

ASSESSMENT REPORT - NUMBER 9

**PINE CREEK  
GOLD MINE  
ENVIRONMENTAL  
ASSESSMENT REPORT**



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ENVIRONMENT UNIT  
CONSERVATION COMMISSION OF THE NORTHERN TERRITORY  
DARWIN N.T.

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Figure 1. Layout of Mine and Township.

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## 1. INTRODUCTION

Enterprise Gold Mines NL and Renison Goldfields Consolidated Ltd (RGC) have formed a Joint Venture to determine the feasibility of developing a gold mine at Pine Creek. RGC is functioning as the operator-manager of the Joint Venture and has implemented detailed economic, engineering and environmental studies prior to a final decision on the viability of the project.

The proposal has been examined under the provisions of *The Environmental Assessment Act* 1982 with the level of assessment proceeding to an Environmental Impact Statement (EIS). Details of the assessment process are provided in Section 1.2.

This report provides a record of the assessment procedure, discusses the potential environmental impacts, assesses the proposed mitigation measures, reviews the public submissions and makes recommendations which are designed to ensure that the project will operate in an environmentally acceptable manner.

### 1.1 Project Synopsis

A significant gold ore body has been delineated, centred on the former Enterprise Gold Mine immediately to the west of Stuart Highway and Pine Creek township (Figure 1). It is proposed to have an open cut mine operation, a metallurgical treatment plant and associated developments such as an overburden dump, tailings dam, process water reservoir, and support facilities.

The support facilities will include power and water supply systems and workforce accommodation in Pine Creek. A slight deviation of the Stuart Highway is necessary to a position about 80 metres closer to the town.

Approximately 14 million cubic metres of ore and overburden will be removed from the pit which will have final dimensions of 850 metres long, a maximum of 250 metres wide and 120 metres deep. The earth moving operation will occur continuously from Monday to 4 pm on Saturday over an expected life of 10 years.

The ore processing operation will involve a crushing and grinding plant, a leaching/carbon-in-pulp processing circuit and a gold recovery circuit. The tailings will be deposited in a storage pond using a subaerial deposition technique. Decanted supernatant water from the tailings will be stored for return to the process plant via the process water reservoir. The area involved in the mining and milling operation covers about 360 hectares.

The development of the mine will require a capital expenditure of about \$26 million. The workforce for both the construction and operation phase is expected to number 186 and 130 personnel, respectively. Accommodation and facilities for the workforce will be constructed in the township.

A detailed description of the project is contained in the EIS.

## 1.2 Environmental Assessment History

The project was brought to the attention of the Department of Mines and Energy (DME) in early 1983 when the joint venturers indicated that they wished to apply for a Mineral Lease. Informal preliminary discussions were held between a number of government departments and RGC in mid 1983, and preliminary documentation on the project was submitted in July and August.

It was realised both from this information and a general assessment of the project that the potential environmental impact was sufficient to warrant an EIS with its associated public review period. A set of guidelines indicating the

scope and content of the EIS was developed by the Conservation Commission in consultation with the Departments of Mines and Energy and Transport and Works.

The joint venturers engaged the environmental consultants Kinhill Stearns to prepare the EIS. The Draft document was presented in February 1984 and was distributed for comment to N.T. Government agencies, including the Departments of Mines and Energy, Transport and Works, Chief Minister's, Community Development, Lands, Health and Primary Production, and other agencies including the Housing Commission, NTEC, Tourist Commission, N.T. Development Corporation, ADMA, Emergency Services, Aboriginal Sacred Sites Authority, Office of Aboriginal Liaison, Museums and Art Galleries Board of the N.T. and all government Ministers. The Draft EIS was also distributed to the Environment Centre, National Trust, N.T. Government Information Centre and public libraries in Darwin, Katherine, Tennant Creek and Alice Springs. Public comment was invited during a four week period from 27 February to 23 March 1984.

A public meeting at Pine Creek was organised by RGC on 28 February 1984. The project was described and questions from local residents addressed. A very high proportion of the district population was represented and responses to the issues raised were included in the Supplement to the Draft EIS.

Altogether 12 private and 10 government submissions were received during the public review period; these were collated and submitted to RGC on 3 April 1984. The environmental consultants for RGC reviewed the submissions and maintained liaison with relevant government advisory bodies in preparing the Supplement to the Draft EIS.

The Supplement was submitted on 4 June 1984 and copies were distributed to everyone who made a submission on the Draft

document. Copied were also placed on public display at nine selected libraries, the enquiries counter at DME, the Government Information Centre and at the Post Office in Pine Creek.

The Draft EIS together with the Supplement combine to form the Final EIS.

This report assesses the potential environmental impacts of the project as it is defined by the Final EIS, and forms the basis of advice forwarded to the Minister for Conservation (in accordance with the Minister's responsibilities under Section 14.3 of the Administrative Procedures under *The Environmental Assessment Act*, 1982).

## 2. IMPACTS AND ASSESSMENT

The environmental impacts have been discussed in the EIS along with an assessment of their magnitude and proposed measures to manage them. The impacts are those commonly associated with a medium sized open cut mining operation, and are discussed below under the major activities or facilities involved in the proposed project. This allows the systematic examination of the effects of the project and the focussing of attention upon the cause of the impacts.

### 2.1 Clearing and Construction

The area that will be extensively cleared and disturbed by the construction of the project facilities involves about 200 hectares (Figure 1) on the western side of the Stuart Highway. Within this area will be the open cut, mill, overburden dump, tailings dump, decant water pond and process water pond.

The main impacts associated with the construction of these facilities are related to habitat loss, dust, noise, archaeological disturbance, soil erosion and visual disturbance.

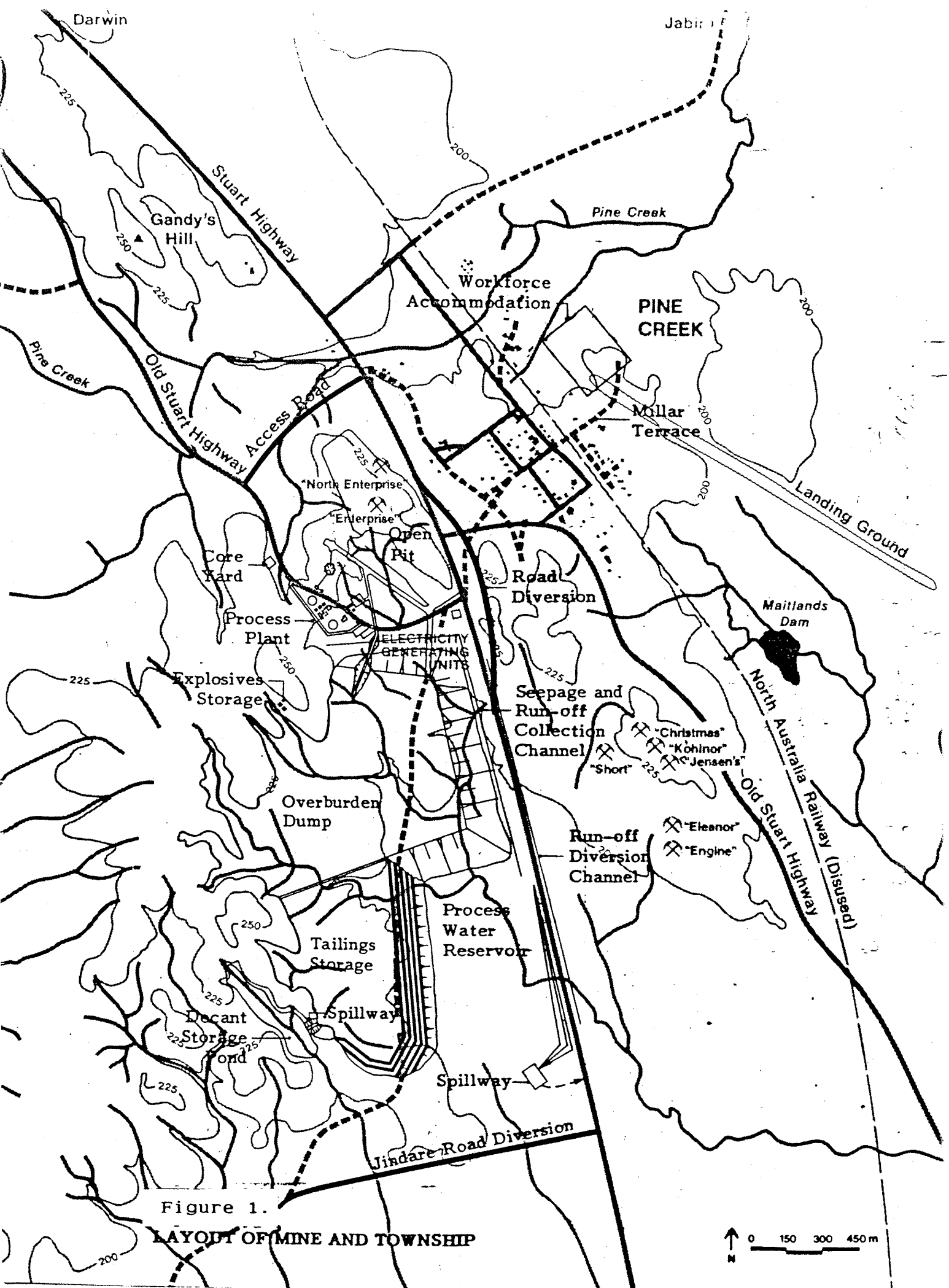


Figure 1.  
LAYOUT OF MINE AND TOWNSHIP

Source: Pine Creek Gold Mine Supplement, June 1984.  
Kinhill Stearns for RGC Ltd.



### 2.1.1 Habitat Loss

The loss of 200 hectares of the land system and vegetation communities and associated faunal habitats is an unavoidable impact of the project. The land lies within the Brocks Creek Ridge system and represents 0.02% of the 4040 sq km area of this system.

The vegetation communities which will be affected are distributed extensively in the region and are in better condition remote from Pine Creek itself - previous mining activity having led to considerable local vegetation community disturbance.

The proponent has stated that a rehabilitation program will be implemented with the objective of restoring the area to its natural condition. The program will be implemented both progressively as an erosion control measure and at the cessation of mining (as required under the *Mining Act 1980*).

### 2.1.2 Dust

The generation of dust will be unavoidable; maximum levels will be experienced during the construction phase, with some dust generation occurring throughout the life of the mine. Due to the proximity of the town, the proponent has recognised the potential impact of dust upon public health and as a nuisance factor.

Estimates of the quantity of dust generated by various sources and measurements of the meteorological conditions in the area have been made. The background levels of dust in the town have been measured using dustfall gauges (EIS Section 6.2).

The levels have been found to be comparable to dust deposition rates typical of rural areas. Estimates of the quantity of dust generated by the project indicate that deposition rates would reach this typical level at a distance of about 0.5 km in the direction of the town (EIS Figure 6.3a).

The meteorological data indicates that the main dispersion directions are away from the town, particularly during the Dry season. The predominant dispersion directions are to the northwest and southeast and dust levels are predicted to reach background levels at about 1 km in these directions.

This information indicates that the increase in dust deposition will not significantly change the dust regime in Pine Creek. There are no other sites of human habitation along the predicted main dispersion directions close enough to be significantly affected. The impact upon vegetation and fauna is difficult to quantify but would not be expected to be significant considering their natural tolerance to dust from other sources.

The proponent has stated that mitigation measures to inhibit the generation of dust will be implemented (EIS Section 6.2.3). These measures include designing the mining operation in a manner that minimises dust generation and the watering of unsealed roads.

The proponent has also stated that the collection of meteorological data and monitoring data will continue in order to confirm the predictions. The monitoring program has been developed to include the monitoring of dust levels, concentration and mineralogical composition. A size analysis will also be performed to determine the amount of 'respirable dust' - a dust

fraction that has been identified as potentially more significant to public health than overall dust levels.

It is considered that the discussion by the proponent of the potential impact of dust has been adequate, and has identified a range of practicable mitigation measures. The discussion could have included the more practical measurements of dust concentration which are more relevant to public health standards. This would have allowed a more comprehensive assessment, however the overall conclusion is that if the mitigation measures are implemented there should not be a major impact upon public health (see Recommendation 2, Section 4 of this Report).

### 2.1.3 Noise

The mining operation will create a new noise source in the area. Noise will be more pronounced during the construction and initial mining phases, but will continue throughout the life of the operation. Due to the proximity of the town the proponent has recognised that noise has the potential to become a major impact.

The proponent has monitored background noise levels in Pine Creek and compared them with estimates of the sources of noise from the mining operation. The addition of noise from the mining operation to the background noise was estimated under worst case conditions.

The conclusions indicated that the nearest town sites would be subject to moderately loud noise somewhat equivalent to an air conditioner at five metres, and other sites would be subject to quiet noise somewhat equivalent to average office noise.

The proponent has stated that mitigation measures will be implemented to minimise noise generation (EIS section 6.3.4). These include the scheduling of the noisier mining operations to daylight hours, the use of suitable techniques to reduce blasting noise and the retention of waste rock on the eastern side of the pit as a buffer for as long as possible.

The proponent has also stated that monitoring of noise levels will be implemented and that they will discuss any other mitigation measures with the relevant government authorities and any affected residents as necessary.

It is considered that the discussion by the proponent of the potential impact for noise has been adequate, and that they have identified the potential for significant disturbance in the nearest parts of the town. There has not been vigorous community response on this issue and, provided the mitigation measures are implemented (see Recommendation 4), it is expected that detrimental noise impacts will be minimal.

#### 2.1.4 Archaeological Disturbance

The proponent has recognised that the project will affect archaeological sites relating to Aboriginal, European and Chinese history. In the area to be cleared there are eleven Aboriginal sites and two European sites which are considered to be significant.

The eleven Aboriginal sites were identified during an archaeological survey of the region (EIS Figure 3.2), which identified fifty three sites. The details of these sites are confidential but the relevant Aboriginal and N.T. government agencies have been involved in assessing their significance.

The proponent has stated that for sites that will be disturbed by the project, a program of salvage archaeology will be implemented (EIS Section 4.1.3). The other sites will be protected by their confidentiality, if outside the immediate vicinity of development, or by the active discouragement of interference for sites that had to be identified.

One Aboriginal site of significance has been identified by the Aboriginal Sacred Sites Authority within the proposed area of development. Other sites have also been identified within the Exploration Licence area and discussions about all these sites are being held with the Sacred Sites Authority by the proponent (EIS Section 4.2.3).

There has been a comment by the Office of Aboriginal Liaison that the degree of consultation with the local Aboriginal community did not appear to be satisfactory. The proponent has stated that they will comply with the relevant legislation and will develop further liaison with Aboriginal agencies and the Pine Creek community (EIS Section 7.5.4).

Two European sites and one Chinese site occur in the immediate vicinity of the proposed development (EIS Figure 4.2).

The two European historic sites have already been extensively disturbed and it appears that their presentation would be best handled at an interpretation centre in Pine Creek. The Chinese historic site will not be directly affected and no specific statement was made by the proponent. The general commitment by the proponent to develop an induction program designed to engender respect for aspects of the local environment and to co-operate with the National Trust in protecting

and in presenting any heritage sites (Supplement Section 4.3.2) is supported (see Recommendation 6, Section 4).

The project will have an indirect effect upon all the archaeological sites in the region through an expected increase in fossicking. The proponent has stated that the induction program will address this aspect, and that it is the responsibility of N.T. government agencies to take appropriate action. There has been no adverse comment to this statement by the relevant agencies.

#### 2.1.5 Soil Erosion

The clearing of vegetation, stockpiling of topsoil and construction of earthworks will create the potential for soil erosion on a massive scale. The impact of the loss of the resource and upon the water systems depends upon the actual quantity that is lost, which in turn depends upon the success of mitigation measures.

During the Dry season the principal dispersion mechanism is the wind, and the success of dust suppression measures will control the degree of impact. During the Wet season the principal dispersion mechanism is water. The watershed directions in the area are to the northeast into Pine Creek and southeast into Bonrook Creek (EIS Figure 5.2).

On much of the mine site itself drainage is to the southeast where the process water pond will act as a siltation trap. To the north, the construction of the access road will provide the opportunity for drainage control though no specific recognition of this aspect has been made by the proponent.

The combined effect of these measures should ensure that the potential for the soil to enter the local water systems is minimised.

Soil that does enter the creeks may be expected to increase the siltation rate at depositional areas. However no sites with functions such as water supply or recreational use have been identified as critical sites which may warrant specific protection.

The proponent proposes to utilise soil erosion control techniques which would minimise the erosion potential, and to liaise closely with relevant government agencies such as the Land Conservation Unit of the CCNT (Supplement Section 9.2.2 and see Recommendation 1, Section 4). Rehabilitation to stable land surfaces would occur both progressively and at the cessation of mining, and in the long term it is proposed to restore the area so that it is as stable as surrounding areas.

The proponent had to be prompted into recognising the necessity for short term erosion control measures, but has now made the commitment. Site-specific measures will be determined on-site, however the general control measures will include contouring, silt traps, hay-mulching, artificial meshes and irrigation.

#### 2.1.6 Visual Disturbance

The impact of visual disturbance to motorists will be more pronounced during the clearing and construction phase but will continue throughout the life of the mine. The distraction will contribute to the traffic hazard in the area as will the increased volume of cross-highway traffic.

The proponent has not completely identified and discussed this impact but has proposed to consult with Roads Division of the Department of Transport and Works about the Stuart Highway realignment and associated traffic problems (Supplement Section 8.4.3).

## 2.2 Mining

The mining of the ore and overburden from the open cut pit is a large earthmoving operation that will contribute to the noise, dust and soil erosion impacts. These have been discussed previously and appropriate mitigation measures which relate to this phase of the project have been proposed (EIS Section 6.3.4). Other impacts associated directly with this activity are related to the necessity to dewater the pit and the ultimate use of the pit.

### 2.2.1 Pit Dewatering

The proponent has identified the fact that the dewatering of the pit will affect the water supply bores in the region. Estimates of the magnitude of the drawdown effect have been made by the proponent (EIS Section 5.3), and it has been pointed out by the Department of Transport and Works that this indicates that eventually all of the town bores would become unproductive. This conclusion was not refuted by the proponent but they indicated that they would be performing further studies, monitoring the effect, and developing a new borefield to supplement the town supply.

Because of the technical uncertainty about the actual effect of the drawdown it appears that the development of the new borefield is necessary. The proponent has also stated that the monitoring results would be reviewed annually and the results submitted to the



Department of Transport and Works (EIS Section 5.3.5 and see Recommendation 8 of this report). It is considered that if all these mitigation measures are implemented then the potential impact of the dewatering will be acceptably handled. The water will be retained as process water rather than released, so there appears no potential impact arising from the release of water.

#### 2.2.2 Pit Rehabilitation

At the cessation of mining the open cut pit would form a large, deep hole which will partially fill with water. The ultimate use of the pit will be determined at a later date taking account of the views of the local residents, the Department of Mines and Energy and the CCNT (Supplement Section 9.2.8). If it was decided to leave the pit open, then considerations of the minimum amount of rehabilitation would address the issues of public safety, mosquito breeding potential and recreational use. The proponent did not fully discuss these issues but their commitment to consult with the appropriate people is acceptable (see Recommendation 9, Section 4).

#### 2.3 Milling

The milling operation involves the crushing and then chemical treatment of the ore and includes the generation of power and the handling of chemicals. This part of the operation will contribute to the noise and dust impacts which have been discussed previously but it is worth detailing those mitigation measures which relate to this part of the project.

The main contribution to the noise level has been identified as the power generation units with the crushing units of secondary importance. The proponent has stated that the relocation of the power units or acoustical attenuation is

being investigated but there is no commitment to implement these measures. The main contribution to dust or air pollution are the power generating units as the crushing facility will be enclosed and have dust suppression equipment.

The proponent has not discussed the contribution from the power units but it was stated that if the monitoring program identified any possible public health risk generated by the mine then appropriate mitigation measures would be implemented (Supplement Section 6.1.3). Considering the small size of the power units it is not expected that they will be a significant source of pollution.

#### 2.3.1 Chemicals Handling

The transport, handling and use of chemicals has been recognised as possibly having an impact in the event of an accidental spillage. The intensity of the impact would depend upon the location of the spillage in relation to borefields, dwellings, etc. The proponent recognises the requirement to adhere to the relevant Dangerous Goods Regulations for the transport and storage of the chemicals (Supplement Section 2.6). The use of chemicals around the mill will be confined to enclosed areas with sumps to collect spillages (EIS Figures 2.5,2.6).

The discussion by the proponent of the potential impacts of the milling operation is considered to be acceptable - particularly considering the high degree of control that the Department of Mines and Energy has over this phase of the operation.

#### 2.4 Waste Materials Handling

The mining and milling operation will produce substantial quantities of waste materials either directly as overburden or

after milling as tailings. The overburden dumping activity will contribute to the noise, dust, visual and soil erosion impacts, which have been discussed previously as part of the clearing and construction phase.

The mitigation measures to restrict the generation of noise include attenuation treatment of major mobile equipment such as haul trucks. The proponent has not indicated whether these measures will be implemented immediately or following a noise monitoring program and community reaction. The mitigation measures to restrict the generation of dust include the watering of haul roads, minimising spillage from haul trucks and watering the dumps. The proponent has made a commitment to implement these measures (EIS Section 6.2.3). The tailings handling activity will not contribute to these impacts because it is handled as a wet slurry.

There is a potential impact from the formation of acid leachate from sulphidic material - mainly in the tailings but also in the overburden. There is also a potential impact from the accidental spillage or release of tailings that may contain residues of process chemicals.

#### 2.4.1 Acid Leachate

The proponent has identified the potential for the formation of acid leachate as a problem - particularly in the longer term following the decommissioning. During the operation of the mine, any leachate will be contained by the process water pond except for storm overflow situations and minor amounts of seepage. The impact in these situations is expected to be insignificant because of the massive dilution.

The proponent has recognised the objective of minimising the formation of leachate, and has proposed mitigation measures which will be implemented both

progressively and during the final rehabilitation phase (Supplement Section 9.1). For the overburden dump, the measures include minimising infiltration by depositing the material as partly compacted layers and ensuring complete surficial drainage, and placing the sulphidic material in discrete pods, possibly with neutralising material such as lime, and capping the pods with a layer of clay.

For the tailings material, the measures include maintaining an alkaline condition during the operation of the dam, depositing the tailings subaerially in layers which inhibit infiltration of rainfall, and shaping the surface during final rehabilitation to minimise infiltration.

The proponent has also stated that a water quality monitoring program will be implemented which will detect leachate and allow the implementation of appropriate measures (Supplement Section 5.2.4). The program will include surface water monitoring as well as groundwater monitoring via bores. The monitoring would continue after the cessation of mining for a period agreed with the Water Division (Supplement Section 9.1.2).

The discussion by the proponent of the potential impact of acid leachate and the proposed mitigation measures is considered to be acceptable.

#### 2.4.2 Tailings Spillage

The tailings will be the most contaminated material from the milling operation, and the plan for handling them involves containment in a pipeline from the mill to the dam. The potential for the accidental release of the material is related to the integrity of the

pipeline and the competence of the dam design. The proponent has stated that the pipeline will be within a bunded corridor which will minimise the dispersion of any spillage. The tailings would be accessible for reclamation and removal to the dam, and the supernatant would drain to the process water pond (Supplement Section 2.2.3).

The proponent also has stated that the design of the dam would reflect accepted engineering practice. This aspect is the responsibility of the Department of Mines and Energy and their lack of comment on this aspect implies their acceptance of the competence of the design.

## 2.5 Water Management Ponds

The operation of the water/management ponds forms an integral part of the water management system; this system is designed to retain as much water as possible for process requirements and to minimise the release of contaminated water.

There are two main storage ponds, the decant water and the process water ponds, and several secondary sumps and channels which form the water management system. The sumps and channels in the pit, mill and around the project area are designed to direct water to the process water pond. The water - run-off or groundwater - is expected to be good quality, and, along with the direct run-off into the process pond, will supply the bulk of the mill water requirements. The decant water pond consists of supernatant from the tailings which will be contaminated with process chemicals and impurities in the ore. The water will be directed to the mill as primary process water and any spillage from the pond will be directed back to the tailings storage.

The potential impacts are related to seepage, release in times of extreme rainfall and access for fauna to the contaminated water in the decant pond.

#### 2.5.1 Seepage

The proponent has estimated the quantity of seepage from the two ponds using knowledge of the geology and similar hydrogeological situations (EIS Section 5.2.3). The estimated quantity is minute compared with groundwater capacity and there is expected to be massive dilution of the seepage plume. Only the seepage from the decant pond can be regarded as contaminated, and the rate of movement of the groundwater will result in its rapid dispersion. This rate is calculated to be between 20 and 200 m/a and it is expected that as the cone of depression forms around the borefield to the south the seepage plume will be captured and returned to the process water pond.

The proponent has stated that a series of six monitoring bores will be constructed and that these will be monitored on a regular basis as determined in consultation with the Water Division (EIS Section 5.2.4).

Considering that the seepage will be collected by either the pit dewatering system or the southern borefield, and that the seepage will undergo massive dilution it is considered that the proponent has satisfactorily addressed this issue.

#### 2.5.2 Release

Water budget modelling has indicated that the process water pond will overflow about two years out of every five. A spillway channel will be designed to handle

these events. The quality of the water is expected to be high as it will be mainly run-off and groundwater; no specific measures are proposed to control it.

The proponent has stated that a monitoring program will be implemented to determine the quality of the spillage water (Supplement Section 5.2.4).

### 2.5.3 Faunal Access

The potential for fauna to utilise the water from the decant pond has been recognised by the proponent as a potential impact. They have stated that a stockproof fence will be built which will keep large terrestrial fauna out. The ponds will be maintained in as biologically sterile a condition as possible by measures such as vegetation clearance of the banks and steep sides, and this will minimise the attraction to other fauna (EIS Section 3.3.7).

The use of the ponds by mosquitoes will be inhibited by the measures discussed above and also by inhibiting plant growth.

## 2.6 Ancilliary Developments

The development of the project includes the construction of support facilities in the town; these will have an impact upon the infrastructure and commerce of the town, and region.

### 2.6.1 Infrastructure Demand

The proponent has recognised that the increased population and developments in the town will increase the demand for water supply, electricity, sewerage and garbage facilities and will also affect the transportation system.

The proponent has estimated the increase in potable water demand and has proposed to augment the present supply by developing new borefields to the northeast and south of the town (Supplement Section 8.1.3).

The increase in demand for electricity will be met by the construction of a 22 kv transmission line from Katherine which is scheduled for completion in December 1984. The proponent has accepted responsibility for the minor additions to the reticulation system (Supplement Section 8.2).

The sewerage system will require additional capacity and the design of the extra facility will be undertaken in consultation with the Department of Transport and Works (Supplement Section 8.3).

The proponent has recognised the fact that the increase in population and therefore garbage will shorten the life of the existing landfill, and has initiated discussions with the Department of Community Development. The proponent has also indicated that negotiation with the local contractor for their refuse collection service will take place, and this appears to be the extent of their financial responsibility (Supplement Section 8.5).

Effects of the project on the local transportation system involve the relocation of the Stuart Highway and Jindare access road, and abandonment of the airstrip. The proponent has indicated that the location and design of these roads will be discussed with the Department of Transport and Works and will utilise accepted traffic engineering practice (Supplement Section 8.4.3)



The design of the highway will include consideration of the expected traffic capacity in the long term, and the increased traffic hazard at intersections which will cater for mine traffic. The location of the highway will be determined after consideration of archaeological, drainage and soil erosion aspects.

The abandonment of the airstrip is an issue that is the responsibility of the Department of Transport and Works. The proponent has indicated that they will be constructing facilities near the end of the airstrip and for safety reasons would support the NT government proposal to abandon the airstrip.

#### 2.6.2 Commercial Development

The development of the project will affect the economic development of the Pine Creek township and the region. The proponent has discussed the beneficial effects upon the NT economy and considered them to include increased employment and commercial development in Pine Creek, Katherine and Darwin. The structure of the economic developments have been described (EIS Section 9), which will allow forward planning by both the proponent and the relevant government agencies. Expenditure during construction is estimated to be \$26 million and for a typical year during operation is estimated to be \$13 million. The project is expected to directly employ 186 people during construction and 130 people during operation.

#### 2.7 General Project Considerations

The project in general will have an effect upon the Aboriginal community and the regional resources; the proponent has identified impacts upon the recreational, heritage and biological resources.

### 2.7.1 Aboriginal Consultation

The proponent identified an impact upon the Aboriginal community involving a change in their relative abundance in the community, further cultural disorientation and improved employment prospects. The proponent has stated that they will implement a number of measures to ameliorate this impact, including initiating discussions with the Aboriginal community in conjunction with the Aboriginal Liaison Unit of the Department of the Chief Minister, developing an induction booklet, implementing a non-discriminatory employment policy, and maintaining contact by the mine manager with the community (EIS Section 7.5.4).

The level of concern exhibited by the proponent over potential impacts to the Aboriginal community has been queried by a government agency and Recommendations 6 and 10 (Section 4 this report) have been framed to ensure adverse impacts are minimised.

### 2.7.2 Recreational Activity

The proponent has identified a potential impact upon the parks and the more informal recreation areas of the region stemming from the increased population. There will also be an impact upon the heritage sites due to increased fossicking, and the proponent has proposed several control measures.

The proponent has stated that an induction booklet will be prepared which will contain educational information about both the recreational and heritage sites, and that the relevant NT government departments are being kept informed of the status of the project so that they may plan appropriate action (EIS Section 7.5.2).

The proponent has aimed the strategy at the mine workforce because it is felt that the development of the mine would not have a significant effect upon tourism.

### 2.7.3 Biological Disturbance

The proponent has identified a range of fauna in the region and has assessed the potential impact upon them. The conclusion has been that for most of the faunal species recorded, it is expected that the habitat loss which would result from the development of the mine would not greatly affect their status in a regional context (EIS Section 3.3.6).

There are a number of significant bat, mammal and avifaunal species which warrant special consideration. Three bat species, the ghost bat, the lesser warty-nosed horseshoe bat and the orange horseshoe bat, are endangered or rare. These bats were found in the Chinatown area where there are numerous adits suitable as roosting or maternity sites.

The potential disturbance to these bat species by increased noise, hunting, fossicking, feral cats and fire was a cause of concern. The proponent has stated that it was not felt that the development of the mine will have a direct impact upon the bats, and that the proponent's action will be limited to including a section in the induction booklet stressing the sensitive nature of the fauna (Supplement Section 3.5.1). They felt that other authorities such as the CCNT should implement some protective measures, particularly for the ghost bat which is listed in the IUCN Red Data Book of Endangered Species.

This attitude is not completely acceptable to CCNT as it is considered that blasting during the maternity phase of the ghost bat residency in Kohinoor may directly affect survivorship of juveniles. It is appropriate that this Commission and the proponent combine to monitor the effect of blasting on the maternity colony (i.e. during September - October) in the first instance, to determine if a modified blasting strategy appears indicated. Recommendations 11 and 12 (Section 4) have been formulated to address this issue.

There are five avifaunal species which were considered to be significant (EIS Section 3.3.3), with the hooded parrot regarded as resident in the area and therefore susceptible to disturbance. It was found that Maitlands Dam was a focal point for the species and it was felt that there would be no direct effect from the development of the mine upon this area. There would be some minor disturbance to the areal habitat of the species due to development in the town. The proponent has stated that educational material on the local ecology would be included in the induction booklet (EIS Section 7.5.2).

There are three mammal species which were considered to be significant; the Darling Downs dunnart, the Carpentarian dunnart and Forrest's mouse. The first two species were recorded from sites outside the area to be developed and no special protective measures were seen to be warranted.

The Forrest's mouse was a single individual trapped in the area designated for the overburden dump and tailings dam. In the absence of further evidence about the distribution of the species the proponent has not proposed any specific protective measures.

### 3. Review Summary

The Pine Creek Gold Mine Project has been adequately described in the Draft EIS and Supplement, which together form a Final EIS. The proponent, Enterprise Gold Mines NL and Renison Goldfields Ltd, has, as part of the planning for the project, identified the impact of the project upon the environment. This includes both the expected and potential impacts and has allowed the opportunity for input from both government and private sources.

The Draft EIS identified most of the impacts and the Supplement completed the discussion and addressed the issues that arose from the public review of the project.

The assessment by NT government agencies was co-ordinated by the Environment Unit of the CCNT which received advice from various sources and accepts responsibility for the recommendations contained in this report.

#### 3.1 Review of Submissions

A total of 22 government and private submissions were received and these have been indexed and paraphrased in Appendix A of the Supplement. The response by the proponent to the issues identified in the submissions has also been indexed for easy cross-referencing.

An assessment of the adequacy of the response is a critical aspect of the overall assessment of the project because the public review phase provides all interested parties the opportunity to raise the issues that concern them.

The response by the proponent to the majority of the comments is considered to be satisfactory as far as answering a query, resolving a conflict or proposing suitable management methods. A lot of the issues were made obsolete by design changes that were made after the Draft EIS was released.

Only one comment was received on the Supplement which indicates that the people who commented on the Draft EIS were satisfied with the response by the proponent.

The Office of Aboriginal Liaison indicated that they were not satisfied with the scope or effectiveness of consultation with the Aboriginal community, and that the question of training and employment had not been comprehensively addressed.

The proponent has made generalised affirmations of intent in this regard and it is now up to the regulatory authorities to ensure that appropriate action is instigated.

#### 4. Recommendations

The environmental assessment of this project has been comprehensive in scope and has resulted in the formulation of the following recommendations designed to minimise environmental impacts.

It is recommended that:

- (1) the proponent formally invite the Land Conservation Unit of the CCNT to provide assistance with the design of soil erosion control structures both on-site and for the access road to the north of the project area;
- (2) the dust mitigation measures be implemented along with a public health monitoring program, the results of which are to be submitted to the Department of Health initially twice per year;
- (3) the power generation units use high grade distillate (Sulphur content < 0.5%) and maintain records of the analysis of the fuel, or install appropriate air pollution control technology;

- (4) the noise mitigation measures be implemented including the attenuation treatment proposed for the major mobile equipment and the generating units, and the monitoring program be implemented and the results be submitted to the regulatory authority twice per year;
- (5) the proponent implement the archaeological program and liaise with the Museums and Art Galleries Board of the NT to the extent that the Board can inform the CCNT that the provisions of the *Native and Historical Objects and Areas Preservation Act 1978* have been complied with;
- (6) the proponent prepare the induction booklet and submit it to the regulatory authority in a time frame so that it is available for the construction workforce shortly after the commencement of the project;
- (7) the proponent liaise with the Aboriginal Sacred Sites Authority and resolve the situation with the Kungararrk mythological site prior to any disturbance or cleaning activity in the project area;
- (8) the proponent devise a specific action plan to be implemented should any private water supply bore go dry because of the dewatering program, and submit it to the Director of Water Division;
- (9) the proponent consult with Water Division about the water monitoring program including an agreed period of monitoring following the cessation of mining;
- (10) in consultation with the Office of Aboriginal Liaison the proponent devise a plan to train and employ some Aboriginals from the local community;

- (11) no exploration activity which could possibly disturb the bat colonies be instigated in the Kohinoor area without prior consultation with the CCNT; and
- (12) the effect of the blasting upon the bat colonies be monitored by the proponent in conjunction with, at least initially, CCNT; this recommendation to be given priority if blasting is proposed in September - October 1984.