Koolyanobbing Iron Ore – W2 pit – mining below the groundwater table

Portman Iron Ore Limited

Report and recommendations of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
Report 1303
November, 2008

Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
21/01/08	**Referral received**	
25/03/08	**Intention to set EPS Level of Assessment advertised (no appeals)**	**4 weeks**
29/07/08	**Proponent's Final EPS document received by EPA**	**17 weeks**
17/11/08	**EPA report to the Minister for the Environment**	**11 weeks**

Report Released: 17/11/08

Appeals Close: 01/12/08

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Contents

Page

Tables

Figures

Appendices

1. Introduction and background

This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for the Environment on the proposal to mine below the groundwater table at Koolyanobbing W2 pit by Portman Iron Ore Limited (PIOL) within the Windarling Range. The proponent is currently conducting mining operations at the Windarling Range Deposit W2 pit above the groundwater table. These operations were approved by the Western Australian and Commonwealth Ministers for the Environment and Heritage in 2003.

Section 44 of the *Environmental Protection Act 1986* (EP Act) requires the EPA to report to the Minister for the Environment on the outcome of its assessment of a proposal. The report must set out:

- the key environmental factors identified in the course of the assessment; and
- the EPA's recommendations as to whether or not the proposal may be implemented, and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation should be subject. The EPA may include in the report any other advice and recommendations as it sees fit.

The EPA was advised of the proposal in January, 2008. Based on the information provided, the EPA considered that, while the proposal had the potential to have an effect on the environment, the proposal, as described, could be managed to meet the EPA's environmental objectives. Consequently it was notified in *The West Australian* newspaper on 25 March 2008 that, subject to preparation of a suitable Environmental Protection Statement (EPS) document, the EPA intended to set the level of assessment at EPS.

The proponent has prepared the EPS (Portman Iron, July 2008), document which accompanies this report. The EPS document sets out the details of the proposal, potential environmental impacts and appropriate commitments to manage those impacts. The EPA notes that the proponent has consulted with relevant stakeholders.

The EPA considers that the proposal can be managed to meet the EPA's environmental objectives, subject to the EPA's recommended conditions being made legally binding.

The EPA therefore has determined, under Section 40 of the EP Act that the level of assessment for the proposal is EPS, and this report provides the EPA advice and recommendations in accordance with Section 44 of the EP Act.

2. The proposal

Portman Iron Ore Limited proposes to mine iron ore (haematite) below the water table at W2 pit Windarling approximately 90km North, North East of Koolyanobbing. Mining below the groundwater table at the W2 pit involves an increase in depth of approximately 114m from nominally 402m AHD to 288m. This would allow an estimated 6 million tonnes of ore to be mined over a life span of approximately 3 years. Waste generated from mining below the groundwater table would be stored within the existing Windarling W2 waste dump. The project would not result in the extra clearing of land or an increase in the mine footprint.

The key components of the proposal are summarised in Table 1 below:

Table 1 – Summary of Key Proposal Characteristics

Element	Description
Duration of mining	3 years (approximately) estimated 6 million tonnes of ore to be mined.
Number of mine pits	One
Area of disturbance	Within existing pit * (see footnote).
Area of vegetation disturbance	Nil – within existing pit* (see footnote).
Total area of rehabilitation	All disturbed areas including final pit area.
Final depth of mine pit	290 metres AHD (approximately).
Waste rock volume	9 800 000 cubic metres (approximately).
Water supply source	Dewatering groundwater
Groundwater abstraction rate	0.44 Gigalitres per year (approximately).

* - No additional disturbance beyond area permitted under Statement No. 627.

The regional location of the proposal and the mine layout are shown in Figure 1.

The potential impacts of the proposal are discussed by the proponent in the EPS document (Portman Iron, 2008).

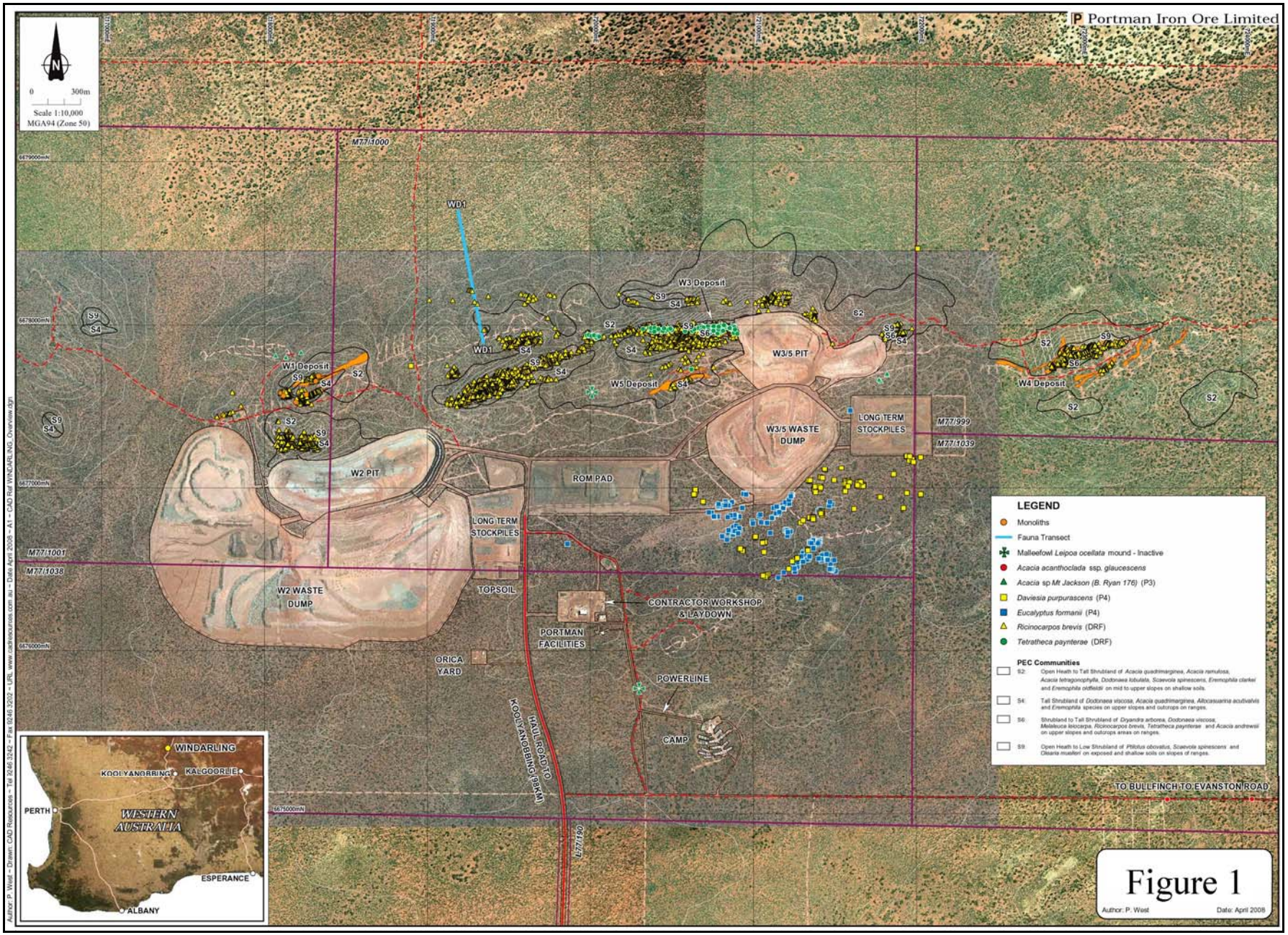

Figure 1: Regional location and mine layout

3. Consultation

During the preparation of the EPS, the proponent has undertaken consultation with government agencies and key stakeholders. The agencies, groups and organisations consulted, the comments received and the proponent's response are detailed in the EPS Portman, July 2008.

A number of environmental issues were raised by the stakeholders during the consultation. Table 2 of the EPS summarises the main issues raised and details the actions taken by the proponent to address the issues.

Table 2: Summary of issues raised during stakeholder consultation

Issue raised	Stakeholder	Response
Opposed to mining below the groundwater table and concerned about the disposal of the groundwater in the long term.	Representative for the Wildflower Society of Western Australia	Opposition is noted. Portman believes that the disposal of saline groundwater can be managed in accordance with the existing Dust Management Plan and the wellfield Operating Strategy.
Does not see a problem with the proposal to mine below the groundwater table as described. Stated strong preference for disposal of excess water by groundwater injection, subject to confirmation of a feasibility as opposed to evaporation.	Chairperson CRG for the Shire of Yilgarn	Noted. Re-injection trials have been undertaken, however are no longer included in this proposal.
Would like to understand the long term solution to excess groundwater disposal before commencing.	Representative for the Malleefowl Preservation Group (MPG)	Portman believes that the disposal of saline groundwater can be managed in accordance with the Dust Management Plan and wellfield Operating Strategy.
Remains concerned with the ongoing incremental expansion.	Representative for the Malleefowl Preservation Group (MPG)	Concerns with the incremental expansion are noted. Expansions have been driven by responses to market demand. The expansions have provided for greater resource utilisation with minimal, environmental impact.

The EPA considers that the consultation process has been appropriate and that reasonable steps have been taken to inform the community and stakeholders on the proposed development.

4. Key environmental factors

It is the EPA's opinion that the following key environmental factors relevant to the proposal require evaluation in this report:

(a) Vegetation and flora – the potential impacts of dust from mining operations and the use of saline water for dust suppression, on significant flora species.

(b) Mine Closure/Rehabilitation - availability of standing water in the mining void and the potential for long-term impacts on the Windarling biodiversity due to increased predation and grazing.

The key environmental factors are discussed in Sections 4.1 – 4.2. The description of each factor shows why it is relevant to the proposal and how it would be affected by the proposal. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

The EPA has provided other advice in relation to fire and rehabilitation of the existing waste dump.

4.1 Vegetation and Flora

Description

Effects of dust on vegetation and flora

The area of the proposal is noted for its enhanced species diversity. It is situated in the transitional zone between goldfields and wheatbelt vegetation with many species and communities at range ends. The Banded Ironstone Formation (BIF) ranges of the region are noted for exceptional biodiversity value.

Two flora species that have been recorded at the Windarling site have been classified as Declared Rare Flora (DRF) under the *Wildlife Conservation Act 1950*. These species are *Tetratheca paynterae ssp.* and *Ricinocarpos brevis. T. paynterae* is also listed as 'Endangered' under the *Environmental Protection and Biodiversity Conservation Act 1999* (C'th). Three Priority 4 flora species *Daviesia purpurascens, Eucalyptus formanii* and *Grevillea erectiloba* (Portman Iron, 2008) also occur within the Windarling site.

Dust from mining at the W2 pit does not present any risk to *T .paynterae* due to the 1100m distance between the *T .paynterae* and the W2 pit.

R. brevis is located approximately 50m north of the W2. One mortality in the population of 1020 has been recorded since mining. Dust and drought are two factors that may have contributed to this mortality.

Annual health condition monitoring of the health of *R. brevis* located near the W2 pit has confirmed that dust from mining the W2 pit reaches the population. The health of the *R. brevis* in this population demonstrates some plants having produced a large number of female

flowers during the first half of 2008, while other plants have suffered leaf loss over a period of years, and have produced no female flowers during 2008. The factors leading to leaf loss and no flowering are believed to be connected to the drought of 2004/2005, as well as some individual plants having better access to water and shorter periods of sun exposure (Portman Iron 2008). *R. brevis* is also located within 15m of the Windarling W3/5 pit where it continues to flower.

Portman proposes to continue with their Dust Management Plan (2003), approved by DEC, to manage the impacts of dust.

Effects of dewatering on vegetation and flora

Mining below the groundwater table at the W2 pit requires dewatering to enable dry-floor mining. Dewatering has the potential to affect the health of groundwater dependent local vegetation/flora.

Prior to mining, the natural groundwater level was at approximately 402m AHD, nominally 80m to 120m below the natural surface ground level. As a result of groundwater abstraction, for operational requirements of the existing mine, the current groundwater level at the W2 pit is approximately 30m lower at nominally between 370-385m AHD (Rockwater 2007). This groundwater is currently abstracted in accordance with a licence issued by Department of Water for the purposes of dust suppression and other mining activities. Dewatering associated with this proposal would reduce the groundwater level within and immediately surrounding the W2 pit.

The current licensed annual water entitlement for the Koolyanobbing Iron Ore Project, including the Windarling mine is 2.25GL/y. In 2006 and 2007 the groundwater abstraction under the licence was 1.37 GL/y and 0.75 GL/y, respectively (Portman 2008d). As the dewatering volume required for dry-floor mining of the W2 pit has been estimated at approximately 0.44 GL/y, dewatering of the W2 pit would not necessitate a change to the annual water entitlement of the licence (Portman 2008).

No management of dewatering impacts on vegetation is proposed as the proponent considers that the vegetation is not groundwater dependent.

Effects of disposal of dewatering water on vegetation and flora

Dewatering required for dry-floor mining of the W2 pit has been estimated at approximately 1.2ML/day (Rockwater 2007), equating to 0.44GL/y. The produced water is saline (20 000mg/L to 29 000mg/L) and would need to be disposed of in a manner that provides for efficient resource use and with minimal environmental impact.

Dewatering water from the W2 pit would be used for dust suppression and other mining activities in accordance with the approved Operating Strategy. Use of saline water for dust suppression has the potential to impact on vegetation and flora if not carefully managed. The Operating Strategy includes provisions for preventing the use of saline dewatering water on areas of terrestrial native vegetation and monthly visual monitoring of vegetation health. Access roads and the haul road have been designed to capture and contain groundwater used in dust suppression to ensure that the groundwater does not impact native vegetation.
Terrestrial native vegetation impacted by saline groundwater used for dust suppression would be rehabilitated.

Assessment

The EPA's environmental objective for this factor is to maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.

The EPA notes that the proposal is for the extension of the existing mine at Windarling. The proposal is to access iron ore at greater depth with no increase in the area of the mine. Therefore, there would be no direct impact on flora and vegetation due to clearing. However, recognising the well-known biodiversity values of the Windarling Range, the EPA has considered the potential for indirect impacts on threatened flora species and the unique vegetation communities.

In considering this factor the EPA had in mind its previous advice relating to the biodiversity values of the Windarling Range. In its section 16(e) advice to the Minister for Environment, entitled "Advice on Areas of the Highest Conservation Value in the Proposed Extensions to the Mount Manning Reserve" (Report 1256) the EPA stated "that…the *Die Hardy Range & Yorkradine Hills, the Windarling Range, the Jackson Range and the Koolyanobbing Range, also have very high environmental significance, especially as refugia for endemic rare species. Within each range, the size and complexity of massive BIF rock outcrops with cliffs was correlated with the presence of rare flora. Intact BIF ranges are important to maintain the genetic diversity within populations of endemic rare flora and to allow survival during periods of adverse climate.*" The findings of report 1256 were subsequently included in "The Government's Strategic Review of the Conservation and Resource Values of the Banded Iron Formation of the Yilgarn Craton." In Report 1082[1] the EPA also noted that there are a number of vegetation communities that are unique to Windarling Range.

At Windarling the habitat for DRF species *T.paynterae* and *R.brevis* are particularly close to mining operations at pits W2 and W3/W5.

The EPA considers the activities that could impact vegetation and flora to be:

- dust;
- dewatering; and
- disposal/use of groundwater for dust control.

Impacts of dust on vegetation and flora

Dust can prevent light capture that is required for plant photosynthesis and gas exchange if it settles on plants. Mining at the W2 pit is unlikely to present any additional risk to *T .paynterae* as a result of the 1100m distance of the Windarling W2 pit. The dust impact to the *R. brevis* located within close proximity to the W2 pit northern wall requires further consideration. Annual health condition monitoring of the *R. brevis* near the W2 pit northern wall of the W2 pit has confirmed that dust from the mining operation within the pit does reach this population.

[1] Koolyanobbing Iron Ore Expansion – Portman Iron Ore Limited EPA Bulletin 1082

Dust management at Windarling is currently conducted in accordance with a Dust Management Plan (Portman 2003a). The Dust Management Plan is required under a condition of Statement 627 and has been approved by the Department of Environment and Conservation.

The EPA notes that risks from dust at W2 pit would be substantially less than for the existing operation due to mining below the groundwater table. The material to be mined has a higher retained moisture content, which would result in fewer particles with the potential for dust generation during blasting and loading operations. The increase in the depth of the pit would also assist to contain dust within the pit area. The EPA also notes that there would be no increase in the surface footprint of the W2 pit.

Effects of dewatering on vegetation and flora

The EPA notes the proponent's claims that vegetation surrounding the Windarling W2 pit, which includes DRF, does not rely on groundwater for water supply and that the salinity of the groundwater, at 20 000mg/L to 29 000mg/L (Rockwater, 2008) is unsuitable for use by terrestrial vegetation. It is argued by the proponent that the vegetation species surrounding the W2 pit rely on water supply from a combination of rainfall, and retained soil/rock-pore and rock-crack moisture. This argument is supported by the maintenance of vegetation health surrounding the W2 and W3/5 pits following a reduction in the groundwater level by approximately 30m due to the current licensed water abstraction to meet operational water requirements.

Effects of disposal of dewatering water on vegetation and flora

The EPA notes that the volume of dewatering required to enable dry-floor mining of the W2 pit is estimated at 0.44 GL/y (Rockwater, 2007), which is within the 0.38 GL/y to 0.56GL/y volume range used at the Windarling mine in 2006 and 2007 (Portman 2008d).

The disposal of dewatering water would be via dust suppression and other mining activities in accordance with the existing approved Operating Strategy (Portman 2008). It is anticipated that the volume of groundwater currently abstracted from other wells for the purposes of dust suppression and other mining activities would reduce being replaced by pit dewatering water. Based on 2006 and 2007 volumes of water for dust suppression, an excess of groundwater from dewatering of the W2 pit is not expected. Excess water during rainfall events would be directed to 'turkey's nest' dams for storage and evaporation.

The EPA notes that all of the dewatering water would be used for dust control and other mining activities and that there would be no increase of water abstraction over current practice.

This means that there is unlikely to be an increase in impacts on native vegetation due to the routine use of saline water for dust control.

The EPA considers that the level of impact from the existing operation does not pose a significant threat to flora and vegetation but that there is a need to closely monitor the situation due to the proximity of DRF species.

Summary
Having regard to:

- the fact that the proposal would not result in a direct impact on flora and vegetation due to clearing;
- mining below the groundwater table is likely to result in less dust due to moisture and increased depth of mining decreasing the potential for dust to escape from the pit;
- information provided by the proponent that the groundwater level has already been lowered 30m without an impact on vegetation and flora indicating that it is unlikely to be groundwater dependent; and
- the use of saline groundwater for dust suppression either abstracted from bores or in combination with pit dewatering would not increase,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor provided that Condition 6 which limits the W2 footprint and requires that the proponent avoids detrimental effects on DRF, priority flora and vegetation, and monitors and reports the impacts of dust, dewatering and saline water use.

4.2 Mine Closure and Rehabilitation

Description

Once mining has been completed at the W2 pit, dewatering would cease. This would allow for the groundwater to recover and permanently fill the W2 pit over time to approximately 330mAHD (at 72 metres below the pre-mining watertable) (Rockwater 2007). The pit water would be saline as the groundwater salinity typically ranges between 20,000 and 29,000mg/L. This does not take into account evaporation that would occur in an open water body.

The open water body in the W2 pit has the potential to attract animals with a consequent local increase in grazing and predation. The proponent has an existing Preliminary Closure Plan (Portman 2003) for the Koolyanobbing Expansion Project, which was developed in accord with Condition 19-1 in Ministerial Statement 627. The Preliminary Closure Plan incorporates the principles and objectives of the Strategic Framework for Mine Closure in accordance with the *Australian and New Zealand Minerals and Energy Council (ANZMEC)/Minerals Council of Australia (MCA), (Aug 2000).*

The proponent proposes to amend the existing Preliminary Closure Plan to clarify its position on the protection of flora and fauna including consideration of fencing and feral animal control. It is also proposed that the Windarling mine site would be transferred to the management of DEC for the purposes of conservation following the completion of mining and rehabilitation. Portman proposes that prior to the transfer it would consult with DEC on the most appropriate method(s) to prevent fauna from accessing the water filled pit, based on best practice standards for mine closure at the time.

Assessment

The area considered for assessment of this factor is the W2 pit void located below the groundwater table and the adjacent area within the Windarling Range containing species and vegetation of conservation significance.

The EPA's environmental objectives for this factor are to:

- maintain landscape and landform integrity, ecological functions and environmental values;
- ensure that closure and rehabilitation achieves stable, non polluting and functioning landforms which are consistent with the surrounding landscape and other environmental values;
- ensure that self-sustaining native vegetation communities are returned after mining, which, in species composition and ecological function are close as possible to naturally occurring analogue sites; and
- protect landforms or geological features of heritage significance or of outstanding scenic or scientific value.

In considering the potential impacts of this proposal, the EPA had in mind its findings in section 16(e) advice to the Minister for the Environment entitled "Advice on areas of highest conservation value in the proposed extensions to the MMR Nature Reserve" (EPA Report 1256).

The EPA recommended that:
"Areas of the highest conservation value and surrounding areas in the MMR [Mount Manning Region] be protected from mining by:

- *Establishing an A Class Nature Reserve to include the highest priority conservation areas…*
- *Defining* ***temporary exclusions for mining*** *and mining infrastructure in the proposed A Class Nature Reserve in areas where mining is currently approved. These areas should* ***become part of the Reserve after successful rehabilitation***[2] *(consistent with the approach of Ministerial Statement 627.*[3]

Condition 13 of Statement 627 required the proponent (Portman) to develop and implement an agreement with DEC for the acquisition of lands into the conservation estate. The proponent has recognised this recommendation by planning for acquisition of the Windarling area into a conservation estate post mining. The EPA therefore considers that rehabilitation of the Windarling mine site is of particular importance in order to be fit for conservation.

Although the proponent has an existing Preliminary Closure Plan for the Windarling mine site that it proposes to amend to include the W2 mining below the water table proposal, the EPA considers that additional measures would be necessary to meet its objective of maintaining the ecological functions and environmental values of the surrounding habitat that surrounds W2. This is because the open pit would provide a water source that would attract animals with consequent local increase in grazing and predation.

In this regard the EPA notes that on completion of mining at W2 pit, the dewatering operation would cease, the water table would recover and that the W2 pit would be permanently filled with water. Hydrological modelling has predicted that, should the pit be left open, the groundwater table would stabilise at 330 m AHD which is 72 metres below the pre-mining level (402m AHD). Backfilling the void to an elevation less than about 400 m AHD is predicted to result in a free water surface developing in a few years (Rockwater 2007).

[2] Bold font added

[3] Koolyanobbing Iron Ore Expansion, Windarling Range on Mt Jackson Shire of Yilgarn

The EPA notes that there would be limited groundwater inflow to the W2 pit water body and periodic cyclonic rainfall events would cause the water to be fresher than the surrounding groundwater (which is around 20,000 mg/l total dissolved solids) for a long period of time (50-100 years) and possibly in perpetuity (Portman 2008). Although the water may eventually become saline, its presence may attract native and feral fauna. This attraction could result in increased predation on native fauna by feral predator species. Fauna such as kangaroos and goats may increase grazing pressure on adjacent native vegetation (Portman 2008). The availability of standing water within the Windarling W2 pit void at mine closure may therefore result in long-term impacts on the Windarling biodiversity due to increased predation and grazing.

Portman's approved Preliminary Closure Plan includes a requirement for safety measures around mine voids as determined in consultation with DEC and Department of Industry and resources. Although this safety requirement is not specific to the safety of fauna and flora, measures for the protection of fauna and flora could be considered within this context. Accordingly Portman proposes to amend the existing Preliminary Closure Plan to include a requirement to exclude fauna from the pit water for fauna and flora protection.

The EPA notes that Portman expects that the Windarling mine site would be transferred to DEC for the purposes of conservation following the completion of mining and rehabilitation. Portman proposes that prior to mine closure it would consult with DEC on the most appropriate method(s) to prevent fauna from accessing the water filled pit, based on best practice standards for mine closure at that time. Such methods could include fauna exclusion fencing, feral animal control, and funding for long-term management and implementation.

The EPA has noted that backfilling of the W2 pit has been investigated by Portman as an alternative to fencing to prevent the attraction of native and feral fauna to the water-filled W2 pit following mining. However, Portman has stated that backfilling of the W2 pit would be cost-prohibitive unless it coincides with mining in the proposed Windarling W1 pit(s). The mining of the W1 pit(s) is subject to Ministerial Conditions that as yet have not been addressed such that mining of this area could occur to facilitate backfilling of the W2 pit. At this stage approval for full access to the W1 pit is uncertain.

The EPA considers that fencing is not a permanent solution to the problem as it would require ongoing maintenance in perpetuity and the cost of flora and fauna protection would be transferred to the State. The only certain solution, that is consistent with conservation, is backfilling the pit void to a level that would prevent the availability of standing water. Based on the proponent's hydrological modelling, the EPA considers that the backfilling would need to be to at least 400m AHD to prevent free water within W2 pit. Allowing for the uncertainty of unknown future weather events, the EPA considers that backfill level would need to be 405m AHD which is 5 metres above the predicted critical backfill level and 3 metres above the pre-mining water table.

The EPA notes that the proponent has argued that the final decision as to whether or not backfilling should be required should be delayed until closure. However, the EPA considers that the long term management of the W2 pit to ensure that it would be consistent with the objectives of an A Class Nature Reserve is a matter that needs to be addressed as part of the decision as to whether this proposal is to be implemented. It is the EPA's preference that the W2 pit should be backfilled as the most certain measure to ensure the long term objective can be met, without creating a cost and management legacy for the State. However it is

recognised that there is only limited knowledge of the potential impacts on conservation areas of leaving mining pit voids. In the first instance a research program would assist in providing clarity on the potential impacts on fauna and flora from which some informed decisions could be made about the type of measures that are necessary to maintain important environmental values where they coincide with mining operations, and the cost of implementing them in the long term. Accordingly the EPA has recommended Condition 7 which requires the proponent backfill the W2 pit void to 405m AHD and ensure the effectiveness of the backfill for a period of five years post mining is implemented. If the proponent has not completed backfilling following the cessation of productive mining at the W2 pit, a combined research and management program would come into effect that is funded by the proponent. The research and management program would be established to the requirements of the Minister for Environment on advice of the EPA and include:

- a research program to determine the potential impacts on flora and fauna from leaving mining voids with standing water;
- an ongoing program of eradication of feral animals; and
- installation of fencing and provision for its ongoing maintenance.

Summary

Having particular regard to:

- the fact that W2 pit would fill with water post mining if it is not backfilled;
- standing water would attract native and feral animals increasing predatation and grazing;
- Windarling area is a biodiversity hotspot and is to be transferred into conservation estate post mining;
- the ongoing cost legacy to the State of maintaining flora and fauna protection should the W2 pit not be backfilled,

it is the EPA's preference that the W2 pit be backfilled. If the proponent has not completed backfilling following the cessation of productive mining at the W2 pit then a combined research and management program should be established that includes:

- a research program to determine the potential impacts on flora and fauna from leaving mining voids with standing water;
- an ongoing program of eradication of feral animals; and
- installation of fencing and provision for its ongoing maintenance.

The research and management program should be established to the satisfaction of the Minister for Environment on advice from the EPA and funded by the proponent.

These matters are addressed in recommended Condition 7.

4.3 Recommended conditions

Having considered the proponent's proposed management actions and the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by Portman Iron Ore Limited for the Koolyanobbing Iron Ore Project W2 Pit – Mining Below the Groundwater Table is approved for implementation. These conditions are presented in Appendix 2.

5. Other Advice

Fire

An uncontrolled fire at Windarling has the potential to impact on flora and vegetation, including DRF. However, the proposal to mine below the water table does not provide any additional fire risk to the current mining operation and the EPA has therefore not considered it as a significant factor.

The management of fire at Windarling mine is currently undertaken in accordance with a Bushfire Management Plan (Portman 2003e). The Bushfire Management Plan includes management actions to prevent both the occurrence of human-caused fires and to respond to fires if they occur. These actions include staff training on the prevention of fire and fire fighting equipment, fire response equipment, the creation of fire breaks, the implementation of prescribed burning in consultation with DEC and pastoral leaseholder, assisting DEC, Fire and Emergency Service Authority (FESA) and the Shire of Yilgarn in fire response, special work permits where work causes has a potential to cause ignition of fires, recording and auditing of fires and rehabilitation of areas impacted by fire.

The EPA notes that there have been no uncontrolled fires at Windarling since the commencement of mining.

Rehabilitation

The EPA has noted that advice received from DEC states that current batter angles of 20-22 degrees being achieved on the waste rock dump may not provide adequate rehabilitation outcomes. DEC further stated that the Department of Industry and Resources (DoIR) Environmental Notes on Mining: Waste Rock Dumps, states that an angle less then 20° should be utilised with optimal material. This should also include adequate topsoil. It is recommended that the DoIR examine in conjunction with DEC the current batter angles being achieved and, if necessary, provide direction to Portman as to what is the appropriate batter angle that would provide the best opportunity for successful rehabilitation of the waste dump.

6. Conclusions

The EPA has considered the proposal by Portman Iron Ore Limited to mine below the groundwater table at W2 Pit, Windarling.

The EPA has considered the environmental issues of:

- Vegetation and flora – the potential impacts of dust from mining operations and the use of saline water for dust suppression, on significant flora species; and

- Mine Closure/Rehabilitation - availability of standing water in the mining void and the potential for long-term impacts on the Windarling biodiversity due to increased predation and grazing.

The EPA notes that all of the dewatering water would be used for dust control and other mining activities and that there would be no increase of water abstraction over current practice. This means that there is unlikely to be an increase in impacts on native vegetation due to the routine use of saline water for dust control. The EPA considers that the level of impact from the existing operation does not pose a significant threat to flora and vegetation but that there is a need to closely monitor the situation due to the proximity of DRF species. Accordingly the EPA has recommended a condition which limits the W2 footprint and requires that the proponent avoids detrimental effects on DRF, priority flora and vegetation, and monitors and reports the impacts of dust, dewatering and saline water use.

The long term management of the W2 pit to ensure that it would be consistent with the objectives of an A Class Nature Reserve is a matter that needs to be addressed as part of the decision as to whether this proposal is to be implemented. It is the EPA's preference that the W2 pit should be backfilled as the most certain measure to ensure the long term objective can be met, without creating a cost and management legacy for the State. If the proponent has not completed backfilling following the cessation of productive mining at the W2 pit then a combined research and management program should be established that includes:

- a research program to determine the potential impacts on flora and fauna from leaving mining voids with standing water;
- an ongoing program of eradication of feral animals; and
- installation of fencing and provision for its ongoing maintenance.

The research and management program should be established to the satisfaction of the Minister for Environment on advice from the EPA and funded by the proponent.

These matters are addressed in recommended Condition 7.

The EPA has therefore concluded that the proposal can be managed to meet the EPA's environmental objectives, provided there is satisfactory implementation of the recommended conditions set out in Appendix 2.

7. Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that the proposal being assessed is for mining below the groundwater table in the W2 pit Koolyanobbing. The W2 pit is located at the Windarling Range 90km North, North East of Koolyanobbing.
2. That the Minister considers the report on the key environmental factors as set out in Section 4;
3. That the Minister notes that the EPA has concluded that the proposal can be managed to meet the EPA's environmental objectives, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 2, including the proponent's commitments; and
4. That the Minister imposes the conditions and procedures recommended in Appendix 2 of this report.

Appendix 1

References

Environmental Protection Authority (2007) - Bulletin 1256: *Advice on areas of the highest conservation value in the proposed extensions to Mount Manning Nature Reserve.* Advice of the Environmental Protection Authority to the Minister for the Environment under Section 16(e) of the Environmental Protection Act 1986.

Environmental Protection Authority (2002) Koolyanobbing Iron Ore Expansion: Report and recommendations of the Environmental Protection Authority - Bulletin 1082.

Government of Western Australia (2007) – *Strategic Review of the Conservation and Resource Values of the Banded Iron Formation of the Yilgarn Craton*

Portman Iron Ore Limited (2003) - *Koolyanobbing Expansion Project - Bush Fire Management Plan Revision G* - prepared by Ecologia Environmental Consultants.

Portman Iron Ore Limited (2003) - *Koolyanobbing Expansion Project -Dust Management Plan Revision D.*

Portman Iron Ore Limited (2008) 2007 *Annual Groundwater Monitoring Report for the Koolyanobbing Expansion project*. GLS No. 154459.

Portman Iron Ore Limited (2008) *Koolyanobbing Iron Ore Project: Windarling W2 Open Pit: Mining Below the Water Table: Environmental Impact Assessment (Environmental Protection Statement)* July 2008 *Revision F* – prepared by Globe Environments Australia

Rockwater Pty Ltd (2007) *W2 pit Dewatering Evaluation for 2007 and Void Water Balance*. Unpublished report to Portman Iron Ore Limited.

Rockwater Pty Ltd (2008) Windarling Pit W2 – *Results of long-term groundwater injection into bore WW7P*. Unpublished report to Portman Iron Ore Limited.

Western Australian Minister for the Environment and Heritage (2003) Statement 627: *Koolyanobbing Iron Ore Expansion, Windarling Range and Mt Jackson, Shire of Yilgarn.*

Appendix 2

Recommended Environmental Conditions

RECOMMENDED ENVIRONMENTAL CONDITIONS

Statement No.

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED
(PURSUANT TO THE PROVISIONS OF THE
ENVIRONMENTAL PROTECTION ACT 1986)

KOOLYANOBBING IRON ORE MINE EXPANSION
WINDARLING RANGE, MINING BELOW THE WATER TABLE
SHIRE OF YILGARN

Proposal: The proposal is for open-cut mining of iron ore (haematite) below the groundwater table at the currently mined W2 pit at Windarling, approximately 90 kilometres north-north-east of Koolyanobbing. The open-cut mine will require a depth increase of approximately 114 metres from nominally 402 metres Australian Height Datum (AHD) to 288 metres AHD. This will enable mining of an estimated six million tonnes of ore.

Proponent: Portman Iron Ore Limited

Proponent Address: Level 11, The Quadrant, 1 William Street, PERTH WA 6000

Assessment Number: 1761

Report of the Environmental Protection Authority: Bulletin 1203

The proposal referred to in the above report of the Environmental Protection Authority may be implemented. The implementation of that proposal is subject to the following conditions and procedures:

1 Proposal Implementation

1-1 The proponent shall implement the proposal as assessed by the Environmental Protection Authority and described in schedule 1 of this statement subject to the conditions and procedures of this statement.

2 Proponent Nomination and Contact Details

2-1 The proponent for the time being nominated by the Minister for the Environment under sections 38(6) or 38(7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal.

2-2 The proponent shall notify the Chief Executive Officer (CEO) of the Department of Environment and Conservation of any change of the name and address of the proponent for the serving of notices or other correspondence within 30 days of such change.

3 Time Limit of Authorisation

3-1 The authorisation to implement the proposal provided for in this statement shall lapse and be void within five years after the date of this statement if the proposal to which this statement relates is not substantially commenced.

3-2 The proponent shall provide the CEO of the Department of Environment and Conservation with written evidence which demonstrates that the proposal has substantially commenced on or before the expiration of five years from the date of this statement.

4 Compliance Reporting

4-1 The proponent shall submit to the CEO of the Department of Environment and Conservation environmental compliance reports annually reporting on the previous twelve-month period, unless required by the CEO of the Department of Environment and Conservation to report more frequently.

4-2 The environmental compliance reports shall address each element of an audit program approved by the CEO of the Department of Environment and Conservation and shall be prepared and submitted in a format acceptable to the CEO of the Department of Environment and Conservation.

4-3 The environmental compliance reports shall:

1 be endorsed by signature of the proponent's General Manager – Iron Ore or a person, approved in writing by the CEO of the Department of Environment and Conservation, delegated to sign on behalf of the proponent's General Manager – Iron Ore;

2 state whether the proponent has complied with each condition and procedure contained in this statement;

3 provide verifiable evidence of compliance with each condition and procedure contained in this statement;

4 state whether the proponent has complied with each key action contained in any environmental management plan or program required by this statement;

5 provide verifiable evidence of conformance with each key action contained in any environmental management plan or program required by this statement;

6 identify all non-compliances and non-conformances and describe the corrective and preventative actions taken in relation to each non-compliance or non-conformance;

7 review the effectiveness of all corrective and preventative actions taken; and

8 describe the state of implementation of the proposal.

4-4 The proponent shall make the environmental compliance reports required by condition 4-1 publicly available in a manner approved by the CEO of the Department of Environment and Conservation.

5 Performance Review and Reporting

5-1 The proponent shall submit to the CEO of the Department of Environment and Conservation Performance Review Reports at the conclusion of the second, fourth, sixth and eighth years after the commencement of mining below the water table and then, at such intervals as the CEO of the Department of Environment and Conservation may regard as reasonable, which address:

1 the major environmental risks and impacts; the performance objectives, standards and criteria related to these; the success of risk reduction/impact mitigation measures and results of monitoring related to the management of the major risks and impacts;

2 the level of progress in the achievement of sound environmental performance, including industry benchmarking, and the use of best available technology where practicable; and

3 significant improvements gained in environmental management which could be applied to this and other similar projects.

6 Flora and Vegetation

6-1 In implementing the proposal, the proponent shall not increase the mine pit footprint beyond that delineated by AMG coordinates listed in schedule 2 (attached).

6-2 In implementing the proposal, the proponent shall not cause loss of health and condition of Declared Rare Flora, Priority flora and vegetation in the project area.

6-3 The proponent shall monitor impacts of the proposal due to:

1 dust;
2 saline water application for dust control; and
3 dewatering,

on Declared Rare Flora and Priority flora species and vegetation referred to in condition 6-2. This monitoring is to be carried out to the satisfaction of the CEO of the Department of Environment and Conservation.

6-4 Prior to commencement of mining below the water table, the proponent shall submit a program for monitoring of the flora and vegetation referred to in condition 6-2 to the CEO of the Department of Environment and Conservation.

6-5 The proponent shall submit the results of the monitoring program referred to in condition 6-4 to the CEO of the Department of Environment and Conservation at times determined by the CEO of the Department of Environment and Conservation.

6-6 The proponent shall immediately provide proposed management measures to the CEO of the Department of Environment and Conservation in the event that the requirements of condition 6-2 are not met or are not likely to be met.

7 Mine Closure and Rehabilitation

7-1 Within two years following the cessation of productive mining at the W2 pit, the proponent shall complete the backfilling of the pit void to at least three metres above the pre-mining groundwater table.

7-2 For five years following the completion of the backfilling at the W2 pit, the proponent shall ensure the effectiveness of backfilling in preventing the presence of visible standing water in the pit void.

7-3 The proponent shall carry out progressive rehabilitation of the mine site and its environs to achieve rehabilitation consistent with the requirements of condition 19 (Closure Plan) of Statement No. 627.

7-4 In the event that backfilling of the mine void to three metres above the water table is not practicable, the proponent, in liaison with the Department of Environment and Conservation, shall fund a combined research and management programme to the satisfaction of the Environmental Protection Authority.

The objective of this programme is:

- to prevent any increased grazing and predation due to the creation of a pit lake that could attract native fauna and feral animals.

This programme shall include:

1. determination of the potential impacts on flora and fauna of not backfilling the mine void;
2. the conduct of an ongoing eradication of feral animals, including fox baiting;
3. monitoring the effectiveness of eradication of feral animals required by (2) above;
4. installation of adequate fencing to exclude feral animals and native fauna from the pit and/or pit lake, if one has formed;
5. provision for effective maintenance of fencing required by (4) above.
6. monitoring the effectiveness and maintenance requirements of the fencing installed as referred to in (4) above.

This programme shall commence within six months following the cessation of productive mining.

Procedures

1. Where a condition states “on advice of the Environmental Protection Authority”, the Environmental Protection Authority will provide that advice to the Department of Environment and Conservation for the preparation of written notice to the proponent.

2. The Environmental Protection Authority may seek advice from other agencies or organisations, as required, in order to provide its advice to the Department of Environment and Conservation.

3. The Minister for the Environment will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environment and Conservation over the fulfilment of the requirements of the conditions.

4. Where a condition lists advisory bodies, it is expected that the proponent will obtain the advice of those listed as part of its compliance reporting to the Department of Environment and Conservation.

5. The proponent is required to apply for a Works Approval and Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986*.

Schedule 1

The Proposal (Assessment No. 1761)

General Description

The proposal is for open-cut mining of iron ore (haematite) *below* the groundwater table at the W2 pit Windarling, approximately 90 kilometres north-north-east of Koolyanobbing. The currently approved project (3 June 2003) at the same location is for mining *above* the water table. The open-cut mine will require a depth increase of approximately 114 metres from nominally 402 metres Australian Height Datum (AHD) to 288 metres AHD. The depth increase of the W2 pit will enable mining of an estimated 6 million tonnes of ore. The project will have a life span of approximately three years.

The proposal and potential impacts are described in the document, *Koolyanobbing Iron Ore Project – W2 Pit – Mining below the Groundwater Table*, Environmental Protection Statement (Revision G, July 2008).

Summary Description

A summary of the key proposal characteristics is presented in Table 1.

Table 1 – Summary of Key Proposal Characteristics

Element	Description
Duration of mining	3 years (approximately) estimated 6 million tonnes of ore to be mined.
Area of disturbance	Within existing pit * (see footnote).
Area of vegetation disturbance	Nil – within existing pit* (see footnote).
Total area of rehabilitation	All disturbed areas including final pit area.
Final depth of mine pit	290 metres AHD (approximately).
Waste rock volume	9 800 000 cubic metres (approximately).
Waste dump	None (Waste rock disposed within existing waste dump).
Water supply source	Dewatering groundwater.
Groundwater abstraction rate	0.44 Gigalitres per year (approximately).

* - No additional disturbance beyond area permitted under Statement No. 627.

Figures (attached)

Figure 1 – Regional location and mine layout (Figure 1 page 3 above).

Schedule 2

Koolyanobbing Iron Ore Mine Expansion, Windarling Range
Mining Below the Water Table, Shire of Yilgarn (Assessment No. 1761)

Eastings and Northings for Mine Pit Footprint

MGA_East	MGA_North	MGA_East	MGA_North	MGA_East	MGA_North
718244	6676809	719050	6677066	718930	6677369
718287	6676797	719055	6677075	718920	6677367
718337	6676794	719060	6677086	718918	6677367
718383	6676793	719065	6677097	718901	6677363
718407	6676795	719070	6677107	718870	6677355
718428	6676796	719074	6677116	718833	6677343
718443	6676798	719079	6677126	718797	6677331
718475	6676796	719083	6677135	718763	6677327
718496	6676794	719088	6677145	718753	6677324
718520	6676793	719092	6677154	718730	6677316
718544	6676793	719096	6677164	718715	6677308
718565	6676799	719102	6677175	718670	6677290
718605	6676810	719104	6677187	718638	6677276
718647	6676821	719107	6677198	718608	6677261
718695	6676832	719108	6677208	718607	6677260
718739	6676842	719108	6677219	718603	6677260
718778	6676853	719108	6677232	718593	6677259
718800	6676858	719107	6677248	718587	6677252
718809	6676864	719099	6677274	718586	6677248
718813	6676873	719097	6677280	718581	6677244
718817	6676883	719094	6677285	718552	6677229
718820	6676890	719088	6677296	718517	6677214
718870	6676902	719082	6677305	718481	6677201
718900	6676917	719076	6677314	718452	6677192
718937	6676943	719068	6677324	718416	6677182
718950	6676951	719060	6677333	718404	6677181
718955	6676955	719058	6677335	718384	6677179
718963	6676962	719049	6677343	718352	6677176
718971	6676969	719040	6677349	718319	6677174
718980	6676976	719030	6677357	718287	6677175
718988	6676983	719021	6677363	718261	6677174
718996	6676990	719010	6677365	718257	6677175
719002	6676998	718998	6677368	718258	6677179
719009	6677006	718988	6677370	718254	6677181
719016	6677014	718986	6677370	718247	6677177
719022	6677022	718975	6677371	718233	6677182
719028	6677031	718964	6677372	718218	6677190
719034	6677039	718953	6677371	718216	6677202
719040	6677048	718950	6677371	718204	6677206
719045	6677057	718940	6677370	718199	6677203

MGA_East	MGA_North	MGA_East	MGA_North
718197	6677198	717998	6677016
718200	6677193	717998	6677014
718208	6677182	718000	6677004
718197	6677182	718007	6677004
718186	6677182	718013	6677002
718179	6677182	718021	6677008
718168	6677182	718023	6677000
718157	6677181	718026	6676988
718146	6677180	718032	6676976
718136	6677178	718036	6676966
718126	6677175	718042	6676954
718115	6677172	718046	6676950
718114	6677172	718054	6676943
718104	6677167	718061	6676935
718095	6677163	718068	6676928
718086	6677157	718077	6676921
718077	6677151	718083	6676916
718068	6677144	718092	6676910
718060	6677137	718103	6676904
718053	6677129	718111	6676899
718046	6677120	718120	6676894
718039	6677111	718129	6676889
718033	6677101	718139	6676884
718028	6677088	718148	6676880
718024	6677078	718153	6676878
718020	6677068	718163	6676873
718007	6677072	718172	6676869
717995	6677071	718181	6676865
717982	6677079	718185	6676864
717986	6677062	718193	6676859
717988	6677064	718202	6676855
717996	6677068	718210	6676850
718003	6677065	718216	6676842
718009	6677058	718217	6676840
718015	6677048	718219	6676834
718017	6677034	718234	6676807
718017	6677025		
718011	6677020		
718003	6677018		