriate licence from CALM for seed collection activities associated with rehabilitation.

2.3 Environmental management programme

2.3.1 Baseline studies

- Carry out a baseline survey of Jones Creek aquatic biology and water quality as soon as possible prior to commencement of construction;
- Carry out a baseline groundwater quality survey as soon as possible prior to the commencement of construction downstream of the tailings dam and in the borefield areas.

2.3.2 Monitoring and inspection programmes

- Monitor groundwater levels and groundwater quality immediately downstream of the tailings dam on a regular weekly basis;
- Carry out daily inspections of the tailings dam;
- Monitor water quality of Jones Creek during the life of the project;
- Monitor groundwater resources (water quality and water levels) in the borefields and pastoral wells at Miranda, Paddy's Knob, Townsend and Henry Wells and pit dewatering, and evaluate extent and depth of drawdowns;
- Carry out regular inspections of the water pipeline from the borefields;
- Monitor noise levels to ensure compliance with Government Acts and Regulations.

2.3.3 Operational management procedures

2.3.3.1 Dust Control

- Establish dust suppression programmes to comply with Mines Department Regulations and minimise dust pollution of the project area and adjacent nature reserve through the following procedures:

(i) minimise clearing of land by staging clearing works and keeping clearing to the minimum for essential use consistent with safe and efficient operations;

(ii) fencing off areas not to be disturbed by the project;

(iii) limiting development of tracks and roads to essential requirements;

(iv) damping haul roads and plant roads with low salinity water when available;

(v) carry out trails with dust suppressant materials (enzymes) mixed with water to assist with dust suppression;

(vi) progressive rehabilitation of tailings dam and waste dumps;

(vii) cover the side slopes and upper surfaces of the tailings dam and waste dumps with rock to prevent wind erosion and dust formation.

(viii) - Dominion will control dust on roads to the tip face using water carts (similar to elsewhere on the lease)

- The northern and easterly faces of each dump lift will be rehabilitated early in the life of the Eastern Waste dump, and paddock dumping will occur in a southerly direction to reduce the chance of dust impact further.

2.3.3.2 Noise

- Where possible, minimise blast noise impact by scheduling blasting during optimal meteorological conditions.

2.3.3.3 Rehabilitation and decommissioning

- Carry out progressive rehabilitation of the waste dumps and tailings dam embankments and rehabilitate the project area to the level of the existing land use in accordance with the rehabilitation programme. This programme will be planned and carefully implemented form the commencement of mining to ensure it becomes part of the operational procedures of the project ensuring its cost effectiveness. Developments in rehabilitation techniques will be incorporated into the rehabilitation programme as appropriate.

(i) Vegetation and topsoil salvage

- in areas to be disturbed, all vegetation litter and topsoil (where present) will be salvaged by progressive removal in front of advancing waste dumps and immediately redeployed, where possible, to conform to natural thickness.
- Where redeployment is not possible, material will be stockpiled in areas specifically reserved for this purpose adjacent to redeployment areas for short term storage, these stockpiles will be surface ripped, seeded and fertilised.

(ii) Waste dumps

- are designed and will be constructed to blend into the existing topography such that visual impact from the main roads is minimised.
- will be constructed with overall 20 degrees overall slopes, in 10 metre high lifts, with a 5 metre wide berm for rehabilitation access separating each lift, with dumping to commence from the outside of the dumps and each lift built to full height before dumping in the centre is commenced.
- Tops of the dumps will be sloped towards the centre of the dump, ripped on completion of construction and windrows constructed at the edge of each terrace.
- Outer faces will be moonscaped and covered with fresh rock.

(iii) Open Pit

- On completion of mining the pit will be left in accordance with the details as laid out in the Department of Mines interim guidelines on safety bund walls around abandoned open pits.

(iv) Tailings Dam

- Will be constructed and operated to maximise water return and tailings density, by collecxtion of water through the central decant and upstream toe drain, with return water being re-used in processing.
- Will be constructed with 20 degrees overall slopes in 10 metre high lifts with a 5 metre wide berm for rehabilitation acess separating each lift.
- The tailings dam will be covered with a layer of waste rock on completion of mining.
- Outer slopes will be moonscaped and covered with fresh rock.
- The tailings lines will be located on the rebated upstream side of the embankment, and a downstream bund will be constructed to contain spills from water return lines which will be fitted with pressure transducers for automatic shut off and one way valves to limit drainage of these lines.
- Bunds will be constructed between the plant and downstream toe drain to contain any pipeline breakages between the plant and tailings dam.
- Decant systems will be left open on completion of mining to assist drainage, with any toxic leachates neutralised by passive methods or directed by pipeline into the abandoned open pit.
- In the event of adverse groundwater quality changes detected by groundwater monitoring a recovery bore or seepage trench system will be installed alternative tailings disposal techniques investigated or an alternative tailings disposal site will be considered.

(v) Support facilities

- establishment and re-introduction of local native flora will be carried out and co-ordinated by the environmental officer in the village area.

- sewage disposal will be carried out in a purpose built treatment plant for the main village and by septic tank and leach drain as appropriate for the houses and main offices.
- all domestic waste will be buried within the waste dump.
- to minimise clearing requirements powerlines, water lines and associated access roads will be constructed in one corridor.
- on completion of mining all buildings and equipment including water pipelines and power transmission lines will be removed. All pipes and boreholes will be capped, costeans backfilled and the ground ripped and seeded. All sites will be left clean and tidy.

2.3.3.4 Surface water

- Install silt traps to collect run-off from roads, waste dumps and tailings dam and prevent sediment from entering the drainage channels in accordance with the management plan for drainage to be provided to the Mines Department prior to commencement of construction;
- Disruption of overland water flow will be minimised by placing the maintenance road adjacent to the pipeline on the same level as the existing ground and raising the pipeline as appropriate to the topography and at least every 50 metres to permit free passage of run-off.
- In the unlikely event that the existing design of the eastern waste dump has not fully obviated the chance of ponding of water during an extraordinary rainfall event leading to flooding of part of the southern areas of the reserve, further suitable earthworks would be performed at that time to overcome such a problem.

2.3.5 Groundwater

- A groundwater management programme will be adopted to balance project requirements from the borefields with the quantities of water recovered from the tailings dam and mine dewatering;
- Pipelines from the borefields will be fitted with a series of one way valves at strategic locations to limit draining of pipes in the event of pipeline failure or for maintenance requirements.

2.3.3.6 Hazardous substances

- Transportation, storage and handling of hazardous substances will be in accordance with the appropriate regulations.
- Waste oils will be combined with fuel for the power station. Waste grease will be collected and transported off site for recycling.

2.3.3.7 Nature Reserve

- Provide new access to the Wanjarri Nature Reserve complete with gate and appropriate fencing.
- Institute education programmes as part of the site induction of employees for the Wanjarri Nature Reserve.

2.3.3.8 Pastoral activities

- Erect fencing as agreed with relevant parties around some or all parts of the development.

- Provide additional stock watering points where wells are affected by project dewatering.

2.3.3.9 Fire control

- Maintain strict fire control procedures.

2.3.3.10 Access to the project

- Restrict human and non avian faunal access to potentially hazardous areas by fencing if required.
- Signs, fences and gates will be installed where necessary to prohibit public access to the mine site and village.

2.3.3.11 Aboriginal interests

- Submit an application to the WA Museum for Aboriginal artefact sites which are to be disturbed.

2.3.3.12 Conditions of employment

- Recreational activities such as off road driving, hunting, etc, will not be permitted by employees.
- Keeping of domestic animals (dog, cats, etc) will be prohibited on the project.

2.4 Environmental management reports

- Submit an annual report of environmental management and monitoring programmes to an agreed format and content with State Authorities.

Appendix 3

Summary of submissions and proponent's response

Department of Environmental Protection

Head Office:
8th Floor, Westralia Square
141 St Georges Terrace
Perth, Western Australia 6000
Tel (09) 222 7000 Fax (09) 322 1598

Waste Management Division:
Ground Floor, 32 St Georges Terrace
Perth, Western Australia 6000
Tel (09) 222 0422 Fax (09) 222 0455
or PO Box Y3030, East, St Georges Terrace
Perth, Western Australia 6832

Regional Offices:
Bunbury • Karratha • Kalgoorlie • Kwinana

Operations Manager - Yakabindie Project
Dominion Resources Pty Ltd
PO Box 465
WEST PERTH
WA 6872

ATTENTION: GAVIN BECKER

Your Ref
Our Ref 103/74
Enquiries Ian Harvey

YAKABINDIE NICKEL PROJECT CHANGES, NORTHERN GOLDFIELDS (989)

As you are aware, your document "Application to Amend Existing Yakabindie Nickel Project Environmental Approvals" was distributed to relevant government and non-government agencies for review. Please find enclosed copies of responses received from the following agencies:

- Department of Conservation and Land Management
- National Parks and Nature Conservation Authority
- Department of Resources Development
- Department of Minerals and Energy

A copy of these responses may be attached as an appendix in the Environmental Protection Authority's assessment report. I would appreciate any comments you have in regard to matters raised in the responses and in particular to the specific matters raised by the Department of Conservation and Land Management.

In addition, the Department of Environmental Protection considers a more detailed explanation of the downstream processing component of the project is required. The following details should be provided to enable the EPA to evaluate the proposal.

- A full copy of the report submitted to the National Parks and Nature Conservation Authority (NPNCA) entitled "Yakabindie Nickel Mine Project, Six Mile - Mt Pasco Blocks Environmental Assessment", January 1995. This will assist the EPA to understand the detailed context within which the NPNCA has considered the proposal by Dominion to utilise the south-western corner of the Six Mile Block.

- A more detailed description, including an annotated flow sheet, setting out the entire processing route and which quantifies the expected waste stream and/or atmospheric emissions, including greenhouse gases, and other environmental impacts. The expected levels should meet EPA specifications as indicated in attachment 1.

- Environmental impacts and management associated with the proposed gas fired power station (eg: NO_X, noise) and the gas pipeline (alignment location, length of spur line, clearing, rehabilitation etc) should be discussed and quantified.

- A more detailed description of the proposed oxygen plant/process including quantifying emissions and analysis of risk.
- Identification of areas of potential risk eg: substances stored under pressure.
- The effect of the increased demand for sub-potable water from the aquifer on other users and the environment. The aquifer should be identified.

I note that no new proponent commitments are proposed and gather that the existing project commitments are intended to apply to the proposed project changes. For each of the proposed changes the relevant existing commitments should be identified. Where you consider that existing commitments are not sufficient to cover the changes to the project a new commitment should be included.

Should you have any queries regarding the above, please contact Ian Harvey on 222 7139.

for R A D Sippe
DIRECTOR
EVALUATION DIVISION

20 February 1996

enc copies of submissions from CALM, NPNCA, DRD and DME

(989)Yakabindie S46 140296 IHA

Attachment 1

Specification of objectives

Environmental topic	EPA objective
Leach residue disposal area and evaporation pond	Ensure the leach residue disposal area and evaporation pond are located and designed so as to minimise environmental impacts.
Social surroundings	Develop procedures in accordance with: Working with Communities, A Guide for Proponents, November 1993, Dept. Commerce and Trade
Rehabilitation	Develop process to identify post-mining land uses and define appropriate rehabilitation criteria.
Risk	Implement project to comply with criteria in EPA Bulletins 611 and 627
Environmental Management Programme	Implement an approved and effective EMP
NO_2 emissions	The maximum one hour average of NO_2 should not exceed 320 ug/m^3 at the nearest residence (World Health Organisation Standard).
SO_2 emissions	The maximum one hour average of SO_2 should not exceed 350 ug/m^3 at the nearest residence (World Health Organisation Standard).
H_2S emissions	Ground level concentration (3 minute glc value) should not exceed 0.00014 mg/m^3 or 0.0001ppm at nearest residence (Victorian EPA 1981 SEPP Policy Schedule 3).
CO emissions	Maximum one hour average of CO should not exceed 30 mg/m^3 at nearest residence. Maximum 8 hour average of CO should not exceed 10 mg/m^3 at nearest residence (NHMRC standards)
Greenhouse gas emissions	Consistent with EPA requirements.
Effects of gaseous emissions / dust on native vegetation.	Protect native vegetation from effects of gaseous emissions / dust on advice from CALM and DEP.
Fugitive dust - storage, transport and handling of materials	Control fugitive dust to an acceptable standard as determined by DEP.
Solid and liquid wastes	Implement best practice to avoid creating a contaminated site; refer to ANZECC & NHMRC 1992 Guidelines
Surface drainage	Ensure no adverse changes to existing drainage systems, vegetation/land systems, and dependent fauna.
Powerlines, pipelines, other utilities	Select route which avoids sensitive areas; rehabilitate to agreed landowner specifications.
Protect groundwater resource from pollution	Implement best practice to avoid contaminating the groundwater, refer to EPA Bulletin 711.
Water supply	Calculate water budget and ensure groundwater resource is not depleted.
Flora and fauna	Protect rare and endangered species. Minimise the loss of locally and regionally significant vegetation associations.

DEPARTMENT OF
MINERALS AND ENERGY
WESTERN AUSTRALIA

MINING OPERATIONS
DIVISION

MINERAL HOUSE
100 PLAIN STREET (CNR ADELAIDE TCE)
EAST PERTH
WESTERN AUSTRALIA 6004

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FACSIMILE (09) 325 2280

Your Ref :
Our Ref : JWB:CK 2299/92
Enquiries to : Mr Bill Biggs
Telephone : 222 3437

Department of Environmental Protection
Level 8, 141 St George's Terrace
PERTH WA 6000

ATTENTION: IAN HARVEY

YAKABINDIE NICKEL PROJECT CHANGES, NORTHERN GOLDFIELDS

Officers of the Department of Minerals and Energy have reviewed this document and support the concepts put forward in Dominion's proposal. In particular the reduction in footprint of the proposed tailings dam, integration of the tailings dam into the proposed waste rock stockpiles and reduced impact on breakaway country. It is also pleasing to see the incorporation of further processing of the ore on site.

The Department has no further comments to add, however before approval can be granted by the State Mining Engineer to commence construction and operation more detailed documentation will be required from Dominion for DME asssessment. The Department would encourage Dominion to contact the relevant officers in DME to discuss the additional information required.

Contact should be made with Kim Anderson (2223690) or Bill Biggs (2223437) for further information.

Regards

J W Biggs
MANAGER
ENVIRONMENT & REHABILITATION

19 January 1996

EMV445QY

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DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

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HACKETT DRIVE CRAWLEY
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Please address all correspondence to Executive Director, P.O. Box 104, COMO W.A. 6152

Your Ref: 103/74
Our Ref: 036996F3102
Enquiries: N Caporn
Phone: 334 0388

FAXED

The Chairman
Environmental Protection Authority
8th Floor, Westralia Square
141 St George's Terrace
PERTH WA 6000

Attention: Ian Harvey

YAKABINDIE NICKEL PROJECT CHANGES, NORTHERN GOLDFIELDS (957)

Thank you for your referral of 13 December 1995 requesting comments on the S46 document. This proposal has been developed in close consultation with the NPNCA and CALM.

Our specific comments are as follows:

Page 3; section 2.2 - This section refers to excision of 600 ha of the reserve for waste dumping. The NPNCA letter (Appendix A in the S46 document) indicates a preference for a General Purpose Lease and would not require a temporary excision from the A Class reserve. Also Dominion's proposal in its letter of 22 February 1995 to the NPNCA indicated this as a preferred option. This remains CALM's preferred option at this time, but that does not preclude further discussion with the company.

Page 18; section 4.3 - CALM acceptance of the proposal is subject to the completion of the appropriate geotechnical work and management systems and plans to protect the reserve. The buffer between the tailings dam and the reserve boundary should be maximised to allow for monitoring and any potential remedial programs.

CALM could advise on the visual landscape management of the tailings dam and assist with a sensitive design to minimise the visual impacts given the proposed dam's proximity to the reserve boundary.

Chris Haynes
A/EXECUTIVE DIRECTOR

16 January 1996

NC EPBRANCH\YAKA

National Parks and
Nature Conservation Authority

The Chairman
Environmental Protection Authority
8th Floor, Westralia Square
141 St Georges Terrace
PERTH WA 6000

Attention: Mr Ian Harvey
Your ref: 103/74

Dear Sir

YAKABINDIE NICKEL PROJECT - APPLICATION TO AMEND EXISTING ENVIRONMENTAL APPROVALS

Thank you for referring the Section 46 amendments for this project to the National Parks and Nature Conservation Authority (NPNCA). As you are no doubt aware Dominion Resources Pty Ltd have met and discussed with the NPNCA a large part of this proposal. Our comments were provided to the company and a copy of this letter is provided as an appendix in the proposal document (Bulletin 781).

We understand the Department of CALM has provided some more specific comments in relation to the need for completion of geotechnical work. The NPNCA supports the comments expressed by the Department.

Yours sincerely

Tom Day
CHAIRMAN

29 January 1996

HACKETT DRIVE, CRAWLEY, WESTERN AUSTRALIA TELEPHONE (09) 442 0300
All correspondence to be addressed to Department of Conservation and Land Management
P O BOX 104 Como 6152

DEPARTMENT OF
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Your Ref: 103/94
Our Ref: R0918/93 V2

The Chairman
Environmental Protection Authority
8th Floor, Westralia Square
141 St. George's Terrace
PERTH WA 6000

Attention Mr. Ian Harvey

YAKABINDIE NICKEL PROJECT CHANGES, NORTHERN GOLDFIELDS (957)

The Department of Resources Development wishes to make this submission in relation to the Consultative Environmental Review (CER) of December 1995 for the above project.

The Department expresses its strong support for the project for three reasons:

- The proponent wishes to now process the ore on site rather than ship the ore to another site and then have a contract processor (toll smelter) to process the concentrate to nickel metal. This decision will have significant benefit to the Western Australian economy.

- The use of the locally-developed Activox process for downstream processing appears to provide value adding, better efficiencies and lower environmental impacts.

- The processing of the ore on site means that instead of 150,000 t/a of concentrate being trucked to another location only 20,000 t/a of nickel metal will be transported. This means a major reduction in transport hazards.

John Prior
ACTING DIRECTOR
NORTH AND INLAND DIVISION

11 January 1996 (IAST0017)

093611

Dominion Mining Limited
A.C.N. 000 660 864

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2488/3.0/CL
ref: c2488a1.let

29 March, 1996

Director Evaluation Division
Department of Environmental Protection
8th floor, Westralia Square
141 St George's Terrace
PERTH WA 6000

Attention: Mr R A D Sippe

Dear Sir

RE: YAKABINDIE NICKEL PROJECT CHANGES, NORTHERN GOLDFIELDS (989)

1.0 INTRODUCTION

With reference to your correspondence of 20 February, 1996, we are pleased to provide the following:-

(i) Responses to the various agencies. These responses are outlined in Section 3.0 of this letter, and ;

(ii) Responses to the specific issues raised by the Department of Environment. These responses are outlined in Section 4.0 of this letter.

However, before moving onto these responses we believe it is appropriate to reinforce a number of background issues with respect to the proposed changes to the Yakabindie Nickel Project which reduce its environmental impacts. These comments are outlined in Section 2.0 of this letter.

2.0 BACKGROUND ISSUES

2.1 SO_2 Emissions

The only SO_2 emissions are from the gas fired power station, <0.30ug/m3.

The proposed changes to the process route in the Yakabindie Nickel Project will result in no SO_2 emissions. Likewise, the requirement for sulphur fixing in an acid plant with subsequent acid disposal problems does not arise.

Compared with conventional technology for the downstream processing of nickel sulphide concentrates, the Yakabindie process is simple and clean. All acid requirements are generated autogenously within the autoclaves with no intermediate generation of gaseous SO_2.

Even the acid laterite projects need to burn sulphur to generate sulphuric acid resulting in potential to produce SO_2 emissions. This will not occur at Yakabindie.

096016

received by hand 29/3

2.4 Greenhouse Gas Emissions

The principal source of hydrocarbon gas emissions from the burning of fuels will be the gas fired power station.

The current proposal is for two nominally 40MW gas fired turbines with two ancillary 4.5MW gas fired turbines. (The project will operate with one 40MW turbine and one 4.5MW turbine for load adjustment. The other machines are on standby.)

The gas requirement is estimated at 10.5TJ per day with expected atmospheric emissions per turbine of 600,000m^3/hour @ 90°C with 6grams per second (g/s) NO_2 (equivalent). Waste heat is recovered for process steam.

Emission concentrations, at the point of discharge, are expected to be:-

- Oxides of nitrogen (NO_2) <50mg/MJ fuel.
- Sulphur dioxide (SO_2) <1.00υg/m^3.

The change from a power station run on bunker fuel to a gas fired power station will result in less greenhouse gas emissions per unit of power generated. The 25MW power station, fired by bunker fuel, in the previous proposal had an estimated consumption of 48,500 tonnes of oil per annum producing 176,000 tonnes of CO_2 per annum. The current proposed gas fired power station will produce 220,000 tonnes of CO_2 per annum during normal operation.

In addition to the above the use of calcrete for the production of lime used in the process will liberate approximately 16,700tpa of CO_2.

It should be noted that the additional 60,000tpa of CO_2 in this proposal is produced during the downstream processing of nickel metal and cobalt concentrate. This CO_2 would have been produced elsewhere in processing the concentrates were this innovative process not to be employed at Yakabindie. Overall the project now brings nickel to the market place more efficiently.

3.0 RESPONSES TO AGENCIES

3.1 Department of Conservation and Land Management (CALM)

Recent discussions with representatives of CALM have indicated their acceptance of the proposal to have a Mining Lease in lieu of 60 General Purpose Leases over the south west corner of the reserve. Dominion are proceeding on this basis.

We understand this course of action would not require the excision of the land within the Six Mile Well Block from the south western corner of the Wanjarri Nature Reserve. However, a similar area of land represented by the Mt Pasco Block within the Yakabindie Pastoral Lease will still be handed to the State under the auspices of CALM and NPNCA.

The granting of this mining lease is subject to the approval of both houses of Parliament. At the same time this approval is obtained, Dominion Mining Limited would transfer the land represented by the Mt Pasco Block within the Yakabindie Pastoral Lease to the State.

The outline of the extreme outer limit of the proposed waste dump is shown on Drawing No. 15A-M31 which is attached. (Copies of this drawing have been sent to CALM and the Department of Minerals and Energy.)

Various odours and vapours from the Flotation and Electro-winning processing areas although detectable will not exceed levels set by relevant regulations. These odours are normally not detectable outside the relevant buildings.

Odours will not be detectable at the nearest area of habitation which is the Yakabindie Village, constructed to accommodate the project employees. The village is located approximately 2.5km from the plant site.

Commitments in respect to the transport, storage and handling of these products are presented in Section 1.3 (vi) of the original CER.

4.3 Gas Fired Power Station

4.3.1 Gas Emissions

The principal source of gas emissions from the burning of fuels will be the gas fired power station, refer to Section 2.4 above.

4.3.2 Gas Pipeline

The location of the gas pipeline is shown on Drawing No. 15A-M33 which is attached.
The length of the gas spur line is 11.9kms, of which 6.3kms will be in a common corridor with the proposed water pipelines. A separate corridor, to the south of the Wanjarri Nature Reserve, will be established from the water pipeline to the main take off point on the Goldfields Gas Pipeline.

The construction and operation of the gas spur line will be in accordance with applicable Government Acts and Regulations.

It is intended that the supplier of gas will own the spur line and will be responsible for the construction of this pipeline from the take off point to the delivery point within the process plant. The gas pipeline is to be buried in a separate trench and the ground surface rehabilitated following construction of the pipeline. Signs warning of the presence of a high pressure gas pipeline will be erected along the pipeline route at intervals such that at least one sign is visible from any position on the pipeline route to minimise the risk of accidental excavation.

Commitment

In addition to previous commitments Dominion Mining Limited makes the following new commitments.

- Construct and operate the gas spur line in accordance with applicable Government Acts and Regulations.
- Bury the gas spur line and rehabilitate the ground surface over the pipeline following construction.
- Erect signs along the pipeline route at intervals such that at least one sign is visible from any position on the pipeline route to warn of the presence of a high pressure gas pipeline.

Commitment

Refer to 4.4 above.

4.6 Sub-potable Water

Borefields for sub-potable water are located on the Yakabindie Station pastoral lease which is owned by Dominion Mining Limited.

Field testing of the sub-potable water during hydrogeological investigations for the project have demonstrated an operationally sustainable yield of 178m^3/hr for about 14 years, with declining supply thereafter. (However, the effect of recharge or throughflow has not been taken into account at this stage.) The project requirements are approximately 95% of the sustainable yield. In any event, the groundwater management procedures as outlined in Section 5.9.1.2, in the original CER will be implemented to monitor and identify impacts on local water resources.

Yakabindie Station is currently destocked. Dominion Mining Limited are not intending to stock the paddocks adjacent to the borefields and therefore there will be no impact on the additional use of sub-potable water on pastoral activities.

The hydrogeological studies carried out to date indicate that following the rehabilitation and decommissioning period, which could take up to 2 years, the groundwater levels in the sub-potable borefield would substantially recover.

Commitments in respect to the management of the borefields are outlined in Section 1.3 (iii) of the original CER, with groundwater management procedures outlined in Section 5.9.1.2, in the original CER. No new commitments in respect of the borefields are warranted at this stage.

5.0 CLOSURE

We trust this information meets your requirements and is sufficient to enable you to rapidly complete your assessment of the proposed changes to the Yakabindie Nickel Project.

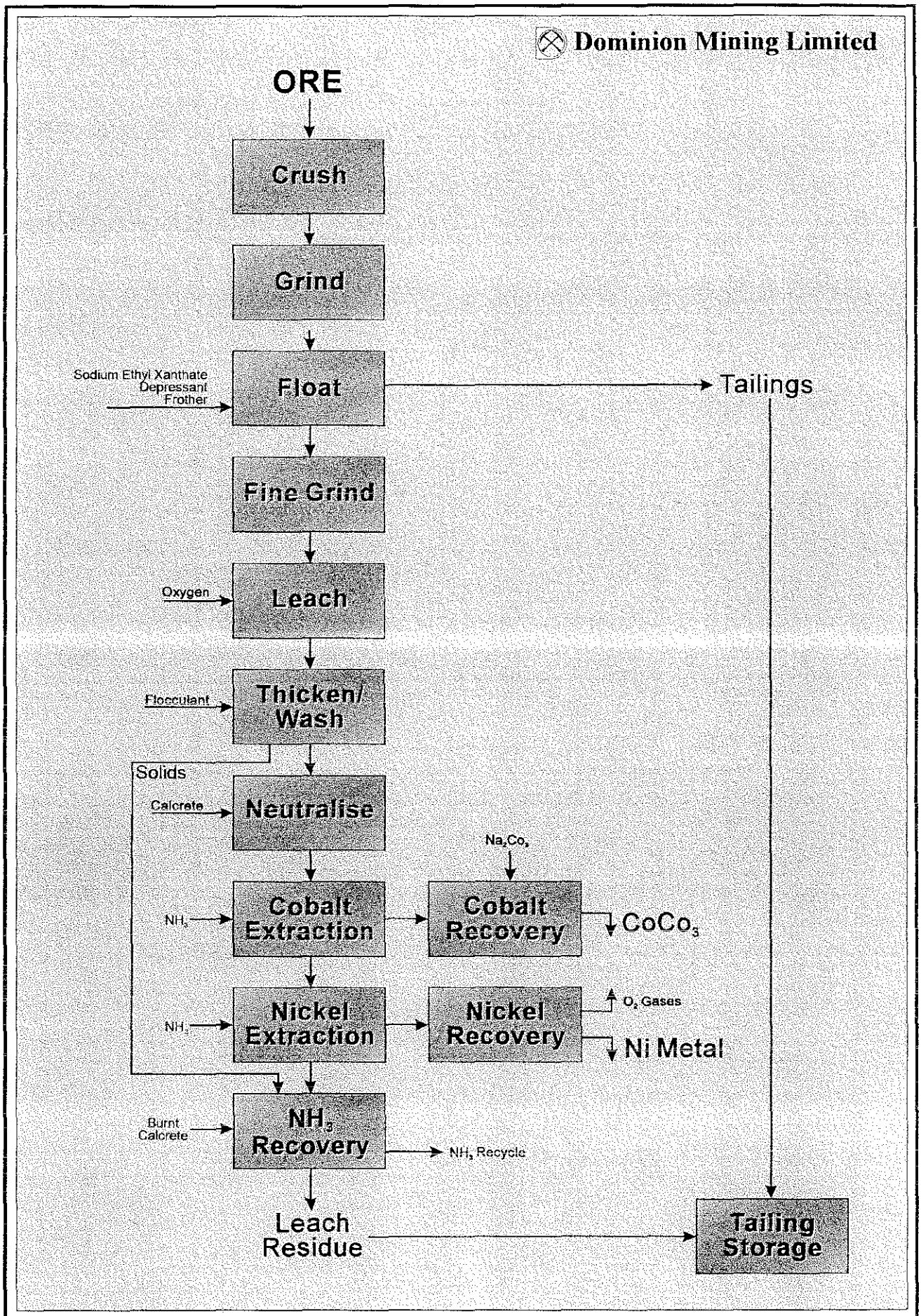
Should you require further information or clarification of any details, please do not hesitate to contact the undersigned or Dave Milton at Dominion Mining Limited.

Yours faithfully
pp DOMINION MINING LIMITED

Gavin Becker
PROJECT MANAGER - Yakabindie Nickel Project

Attachments
- o Drawing No. 15A-M31.
- o Drawing No. 15A-M32.
- o Drawing No. 15A-M33.
- o Six Mile Well - Mt Pasco Blocks Environmental Assessment.

Yakabindie Process Flow Sheet



Appendix 4

List of submissions

State and local government agencies

Department of Minerals and Energy

Department of Conservation and Land Management

National Parks and Nature Conservation Authority

Department of Resources Development

Appendix 5

Consolidated list of proponent's commitments

Yakabindie Nickel Project
Summary of proponent's commitments

Dominion Resources Pty Ltd (the proponent) undertakes to fulfil the following commitments to protect the environment and public during the life of the Yakabindie Project from commitment to proceed with the project to decommissioning following the completion of mining, and while ever Dominion holds the leases on which project activities have been undertaken.

Government Acts and Regulations

1. Comply with the requirements of all applicable Acts and Regulations.

Environmental Officer

2. Appoint a Project Environmental Officer prior to the commencement of construction whose duties include:

   (i) environmental impact assessment and monitoring of project activities;

   (ii) design and implementation of the progressive rehabilitation programmes including research activities associated;

   (iii) establish fauna monitoring programmes in consultation with CALM;

   (iv) establish feral animal eradication programmes in consultation with CALM and the APB;

   (v) liaise and report to Government Departments as required in relation to environmental matters;

   (vi) act as an honorary warden for the Wanjarri Nature Reserve;

   (vii) set up an educational programme as part of the site induction of employees for the protection of the Wanjarri Nature Reserve and areas surrounding the project;

   (viii) obtain the appropriate licence from CALM for seed collection activities associated with rehabilitation;

3. The proponent will enter into a Section 16A Joint Management Agreement with CALM (in conjunction with, and in the spirit of, the already signed Memorandum of Understanding) for the protection of a *Grevillea inconspicua* population and an area of the Montague landform unit near the project area.

Environmental Management Programmes

Baseline Studies

4. Carry out a baseline survey of Jones Creek aquatic biology and water quality as soon as possible prior to commencement of construction.

5. Carry out a baseline groundwater quality survey as soon as possible prior to the commencement of construction downstream of the tailings dam and in the borefield areas.

Monitoring and Inspection Programmes

6. Monitor groundwater levels and groundwater quality immediately downstream of the tailings dam on a regular weekly basis.

7. Carry out daily inspections of the tailings dam;

8. Monitor water quality of Jones Creek during the life of the project;

9. Monitor groundwater resources (water quality and water levels) in the borefields and pastoral wells at Miranda, Paddy's Knob, Townsend and Henry Wells and pit dewatering, and evaluate extent and depth of drawdowns.

10. Carry out regular inspections of the water pipeline from the borefields.

11. Monitor noise levels to ensure compliance with Government Acts and Regulations.

Operational Management Procedures

Dust Control

Establish dust suppression programmes to comply with Mines Department Regulations and minimise dust pollution of the project area and adjacent nature reserve through the following procedures:

12. minimise clearing of land by staging clearing works and keeping clearing to the minimum for essential use consistent with safe and efficient operations;

13. fencing off areas not to be disturbed by the project;

14. limiting development of tracks and roads to essential requirements;

15. damping haul roads and plant roads with low salinity water when available;

16. carry out trials with dust suppressant materials (enzymes) mixed with water to assist with dust suppression;

17. progressive rehabilitation of tailings dam and waste dumps;

18. cover the side slopes and upper surfaces of the tailings dam and waste dumps with rock to prevent wind erosion and dust formation;

19. The proponent will control dust on roads to the waste tip face using water carts (similar to elsewhere on lease).

20. The northern and easterly face of each dump lift will be rehabilitated early in the life of the Eastern Waste dump, and paddock dumping will occur in a southerly direction to reduce the chance of dust impact further.

Noise

21. Where possible minimise blast noise impact by scheduling blasting during optimal meteorological conditions.

Rehabilitation and Decommissioning

22. Carry out progressive rehabilitation of the waste dumps and tailings dam embankments and rehabilitate the project area to the level of the existing land use in accordance with the rehabilitation programme. This programme will be planned and carefully implemented from the commencement of mining to ensure it becomes part of the operational procedures of the project ensuring its cost effectiveness. Developments

in rehabilitation techniques will be incorporated into the rehabilitation programme as appropriate.

Vegetation and Topsoil Salvage

23. In areas to be disturbed, all vegetation litter and topsoil (where present) will be salvaged by progressive removal in front of advancing waste dumps and immediately redeployed where possible to conform to natural thickness.

24. Where redeployment is not possible material will be stockpiled in areas specifically reserved for this purpose adjacent to redeployment areas for short term storage, these stockpiles will be surface ripped, seeded and fertilised.

Waste Dumps

25 Are designed and will be constructed to blend into the existing topography such that visual impact from the main roads is minimised.

26. Will be constructed with overall 20° overall slopes, in 10 metre high lifts, with a 5m wide berm for rehabilitation access separating each lift with dumping to commence from the outside of the dumps and each lift built to full height before dumping in the centre is commenced.

27. Tops of the dumps will be sloped towards the centre of the dump, will be ripped on completion of construction and windrows constructed at the edge of each terrace.

28. Outer faces will be moonscaped and covered with fresh rock.

Open Pit

29. On completion of mining the pit will be left in accordance with the details as laid out in the Department of Minerals and Energy interim guidelines on safety bund walls around abandoned open pits.

Tailings Dam

30. Will be constructed and operated to maximise water return and tailings density, by collection of water through the central decant and upstream toe drain with return water being re-used in processing.

31. Will be constructed with 20° overall slopes in 10 metre high lifts with a 5 metre wide berm. for rehabilitation access separating each lift.

32. The tailings dam will be covered with a layer of waste rock on completion of mining.

33. Outer slopes will be moonscaped and covered with fresh rock.

34. The tailings lines will be located on the rebated upstream side of the embankment, and a downstream bund will be constructed to contain spills from water return lines which will be fitted with pressure transducers for automatic shut off and one way valves to limit drainage of these lines.

35. Bunds will be constructed between the plant and downstream toe drain to contain any pipeline breakages between the plant and tailings dam.

36. Decant systems will be left open on completion of mining to assist drainage, with any toxic leachates neutralised by passive methods or directed by pipeline into the abandoned open pit.

37. In the event of adverse groundwater quality changes detected by groundwater monitoring a recovery bore or seepage trench system will

be installed, alternative tailings disposal techniques investigated or an alternative tailings disposal site will be considered.

Support Facilities

38. Establishment and re-introduction of local native flora will be carried out and co-ordinated by the environmental officer in the village area.

39. Sewage disposal will be carried out in a purpose built treatment plant for the main village and by septic tank and leach drain as appropriate for the houses and main offices.

40. All domestic waste will be buried within the waste dump.

41. To minimise clearing requirements powerlines, water lines and associated access roads will be constructed in one corridor.

42. On completion of mining all buildings and equipment including water pipelines and power transmission lines will be removed. All pipes and boreholes will be capped, costeans backfilled and the ground ripped and seeded. All sites will be left clean and tidy.

Gas Pipeline

43. The proponent will bury the gas pipeline and rehabilitate the ground surface over the pipeline following construction.

Surface Water

44. Install silt traps to collect runoff from roads, waste dumps and tailings dam and prevent sediment from entering the drainage channels in accordance with the management plan for drainage to be provided to the Department of Minerals and Energy prior to commencement of construction.

45. Disruption of overland water flow will be minimised by placing the maintenance road adjacent to the pipeline on the same level as the existing ground and raising the pipeline as appropriate to the topography and at least every 50m to permit free passage of runoff.

46. In the unlikely event that the existing design of the Eastern Waste dump has not fully obviated the chance of ponding of water during an extraordinary rainfall event leading to flooding of part of the southern areas of the reserve, further suitable earthworks would be performed at that time to overcome such a problem.

47. The proponent will update the Drainage Management Programme and the Jones Creek Diversion plan, required by Environmental Conditions 3-1 and 4-1 (of the statement published on 20 July 1995), to incorporate changes made to the proposal.

Groundwater

48. A groundwater management programme will be adopted to balance project requirements from the borefields with the quantities of water recovered from the tailings dam and mine dewatering.

49. Pipelines from the borefields will be fitted with a series of one way valves at strategic locations to limit draining of pipes in the event of pipeline failure or for maintenance requirements.

50. Additional studies of the hydrological and geotechnical aspects of the tailings dam site will proceed and be submitted to the Department of Minerals and Energy, the Department of Conservation and Land

Management, the Water and Rivers Commission, and the Department of Environmental Protection.

Hazardous Substances

51. Transportation, storage and handling of hazardous substances will be in accordance with the appropriate regulations.

52. Waste oils and grease will be collected and transported off site for recycling.

53. A hazardous substances and dangerous goods register will be prepared that will detail the following procedures:

(i) Transportation, handling and storage practices.

(ii) Safety and hazard management.

(iii) Maintenance, testing and audit procedures.

(iv) Contingency, cleanup and disposal procedures.

(v) Personnel training procedures.

Emissions

54. The proponent will specify emission criteria in tender documents for the supply of equipment for the Plant. Compliance testing will be carried out by the proponent during the commissioning of the Plant to confirm that the emissions from the plant equipment are within the specified limits. This commitment will be implemented to meet the requirements of the DEP.

Safety

55. The proponent will construct and operate the gas pipeline in accordance with applicable Government Acts and Regulations.

56. The proponent will erect signs along the pipeline route at intervals such that at least one sign is visible from any position on the pipeline route to warn of the presence of a high pressure gas pipeline.

57. The proponent will construct the process plant in accordance with applicable Australian Standards and International Standards, as appropriate.

58. The proponent will operate the process plant in accordance with operational and safety procedures as prepared for the NOI (in respect to the operational safety issues as they relate to the new Mine safety Inspection Act) and other Government Acts and Regulations.

Nature Reserve

59. Provide new access to the Wanjarri Nature Reserve complete with gate and appropriate fencing.

60. Institute education programmes as part of the site induction of employees for the Wanjarri Nature Reserve.

61. The proponent will protect the buffer zone (a zone of approximately 200m established between the limit of waste dump and the Wanjarri Nature Reserve) from disturbance as agreed with by NPNCA.

62. The proponent will fence the area designated for inclusion into the Wanjarri Nature Reserve and protect the area of the excised nature reserve while active in this area by methods agreed with CALM.

Pastoral Activities

63. Erect fencing as agreed with relevant parties around some or all parts of the development.

64. Provide additional stock watering points where wells are affected by project dewatering.

Fire Control

65. Maintain strict fire control procedures.

Access to the Project

66. Restrict human and non avian faunal access to potentially hazardous areas by fencing if required.

67. Signs, fences and gates will be installed where necessary to prohibit public access to the mine site and village.

Aboriginal Interests

68. Submit an application to the W.A. Museum for Aboriginal artefact sites which are to be disturbed.

Conditions of Employment

69. Recreational activities such as off road driving, hunting etc. will not be permitted by employees.

70. Keeping of domestic animals (dogs, cats etc.) will be prohibited on the project.

Environmental Management Reports

71. Submit an annual report of environmental management and monitoring programmes to an agreed format and content with State Authorities.