Upgrade of Dust Management at Finucane Island and Nelson Point, Port Hedland

BHP Iron Ore Pty Ltd

Report and recommendations of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
Bulletin 831
October 1996

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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 8 November, 1996.

Environmental Impact Assessment Process Timelines

Date	Timeline commences from receipt of full details of proposal from proponent for public review	Time (weeks)
29/07/96	Proponent document released for public comment	
26/08/96	Public comment period closed	4
06/09/96	Issues raised during public comment period summarised by EPA and forwarded to the Proponent	2
20/09/96	Proponent response to the issues raised received	2
25/10/96	EPA reported to the Minister for the Environment	5

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Summary and recommendations

The Environmental Protection Authority (EPA) has assessed, under Part IV of the *Environmental Protection Act* 1986, a programme by BHP Iron Ore Pty Ltd to upgrade its dust management at Finucane Island and Nelson Point, Port Hedland (referred to as the proposed programme).

This report and recommendations provides advice to the Minister for the Environment on the environmental factor relevant to the proposed programme and the conditions and procedures to which the proposed programme should be subject.

The proposed programme comprises four main components to address the following key issues:

- impacts of airborne dust on community amenity;
- potential impacts of airborne dust on public health;
- potential ecological impacts of airborne dust; and
- potential impacts of wastes containing iron ore fines on the water quality and mangroves.

Impacts of airborne dust on community health and amenity have been issues of significant concern to the Port Hedland community.

On the basis of the information contained in the proposed programme and in the submissions received, the EPA considers that the environmental factors relevant to the proposed programme are:

(i) airborne dust in relation to health and amenity of Port Hedland residents;

(ii) airborne dust in relation to the surrounding ecological values, particularly the health of mangroves; and

(iii) wastes containing iron ore fines in relation to water quality and health of mangroves.

Following evaluation of these relevant factors, the EPA has concluded that the proposed programme can meet the EPA's objectives, subject to the satisfactory implementation of the proposed programme, the proponent's commitments, and the conditions and procedures recommended in this assessment report.

The EPA recommends that the Minister for the Environment:

- note the environmental factors relevant to the proposed programme;
- note that the EPA has concluded that the proposed programme can meet the EPA's objectives, subject to the satisfactory implementation of the proposed programme, the proponent's commitments, and the EPA's recommended conditions and procedures;
- adopt the conditions set out in Section 6 of this report if the Minister agrees that the proposed programme should be implemented; and
- note that the Port Hedland region will be included as a geographic location schedule in the definition study for the EPA's State air quality Environmental Protection Policy which is currently being developed.

1. The report

This report and recommendations provides the Environmental Protection Authority's (EPA) advice and recommendations to the Minister for the Environment on the environmental factors applicable to the proposed programme by BHP Iron Ore Pty Ltd (the proponent) to upgrade dust management for its operations at Finucane Island and Nelson Point in Port Hedland.

Section 1 introduces the report by stating its purpose and outlining the structure of the report. Section 2 summarises the proposed programme as described in the proponent's Consultative Environmental Review (CER).

Section 3 explains the method of assessment and reviews the factors raised throughout the assessment process, including those identified in the setting of guidelines and through public and government agency submissions. From these factors, the EPA identifies those environmental factors considered to be relevant for further evaluation. Table 2 summarises this identification process.

Section 4 sets out the evaluation of the relevant factors. For each factor, the objective of the assessment for the factor and relevant policy are stated, and technical information provided. Comments from key agencies and the public are summarised and the proponent's response is presented. Each section is concluded with the EPA's evaluation in terms of achieving the stated objective. Table 3 summarises this evaluation process.

Advice to the Minister on the environmental factors relevant to the proposed programme, conclusion and recommendations are provided in Section 5. Section 6 sets out the recommended Environmental Conditions to which the proposed programme should be subject if the Minister agrees that the programme may proceed. The reference and bibliography list is provided in Section 7.

2. The proposed programme

BHP Iron Ore Pty Ltd proposes to develop and implement a programme to improve management of dust and reduce the dust impacts from its operations at Finucane Island and Nelson Point in Port Hedland (the proposed programme).

The proponent has acknowledged that iron ore dust from its operations is an issue of concern to the Port Hedland community and has implemented some dust control measures. In addition, during the assessment of the Hot Briquetted Iron (HBI) project in Port Hedland (EPA, 1995), the EPA recognised that there was a high level of concern from the community about the existing dust problems associated with BHP Iron Ore's operations. These have led to the submission of this proposed programme by the proponent.

Figure 1 (Figure 5.1 of the CER) shows the location of the proponent's operations at Nelson Point and Finucane Island. Currently some 57,500 tonnes of iron ore are handled through these operations per year (50,000 tonnes from Nelson Point and 7,500 tonnes from Finucane Island).

In general, Nelson Point and Finucane Island operations comprise the following facilities:

- ore unloading facilities;
- crushing and screening plants;
- beneficiation plant (Finucane Island only);
- ore handling and stockpile facility/yards;
- ship loading facilities; and
- associated maintenance and administration facilities.

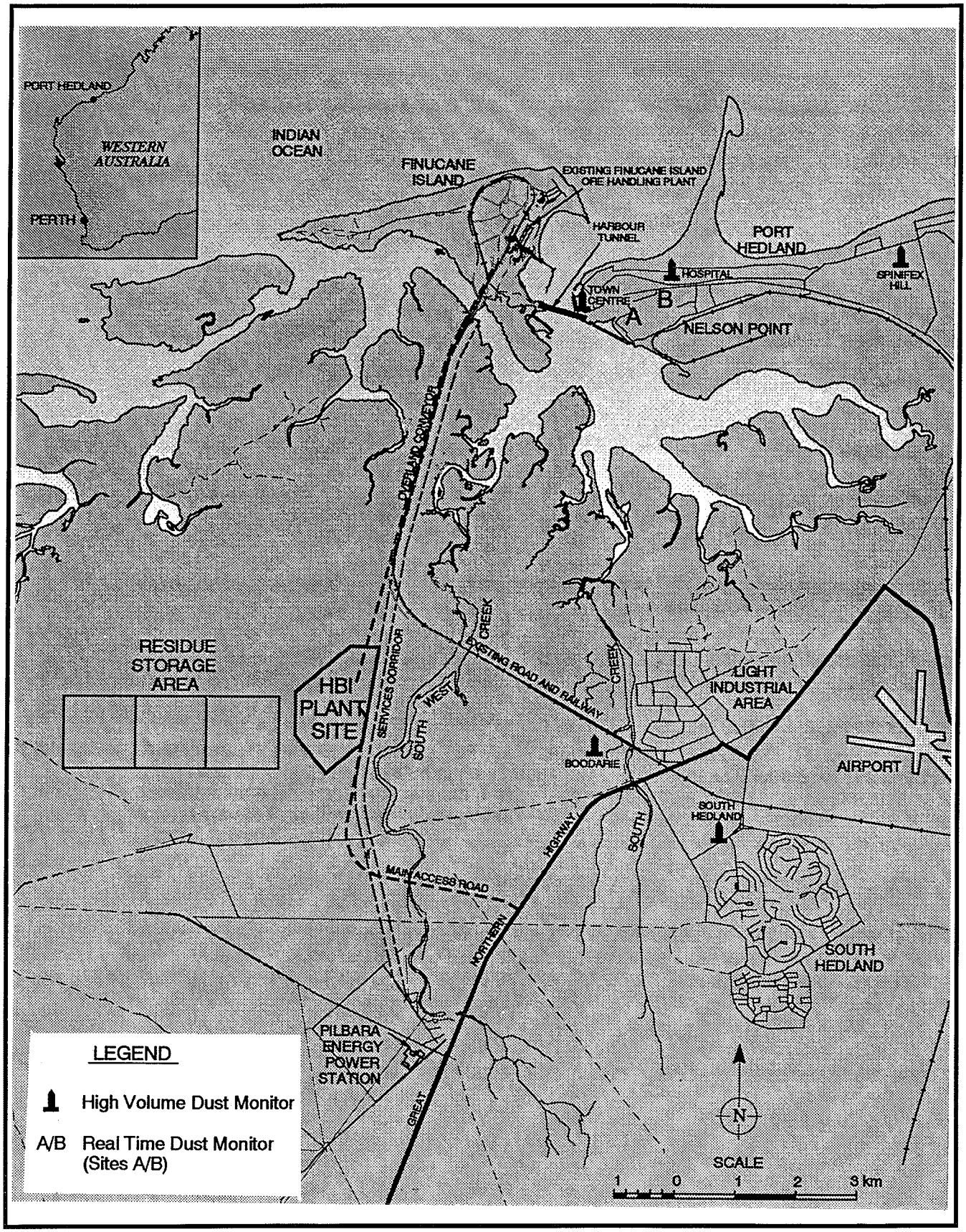


Figure 1. Location Plan and Dust Monitoring Locations. (Source: Figure 5.1 of the CER)

Figures 2 and 3 (Figures 4.1 and 4.2 of the CER) show the existing iron ore handling flow charts at Nelson Point and Finucane Island.

The CER indicates that potential dust generation sources from Nelson Point and Finucane Island operations are similar, but the potential for dust generation is less at Finucane Island due to lower tonnages handled and lower operational time.

During 1992-1994 the proponent developed and installed an improved stockpile dust suppression system (Halpern Glick Maunsell, 1993a). Following this, the proponent developed the Dust Management Performance Improvement Programme (Dust Management PIP) in 1994 to identify specific dust generation sources and to provide dust minimisation strategies within its operations (BHP Iron Ore, 1995). In total, 210 dust sources were identified from Nelson Point and Finucane Island operations. Overall, 81% of the dust was attributable to materials handling (eg ore moisture content, trippers, splitter plant, transfer stations, stackers, belts and ship loading), 6% to vehicle movements, 5% to mobile plant and 4% each to stockpiles and other sources. Detailed information on these activities is given in Sections 4.4.2 & 3 of the CER.

The Dust Management PIP has recently been reviewed to expand beyond the above activities and forms part of the proposed programme. Figure 4 (Figure 4.4 of the CER) shows an overview of the Dust Management PIP. The proponent's evaluation phase of the Dust Management PIP was completed in April 1995 and the implementation phase is scheduled to complete in April 1997.

The proposed programme comprises four main components to address the following key topics:

- impacts of airborne dust on community amenity;
- potential impacts of airborne dust on public health;
- potential ecological impacts of airborne dust; and
- potential impacts of wastes/effluent containing iron ore fines on the water quality and mangroves.

The proposed programme and the outcomes predicted by the proponent are summarised in Table 1 (Table 1.1 of the CER).

More detail on the proposed programme considered in this assessment is provided in the proponent's CER document (BHP Iron Ore, 1996).

3. Identification of environmental factors

3.1 Method of assessment

The purpose of an assessment under Part IV of the *Environmental Protection Act* 1986 is for the Environmental Protection Authority to report to the Minister for the Environment on the environmental factor(s) relevant to a proposal, and on the procedures and conditions to which the proposal should be subject if the Minister determines that the proposal may proceed. The EPA may also make such recommendations to the Minister as it sees fit.

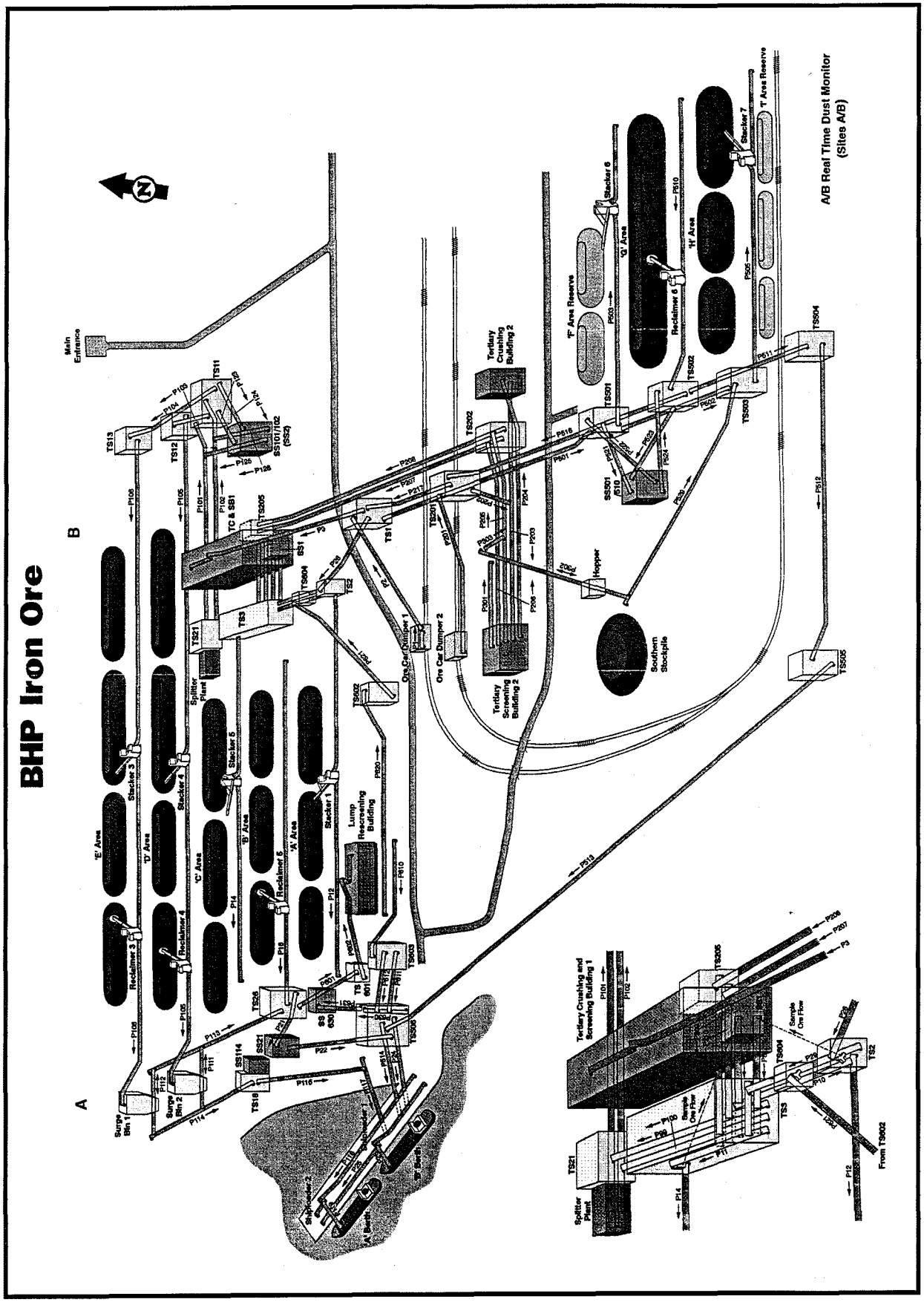


Figure 2. Nelson Point Ore Handling Flow Chart. (Source: Figure 4.1 of the CER)

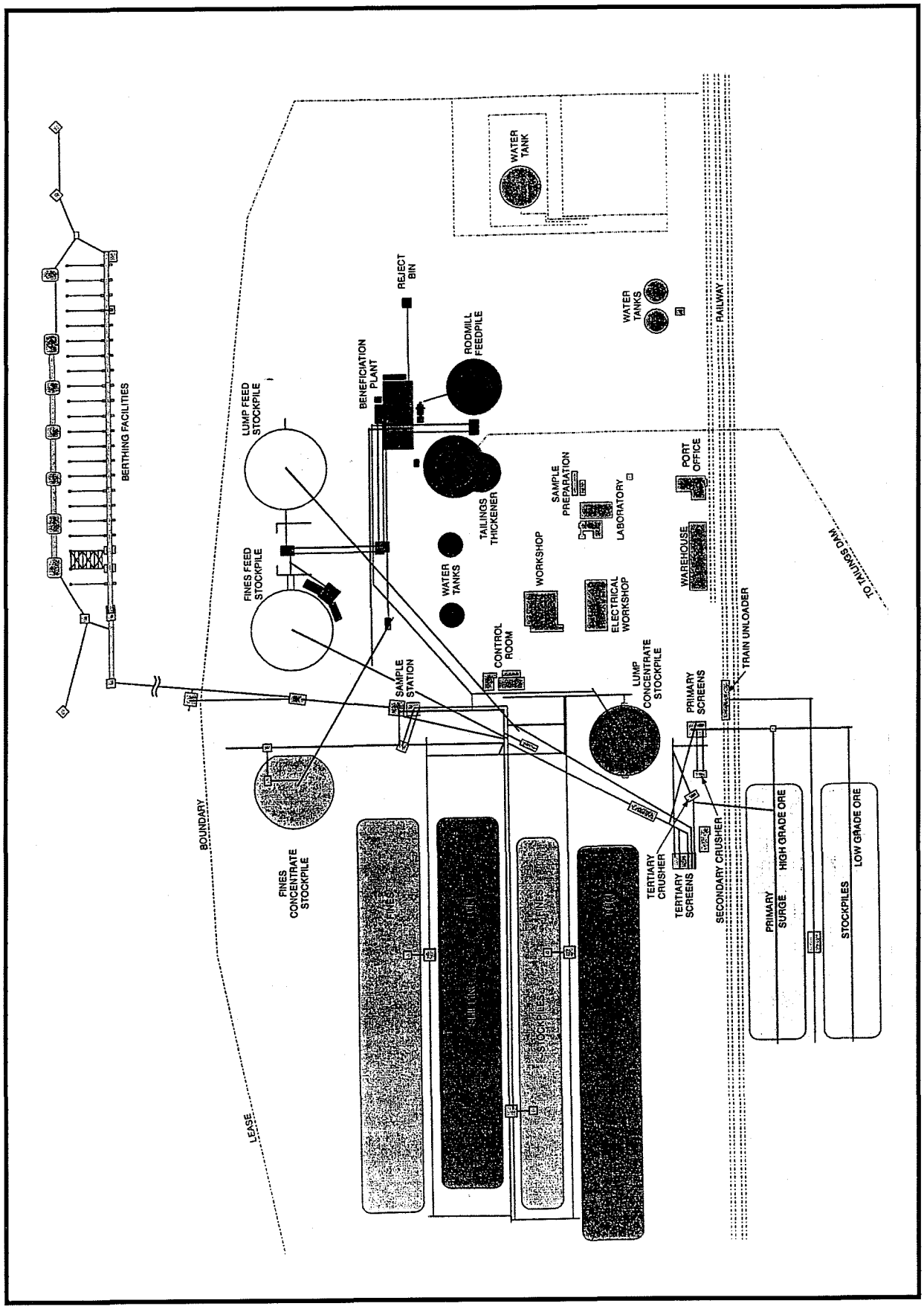


Figure 3. Finucane Island Ore Handling Flow Chart. (Source: Figure 4.2 of the CER)

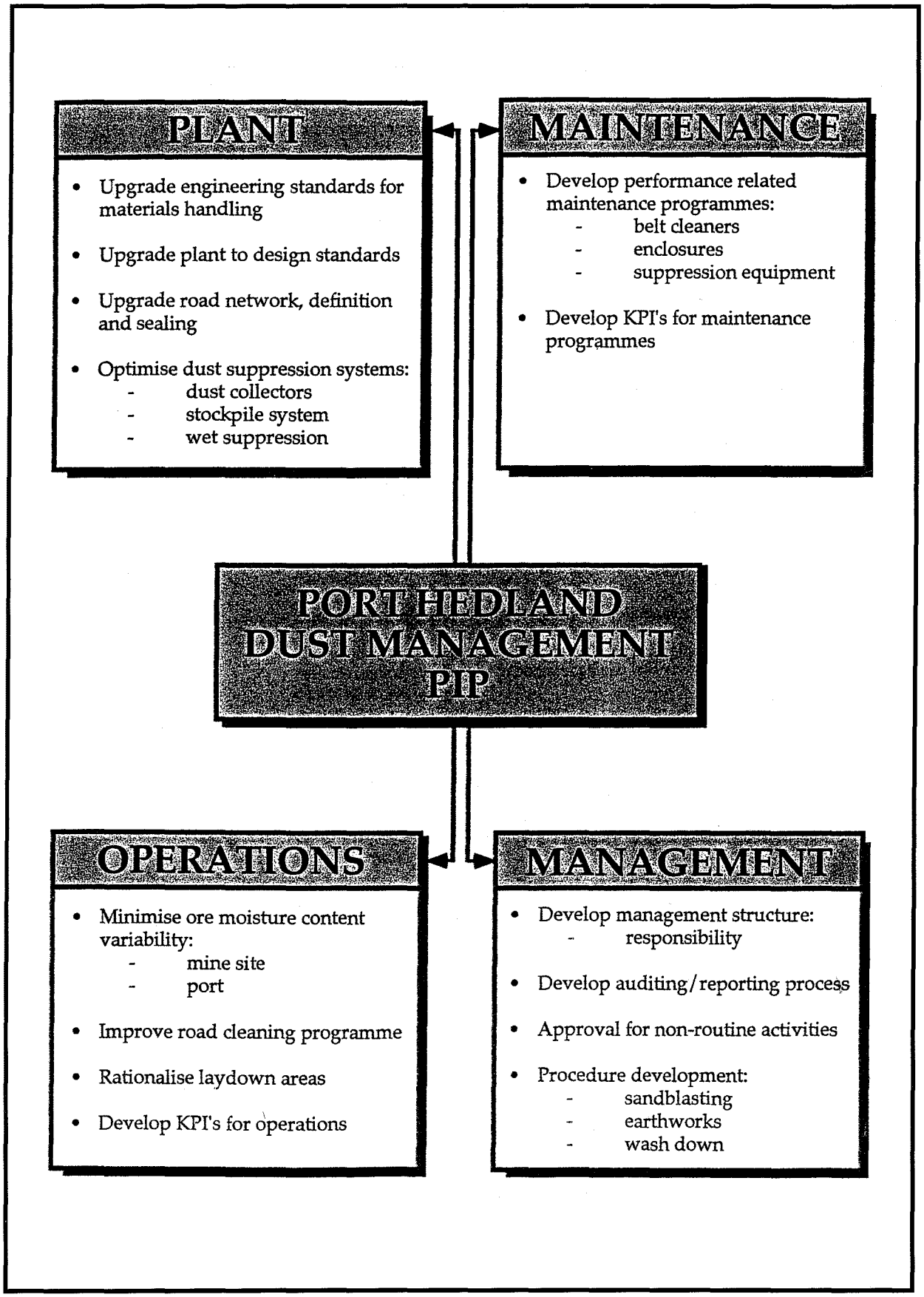


Figure 4. Overview of Dust Management PIP. (Source: Figure 4.4 of the CER)

Table 1. Summary of proposed (dust management) programme and predicted environmental outcomes (Source: Table 1.1 of the CER)

Topics	Present State of the Environment	Management Objectives	Proposed Management Procedures	Resultant State of the Environment
Community Amenity Impacts	Significant level of community nuisance impact is being experienced	To effect a significant reduction in community nuisance impact and enhance issue definition and community consultation	• Implement Dust Management PIP • Maintain a community complaints register • Adopt the DEP Kwinana PM50* 24h limit of 260 $\mu g/m^3$ as the target level • Analyse and report exceedances to the DEP • Develop Performance Targets based on annual number of complaints and exceedances • Develop/maintain community consultation • Review new developments in dust management technology	Progressive reduction in the level of community nuisance impacts and enhanced community awareness
Potential Public Health Impacts	Available information indicates minimal health impacts	To provide for confirmation of minimal potential impacts and enhanced community consultation	• Implement Dust Management PIP • Establish a PM10** residential dust monitoring programme • Adopt USEPA PM10 maximum 24h average (150 $\mu g/m^3$) as the target level • Analyse and report annual averages to the Department of Environmental Protection • Review new information and data on dust related health impacts • Disseminate relevant information and data to the community	Enhanced issue definition and community awareness
Potential Ecological Impacts	Current research information indicates minimal ecological impacts	To provide for confirmation of minimal potential impacts and enhanced community consultation	• Implement Dust Management PIP • Undertake monitoring studies with respect to dust deposition rates and changes in vegetation composition within the receiving environment • Disseminate relevant information to the community	Enhanced issue definition and community awareness
Wastes containing Iron Ore fines	Minimal ecological impacts are being experienced to date	To reduce waste generation and level of site discharge	• Implement Dust Management PIP • Undertake monitoring studies with respect to potential effluent discharge impacts • Implement waste reduction programmes • Disseminate relevant information to the community	• Enhanced issue definition and community awareness • Reduction in waste generation and effluent discharge

* PM50 - particles with an Equivalent Aerodynamic Diameter (EAD)*** of less than approximately 50 um.

** PM10 - particulate matter having an EAD of less than approximately 10 um.

*** EAD is the diameter of a spherical particle of density 1000 kg/m^3 which exhibits the same aerodynamic behaviour as the particle in question

The Department of Environmental Protection provides services to the EPA according to the *Environmental Protection Act* 1986, gazetted Administrative Procedures, 1993, and internal procedures agreed by the EPA (Appendix 1 shows a flow chart illustrating the procedures). It is through these procedures that the EPA directs the preparation of guidelines, factors, environmental objectives and reporting to the Minister.

To assist the proponent in the preparation of the CER document, the Department of Environmental Protection, on behalf of the EPA, issues the proponent with guidelines which list the factors (or topics) which should be examined.

These factors are then considered by the proponent in the CER both in terms of identifying potential impacts as well as making project modifications or devising environmental management strategies.

In the assessment of the proposed programme, the EPA considers the information contained in the CER document, public and agency submissions and the proponent's response to those submissions (refer Appendix 2). This consideration resulted in three environmental factors relevant to the proposed programme (refer Table 2).

The relevant factors are then evaluated by the EPA. Each relevant factor is assessed against the EPA's objective and policy in relation to that factor to determine if the proposed programme, incorporating the proponent's commitments (refer Appendix 3), can be managed within the objective established by the EPA. The EPA then provides advice to the Minister on the conditions and procedures to be applied for the implementation of the proposed programme.

Limitation

This evaluation has been undertaken using information currently available. The information has been provided by the proponent in the CER document and supplementary documentation, by DEP officers utilising their own expertise and reference material, by utilising expertise and information from other State government agencies, and by contributions from EPA members.

The EPA recognises that further studies and research may affect the conclusions reached in this assessment report. The EPA considers that if the proposal has not been substantially commenced within five years of the date of this report, then such approval should lapse. After that time, further consideration of the proposal should occur only following a new referral to the EPA.

3.2 Public and agency submissions

Comments on the CER were sought from the public, interest groups and local and State government agencies. During the public review period three submissions were received, two of which were from State government agencies (Health Department and Department of Resources Development) and one was a public group submission from Port Hedland Dust Management Committee. These submissions were forwarded to the proponents for response (refer Appendix 2).

The Health Department and Department of Resources Development indicated their support to the proposed programme.

The principal concerns raised in the public group submission relate to the impacts of airborne dust on human health and amenity. A summary of these concerns is provided in Section 4.1 of this report.

The Environmental Protection Authority has considered the submissions received and the proponent's response in its evaluation of the proposed programme.

3.3 Review of factors

3.3.1 Identification of factors

Three factors were raised during the environmental impact assessment process and are those factors identified in the guidelines for the CER. No additional factor was identified from the submissions described above. These factors are:

- airborne dust in relation to human health and amenity;
- airborne dust in relation to the surrounding ecological values, particularly the health of mangroves; and
- wastes containing iron ore fines in relation to water quality and health of mangroves.

The factors are discussed below and the relevant environmental factors which require further evaluation by the EPA are identified. Table 2 summarises this process.

3.3.2 Identification of relevant environmental factors

Airborne dust in relation to human health and amenity

No criteria have been set or considered for ambient dust in Port Hedland, mainly because of the relatively high background dust levels in the region.

Submissions indicate a strong desire from both government agencies and the Port Hedland community to protect the health and amenity of the residents from unacceptable impacts of dust emissions from the proponent's operations.

This relevant factor requires further detailed evaluation by the EPA (refer Section 4.1).

Airborne dust in relation to the surrounding ecological values, particularly the health of mangroves

The EPA has recognised the need to protect the remaining mangrove ecosystems of the Pilbarra as they are the only mangroves inhabiting a tropical-arid coastline in Australia and are nationally important (EPA, 1995).

This relevant factor requires further detailed evaluation by the EPA (refer Section 4.2).

Wastes containing iron ore fines in relation to water quality and health of mangroves

The EPA has identified in the guidelines that this factor is relevant to the proposed programme since there is a need to ensure that there is no significant pollution of surface run-off or the ocean, as well as no significant impacts on the health of mangroves, from the disposal of wastes containing iron ore dust.

This relevant factor requires further detailed evaluation by the EPA (refer Section 4.3).

3.3.3 Summary

The EPA has reviewed the above factors and considers that all of these factors are relevant to the proposed programme and require further evaluation by the EPA (Section 4). Table 2 summarises the process by which the relevant factors have been identified.

Table 2. Identification of relevant environmental factors

Factors	Proposal Characteristics	Government Agencies (including DEP) and Public Comments	Identification of Relevant Factor
Pollution			
Airborne dust in relation to human health and amenity.	Reduce ambient dust levels progressively through upgrading engineering designs and management practice.	**Government Agencies (including DEP):** • PM10 target level may not be appropriate for health and needs to be reviewed. • Ambient monitoring for PM2.5 should be considered. • DEP should be involved in developing the ambient dust monitoring programme. • Requirements for reporting of monitoring data to DEP (ie. what data and how frequent) should be reviewed. • No evidence from community health records that there is an increase in respiratory complaints in Port Hedland residents. • PM10 monitoring results should be reported annually to Health Department. **Public:** • Target levels may not be appropriate or stringent enough to protect amenity and health of Port Hedland residents. • The EPA/DEP should set compliance criteria as part of the assessment. • Information on monitoring data/results should be disseminated to the community. • DEP involvement/representation on Port Hedland Dust Abatement Committee, and a DEP officer located in Port Hedland (not from Karratha) are requested. •Proponent should fund Health Department to carry out research to determine the public health effects of dust.	Relevant factor and EPA evaluation is required.
Airborne dust in relation to the surrounding ecological values, particlarly on the health of mangroves.	Outcomes of proposed programme will reduce dust on mangroves and confirm impacts of dust on vegetation and mangroves.	**Public:** • Dust monitoring should be carried out in environmentally sensitive areas. **DEP:** • assurance is sought from the proponent to undertake remedial action should the monitoring studies identify unacceptable impacts of iron ore dust on mangroves and other vegetation.	Relevant factor and EPA evaluation is required.
Wastes containing iron ore fines in relation to water quality and health of mangroves.	Outcomes of proposed programme will reduce waste generation and allow quantification of changes and impacts to ecological values.	**DEP:** • Results of the work done by the proponent will provide useful information to the "North West Shelf Marine Environmental Study" to be conducted by DEP. • Concentrations of heavy metals in sediment (excluding iron and manganese) are within minimal-effects range. • Waste discharges will be controlled through Part V new licence system. • assurance is sought from the proponent to undertake remedial action should the monitoring studies identify unacceptable impacts of iron ore dust on the harbour marine environment including mangroves.	Relevant fasctor and EPA evaluation is required.

4. Evaluation of relevant environmental factors

4.1 Airborne dust in relation to human health and amenity

4.1.1 Technical/background information

The proponent has proposed, through the Dust Management Performance Improvement Programme (Dust Management PIP) initiated by proponent in 1994, to upgrade engineering designs, operational controls, maintenance procedures, housekeeping and management practices at Nelson Point and Finucane Island facilities. Sections 7.2.2.2 & 3 of the CER summarises the proposed works activities for the Dust Management PIP. Key performance indicators (KPIs) for operations and "benchmark" practices for dust management will be developed as part of the Dust Management PIP.

Interim targets for ambient dust levels of 150 $\mu g/m^3$ PM10 (24 hr average) for health and 260 $\mu g/m^3$ PM50 (24 hr average) or Total Suspended Particulate (TSP) for amenity have been proposed for the Dust Management PIP (the definitions of PM10 and PM50 are provided in the footnotes of Table 1). The target for health protection is based on an existing particulate standard in the United States (Federal Register, 1987), which is designed for urban areas (Section 3.2.3 of the CER). The target for amenity protection is based on the 24 hr dust limit for Area B (commercial / residential area) under the *Environmental Protection (Kwinana) (Atmospheric Waste) Policy 1992* (EPA, 1992), and on what the programme can achieve in the interim on the basis of the dust monitoring results obtained since 1994 (Table 7.1 of the CER and additional information provided at the proponent's presentation to the EPA on 19 September 1996). The proponent will report exceedances of these target levels and their analysis to the Department of Environment on a required and annual basis).

The above interim targets provide initial air quality goals for the programme only and will be subject to change resulting from a future regional air quality policy for Port Hedland. The information and research being compiled under the Dust Management PIP will assist in the collection of data for the development of such a policy.

In addition to the five monitoring stations for PM50 (located at the townsite, the hospital, Spinifex Hill, Boodarie and South Hedland) required by the current licence conditions (under Part V of the *Environmental Protection Act. 1986*) for the proponent's operations, ambient monitoring for PM10 and real time monitoring will be carried out. The locations of the PM50 and PM10 dust monitors (referred to as high volume dust monitors) and real time dust monitors are shown in Figure 1. Three PM10 dust monitors are provided, which are located at the townsite, the hospital and Boodarie.

In conjunction with the above, the proponent will develop and implement a community consultation process to deal with complaints from, and information exchange with, the residents (Section 7.2.2.7 of the CER). On-going review of new developments on dust management technology and of new information and data on dust related health impacts will also be carried out.

The proponent has indicated that all components of the Dust Management PIP will be modified and refined during the course of its implementation, based on community feedback, better understanding of the impacts of dust on community health and amenity, new developments on dust control technology, and the dust monitoring results. This process is in accordance with the principle of continuous improvement.

Figures 5a and 5b (Figures 5.2 and 5.3 of CER) show a decrease in ambient dust levels during 1995 despite an increased trend in tonnage of ore handled through Nelson Point and Finucane Island. This decrease has resulted from the commissioning of the stockpile dust suppression system during 1994 and the subsequent initiation of the Dust Management PIP. Information presented by the proponent to the EPA (on 19 September 1996) shows a further significant decrease in the ambient dust levels during 1996, as a result of progress made in the implementation of the Dust Management PIP.

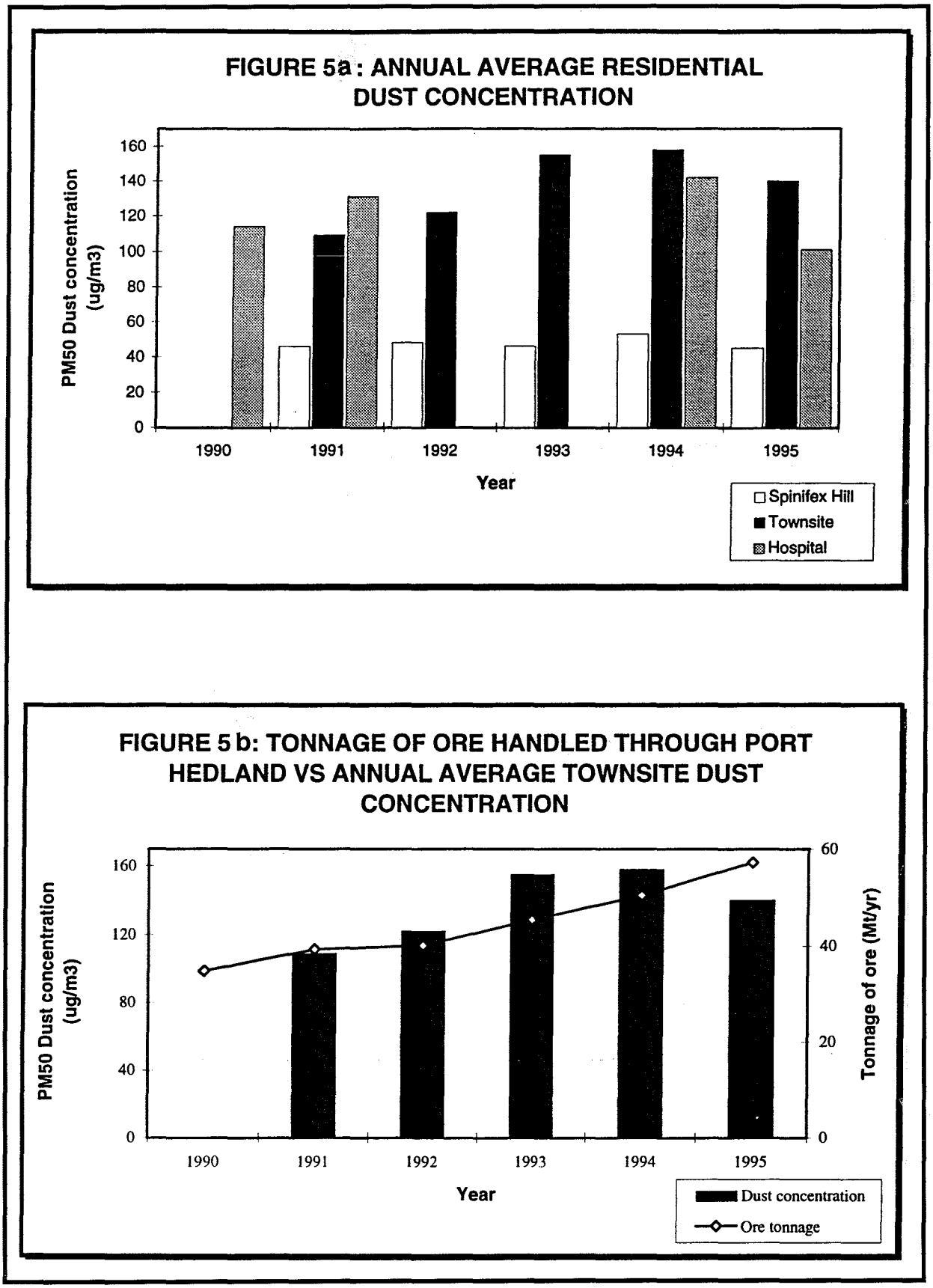


Figure 5. Ambient Dust Concentrations (5a) versus Tonnages of Ore Handling (5b) for 1990-1995. (Source: Figures 5.2 and 5.3 of the CER)

4.1.2 Agency and public comments

Concern raised in the submission by Port Hedland Dust Management Committee can be summarised as follows:

- the proposed target level of 260 μg/m^3 designed for Kwinana may not be appropriate for Port Hedland;
- the EPA and the Department of Environmental Protection should set compliance criteria for ambient dust for Port Hedland as part of this assessment;
- information on monitoring data/results should be disseminated to the community;
- exceedances of the target levels should be reported to the Department of Environmental Protection and the Committee as soon as possible after the specific events;
- the Department of Environmental Protection should provide a representative on Port Hedland Dust Management Committee, and a departmental officer should be located in Port Hedland (not from Karratha); and
- the proponent should fund the Health Department to carry out research to determine the public health effects of dust.

While supporting the proposed programme, the Health Department provided the following comments:

- there is no evidence from community health records that there is an increase in respiratory complaints in Port Hedland residents.
- the PM10 monitoring results should be reported annually to the Health Department.

The Department of Environmental Protection provided the following comments on the proposed programme:

- in view of the recent PM10 (24 hr) criteria adopted or being considered in Victoria and overseas (California, United Kingdom and Canada) or likely to be considered in a national environmental protection measure being developed for air quality, the proposed PM10 (24 hr) target level of 150 μg/m^3 may not be appropriate for health and needs to be reviewed;
- in addition to reporting of exceedances of 260 μg/m^3 PM50 (24 hr average), exceedances of 150 and 90 μg/m^3 PM50 (24 hr average) should also be reported to the Department;
- additional reporting of raw monitoring data to the Department is required;
- in regard to health impacts, ambient monitoring for PM2.5 (particulate matter having an equivalent aerodynamic diameter of less than approximately 2.5 micrometer) should be considered in conjunction with PM10 and PM50 monitoring;
- the Department should be involved in the definition of the ambient monitoring programme; and
- more information on key performance indicators and bench marking is required as the development of these is an important aspect of the proposed programme.

The Department of Environmental Protection also provided the following comments on the above issues raised by Port Hedland Dust Management Committee and the Health Department, which relate to its operations:

- the proposed target levels are for monitoring and reporting on the proponent's management of airborne dust and are not to be considered as legal or compliance limits;
- although current resources do not allow the Department to provide a representative on Port Hedland Dust Management Committee on a permanent basis, the Department can provide technical advice and if necessary, a representative to attend Committee meetings, on a needs basis at the request of the Committee;

- in terms of the overall regional services provided by the Department in the State, there is no justification currently to locate a departmental officer in Port Hedland in addition to the departmental regional office in Karratha; and
- the Department will forward the PM10 monitoring results received annually to the Health Department for comments and advice on public health aspects.

4.1.3 Response from the proponent

The proponents' response to submissions is contained in Appendix 2. A summary is provided below.

- the proposed ambient dust levels of 150 $\mu g/m^3$ PM10 (24 hr average) for health and 260 $\mu g/m^3$ PM50 (24 hr average) are interim targets only and will be reviewed as a component of continuous improvement;
- acceptable air quality criteria for dust should be determined through the development of a regional air quality policy for Port Hedland region;
- the Committee will be informed of the progress of the programme implementation and dust management performance;
- exceedances of the target levels will be reported to the Department of Environmental Protection soon after the events (within one week of occurrence);
- raw monitoring data will be supplied to the Department of Environmental Protection which will allow the Department to assess exceedances of 260, 150 and 90 $\mu g/m^3$ PM50 (24 hr average);
- through discussion with the Department of Environmental Protection, the proponent has agreed to review the need for the monitoring of fine particles including PM2.5, and the Department's involvement in the ambient monitoring programme has always been invited; and
- specific key performance indicators and bench marking will be developed as part of the Dust Management PIP, and the outcomes of their development and progress will be reported annually to the Department of Environmental Protection.

4.1.4 EPA evaluation

Objective

With respect to the environmental factor of airborne dust in relation to human health and amenity, the EPA's objective is to ensure that the health and amenity of nearby residents are protected from adverse dust impacts resulting from the proponent's operations at Finucane Island and Nelson Point.

Existing policy/framework

To achieve the above stated objective, the EPA considers that the proposed dust management strategies should:

- incorporate best practice environmental management; and
- reduce ambient dust levels outside the boundaries of proponent's operations to a practicable minimum.

As a management principle, the EPA seeks a net improvement in environmental quality through the implementation of the proposed programme.

Evaluation

As mentioned earlier, during the assessment of the Hot Briquetted Iron project in Port Hedland in 1995, the EPA acknowledged that there was a high level of concern from Port Hedland community regarding the impacts of dust associated with the proponent's operations at Nelson

Point and Finucane Island (EPA, 1995). This proposed programme is considered a step forward by the proponent in its best practice environmental management, since the implementation of the proposed programme will have positive impacts on air quality in Port Hedland.

The EPA notes the significant decrease in ambient dust levels during 1995 and 1996 from the recent dust monitoring results. This is the outcome of the partial implementation of the Dust Management PIP. The EPA believes that further decreases in ambient dust levels can be achieved from the complete implementation of these initial strategies (by April 1997) and from progressive improvement of the dust management by the proponent.

The EPA notes the proponent's commitments to address the issues of potential health impacts and in particular amenity impacts of dust emanating from its operations (Commitments 1 to 6, Appendix 3), in accordance with the principle of continuous improvement.

The EPA also notes the proponent's commitments to adopt quality assurance principles (in the voluntary Australian Standard ISO 9000 series) and environmental management principles (in the voluntary draft Australian Standard ISO 14 000 series).

The EPA considers that the proponent's response to the comments made by the Port Hedland Dust Management Committee and the Department of Environmental Protection is appropriate at this stage, given that the Dust Management PIP will be modified and refined during the course of its implementation on the basis of community feedback, better understanding of the impacts of dust on community health and amenity, new developments on dust control technology, and the dust monitoring results.

Although the EPA understands the Port Hedland Dust Management Committee's desire to have compliance criteria set for the proposed programme through the EPA's assessment process, this is not an appropriate mechanism for a number of reasons. Available ambient criteria for dust (such as the National Health and Medical Research Council's air quality guideline of 90 $\mu g/m^3$ (annual average) for PM50 or the Kwinana EPP standards/limits) are not applicable to the Port Hedland region as it has a high background dust level. Recent ambient criteria focus on the impacts of fine particulate matter on health (such as PM10 and PM2.5) and are primarily for the urban environments. Furthermore the EPA does not have sufficient data to advise on an acceptable dust criterion for amenity at this stage.

The EPA considers that the appropriate mechanism to establish acceptable dust criteria for Port Hedland is to include dust in an air quality policy for the region which will take into consideration existing industry, future developments and the high background dust level in the region. This was foreshadowed in the EPA's report on the assessment of the Hot Briquetted Iron project (EPA, 1995). The policy would be developed as a schedule to the State air quality Environmental Protection Policy (EPP) recently initiated by the EPA.

Accordingly, the EPA has requested the Department of Environmental Protection to include in the definition study for the EPA's State air quality EPP, a proposal to add the Port Hedland region as a geographic location schedule.

The EPA concludes that the proposed strategies to manage airborne dust are appropriate at this stage and their implementation can meet the EPA's objective in the long term.

4.2 Airborne dust in relation to the surrounding ecological values, particularly the health of mangroves

4.2.1 Technical/background information

The CER (Section 6) indicates that although mangroves in some areas of the harbour have been observed to have a coating of dust on their leaves and in some instances exhibit a degree of dieback, a direct causative link between iron ore dust emissions from the proponent's operations and the mangrove dieback has not been established.

The proponent has committed, as part of the dust management programme, to establish dust deposition and vegetation (predominantly mangroves) monitoring studies to further understand and confirm the ecological impacts of iron ore dust on the surrounding vegetation (Commitment 7, Appendix 3). The information and data from the studies will be disseminated to the community (commitment 8, Appendix 3).

The CER (Sections 7.4.2.2&3) indicates that data collected from depositional dust gauges will allow dust deposition rates resulting from iron ore handling activities to be quantified and compared to deposition rates which occur naturally. Data collected from permanent vegetation monitoring quadrats (to be established in association with the depositional dust gauges) will be used to quantify any changes that occur as a result of dust deposition from iron ore handling activities.

4.2.2 Agency and public comments

The Port Hedland Dust Management Committee has indicated in its submission that it would like dust monitoring to be carried out by the proponent in environmentally sensitive areas such as the western tip of Finucane Island, Boodarie landing, Anderson Point and entrance to the South West Creek.

The Department of Environmental Protection sought an assurance from the proponent to undertake remedial action should the monitoring studies identify unacceptable impacts of iron ore dust on mangroves and other vegetation.

4.2.3 Response from the proponent

In response to the issue raised by the Port Hedland Dust Management Committee, the proponent advised that dust deposition gauges are being installed to monitor the deposition rates of dust in ecologically sensitive areas, and the proponent will inform the Committee on the detail of this monitoring programme.

In response to the assurance sought by the Department of Environmental Protection, the proponent has made a commitment to address any potential impacts identified from the monitoring studies through an appropriate management programme in consultation with the Department (Commitment 7, Appendix 3).

4.2.4 EPA evaluation

Objective

The EPA's objective for this factor is to ensure that the ecological values outside the boundaries of the proponent's operations, particularly the mangrove areas, are protected from adverse dust impacts.

Existing policy/framework

To achieve the above stated objective, the EPA considers that the proponent should:

- incorporate best practice dust management;
- reduce ambient dust levels outside the boundaries of proponent's operations to a practicable minimum; and
- maintain or improve the health of mangroves.

Evaluation

The EPA has recognised that development in the Port Hedland area to date has caused major clearing of mangroves and further losses of mangroves should be minimised (EPA, 1995).

The EPA notes that according to a study done by the Semeniuk Research Group, on behalf of the Department of Resources Development, on the status of arid zone mangroves and the impacts of existing developments on mangroves in the Pilbarra (Semeniuk, 1994), iron ore dust is more dangerous to mangroves than other more naturally derived dust types. The study also

indicated that and *Avicennia marina*, the most predominant mangrove type of the Port Hedland harbour, is the mangrove most susceptible to this type of dust.

Although the EPA understands that high environmental dust loading can affect the health of mangroves and can cause mangrove mortality, there is no conclusive information to date to confirm the adverse impacts of iron ore dust from the proponent's operations on mangrove dieback or on the surrounding vegetation. The implementation of the proposed programme would reduce dust loading on mangroves and will confirm the impacts of iron ore dust on mangroves and other vegetation.

Hence, the EPA considers that the proposed studies, in conjunction with the implementation of the dust reduction programme and the proponent's commitments, are an appropriate approach to meet the EPA's objective in the long term.

4.3 Wastes containing iron ore fines in relation to water quality and health of mangroves

4.3.1 Technical/background information

The CER (Section 6.7 and 6.8) indicates that since 1993, the water, sediments and selected biota of Port Hedland harbour and the adjacent coastal region have been monitored for heavy metals. The results so far suggest that although minor heavy metal contamination (eg. iron and manganese) was detected at a few locations where ore handling occurs (eg. adjacent to the Nelson Point wharf), in general, concentrations within the harbour of most metals are within ranges obtained from regional sites and were consistently below guideline and/or detection limits. Benthic infauna were also monitored in harbour sediments to collect baseline data and quantify ecosystem status. In conjunction with these, a large scale exercise was undertaken to map the mangrove habitats in the creek system to determine future changes in mangrove communities within the harbour.

In regard to the sub-programmes to reduce the generation of wastes containing iron ore fines, the CER (Sections 7.4.2.4 & 5) indicates that these will include monitoring of stormwater sediment loads, recovery of fresh water and reduction in off-site fines discharge.

The proponent has committed to the following activities:

- to monitor the receiving environment with respect to potential effluent discharge impacts (Commitment 7, Appendix 3); and
- to develop and implement programmes to reduce the generation of wastes containing iron ore fines (Commitment 9, Appendix 3).

The information and data from the studies will be disseminated to the community (Commitment 8, Appendix 3).

4.3.2 Agency and public comments

The Department of Environmental Protection advised that the Department will conduct an environmental study on the North West Shelf marine areas ("North West Shelf Marine Environmental Management Study"). The objective of this study is to develop an effective ecologically-based management framework and information for the region, which can be used to support decision making and assist strategic planning for environmental protection and sustainable development. The results of the work done by the proponent will contribute useful information to the this study.

The Department considered that, with the exception of iron and manganese for which there are no water quality or sediment guidelines available currently, the concentrations of other heavy metals in sediment as reported in the CER (Table 6.1 of CER) are within the range in which impacts would be minimal or rarely observed (Long et al, 1995).

With respect to the disposal of wastes containing iron ore fines, the Department advised that the discharge will be controlled through the new licence system under Part V of the *Environmental Protection Act*..

The Department further sought an assurance from the proponent to undertake remedial action should the monitoring studies identify unacceptable impacts of iron ore dust on the harbour marine environment including mangroves.

4.3.3 Response from the proponent

In response to the assurance sought by the Department of Environmental Protection, the proponent has made a commitment to address any potential impacts identified from the monitoring studies through an appropriate management programme in consultation with the Department (Commitment 7, Appendix 3).

4.3.4 EPA evaluation

Objective

The EPA's objective for this factor is to ensure that wastes containing iron ore fines are reduced as far as practicable and disposed of in an environmentally acceptable manner so that the quality of nearby waters and the health of mangroves are protected.

Existing policy/framework

The EPA considers that the generation of wastes containing iron ore fines should be minimised through an appropriate waste minimisation strategy which includes recycling and water conservation.

Effluent discharges should comply with statutory requirements and where applicable, the water quality should meet the requirements of the Draft Western Australian Guidelines for Fresh and Marine Waters (EPA Bulletin 711, 1993) and the Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC, 1992).

In addition to the above, the ecological values of the Port Hedland harbour environment should be maintained or improved.

Evaluation

The EPA understands that the studies carried out by the proponent are part of the Port Hedland Harbour Environmental Study and Monitoring Programme, which was initiated by the proponent in 1993 (Halpern Glick Maunsell, 1993b). The objective of the study programme is to establish a baseline condition against which future changes can be monitored and quantified. The EPA fully supports such an initiative by the proponent.

The EPA also recognises that the results of the work done by the proponent will contribute useful information to the "North West Shelf Marine Environmental Management Study" to be conducted by the Department of Environmental Protection.

The EPA considers that the proposed marine environmental studies, in conjunction with the implementation of the waste generation reduction programme and the proponent's commitments, can meet the EPA's objective in the long term.

Summary

The EPA has evaluated the environmental factors relevant to the proposed programme and considers that the proposed strategies to manage airborne dust and wastes containing iron ore fines are appropriate at this stage and their implementation can meet the EPA's objectives in the long term.

Table 3 summarises the EPA's evaluation process for the relevant factors.

Table 3. Assessment of relevant environmental factors

Relevant Factors	Technical Information	Proponent's Commitments	Objectives	Existing Policy/Framework	EPA Recommendation
Pollution					
Airborne dust in relation to human health and amenity.	• Upgrading engineering designs, operational controls, maintenance procedures, housekeeing and management practices. • Development of key performance indicators (KPIs). • Interim targets for health and for amenity. • Additional PM10 and real time monitoring. • Community consultation. • Decrease in ambient dust levels resulting from recent dust suppression initiatives on stockpiles.	• Adopting quality assurance and environmental management principles to AS/ISO 9000 and 14000 series. • Upgrading materials handling, dust suppression equipment and traffic/open areas at Nelson Point and Finucane Island. • Reporting to DEP (raw data, all exceedances above target levels and their analysis). • Developing benchmarking and annual performance targets • On-going review of dust management technology and dust related health impacts. • Community feedback and dissemination of information/data to community.	To ensure that the health and amenity of nearby residents are protected from adverse dust impacts.	• To incorporate best practice. • To reduce ambient dust levels to a practicable minimum.	EPA objectives met through proponent's commitments.
Airborne dust in relation to the surrounding ecological values, particularly the health of mangroves	• No direct link between iron ore dust and existing mangrove dieback. • Monitoring of dust deposition rates and vegetation to enhance understanding of ecological impacts of iron ore dust.	• Establishing dust deposition and monitoring studies. • Information disseminate to community. • Addressing any potential impacts identified from the monitoring studies through an appropriate management programme.	To ensure that ecological values and the health of mangroves are protected from adverse dust impacts.	• To incorporate best practice. • To reduce ambient dust levels to a practicable minimum. • To maintain or improve the health of mangroves.	EPA objectives met through proponent's commitments.
Wastes containing iron ore fines in relation to water quality and health of mangroves	• Reduce waste generation and off-site discharges. • Monitor and establish baseline for marine water quality through the Port Hedland Harbour Environmental Study and Monitoring Programme initiated in 1993 by proponent. • Disseminate information to community.	• Developing and implementing programmes to reduce the generation of wastes containing iron ore fines. • Monitoring the receiving environment with respect to potential effluent discharge impacts. • Addressing any potential impacts identified from the monitoring studies through an appropriate management programme.	To ensure that wastes containing iron ore fines is reduced and disposed of in an environmentally acceptable manner so that the quality of nearby waters and the health of mangroves are protected.	• To minimise waste generation. • To comply with statutory requirements and the 1993 Draft Western Australian Guidelines for Fresh and Marine Waters and the 1992Australian Water Quality Guidelines for Fresh and Marine Waters. • To maintain or improve ecological values.	EPA objectives met through proponent's commitments.

5. Advice to the Minister for the Environment

The EPA has assessed the proposed programme by BHP Iron Ore to upgrade its dust management at Finucane Island and Nelson Point.

In undertaking its assessment the EPA has reviewed the CER, submissions from the public and government agencies, the proponent's response to those submissions, additional information which has been forwarded (as detailed in Section 4), and the proponent's environmental management commitments.

The environmental factors relevant to the proposed programme, the conditions and procedures, if any, to which any implementation of that programme should be subject and other recommendations as the EPA sees fit, as required under Section 44(1) of the *Environmental Protection Act* 1986, are set out below.

5.1 Environmental factors relevant to the proposed programme

The EPA has identified the environmental factors relevant to the proposed dust management programme as:

(i) airborne dust in relation to human health and amenity;

(ii) airborne dust in relation to the surrounding ecological values, particularly the health of mangroves; and

(iii) wastes containing iron ore fines in relation to water quality and health of mangroves.

Environmental objectives for these factors are given in Sections 3 and 4. The relevant environmental factors for the proposed programme should be read in the context of these objectives.

5.2 Conditions and procedures to be applied for implementation of the proposed programme

The EPA has set out in Section 6 the recommended conditions and procedures to which any implementation of this proposal should be subject. These include:

(a) implementation of the proponent's commitments;

(b) requirements in relation to any changes in the proposal;

(c) maintenance of proponent status;

(d) time limits on approval;

(e) performance review;

(f) compliance auditing; and

(g) procedures for assessing compliance.

The proponent should consider the relevant factors and manage to the objectives set out in Section 4. A general environmental management plan should be established for the implementation of the proposal. The plan should adopt quality assurance principles (such as those adopted in the voluntary Australian Standard ISO 9000 series) and environmental management principles (such as those adopted in the voluntary draft Australian Standard ISO 14000 series).

The proponent shall exercise all care and due diligence in managing the proposed programme to ensure the protection of the environment.

As part of the management system there should be an annual audit and a five year review of the dust management performance and management systems. Performance indicators for each objective should be established.

5.3 Conclusion

The EPA has concluded that the proposed programme by BHP Iron Ore to upgrade its dust management in Port Hedland can meet the objectives established by the EPA, subject to the implementation of the proposed programme, the environmental management commitments made by the proponent (refer to Appendix 3), including the commitment to continuous improvement in dust management, and the EPA's recommendations below.

5.4 Recommendations

Recommendation 1

That the Minister for the Environment note the factors relevant to the proposed programme and the environmental objectives set for these factors.

Recommendation 2

That the Minister for the Environment note that the EPA has concluded, subject to the satisfactory implementation of the proponent's environmental management commitments and the EPA's recommended conditions and procedures, that the proposed programme can meet the objectives established by the EPA.

Recommendation 3

The EPA recommends that the implementation of the proposed programme be subject to the recommended environmental conditions set out in Section 6 of this report.

Recommendation 4

That the Minister for the Environment note that the Port Hedland region will be included as a geographic location in the definition study for the EPA's State air quality Environmental Protection Policy which is currently being developed.

6. Recommended environmental conditions

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

PROPOSAL:	UPGRADE DUST MANAGEMENT AT FINUCANE ISLAND AND NELSON POINT, PORT HEDLAND (955)
PROPONENT:	BHP IRON ORE PTY LTD

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, the proponent shall fulfil the commitments made in the Consultative Environmental Review and in response to public submissions; provided that the commitments and environmental management measures are not inconsistent with the

conditions or procedures contained in this statement. These commitments are included in Appendix 3 of this report).

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 Proponent

These conditions legally apply to the nominated proponent.

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

4 Time Limit on Approval

The environmental approval for the proposal is limited.

4-1 If the proponent has not substantially commenced the project within five years of the date of this statement, then the approval to implement the proposal as granted in this statement shall lapse and be void. The Minister for the Environment shall determine any question as to whether the project has been substantially commenced.

Any application to extend the period of five years referred to in this condition shall be made before the expiration of that period to the Minister for the Environment.

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 five years.

5 Compliance Auditing

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

5-1 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 proponents.

6 Environmental Management

6-1 The proponent shall exercise all care and due diligence in managing the proposal to ensure the protection of the environment.

6-2 The proponent shall prepare and implement an environmental management plan and environmental management procedures (for example those provided for in Australian Standards 9000 and 14000 (draft) series) to manage the relevant environmental factors to achieve the objectives specified in this Bulletin, with appropriate monitoring, auditing and reporting to ensure compliance with these conditions and procedures and the ongoing protection of the environment.

6-3 If through the implementation of the procedures referred to in 6-2 the proponent identified a relevant environmental factor not listed as such in this Bulletin, the proponent shall immediately report to the Minister on that factor, a proposed objective and any proposals for management of the factor to achieve the objective.

7 Performance Review

7-1 Following the approval of the proposal, the proponent shall carry out an annual audit of the dust management performance and management system. The proponent shall provide the audit report to the Department of Environmental Protection each year for the first five years of the approval.

7-2 Each five years following the approval of the proposal, the proponent shall prepare a major review of the following:

1. environmental protection, including but not limited to consideration of the environmental objectives;

2. the audit of performance against the environmental objectives; and

3. the annual audits required by condition 7-1,

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

These environmental objectives shall include but not be limited to those identified by the Environmental Protection Authority in the assessment report (Environmental Protection Authority Bulletin 831).

The environmental objectives may be changed by the Environmental Protection Authority following the review.

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.

7. References and bibliography

BHP Iron Ore (1995) *Dust Management Improvement Programme - Mid Point Review Presentation*, BHP Iron Ore Pty Ltd, February 1995.

BHP Iron Ore (1996) *Port Hedland Dust Management Programme* BHP Iron Ore Pty Ltd and Halpern Glick Maunsell Pty Ltd, July 1996.

Environmental Protection Authority (1992) *Development of an Environmental Protection Policy for Kwinana,* Environmental Protection Authority, Perth, Bulletin 644, July 1992.

Environmental Protection Authority (1995) *Hot Briquetted Iron Project - Report and recommendations of the Environmental Protection Authority,* Environmental Protection Authority, Perth, Bulletin 786, June 1995.

Federal Register (1987) various as quoted in the CER.

Halpern Glick Maunsell (1993a) *Nelson Point Stockpile Dust Suppression System Ugrade Project Definition Document,* prepared for BHP Iron Ore Pty Ltd, Port Hedland, September 1993.

Halpern Glick Maunsell (1993b) *Port Hedland Harbour Environmental Study,* prepared for BHP Iron Ore Pty Ltd, Port Hedland, November 1993.

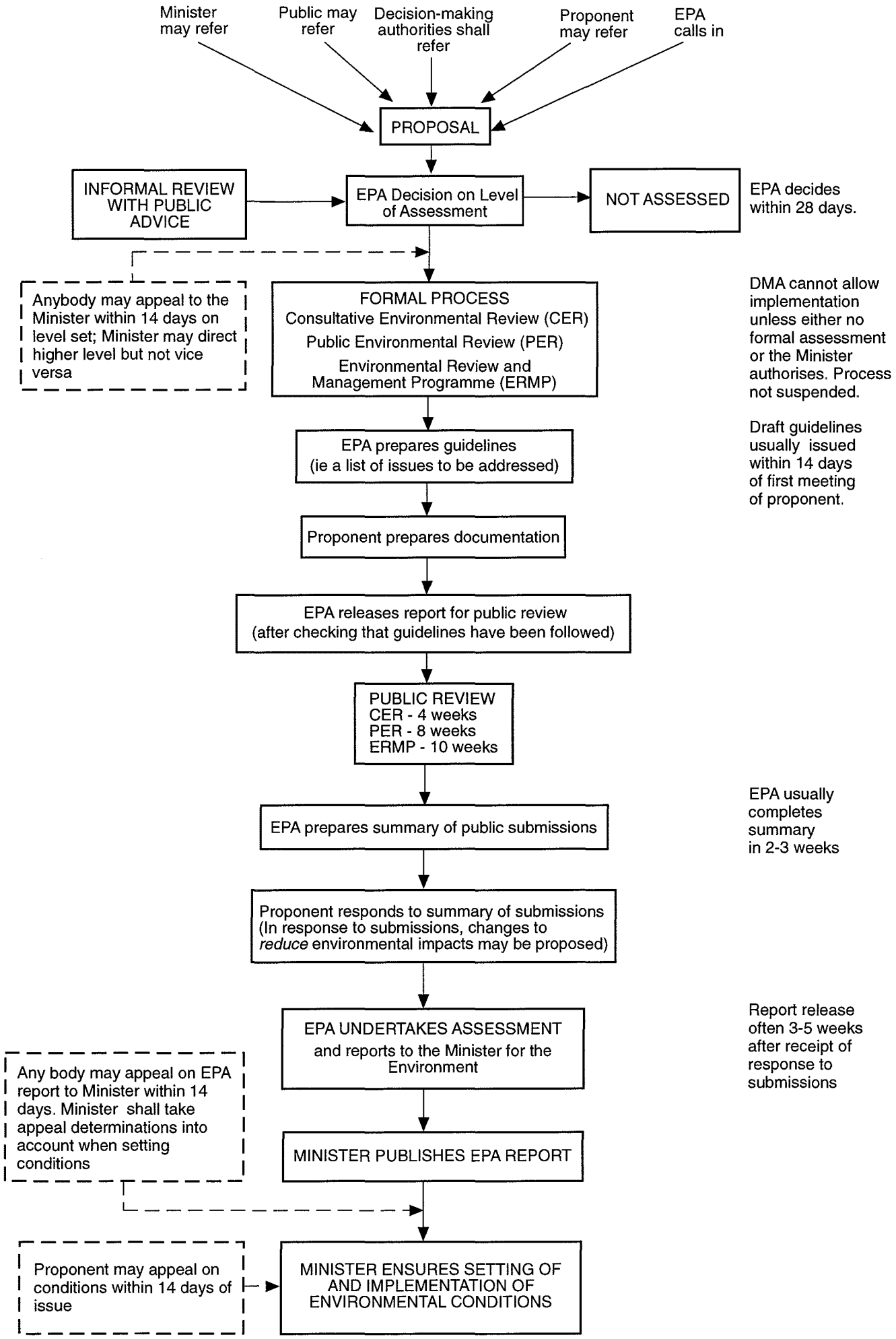
Long, E R et al (1995) *Incidence of Adverse Biological Effects Within Ranges of Chemical Concentrations in Marine and Estuarine Sediments,* Environmental Management Volume 19, No. 1, 1995

Semeniuk Research Group (1994) *Study of the Impacts of Pilbara Coastal Developments on Arid Zone Mangroves - Stage 3: Assessment of Impacts of the Iron Ore Industry,* prepared for the Department of Resources Development.

Appendix 1

Environmental Impact Assessment flow chart

EIA PROCESS FLOW CHART



Appendix 2

Submissions and proponent's response

BHP

BHP Iron Ore

20 September 1996

23 SEP
63/95 XNG 6

1 X REPORT ENCL
1 X DISK ENCL

Department of Environmental Protection
Evaluation Division
141 St George's Terrace
PERTH WA 6000

Attention: Ms Xuan Nguyen

Dear Madam

Please find attached BHP Iron Ore's responses to the dust abatement committee's submission. Additionally, we enclose further information requested in your facsimile transmission of 6 September 1996.

Yours faithfully

RONALD J HILLIS
Manager Environment

Enc:

RJH:PAM/L1200996

101516

RESPONSE TO DEP FACSIMILE TRANSMISSION DATED 6 SEPTEMBER 1996 ON PORT HEDLAND DUST MANAGEMENT PROGRAMME

SECTION 4

Q.1 *Some explanation of Figure 4.1 is required regarding which type of ore is stockpiled where. That is, where is Marra Mamba ore stockpiled, where are the high grade lump and high grade fines stockpiles and where is the Yandi ore stockpiled? These should be outlined in terms of the dust generation potential. So BHP should indicate that Marra Mamba is only stockpiled in South Yard, etc. Figure 4.1 could update this.*

A.1 Stockpile layout is a dynamic feature of an ore handling plant dictated by ore shipment and receival. The potential for dust generation of any material from stockpiles is low due to the effectiveness of the stockpile dust suppression system. Adequate stockpile dust suppression can be achieved on all materials.

NOTE: Marra Mamba Ore Shipment ceased in July 1996.

Q2. *Section 4.4.3 (p 19). How are BHP going to develop "benchmark" practices for dust management?*

A.2 "Benchmarking" is a well established tool used by modern industry. The methods of benchmarking are well known and will be followed in this area, eg. literature reviews, conference and course attendance, networking, visits and in-house results. The outcomes of the DEP and benchmarking activity and their progress will be reported annually to the DEP.

SECTION 5

Q.3 *The sampling frequency of high volume sampler dust monitoring (p 21, p 23) is not clear. It appears to be 24-hourly, 5 days per week. For what appears to be a seven day per week operation, why is sampling frequency not similar?*

A.3 The Australian Standard (AS2724.3) states for statistical purposes one in six days sampling is adequate for routine monitoring in areas of continuous operation. BHPIO's programme already well exceeds this requirement and an expansion to 7-day monitoring would have an unnecessary cost penalty.

Q.4 *A simple table should be provided to show for each ambient monitoring location, the samplers used, the parameter measures (ie TSP, PM10 etc) and the sampling frequency for each.*

A.4 Figure 5.1 shows where current TSP and real time monitoring occurs. Sampling frequency for TSP is 24 hourly intervals, 5 days/week. PM10 monitoring is not shown as it is not currently a licence condition and this document commits to establishing PM10 monitoring per Commitment 5i.

Q.5 *Real Time dust monitoring (p 24) - Why were Beta Gauges selected in preference to TEOMs? Are they measuring TSP or PM10 (p 9 description "infers" both)?*

A.5 The objective for the BHPIO real time dust monitoring programme is to provide automated land reliable operational feedback on dust generation events. BHP Research was commissioned in 1994 to provide advice on the feasibility of establishing such a programme in Port Hedland. Considerable assessment had at this stage been undertaken on the use of beta-gauge samplers versus TEOM samplers. This occurring at BHP steelworks and coal port facilities.

BHP Research recommended that for the intended use at Port Hedland, beta-gauge samplers would be more appropriate. Specifically the reasons were:

(i) the beta-gauge samplers are generally a more robust and reliable than TEOM samplers;
(ii) the extreme conditions experienced in Port Hedland require the use of robust monitoring equipment;
(iii) TEOM samplers utilise an oscillating, micro balance. Vibration and high ambient dust concentrations would result in sampling inaccuracy and ongoing calibration issues.

Any further real-time monitoring assessments and developments associated with air quality issues (i.e. not operational feedback) will form part of the proposed air quality policy study.

Q.6 *It is essential that the DEP is provided with the raw data from the ambient monitoring programme (eg. quarterly or diskette) - this can be arranged through licence conditions.*

A.6 As discussed with DEP raw data will be supplied as requested.

Q.7 *The discussion of the monitoring trials (pp 25-26) contains some peculiar statements, ie. "elevated dust concentrations are associated with low wind speeds and not with high wind speed or lift-off considerations". On the face of it, this is contrary to expectations although there may be other factors at play confounding this result (eg wind direction influence, wind speed and/or wind direction fluctuations, fluctuations source characteristics, etc). A more detailed analysis or more information is required to better explain this outcome.*

A.7 The influence of wind conditions on the dust issue in Port Hedland needs to be defined in terms of both dust generation and dispersion:

(i) Non-wind (i.e. mechanical) dust generation from sources such as materials handling and traffic occur consistently as a function of operational activity. This significance is compounded due to the dry nature (high dust generation potential) of iron ore and the dry/arid operating environment.

Wind generated dust emissions can only occur with wind speeds exceeding 'lift-off' conditions. This does not occur consistently and in fact wind speeds only have a potential lift-off effect for approximately 10% of the year.

In comparing the two categories of dust generation for the BHPIO Port Hedland situation, the non-wind/mechanical sources are the main dust generation sources. This is reflected in the relative consistency of the high volume dust monitoring results for the town and hospital sites where significant ambient dust levels occur throughout the year and are not directly related to high wind speeds. It is common for a high 24-hour average dust level to occur with no corresponding lift-off wind conditions.

(ii) Dust dispersion - assuming a relatively constant dust generation source (i.e. a function of operational activity), ambient dust concentrations will increase under lower dispersion conditions ie. low wind speed/inversion conditions. Alternatively, as dispersion conditions increase (higher wind speeds/no inversion conditions) ambient dust concentration will decrease. It should be noted that high dispersion conditions do not necessarily include lift-off conditions.

An analogy would be the generation and dispersion of photochemical smog/haze within an urban environment.

SECTION 6.7

Q.8 *What typically are the heavy metal concentrations in the different ore types of BHP? This may help put BHP's contribution to the heavy metal load, from dust into perspective.*

A.8 See product specifications sheets attached.

SECTION 7

Q.9 On the dust control measure, this document neither details how far BHP have progressed with implementing these measure, nor does it outline the priorities for future work on areas defined as having a potential for dust generation.. Details (list perhaps) of what work to be undertaken in this PIP and when should be provided, in relation to upgrading specific areas highlighted as sources of dust.

Although the CER mentions that indicators are important and that a two tiered approach will be adopted, development of KPI's section (pp 37-38) contains no definitive performance indicators. The initial indicators should be defined as well as a mechanism for reviewing them. Are the indicators the objectives listed under section 7.2.2.1?

A.9 Section 7.2.2.2. lists the PIP initiatives. The KPI section outlines the areas where they will be used. The development of the specific KPI's and management of, is part of the Dust PIP programme (see Commitment 1). The following table outlines the status of the Dust Management Programmes as at 7 September 1996:

DUST MANAGEMENT PROGRAMME STATUS 07.09.1996

MANAGEMENT ISSUES

1.	**Belt Cleaning KPI**	• in place in Belt Reco contract.
2.	**Belt Transfer KPI**	• in place in Belt Reco contract.
3.	**Dust collector KPI's**	• in place in contract document. • Contract to be awarded within next w weeks.
4.	**Stockpile dust suppression Cannon KPI**	• in place in contract document. • Contract is same as dust Collectors.
5.	**Moisture Content KPI**	• in place at Finucane Island. • awaiting new PQCS at Nelson Point.
6.	**Road Cleaning KPI**	• KPI still to be determined. NB. All KPI's to be in place by January 1997. Initial EMS development for management to occur through to May 1997.
7.	**TSP Monitoring**	• network complete. • reporting formats complete. • quality control work instructions outstanding.
8.	**PM10 Monitoring**	• network complete. CER 7.3.22. Location town, hospital, Boodarie • reporting requirements to be finalised. • quality control work instructions to be in EMS by May 1997.
9.	**Real Time Monitoring**	• network complete. Location being at the town monitoring station. 2 at northern boundary of Nelson Point and 1 at south-western boundary (Burgess Point) • reporting requirements to be finalised. • quality control work instructions to be in EMS by May 1997.
10.	**Overall Management System in place by May 1997**	• auditing/management to be test case for new ISO14000 EMS.

MANAGEMENT PROGRAMME
DUST UPGRADES (ENGINEERING DESIGN AND INSTALLATION)

SITE	UPGRADE	COMPLETION DATE
Nelson Point		
	Tertiary Crusher Building 1	February 1997
	Stackers	January 1997
	Transfers	May 1997
	Dust Extraction	May 1997
	Roads	December 1996
	Belt Cleaning	May 1997
Finucane Island		
	Crushing and Screening	February 1997
	Shiploading	January 1997
	Belt Cleaning	May 1997
	Stockpile Dust Suppression - Stage I	May 1997
	Roads	February 1997

SECTION 7.2

Q.10 *The CER restricts reporting of dust monitoring levels to exceedences of 260 µg/m^3 (24-hour), which is the Kwinana EPP limit for industrial and buffer areas. It is recommended that public exceedence reporting should also include exceedences of 150 µg/m^3 and 90 µg/m^3 which the Kwinana EPP residential area limit and standard respectively. This would provide the community with information more directly relevant for quantitative comparisons of acceptability.*

A.10 BHPIO has made a commitment to supply raw data to the DEP, this will allow the DEP to assess any exceedences based on 260 µg/m^3, 150 µg/m^3 or 90 µg/m^3.

Q.11 *Despite acknowledging the short term nature of dust nuisance impacts, the proponent has not discussed the use of the Kwinana EPP 1000 µg/m^3 (15 minute) criterion.*

A.11 Adoption of 15 minute monitoring (and criterion) is not relevant for the Port Hedland/BHPIO Dust Management Programme.

SECTION 7.3

Q.12 *There is virtually no discussion of the overwhelming evidence appearing in the recent literature regarding the impacts of fine particulate matter on health. Before considering the use of the USEPA PM10 standard as acceptability criterion, a review on the literature should be carried out, particularly studies on health impacts of Fine Particle Matter outside the urban pollution context. (See Appendix).*

A.12 There is an overwhelming amount of literature available that discusses this issue. There does not appear to be any consensus to the real effects of PM10/PM2.5 at this stage. Commitment 5 commits to the ongoing review of developments in this area.

Q.13 *It is believed that a National environmental protection measure is being developed for air quality which recommends criterion below 150 µg/m^3, in the range 50-120 µg/m^3 (24-hour) (see Table 1).*

Table 1 - Recent 24-hour PM10 ambient criteria adopted or being considered

Jurisdiction	24-hour value	Status	Reference
Victoria	120	Recommendation	Streeton, J.A.,. 1990 "Air Pollution Health Effects and Air Quality Objectives in Victoria"
California standard	50	Standard	Internet
United Kingdom	50	Recommendation by British Dept of Health	Bates, D.V., 1996 "Air Pollution: Time for more clean air legislation?", British Medical Journal, Vol 312, March 1996
British Columbia (Canada)	above 30	Recommendation	Vedal S., June 1995, Health Effects of Inhalable Particles: Implication for British Columbia, prepared for the Air Resources Branch, British Columbia Ministry of Environment, Land and Parks

A.13 The table presented is a good start to the sort of information that will be needed for the development of a regional air quality policy. Much more work is needed in this area. Can DEP provide copies of literature referenced? Again these issues will form part of the development of a Port Hedland Air Quality Policy.

Q.14 *There is a need to emphasis real time PM10 monitoring. Preferably, at least one such monitor should be co-located with a PM2.5 monitor TSP monitor. The DEP would like to be involved in the definition of the ambient monitoring programme.*

A.14 Through discussion with DEP it has been agreed to review the need for the monitoring of fine particles. DEP's involvement has always been invited and their involvement in the development of an air quality policy will provide opportunity for involvement in this area.

BHPIO RESPONSE TO PORT HEDLAND TOWN COUNCIL DUST MANAGEMENT COMMITTEE'S SUBMISSION ON DUST MANAGEMENT PROGRAMME CONSULTATIVE ENVIRONMENTAL REVIEW

Q.1 *Commitment 4 of the document suggests that the proponent only has to review (or benchmark) new or better technology. It is the belief of the Committee that the proponent should be more committed in the document to adopting and utilising new technology, once discovered, where it would assist in the reduction of dust emissions.*

A.1 Commitment 4 (review developments in dust management technology) should be viewed in conjunction with Commitment 1, i.e. commitment to continual improvement, means continually reviewing and implementing developments in dust management.

Q.2 *It was considered by the committee that it is critical that TSP monitoring continues.*

A.2 BHP Iron Ore agrees with TSP monitoring as it is the required monitoring method for proposed community amenity impacts criteria. Commitment 2 ii, commits to maintain existing licence conditions for dust monitoring, i.e. TSP at licence sites.

Q.3 *The current data is not provided in any definite way. The DEP only receives annual averages once a year, and it is considered that information pertaining to specific events should be provided and reported at the time of the event, to both the DEP and the Chairperson of the PHDMC.*

This information should be readily available from the Real Time Monitors the proponent intends to use, but the DEP should not wait until the end of a reporting period to act on a specific event which exceeds the prescribed allowed limits for such an event

A.3 The current data provided to the DEP is for monthly and annual average trend analysis only. Commitment 2 proposes utilising TSP exceedances targets (i.e. not prescribed limit) to identify significant events in addition to the current reporting to the Department of Environmental Protection. This process can also be undertaken on behalf of the PHDMC, ie. sources may be non-BHPIO. This will initiate a source assessment/remedial action reporting process. This process will involve the time to analyse all monitoring and operational data. It will provide the basis for any required future changes in the management direction. It is not possible for this process to occur instantaneous (at the time of any specific event). The information relating to the description of an exceedance event will be made available with the associated performance criteria data, to the PHDMC at their regular meetings. All through Commitment 2, does not give a specific reporting time, exceedances to the DEP could be reported within one week of occurrence.

Q.4 *The Committee is vehement in its opinion that DEP representation is critical on the PHDMC to enable educated analysis on the information presented by the proponent at the time of its presentation. Further, it is the express concern of the Committee that until the DEP sites a full-time officer in Port Hedland, especially in light of the proposed second stage of the HBI project and mooted development of the Boodarie Industrial Estate, it is impossible for that department to properly police the conditions of any environmental licences, let alone this Dust Management Programme, with any professionalism or timeliness.*

A.4 BHP Iron Ore supports the concept of DEP involvement/representation on the PHDMC.

Q.5 *Commitment 6 suggests that the proponent only has to present 'relevant' results. The Committee is concerned that the term relevant is not prescriptive and does not outline the depth of information that should be required to be presented.*

It also does not outline in any detail the avenues of information dissemination, and it is recommended that the Committee accepts a role in this regard.

A.5 Until now BHPIO believed that the level of information released to the PHDMC had been adequate to meet their needs. However, if the committee wishes more data, BHPIO is prepared to discuss this with the committee so the information need is met. BHPIO proposes that the PHDMC should be taking an active role in the collection and review of dust information. The dissemination of information then becomes a committee based activity rather than solely a BHPIO activity.

Q.6 Align all new stockpiles (including the HBI site) to present least profile to the prevailing winds. Is attention being paid to the existing alignment of stockpiles on Finucane Island?

A.6 All proposed stockpile alignments will be based on operational requirements. The current BHP Iron Ore standard stockpile dust suppression ("SDS") system design which is a water spray system, takes into account all climatic conditions. Adequate SDS can be achieved with any stockpile alignment.

Q.7 *It was considered by the Committee that comments made by the proponent throughout the document on the 'negligible effects' of Iron Ore dust are without basis, and to this end, it is recommended that the proponent fund research by an unbiased body (eg. Health Department of WA) towards an officially recognised confirmation of whether any health effects may result from exposure to iron ore* dust.

A.7 The term 'negligible' was made in the context of the potential for impacts not a direct statement on any specific effects. BHP Iron Ore considers that based on the monitoring data/studies available to date and the current accepted monitoring criteria, the potential for any significant health or ecological impact from existing residential dust levels is 'negligible'. This potential will be assessed on a continual basis through the proposed monitoring/study commitments.

The concept of the W.A. Health Department undertaking any form of health related ambient air quality research should be directed (by the PHDMC) to this Department for comment.

Q.8 *BHP to set up an "1800" number to log all complaints relating to the programme, and a record of that log to be presented on a monthly basis to the PHDMC, and an annual basis to the DEP.*

A.8 A complaints register is kept as a requirement of the existing DEP licence. An update on the status of this will be reported to the regular meetings of the PHDMC (i.e. as per Commitment 2).

Q.9 *Dust CER to be more specific about its boundaries. Specific mention of this management programme is made in the Hot Briquetted Iron Project's environmental management programme (September 1995) as a basis for the dust management on that site. However, this dust CER does not appear to mention its total purpose to those ends, mentioning only the two recognised sites of Nelson Point and Finucane Island.*

Perhaps the proponent should be reminded that the extent of this dust management programme includes the entire BHP/DRI development/operation within the Port Hedland region, and is not two-site specific.

A.9 Section 4.4.3 outlines the objectives of Dust PIP. A key objective is to develop benchmark practices for dust management within BHP Iron Ore operations in the Port Hedland area. This is intended to include the DRI/HBI operations.

The development of the dust management programme for the HBI operations forms part of the HBI EMP process. This will be cross referenced to commitments within the Dust Management CER.

Q.10 7.2.2.6 (p 38) states that all information drawn from the 24 hour average will be reported annually to the DEP. Again, the Committee re-iterates that the receival of year old results of evidence of exceedences is pathetic, and the proponent should be required to record any such event the moment it happens, not 12 months later.

How is the DEP going to be able to enforce the legislations (1) from Karratha or Peth, and (2) after an event?

The above-mentioned point about timely DEP representation was re-iterated throughout the meeting, and possibly above almost all other queries, forms in the opinion of the Committee the crux of the CER. It is considered negligent by the Committee that the DEP has not installed the relevant officer(s) into a townsite that currently threatens to explode with industrial development, and where billions of dollars of development have already been either initiated or mooted.

A.10 The exceedence criteria targets are intended as a basis to form performance goals for the Port Hedland Dust Management Programme. (i.e. it is not intended as a prescriptive device for day to day policing of BHP Iron Ore operations). It is the aim of the Dust Management Programme to have zero exceedences for the TSP (24 hr -260 μgm^3) and PM10 (24 hr - 150 $\mu g/m^3$) criteria. These are interim targets and will be reviewed as a component of continual improvement.

The PHDMC should also be reminded that these targets are for dust management for the Port Hedland area as a whole, not just for BHP Iron Ore.

The proposed annual target will be recorded as a revolving 12 month target (i.e. updated monthly). The status of the target and the associated analysis of exceedances (BHP Iron Ore or non BHP Iron Ore sources) will be reported to the PHDMC at their regular meetings. The CER document does not make any reference to reporting exceedences only annually.

It is intended to utilise the existing license annual reporting requirement to provide the DEP with an ongoing assessment of the operations dust management performance. Any issues with the 'level of performance' of the operations can be resolved through assessing the direction of management and amending it accordingly.

Q.11 *Page 11 of the document refers to an AQ Policy for the area. It is suggested that existing criteria of 260 micro g/m^3 utilised in Kwinana be adopted as the 24 hour exceedence limit. It is drawn to DEP's attention the proponent has already agreed to try and meet 100 micro.g/m^3 as a target level, and therefore, why should targets set in very different areas with very different types of emissions be instigated in Port Hedland?*

It is felt that if the responsibility for setting those criteria are with the DEP, that authority should set such levels now, before the CER is approved, instead of at a later date. The alternative is to lower the suggested 260 micro g/m^3 to 100 in residential or industrial area, and 250 in other areas of "lesser" impact.

A.11 The existing target of 100µg/m^3 is for an annual average not for a 24 hour average. It is also an agreed target for the PHDMC (ie not solely BHP Iron Ore). The use of 24 hour average criteria highlights events rather than only long term trends. It is considered that as a performance monitoring tool assisting and targeting the number of 'events' occurring is more appropriate a tool than just relying on long term trend analysis.

The 24 hour average level of 260µg/m^3 is adopted as an interim target only. It is the level set by the USEPA and has been adopted in the Kwinana area as a ambient limit for residential and industrial areas adjacent to industrial area. BHP Iron Ore supports the review of all air quality criteria for the Port Hedland area, within an air quality policy framework.

Q.12 *What work is being done to implement work site strategies along the lines of BHP's 5 star safety programme. For example, could BHP target more the individual worker or contractor to try and reduce events? What about induction training for all employees and contractors relating to dust management?*

A.12 Section 7.1 refers to the development of a Site Environmental Management System in compliance with ISO 14000. All dust management activities will occur within this framework. This process will be the main focus for the final quarter (to May 1997) of the Dust Management Programme. it will follow on from the engineering upgrades.

It could be noted the Dust PIP process involved continuous communication with site employees. The communications included idea generation meetings and feed back.

Q.13 *Results and minutes from the BHP on-site management group's meetings to discuss the performance of the dust PIP should be made available on a regular basis to the PHDMC.*

A.13 The PHDMC will be kept informed of the progress with the programme implementation and on an ongoing basis for dust management performance. Minutes from internal meetings are internal documents and will not be distributed externally.

Q.14 *PHDMC to be invited on annual tour of facilities to be shown what improvements have occurred, and the ongoing works in progress. (NOTE: BHP already extend this courtesy to the Committee).*

A.14 An open invitation is extended to the PHDMC for site tours at any time that is convenient for BHP Iron Ore and the PHDMC.

Q.15 *The Committee would like to see extra HV samplers located in the following positions to allow more representative results of general emission levels:*

- *Western tip of Finucane Island*
- *Boodarie Landing*
- *Anderson Point*
- *Entrance to SE Creek*

At this stage, samples are only being taken with a residential impact bias, and the Committee had some concerns that without site specific monitoring in environmentally sensitive areas, true impacts cannot be gauged.

A.15 High Volume samplers are designed to provide data specific to gauging ambient residential air quality. Dust deposition gauges are being installed to gauge the 'deposition rate' of dust in ecologically sensitive areas. The details of this programme will be presented to the PHDMC at it's regular meetings.

Q.16 It is suggested that BHP be required to carry out audits of their contractors in relation to dust management. This could include prescribed actions as a contractor, including dust suppressing on their sites, and proper covering of their cartage vehicles. Further, if BHP lets a large haulage contract, thought should be paid to more frequent watering or utilisation of a surfactant to suppress dust more effectively.

A.16 Contractor auditing falls within the management controls area (ie being addressed within the site EMS, see Q.12 response). All contractors currently have to submit environmental management planned for BHP Iron Ore approval prior to any work commencing on a contract.

Q.17 *It is suggested that regular diagnosis of silica content of HIVol samples occur as part if any programme or research into health effects if Fe dust. This should be carried out independently of BHP, by perhaps the DEP.*

A.17 BHP Iron Ore analyses for quartz in its ore on a six-monthly composite sample. In general the quartz content ranges between 2% and 4% compared to silica beach sand which is usually above 70% quartz.

BHP Iron Ore also measures dust exposure to its employees and analyses these respirable dust samples for free silica. To date all samples have free silica values below the detection limit of $0.001 \mu g/m^3$. BHPIO does not believe silica is a health issue for dust generated from our operations. During the development of the Enironmental Protection Policy for the Port Hedland area, characterisation of air borne particulates will be undertaken.

Western Australia
Health Department of Western Australia
Environmental Health Service

Your Ref
Our Ref
Enquiries

FACSIMILE

TO: **The Chairman**
Environmental Protection Authority
9th Floor, Westralia Square
141 St George's Terrace
PERTH WA 6000

FAXED 3/9

Copy to: M. McKinnon

Attention : Ms Xuan Nguyen

FROM: **Dr C F Quadros**

DEPARTMENT OF ENVIRONMENTAL PROTECTION
- 5 SEP 1996
File No 1 63/95 Initials XNG
File No 2 _____ Initials _____

DATE: **3 September 1996**

PAGES: **1**

FAX NO: **322 1598**

SUBJECT: **PORT HEDLAND DUST MANAGEMENT PROGRAMME**

110/95

Comparative statistical information for hospital admission for asthma and chronic obstructive airways disease for Port Hedland, Bunbury and Geraldton Hospitals for a period 1991 to 1994 have been assessed.

Hospital admissions for these conditions are not higher in Port Hedland than in these other centres. In addition the Port Hedland Principal Environmental Officer has received no complaints regarding dust from local residents.

From this information the proposed dust management programme appears to be satisfactory from a public health point of view.

Dr C F Quadros
A/PRINCIPAL MEDICAL OFFICER
ENVIRONMENTAL HEALTH

100724
Info

3 September 1996

6903QF1A.fax.gc4

(Hard copy will follow in mail shortly)

Grace Vaughan House 227 Stubbs Terrace Shenton Park Tel (09) 388 4999 Fax (09) 388 4955
Correspondence to: PO Box 8172 Stirling St Perth WA 6849

Western Australia

Health Department of Western Australia — Environmental Health Service

Your Ref
Our Ref 6844/96
Enquiries

The Chairman
Environmental Protection Authority
9th Floor, Westralia Square
141 St George's Terrace
PERTH WA 6000

Attention: Ms Xuan Nguyen

Dear Ms Nguyen

Further to an earlier facsimile from Dr Quadros and your subsequent discussions with Ms Griffiths, additional comments are provided, as attached, in regard to the Port Hedland Dust Management Programme prepared by BHP Iron Ore Pty Ltd, July 1996.

The opportunity to review this report from a public health perspective is appreciated. However the configuration of the report and the data presented make public health based assessment both time consuming and difficult.

Industrial developments impacting our environment often have potential outcomes for public health. Your consideration of a proposal for public health impact assessment criteria to be included in environmental submissions to your office is recommended. Such information, as agreed to by our respective government agencies, could significantly assist in comprehensively reviewing future environmental management reports and proposals.

With respect to the Port Hedland Dust Management Review, the inclusion of the Health Department WA in matters pertaining to public health, is recommended. As stated in the accompanying comments your assistance is sought in providing for the Health Department to regularly review relevant air monitoring data, and thereby assess potential health implications for the Port Hedland community.

101393
Info

Grace Vaughan House 227 Stubbs Terrace Shenton Park Tel (09) 388 4999 Fax (09) 388 4955
Correspondence to: PO Box 8172 Stirling St Perth WA 6849

I hope the attached comments will prove useful in your review of the Port Hedland Dust Management Programme and I await your feedback with respect to introducing a requirement for public health assessment criteria to be included in future environmental management submissions and reviews.

Yours sincerely

Michael Jackson
A/DIRECTOR
ENVIRONMENTAL HEALTH SERVICE

attch.

18 September 1996

6918gs1b.doc

COMMENTS PREPARED BY HEALTH DEPARTMENT WA IN RELATION TO THE PORT HEDLAND DUST MANAGEMENT PROGRAMME, BHP IRON ORE PTY LTD, JULY 1996

1.0 On the basis of the report, which is considered comprehensive in most aspects, BHP have demonstrated a commitment to environmental protection and the minimisation of airborne particulate emissions from their Nelson Point and Finucane iron ore operations.

2.0 From a public health perspective, iron ore dust is generally treated as a nuisance particulate in that its ability to invoke organic disease or irreversible tissue damage is not considered significant. Nevertheless airborne concentrations need to be controlled to prevent overloading the body's natural defence mechanisms for both healthy and health-compromised members of the community.

3.0 The primary sources of community exposures to particulate emissions are uncovered stockpiles, particularly during materials handling and during dry and windy conditions, and vehicle movements on dust covered surfaces. These sources are being suppressed and controlled by a range of strategies, as detailed in the report, which require local inspection and assessment to determine their adequacy and effectiveness.

4.0 As stated in previous correspondence, there is no evidence from community public health records that Port Hedland residents are experiencing any increase in respiratory complaints by virtue of living in the township.

5.0 **Public Health Exposure Standards**

With respect to assessing the report against public health exposure criteria, the following comments are provided:

5.1 The NHMRC standard of 90 $\mu g/m^3$ annual average relates to total suspended particulates, as opposed to respirable particulates, and fails to adequately assess human health criteria.

The absence of recognised, comprehensive Australian standards which review human health impacts, including potential respiratory outcomes, necessitates a consideration of international PM_{10} criteria. In USA respirable suspended particulates in ambient air in urban areas should not exceed 50 $\mu g/m^3$ annual arithmetic average and 150 $\mu g/m^3$ 24-hour average. Even these levels may not totally protect those members of the community whose health is already compromised.

5.2 Occupational exposure standards established in Western Australia, through the Occupational Health, Safety and Welfare Regulations 1988, require average 8-hour respirable particulates exposures to be

kept below 5 $\mu g/m^3$ air. This figure has been established to protect the majority of workers from eye, skin and respiratory irritation. It cannot however be readily extrapolated to reflect environmental and public health outcomes due to the need to consider such factors as the variable health status of Port Hedland community members and individual exposure potentials and exposure duration factors.

Nevertheless, as occupational exposure levels have the potential to be significantly greater than ambient exposures for members of the community, demonstrated compliance with occupational exposure standards can lower the associated public health risks provided appropriate dust controls are maintained.

5.3 Figures provided in the report indicate that five high volume dust samplers are used to monitor dust concentrations in the Port Hedland area, on a 5-days-per-week basis, in accordance with current DEP licence conditions. Residential annual average dust concentrations (PM_{50}) in the townsite increased from approximately 110 $\mu g/m^3$ in 1991 up to approximately 158 $\mu g/m^3$ in 1994, but declined to approximately 140 $\mu g/m^3$ in 1995. This recent decline is believed by BHP to be due to the initiation of their dust management suppression plan in 1994 and has occurred despite an increase of approximately 20 mT of ore handled. These concentrations significantly exceed the NHMRC standard of 90 $\mu g/m^3$ annual average.

5.4 Residential annual dust concentrations provided reflect PM_{50} values and are therefore likely to significantly over estimate PM_{10} figures which more directly relate to public health issues. The report states that the majority of emissions of particulates from the iron ore industry fit into the upper size range of the coarse particle zones, defined as larger than 2-3 μm to 100 μm, and therefore most dust particulates in Port Hedland would not be expected to penetrate to the lower respiratory tract. Trial PM_{10} monitoring during June-October 1995 reported maximum 24-hour averages of 87 $\mu g/m^3$ (town), 70 $\mu g/m^3$ (hospital) and 40 $\mu g/m^3$ (Boodarie) which are within the USEPA standard of 150 $\mu g/m^3$.

5.5 No PM_{50} 24-hour averages or PM_{10} values are provided in the report. This makes health related interpretation very subjective and unreliable.

6.0 Public Health Related Conclusions and Recommendations

6.1 Although hospital admissions data do not appear to indicate an increased respiratory health risk for Port Hedland residents, annual average PM_{50} dust concentrations (approximately 140 $\mu g/m^3$ in 1995) could be of concern as they significantly exceed the NHMRC standard of 90 $\mu g/m^3$ and the background concentrations (approximately 40 $\mu g/m^3$) as provided by the Spinifex Hill high volume sampler. The

trial PM_{10} monitoring results, ranging from 40 $\mu g/m^3$ to 87 $\mu g/m^3$ are however below the USEPA PM_{10} 24-hour average standard of 150 $\mu g/m^3$. The PM_{10} results are more relevant to public health assessments as they reflect respirable dust levels. Providing the trial results are found to be valid and representative throughout a full year the risk to public health, as assessed against the USEPA PM_{10} standard, would not therefore be considered significant.

6.2 The range of environmental management procedures outlined in the review report (as summarised in table 1.1) appear appropriate however, to assist in assessing potential public health implications, results from the proposed PM_{10} residential dust monitoring program should also be recorded, analysed and reported, at least annually, to the Health Department WA. Such monitoring should be undertaken with sufficient frequency to highlight trends throughout the year, whilst reflecting and allowing for the interpretation of, maximum and minimum seasonal variations.

The Health Department should continue to be actively consulted on public health related issues arising through the Port Hedland Dust Management Program, including relevant matters raised through meetings of the Port Hedland Dust Abatement Committee.

6.3 The development of an air quality policy for the Port Hedland region, similar to that established in the Kwinana Environmental Protection Policy, 1992, is considered desirable. Such policies must necessarily consider both PM_{50} and PM_{10} health based concentrations. In the absence of Australian standards application of the USEPA PM_{10}, 24 hr average of 150$\mu g/m^3$ is considered appropriate. The development of residential air quality and public health criteria, and their inclusion in environmental protection licences, would be desirable.

DRD

DEPARTMENT OF RESOURCES DEVELOPMENT

168 St Georges Terrace
Perth, Western Australia

Postal Address:
PO Box 7606, Cloisters Square,
Perth, Western Australia 6850

Telephone (09) 327 5555
Fax (09) 327 5500

Our Ref: R0284/93

The Chairman
DEPARTMENT OF ENVIRONMENTAL PROTECTION
9th Floor, Westralia Square
141 St Georges Terrace
PERTH WA 6000

Attention: Ms Xuan Nguyen

BHP IRON ORE - PORT HEDLAND
DUST MANAGEMENT PROGRAM

Thank you for the CER forwarded for comment, on the Dust Management Program for the BHP operations at Port Hedland. This Department has reviewed the document and supports the proposed Dust Management Program.

for D R Kelly
CHIEF EXECUTIVE OFFICER

23 August 1996 (BRWO0386.DOC)

Appendix 3

Proponent's Environmental Management Commitments

PROPONENT'S ENVIRONMENTAL MANAGEMENT COMMITMENTS

The proponent makes the following commitments in relation to the development:

General

Commitment 1

The proponent will develop and implement the Dust Management Programme as a component of BHPIO's Environmental Management Programme to improve dust management and reduce operational dust impacts.

The programme will incorporate:

- quality assurance and environmental management principles according to AS/ISO 9000 and draft AS/ISO 14000 series;
- performance measurement/ continual improvement;
- bench marking for all Hedland Operations;
- operational feedback; and
- community consultation.

The programme will be developed and implemented to the satisfaction of the DEP.

Community Amenity Impacts

Commitment 2

The proponent will develop and implement for community amenity impacts, an issue definition and dust management performance assessment process, to:
(i) address community consultation by maintaining a community complaints register;
(ii) develop Total Suspended Particulate (TSP or PM50) air quality criteria for the Port Hedland residential area;
(iii) develop annual performance targets based on the number of complaints/exceedances; and
(iv) address community consultation on community amenity impacts.

The process will include the following:

- recording and responding to community complaints;
- informing Port Hedland Dust Management Committee (PHDMC) of status on a regular basis;
- maintain residential TSP monitoring programme;
- setting agreed interim TSP criteria;
- assisting the development of an air quality policy for Port Hedland in conjunction with the DEP and PHDMC;
- establishing a protocol for exceedance / complaint analysis and reporting to DEP; and
- developing and maintaining community consultation on community amenity impacts.

The above components will be developed and implemented in consultation with Port Hedland Dust Management Committee (PHDMC) and to the satisfaction of the DEP. The DEP Kwinana PM50 24h limit of 260ug/m^3 is adopted as the interim exceedance target for amenity.

Commitment 3

To complete the dust management upgrade programme for Nelson Point and Finucane Island, the proponent will undertake the upgrading of:

- materials handling;
- dust suppression equipment;
- traffic and open areas; and
- dust management system.

The upgrades will be to the satisfaction of the DEP and will be completed by May 1997.

Commitment 4
The proponent will carry out ongoing review of new developments in dust management technology to continually improve dust management through:
- undertaking continual review of dust management technology; and
- implementing appropriate developed technology.

Potential Environmental Health Impacts

Commitment 5

The proponent will develop and implement a process for ongoing definition of the potential for environmental health impacts. This will be based on:
- establishing a PM10 monitoring programme;
- setting agreed interim PM10 criteria; and
- establishing a protocol for exceedance analysis and reporting to the DEP;
- assisting the development of an air quality policy for Port Hedland in conjunction with the DEP and PHDMC;
- continual review of developments in monitoring/criteria in conjunction with DEP and implement agreed programmes; and
- informing PHDMC of status on a regular basis.

The above components will be developed and implemented in consultation with the Health Department and the PHDMC, and to the satisfaction of the DEP. The US EPA PM10 maximum 24h average of 150ug/m^3 is adopted as the interim exceedance target for health.

Commitment 6

The proponent will develop and implement a process to inform community on status of environmental health impacts, through dissemination of relevant information and data to the community on a regular basis, in consultation with the Health Department, the DEP and PHDMC.

Potential Ecological Impacts

Commitment 7

The proponent will develop and implement a process for ongoing definition of the potential for ecological impacts. This will be based on:
- establishing a dust deposition/ vegetation monitoring programme;
- establishing effluent discharge/harbour monitoring studies; and
- informing PHDMC of status on a regular basis.

The above components will be developed and implemented to the satisfaction of the DEP. Any agreed potential impacts identified from these monitoring studies will be addressed through an appropriate management programme to be developed in consultation with the DEP.

Commitment 8

The proponent will develop and implement a process to inform community on status of ecological impacts, through dissemination of relevant information and data from the above studies (Commitment 7) to the community, in consultation with the DEP and PHDMC.

Commitment 9

The proponent will develop and implement programmes to minimise iron ore fines waste generation, to the satisfaction of the DEP.