Spinifex Ridge Molybdenum Project

MOLY MINES LIMITED

November 2007

RESPONSE TO SUBMISSIONS

Contents

List of Figures

List of Tables

1. Introduction

Moly Metals Australia Pty Ltd (Moly Mines) is proposing to construct and operate the Spinifex Ridge Molybdenum Project, which is located approximately 50 km north east of Marble Bar in Western Australia. The project was determined to require assessment under Part IV of the WA *Environmental Protection Act 1986* (EP Act).

A Public Environmental Review document (PER) for Spinifex Ridge was prepared and released for public comment for a six week period between 20th August and 2nd October 2007.

A total of seven submissions were received on the PER. Submitters were:

- Department of Health (DOH);
- Department of Industry and Resources (DOIR);
- Department of Water (DOW);
- Department of Environment and Conservation (DEC);
- The Wildflower Society;
- Dr Graham Thompson; and,
- Conservation Council of WA

In addition to submissions, a number of agencies provided feedback that they had reviewed the PER and were satisfied that, if there were any issues that were relevant to the agency, these were able to be addressed through other regulatory processes. These included:

- Department of Indigenous Affairs (DIA)
- Department of Consumer and Employee Protection (DOCEP)
- Commonwealth Department of Environment and Water Resources (DEWR)
- Shire of East Pilbara

This document summarises the issues raised from the public submissions and provides Moly Mines' responses to these issues.

Some changes to the proposal have been made based on issues raised within the public submissions. The changes made are considered minor, or provide a clear environmental benefit compared to the project as described in the PER. These changes are also outlined, with a comparative description of impacts associated with these changes.

2. Project Description

The detailed project description provided in the PER is summarised in Section 2.1. A number of changes to the project have been made from what was described in the PER. These changes have been decided based on one or more of the following reasons:

- Review of design based on PER submissions;
- Environmental and heritage factors;
- Review of design through finalisation of the Definitive Feasibility Study;
- Technical input from consultants;
- Secondary review of PER layout.

Changes to the project are outlined in Section 2.2.

The key characteristics of the project as presented in the PER are given in Table 2.1, with a comparison of the proposed modifications to the project outlined in this document.

Table 1: Key Characteristics of the Spinifex Ridge Project

Element	Project Characteristics (from PER)	Modified Project Characteristics
Nominal Mine life	10 Years	10 years
Manpower	400 including contractors	425 including contractors
Capital cost	~A$900 M	~$1,070M*
Total footprint	Approx. 1650 ha	Approx. 1600 ha
Construction commencement	Q1 2008	Q1 2008
Commence production	June 2009	June 2009
Strip ratio	1:1.3 excluding 40Mt pre strip	1:1.3 excluding 40Mt pre strip
Final depth of pit	Approximately 430 m from creek level	Approximately 430 m from creek level
Treatment rate	Nominal 20 Mtpa (with potential 10% debottlenecking)	Nominal 20 Mtpa (with potential 10% debottlenecking)
Mo concentrate production	Average 23 000 tpa (max ~25 000 tpa)	Average 23 000 tpa (max ~25 000 tpa)
Cu concentrate production	Average 48 000 tpa	Average 48 000 tpa
Power requirements	600 GWh/a	600 GWh/a
Water requirements	Average 15 GL/yr	Average 10GL/yr
Processing plant	Secondary and tertiary crushing, grinding and milling circuit, float and leach circuits	Secondary and tertiary crushing, grinding and milling circuit, float and leach circuits
Tailings storage facility	660 ha circular TSF	600ha Filtered Tailings Storage

* based on Definitive Feasibility Study completed September 2007

2.1 Summary of PER Project description

The Spinifex Ridge project, 50 km north-east of Marble Bar, will involve the open pit mining and processing of 20 Million tonnes per annum (Mtpa) of ore to produce 23,000 tpa of molybdenum concentrate and 48,000 tpa of copper concentrate (co-product). Spinifex Ridge has a nominal ten year life of mine and will be a significant contributor to the world molybdenum market, ranking Moly Mines in the top ten molybdenum producers in the world.

Mining of overburden and ore will be by simple open pit methods using conventional mining equipment and techniques such as drill and blast, and load and haul. To facilitate mining, the diversion of Coppin Creek around the pit will be required. Ore from the open pit will be crushed and conveyed through a transport tunnel to secondary crushing facilities. Crushed ore will be drawn from stockpiles and fed to a mill circuit to prepare it for processing by flotation, followed by thickening, leaching and filtration.

The processing of ore will produce tailings as a waste product. The PER indicated that tailings were to be stored in a large circular tailings storage facility (TSF) approximately 2.9 km in diameter and occupying an area of approximately 660 ha. This tailings disposal has been modified, as outlined in Section 2.2.1, to a 600 ha filtered tailings stacking facility.

Overburden will be stockpiled to form three large waste rock landforms, covering a total area of approximately 400 ha. The waste rock landforms will be located to the south, southwest and west of the open pit.

Spinifex Ridge will be supported by a predominantly fly-in fly-out (FIFO) workforce, with approximately 400 personnel accommodated on site. A small component of the workforce will consist of locally based employees who will drive in and drive out (DIDO).

Power for the operational phase of the project will be supplied by an onsite gas power plant comprising multiple, spark ignition, reciprocating engines. The main substation and switchyard will be located in the grounds of the processing plant. Water will be supplied from two borefields, the De Grey River Borefield and the Canning Borefield.

The main components of the project include:

- Open cut pit;
- Waste landforms;
- Crushing facilities;
- Conveying and access tunnel through Spinifex Ridge;
- Process plant;
- Tailings storage facility;
- Communications towers;
- Creek diversion (approximately 1.3km);

- Administration, office and storage buildings;
- Workforce accommodation camp (400 person);
- Airstrip;
- Access and internal service roads including through Kitty's Gap;
- Water supply borefield and pipeline; and
- Power supply.

A conceptual layout of the Project Area is shown outlined in Figure 1. This layout incorporates the changes outlined in this document.

Other project activities that were assessed in the PER document include:

- clearing of land for mining, processing and associated infrastructure and activities;
- sourcing of construction materials for infrastructure (e.g. roads, airstrip and concreting);
- transportation of chemical reagents, equipment and other materials to site;
- waste generation and disposal; and,
- establishment of support infrastructure such as warehouses, storage areas, lay down yards, water supply pipelines, internal roads, access ways, administration buildings and accommodation village.

Figure 1 Conceptual Project Layout

MOLY MINES LIMITED

Western Australia

Spinifex Ridge project

Figure 1
Project Layout

0 — 2500m

Map Projection: MGA 51 (Australia GDA94)

File: j:\3100 spinifex ridge mo\14 gis\mining\infrastructure\site layout\proposed\ moly designed 20071105\mol20071105-a3-02.wor

Compiled: 6 / 11 / 2007 — Compiled by: JS

Updated : 20 / 03 / 2008 — Checked by : GK

Plan No : — Revision No : A

Location Diagram :

Well or Bore

Watercourse

Road

Highway

4WD Track

Nature Reserve 31047

Moly Metals Mineral Tenement

Infrastructure Footprint

Minor changes to the final layout are anticipated, but are not considered significant eg road layout changes, waste landform optimisation.

2.2 Modifications to the Project

A number of changes have been made to the project as outlined in the PER. These are presented below. The changes that have been made are considered minor, with the exception of the filtered tailings stacking which provides significant environmental benefits when compared to conventional wet tailings disposal.

2.2.1 Filtered Tailings Stacking

The most significant modification to the project involves a change to the management of the process plant tailings. The modification involves the filtration and stacking of the filtered tailings instead of pumping and sub-aerial disposal of slurried tailings. A description of the process is given below.

The first step of the process involves use of large belt filters to dewater the tailings to around 15-17% moisture content (by weight). The filters are a commonly used piece of process equipment with a proven track record for reliability. The filters will be located in the identified process plant footprint. The water recovered by the filters will be returned to the process water circuit for re-use.

Once dewatered, the tailings will be transferred to a system of fixed conveyors for transport to the filtered tailings storage area. The equipment used in the placement of the tailings will include a long conveyor carried on powered tracks, and capable of moving in almost any direction according to a computer generated pattern. The conveyor will carry a mobile tripper conveyor to facilitate tailings discharge over the face of the stack. As the stack develops in extent, the moving conveyor also moves. Additional sections of fixed conveyor will be added as required.

The technology associated with the fixed and moving conveyors is well proven. The system is mainly used for large heap leach projects, and is currently being used at many sites around the world. The system is also used for large scale tailings disposal overseas.

The use of the tailings stacking system will allow the storage to be built to full height in one area prior to moving to the next area. The total open area will be much reduced (<100ha open cf >600ha open). This will also facilitate progressive rehabilitation and the utilisation of freshly stripped topsoil directly replaced onto the final landform.

Geotechnical and geochemical work that was undertaken for the conventional TSF is relevant to the modified proposal. The stacking of filtered tailings will result in very low (if any) levels of seepage, an issue that was raised in the PER submissions. Additional geotechnical testing is currently underway to finalise the design of the facility and to satisfy DOIR requirements. In

addition a tailings storage facility operating manual is also required to be completed and approved by DOIR.

A comparison of other aspects of filtered tailings stacking and conventional tailings disposal methods is presented in Table 2.

Table 2: Comparison of Conventional v Filtered Tailings Disposal

Item	Conventional Disposal (as in PER)	Filtered Tailings Disposal
Description	Thickened tailings pumped to a circular 660ha Tailings Storage Facility (TSF) at ~ 60% solids. Recovered water returned to the process plant. TSF active for the life of the operation with subsequent closure.	Thickened tailings pumped to a bank of belt filters, then transported by conveyor to a stacker for placement in a ~ 600ha filtered tailings storage area.
Area of disturbance	660ha	<600ha
Project water requirement	~15GL/a	~10GL/a
Tailings Seepage	Some seepage and seepage recovery system. Seepage may be up to 0.1 mg/L Mo.	Minimal seepage – tailings stacked as a moist cake.
Dust Management	Maintain TSF areas moist; Progressive rehabilitation of TSF slopes as height raised Application of dust suppressants	Same dust management techniques will be applied, but open surface area will be <100ha cf >600ha
Rehabilitation	Only embankments can be rehabilitated prior to end of operation	Progressive rehabilitation can be undertaken including the progressive reuse of most topsoil and subsoil
Visual Amenity	Minimal change to view from public access areas north of the ridge	No significant change – tailings storage will be higher on the plant side but will be more efficient use of the tailings area
Other issues		No significant change to flora & fauna (apart from reduced disturbance).
Geotechnical Stability	The embankment can be designed to meet international standards	With the absence of a phreatic surface, the long term stability of the stack has less risk with prevention of erosion of the sides providing effective stability management
Cyclonic Rainfall	The storage can be designed to prevent overtopping	As there is no permanent or semi-permanent pond, overtopping during cyclonic rainfall is not a consideration

2.2.2 Waste dump Layout

The waste dump footprint has been modified slightly based on environmental considerations (Figure 2.1). The northern extent of Waste Dump 3 has been trimmed to ensure that the dump does not encroach on the minor creek line that flows into Coppin Creek just south of Coppin Gap during episodic rainfall events.

The western boundary of this waste dump has been adjusted away from the diversion channel to ensure that flood waters in the channel do not impact the dump.

2.2.3 Airstrip Location

The airstrip has been moved closer to the camp and processing plant (Figure 2.1). This location is impacted less by drainage lines and allows for a more consolidated overall project layout. The requirement for a temporary strip, as presented in the PER, has been reviewed and will no longer be constructed.

2.2.4 Road Alignment

As outlined in the PER, road alignment is likely to change based on environmental considerations through the detailed design phase. Some of these changes have already been identified and are presented in Figure 2.1. As an example, the road from Kitty's Gap will no longer cross Kookenyia Creek, but will go straight north to the Processing Plant access road. As well as eliminating the requirement for a substantial creek crossing, the overall road distance will be shortened, resulting in less disturbance.

2.2.5 Other Minor Changes

The waste water treatment ponds have been moved south of the Warrawagine Road to reduce the traffic crossing the Warrawagine Road.

The landfill site has moved adjacent to the tailings stack, and consideration will be given for locating the landfill in the later footprint of the tailings.

Construction laydown areas will be located on the tailings footprint.

The mine workshop and office area has been moved from an undulating site further south to reduce earthworks and road upgrade requirements.

3. Response to Submissions

3.1 Overview of Key Issues Raised in Submissions

Moly Mines has considered each of the submissions received during the public comments period and has prepared responses to each point made in the submissions made by agencies, organisations and individuals. These responses are in tabular format in the following sections. Where similiar points were made by one or more submitters, these have been combined in the tables to prevent duplication.

A number of issues were raised by more than one submitter. These key issues include:

- The need for other approvals or environmental management documentation to be obtained or developed;
- Questions about the adequacy of field surveys (especially those for flora and fauna) as a basis for impact assessment;
- Questions about the possible impacts mining or mine-related activities may have on aquatic, subterranean, riparian or other ground-water dependent systems, given the potential for changes to groundwater or surface water regimes.

These issues are summarised in the following sections (Section 3.1.1 to 3.1.3), with individual points addressed in the tables in Section 3.2.

3.1.1 Other Regulatory and Management Requirements

A number of submissions raised issues that are appropriately handled through other statutory processes that Moly Mines is required to follow prior to commencing work. Sufficient information has been provided in the PER and supporting appendices to allow assessment of the environmental impacts and management for the Part IV process. In addition, supplementary information has been provided in the Environmental Management Programme, including issue-specific management plans, not required for PER level assessments.

The major additional approvals required that relate to the submission issues raised are:

- Mining Proposal approval through DOIR. This document is required to provide an additional level of detail on some key operational aspects of the project, specifically the management of tailings and waste rock as well as closure issues. Requirements for tailings management under this process include detailed geotechnical assessment of the tailings storage design and technical review of the tailings operating manual. More detailed discussion will also be provided on geochemical characterisation of waste rock and management of PAF material. DOIR also have the ability to recommend environmental conditions on the Mining Leases for the project.
- Construction of water bores and abstraction of water from these bores require separate approvals, managed by the DOW. Additional detailed investigations, not available through the PER, are assessed by DOW as part of the licensing application. DOW

routinely require a borefield management strategy to be approved to effectively manage borefield abstraction.

- A Project Management Plan is required to be approved by DOCEP which, among other things outlines management and monitoring of any potential contaminants that may impact employee health. Given the greater levels of potential contaminants that employees may be exposed to, it is logical that effective management of these contaminants will preclude environmental impacts.

3.1.2 Adequacy of Technical Surveys

Various submitters expressed views questioning aspects of the biological surveys, indicating that they considered the findings were based on inadequate or incomplete survey work which did not allow full characterisation of the environment or the impacts of the project.

Moly Mines and its consultants have exercised great care in the design and implementation of field surveys. All survey work has been undertaken in accordance with relevant guidelines (ie EPA Guidance Statements) that had been published at the time of the surveys. In some instances, surveys (such as the subterranean fauna surveys and surveys for short range endemics) were carried out before EPA had released guidelines relevant to the surveys. In order to ensure that the surveys were designed and implemented in a way that reflected current departmental requirements, Moly Mines and its consultants actively and repeatedly sought input and comment from relevant agencies. In certain cases where specialist knowledge was required, Moly Mines and its consultants sought independent expert advice, for example in relation to identification of biological specimens. Records of these communications have been maintained and are available to EPA if required.

One submitter made many specific and detailed comments about the technical adequacy of the PER, particularly in relation to its assessment of the impacts of the project on fauna and biodiversity. These comments have been kept separate from other submitter comments and a point-by-point response to this submission is provided in Section 3.2.3.

Other submissions have suggested that results of the surveys conducted by Moly Mines do not, in some instances, match results obtained by DEC or by other investigators. Where possible, Moly Mines has presented its findings in the context of other relevant and publicly available work. At the same time, Moly Mines and its consultants have provided detailed information on the study methods adopted by them and have noted any scientific limitations on the studies. Given the careful and well-documented quality control adopted in the design and implementation of baseline studies, Moly Mines considers that it has adequately demonstrated that the explanation for any differences between its survey results and those of other workers is more reasonably attributed to variation of biological systems in response to abiotic factors, rather than to any deficiencies in the baseline studies for the Spinifex Ridge project.

In preparing an environmental impact assessment, proponents are expected to demonstrate that all reasonable measures have been undertaken to avoid significant impacts on the environment. Proponents are expected to provide sufficient information to show that possible adverse impacts of the project can be detected, monitored and managed in a practical way, and that feasible contingency actions are available in the event that monitoring shows that management intervention is warranted. None of these obligations requires perfect knowledge of the natural systems which may be affected by the project. In cases where knowledge about the nature or the behaviour of natural systems may be lacking, Moly Mines has made conservative assumptions in its estimation of impacts and has adopted conservative designs with sufficient redundancy in its controls to enable a range of contingency actions. The degree of detail in the baseline studies and related analysis conducted for the Spinifex Ridge project is appropriate to the level of risk and complexity of the project. Although Moly Mines proposes to conduct a range of further investigations and/or on-going monitoring to continuously improvement its management at Spinifex Ridge, it would be highly unlikely that additional survey effort would substantially change the outcomes of the work for the purposes of the Environmental Protection Act 1986 impact assessment process.

3.1.3 Reliability of Predicted Impacts on Surface and Groundwater Systems

The impact assessment for the surface and groundwater at Spinifex Ridge has used a conservative approach to modelling, utilising the most accurate and detailed information available at this stage of the project.

The PER document summarises detailed hydrological and hydrogeological investigations that are presented as appendices to the PER. These investigations indicated that the mining and processing activities will not have any significant adverse impacts on the surface and groundwater systems based on the modelling work outlined in the reports.

A significant component of the proposed management of the project is the ongoing monitoring of surface and groundwater systems that will allow improved validation and refinement of the models. Contingency actions have also been identified for both short term and long term response to unexpected changes to these systems. These contingencies are outlined in the PER and appendices, including the Environmental Management Programme.

3.2 Detailed Response to Submissions

3.2.1 Submissions on Project Description

Submitter	Issue	Submission Detail	Response
DoIR	Land Tenure	Appropriate *Mining Act 1978* tenure will be required for the western edge of the tailings storage facility, sewage ponds and evaporation ponds (currently on E45/2825), and the mine road (currently on E45/2650).	The vast majority of the relevant tenure is in place and any other appropriate tenure will be applied for.
DoIR	Life of Mine	The web site promotes a 20 year mine operation, yet the PER states 10 years. It is mentioned in the PER they may apply to operate for 20 years depending on the market at the time. However, the prominent promotion of a 20 year mine on the web site is not consistent with the PER	Moly Mines is confident that mine life will extend beyond 10 years, however methodology may change and potential impacts cannot be assessed for an extended life. The PER proposal extends as far as can be predicted to assess environmental impacts, with future activities subject to further approvals.
DoIR	Life of Mine	The report indicates that by the end of 10 years the current tailings site will be rehabilitated, yet there is no indication where the mine tailings will be placed if the mine continues for a further 10 years	Options for future tailings disposal will be considered and assessed through the approval process for any extension in mine life. Options may include increasing the height or extent of the existing facility or a separate facility.
Cons Council	Open Pit	The proposed mine open pit boundary intersects part of the Coppins Gap reserve	No mining activities or infrastructure occur with the reserve. The only mining activities that will occur within the reserve are those associated with environmental monitoring.
Cons Council	Water Supply	Use of existing dewater fields should be used wherever possible both for environmental and sustainability reasons.	Woodie Woodie has been reviewed as a potential water source and discounted for a number of reasons including environmental and sustainability reasons.
Cons Council	Water Supply	Cumulative impacts of mine site dewatering and water abstraction for mining in the Pilbara. The 16GL per year of water usage is a very large amount of water for any commercial venture and will put pressure on the increasingly pressured water resources of the Pilbara. Context needs to be provided in terms of other potential uses for this water – including its environmental function.	The Canning Basin is a very large water source with currently very low levels of use. Nevertheless, through the change in tailings handling outlined in Section xx, Moly Mines has been able to reduce water requirements from 16GL/a to 10 GL/a. Other opportunities to reduce water usage will be explored as part of ongoing environmental management.
DEC	Borrow Pits	The specific location of the borrow pits for construction of access roads has not been documented in the PER (p 47-48) as previously requested by DEC. The proponent should consult with DEC in order to establish suitable locations for the borrow pits to ensure that environmental values are not negatively impacted. Site selection should consider environmental parameters such as flora and vegetation, weed risk, fauna habitat and topography/drainage.	Moly Mines has advised in the PER that borrow pits will be located within the footprint of the disturbance areas (pit; waste dumps and tailings storage). Any disturbance areas outside of the project footprint will only be used after discussion and approval of DEC or other regulatory bodies.
DEC	Pipeline Route	DEC would like to have the opportunity to view and provide comment on detailed maps of the pipeline route.	Moly Mines has provided copies of finalised reports to DEC which include detailed maps of the pipeline route. Consultation with DEC will continue as further work is undertaken.

DEC	Pit Backfilling	In reviewing the draft PER, DEC questioned the proponent's intention to not backfill the pit to above the pre-mining water table, and requested a feasibility study that considers environmental impacts in order to determine the most suitable closure option. This justification has not been addressed in the PER and there is no discussion on potential long-term impacts to groundwater quality (and subsequently groundwater dependent ecosystems) as a result of leaving an open pit void.	The option of backfilling the pit has been considered in the closure planning and discounted on environmental, logistical and economic grounds. The disturbance of rehabilitated landforms to return waste rock and tailings to the pit is considered to have limited benefit. Although operational environmental issues can be effectively managed (eg dust, noise, energy usage etc) backfilling the pit will double the duration of these activities, and this is not considered a realistic option. Logistical limitations relate to the return of tailings to the south of the ridge. In addition, backfilling of the pit would effectively sterilise a potential future mining resource ie the lower grade orebody halo which is currently uneconomic.
DOIR	Ore Processing	The flow chart should show all waste streams generated and the properties of these waste streams should be specified. The chemical constituents/concentrations of the Ferric Chloride leach solution stream should be detailed. Does the tailings slurry water tested in geochemical analyses included this stream.	Volumes involved in this bleed stream are extremely small in comparison to the total tailings stream (approx 40 m^3/day in a 33,000 m^3/day stream). The soluble copper in the bleed stream will be recovered and sold as metallic copper product by a cementation process using scrap iron. Any elements not precipitated in the cementation process end up neutralized and precipitated in the tailings stream resulting in very low levels of soluble compounds. Groundwater monitoring will target the range of elements present in the tailings to confirm that no metals are being mobilised. The geochemical analyses did not include this stream as there was no practical way to incorporate this material at the low levels that will present in the tailings.
DoIR	Ore transport	The PER proposes 32 trucks per month will transport molybdenum to either Port Hedland or Dampier Port, and 40 trucks per month will transport copper to Port Hedland. The impact of transport, dust, noise and stockpiling of the ores in these towns is not adequately addressed	Transport of concentrate involves an average of 2-3 trucks per day and is considered insignificant in terms of the overall traffic usage of the roads. Molybdenum concentrate will be containerised, preventing dust and stockpiling issues. Copper concentrate will be temporarily stored in a purpose built shed designed with due consideration of management of dust and noise issues in Port Hedland. Construction of this shed will be subject to appropriate approvals processes.
DOIR	TSF	Clarify height of TSF starter embankment. Clarify thickness of rock armouring over upstream lifts constructed with tailings. The location of part of the TSF within the floodplain of Kookenyia Creek is of concern. All permanent infrastructure (e.g. TSF, WRDs) should be outside the area flooded by 1in 100, 72 hr rainfall event, and armoured to withstand a potential maximum flood event. The construction of upstream lifts with tailings is generally considered a higher risk option than construction of lifts with competent mine waste or borrow, particularly from the point of view of long term stability of the facility. This aspect of the TSF design will need to be justified in the detailed design documentation for the TSF submitted in the Mining Proposal, and will be closely scrutinised. If future	The tailings disposal concept has changed and the new approach is detailed in Section 2.2.1 of this Response to Submissions report. Additional technical detail will be provided in the Mining Proposal document which requires DOIR approval.

		expansions of the project are likely to occur (P10), the implications for future tailings storage should be considered during the design of the current facility.	
DOIR	Power Supply	Natural gas is identified as the main power source, it is recommended to also consider solar power as an option in conjunction with natural gas.	Solar power has limited scope for the bulk of the power requirements for site. Solar power applications have been considered and are being progressed for certain applications within the project including camp requirements.
DOW	Water Supply	A full hydrological study of the water resource and environmental water requirements, suitable monitoring and reporting regimes would be required as a condition of licence for the chosen water supply options	A full hydrological study for the Canning Basin and De Grey borefields has been completed. This information has been presented to DOW and will be included as part of the licence approval process. Supplementary information is currently being obtained by an additional drilling and test pumping programme currently underway.
DOW	Water Supply	The De Grey borefield option is a valid water supply source that can be managed, although further discussion is required on borefield design and allocation volumes, with consideration of vegetation, semi-permanent pools and stygofauna habitat	Moly Mines agrees with this summation, and that the licensing process for bore installation and abstraction provides the appropriate mechanism for ongoing discussion on borefield design and allocation volumes.
DOW	Water Supply	The Woodie Woodie water supply has the potential to introduce high nitrate level water into Coppin Gap pool if this source were used to maintain pool levels. Issues relating to establishment and closure of the water pipeline would need consideration	The Woodie Woodie supply is unlikely to proceed given the excessive distance for pipeline construction. If it does proceed, potential impacts of nitrate levels would be considered prior to any use of this water to supplement Coppin Gap pool levels.
DOW	Water Supply	A water licence application would require more detail as part of a water management plan including a detailed water balance, long term efficiency targets and how ongoing water use efficiencies will be achieved as well as minimum environmental water requirements for groundwater dependant ecosystems, particularly the pools at Coppin and Kitty's Gap.	Moly Mines will ensure that DOW requirements are met as part of the licensing processes applicable to the Spinifex Ridge development.
DOW	Water Supply	No discussion of water requirements associated with product handling at loading facilities in Port Hedland given limited water availability	The water requirements for product handling at Port Hedland are outside the scope of the PER. However, water requirements will be minor given that molybdenum concentrate will be containerised and that copper concentrate will be in a purpose built shed. Water requirements for design and management of the multi-user shed will be subject to separate approval processes.

3.2.2 Submissions on Environmental and Social Factors

Submitter	Issue	Submission Issue	Response
DEC	Flora and Vegetation	The PER does not address the limitations of the flora and vegetation surveys as outlined in EPA guidance statement No 51 (EPA, 2004).	All botanical survey work undertaken for the Spinifex Ridge project complied with EPA Guidance Statement No 51 (EPA, 2004). Individual reports, including the two surveys reported in OES (2006d), as well as G&G (2006), G&G (2007a), and G&G (2007b), all discuss limitations to surveys within the appropriate sections. The PER provides an accurate summary of combined survey results, rather than a discussion of individual survey methodologies and individual site conditions prevailing over five separate surveys. Survey limitations identified are not significant and do not compromise the data collected or the assessed outcomes.
DEC	Flora and Vegetation	Surveys to date have not provided sufficient information to assess the impact of the development on vegetation and flora. While the timing of the April 2006 survey was good it would have been appropriate to undertake another survey later in 2006. One sampling event over the majority of the project area (E45/2226) has not been sufficient to capture the full list of species likely to occur. The number of sites assessed (62) is a relatively small number. The proponent's species list does not contain annual taxa, particularly taxa from the Goodeniaceae, Amaranthaceae and Poaceae families.	Two surveys have been undertaken over the Spinifex Ridge project area conforming to EPA Guidance Statement No 51 (EPA, 2004). That is, a preference for multiple surveys over a variety of seasons and advice that the season that follows the season of maximum rainfall (ie. Autumn in the Pilbara), is the most productive and important survey period. The timing of the preferred Autumn survey (April 2006) corresponded with significant rainfall falling prior to the survey of almost twice the annual average. The 2005 survey was undertaken in a different season and therefore contributed to multi-seasonal data. Additionally, botanical transect sampling of Coppin Creek (work associated with the proposed creek diversion) was also undertaken during the optimal survey time of April 2006 (OES, 2006c) Sample sites represented all landforms and soil types, and site selection considered topography, wildfire history, vegetation condition, patchiness and variability amongst systems. A number of the sites established in 2005 were re-surveyed during the 2006 survey (which included an expanded footprint area) in order to capture annual species present. In addition, extensive transect sampling of Coppin Creek (work associated with the proposed creek diversion) was undertaken during the optimal survey time (April 2006) and all taxa identified during this work were included in the final species list for the project area (OES 2006d). For the purpose of statistical comparisons with regional data sets, analysis by Griffin (2007) concluded that the sites sampled once from Spinifex Ridge give a reasonable representation of the regional variation. 188 taxa were identified from the Spinifex Ridge project area. The flora survey report (OES, 2006d) compares species assemblages with four similar regional project sites in close proximity, where between 126 and 209 species were recorded. Of the 188 species recorded at Spinifex Ridge 58 were annuals (or ~31%), including 20 species from the families Poaceae, Amaranthaceae and Goodeniaceae. Of the combined Pilbara region flora listed by Van Vreeswyk *et al.* (2004), 31.8% are considered annuals. It is acknowledged that this proportion will vary according to site conditions, however,

Submitter	Issue	Submission Issue	Response
			results obtained from Spinifex Ridge are consistent with this proportion. Although additional annual species are likely to be recorded with increased survey effort, the surveys conducted were considered adequate for independent regional analysis (Griffin, 2007) and conform to EPA (2004). Data accumulated for Spinifex Ridge over two survey periods were sufficient for Mr M. Trudgen and Mr E. Griffin (referenced in the PER as Griffin, 2007) to undertake a robust statistical analysis (PATN) comparing Spinifex Ridge data with all other available regional data sets from six additional regional sites. Of the regional data sets compared, Spinifex Ridge represented the project area with the second highest number of survey sites (plots) assessed. The three individual surveys undertaken over service corridors and proposed borefield areas (that is, G&G, 2006; G&G 2007a; and G&G, 2007b) complied with EPA (2004). Timing of field work varied, with two surveys (the De Grey and Canning borefields and associated service corridors) undertaken in the preferred Autumn season, and during the favourable conditions of 2007. Quadrat based data was collected and statistically analysed (PCA ordination) over individual project areas to characterise associations. Regional and local significance was assessed for both flora and vegetation. Comprehensive surveys that have complied with EPA (2004) have been undertaken over all disturbance areas, and have provided robust quadrat-based data to enable regional and local statistical analysis. Surveys have provided sufficient information to assess the impact of the proposal on vegetation and flora. It would be unlikely that additional survey effort would change the outcomes of the work for the purposes of the *Environmental Protection Act 1986* impact assessment process.
DEC	Flora and Vegetation	Various bullet point questions on p 2 of submission: 1. Sandy Plain P3 vegetation type dominated by *Acacia vitoriae*	1) *Acacia victoriae* is known to occur across an area extending from the Central Kimberley to the Murchison and Yalgoo IBRA bioregions, with the majority of specimens held at the WA Herbarium originating from the latter bioregions. Within the Pilbara, the nearest vouchered sample of this species (to Spinifex Ridge) originates from near Wittenoom and on Roy Hill Station north of Newman. *Acacia victoriae* was identified in the field and this species will require re-sampling to verify identification. *Acacia victoriae* was also identified during a vegetation survey of the Woodie Woodie service corridor (G&G, 2006) at a site approximately 64km east of Spinifex Ridge. At this same site, *Acacia synchronicia* was also identified. This species has a similar appearance to that of *A. victoriae* (ie. spinescent shrub or tree) and appears more common in the Pilbara than *A. victoriae.* In the event that *A. victoriae* has been identified incorrectly at Spinifex Ridge, the species present is likely to be *A. synchronicia.* Neither species is threatened. Verification of the identification will be undertaken.

Submitter	Issue	Submission Issue	Response
		2. *Triumfetta maconochieana* ms is no longer a manuscript name	2) It is recognized that *Triumfetta maconochieana* is no longer a manuscript name. The letters "ms" should not have followed the species name in the PER.
		3. No priority taxa were sighted. This may be due to inadequate survey effort, timing or ID.	3) Moly Mines believes that survey effort, timing and ID were appropriate for identification of any priority taxa for the project and were consistent with the EPA Guidance Statement No 51. Not only were there no priority taxa identified from plots, but none of the known priority species from the region were sighted over the project during the course of extensive field work. Limitations on the survey work are adequately identified and described in all flora-vegetation reports.
		4. Analytical routines taken to develop MDS plots should be provided within the appendix.	4) EPA (2004) guidance suggests that a form of multivariate analysis of data is likely to be warranted. This was undertaken both locally (Spinifex Ridge project area) and regionally (six additional project areas (Griffin [2007]). Although not included in the PER all reports, data, and analytical routines have been provided to DEC.
		5. Survey did not detect the weed species *Parkinsonia* at the Muccan Crossing	5) G&G (2007a) recorded and reported *Parkinsonia* at the Muccan Crossing and elsewhere, and provide recommendations for its management. The PER summarises findings in respect to weeds in Section 4.7.4 (p135) including a specific reference to *Parkinsonia.*
		6. A much more extensive list of species for the Woodie Woodie corridor would be expected.	6) A total of 162 taxa were recorded during the Woodie Woodie survey, representing 34 families and 83 genera. o Although passing through a number of land systems the survey was confined to a narrow existing road reserve, with a relatively small area of ~ 4km². o The number of species recorded is considered high given the area sampled and G&G (2006) provides an adequate comparison with other regional data. o Additional species were recorded during subsequent surveys, including within a section of service corridor that is utilised by both the DeGrey and Woodie Woodie routes.(ie. from the Spinifex Ridge site to the DeGrey River) o No Declared Rare or Priority flora species were identified in either the borefield or service corridors The survey methodology and approach was consistent with similar projects and it would be unlikely that additional survey effort would change the outcomes of the work for the purposes of the *Environmental Protection Act 1986* impact assessment process.
DEC	Flora and	The flora survey report places too great an emphasis on land	Although the flora survey report (OES, 2006d) did use land systems to provide the reader with a

Submitter	Issue	Submission Issue	Response
	Vegetation	systems as a surrogate for vegetation communities.	regional framework within which to consider the data obtained from the survey area, additional work provided sufficient information to adequately assess vegetation communities in the regional context. Subsequent to OES (2006d), Mr M. Trudgen and Mr E. Griffin (referenced in the PER as Griffin, 2007) compared data obtained from the two surveys reported in OES (2006d) with all other available regional data sets (six other regional sites). A robust statistical anaysis (PATN) was performed on all data sets. This comparison is summarised and discussed in the PER on page 138 'Regional Comparison'. All relevant regional data sets were utilised and no other relevant regional data is available for such a comparison.
DEC	Flora and Vegetation	DEC requests copies of flora/veg survey conducted by G&G Environmental in borefields areas and proposed service corridors.	After a meeting with the Environmental Management Branch of the DEC on 30/04/07 all completed baseline flora and fauna reports (six) were submitted to DEC for review. The reports submitted to DEC included the G&G Environmental report detailing results of the Woodie Woodie service corridor, (referenced in the PER as 'G&G Environmental, 2006'). The two subsequent reports have since been forwarded to the DEC.
DEC	Flora and Vegetation	If the option to use gas turbine generation is not pursued the proponent will need to undertake flora and vegetation surveys of corridors for transmission lines. Surveys of these service corridors need to be carried out when the potential alignments are better understood (during route planning and detailed design phase).	If power supply options require reticulated power from Port Hedland or alternative pipeline routes, detailed flora and vegetation surveys of corridors will be undertaken of a suitable width to allow for alternative alignment options if biodiversity values are identified.
DEC	Flora and Vegetation	*DEC RECOMMENDATION S* 1) The proponent should provide a risk assessment of the impact of mining activities on flora and vegetation at the local and regional scales, in the context of the limitations of the surveys based on species detected in other surveys.	1. Comprehensive and adequate flora and vegetation surveys consistent with EPA (2004) have been undertaken for all disturbance areas, and limitations identified. An assessment of flora and vegetation of conservation significance at the local and regional scales has been undertaken within the various reports prepared, and Spinifex Ridge data has been statistically compared with all available regional data sets. No DRF or Priority flora have been identified over the project area, service corridors or borefields. An impact assessment is presented in the PER. A draft EMP has been developed (Section 8.5.4.4 and Appendix F of the PER), which includes a Flora and Vegetation Management Plan containing a commitment to an internal "permit to clear" process before any ground disturbance. This process will provide for targeted checking and area-by-area sign off before clearing is allowed to proceed. (Reference FVMP 1).

Submitter	Issue	Submission Issue	Response
		2) Additional, more detailed surveys of infrastructure corridors should be undertaken to support identification and avoidance of significant flora values potentially affected by these elements during route planning and the detailed design phase for these elements.	2. If power supply options require reticulated power from Port Hedland or alternative pipeline routes, flora and vegetation surveys of corridors will be undertaken of a suitable width to allow for alternative alignment options if biodiversity values are identified. Once the method of construction and proposed clearing footprints are determined for infrastructure corridors a pre-disturbance procedure will be implemented to support identification and avoidance of DRF, Priority taxa, and significant vegetation (including riparian vegetation). The procedure will form part of the Vegetation and Flora Management Plan and will apply to all service corridors and water supply areas (Section 8.5.4.4; Appendix F). The procedure will prescribe the pre-clearance checks that must be conducted before finalising disturbance areas and before commencing ground disturbing works. Where required, additional targeted searches for particular species or associations, within particular habitats will be conducted as part of the pre-disturbance procedure.
DEC	Flora and Vegetation	The first two pages of the Flora species list in Appendix G are repeated and many families are missing.	Appendix G is a report pertaining to Short-range Endemic Fauna. The species list in Appendix D "Flora and Vegetation" does not appear to repeat pages. Note however: the family name only occurs once in the tables, with all genera listed below belonging to this family. Four separate sets of tables are presented: • Sites 1-16, then • Sites 17-32, then • Sites 33-48, then • Sites 49-62
DEC	Weeds	DEC requests that a weed survey be undertaken encompassing the full extent of the project area, borefields and service corridors to provide weed distribution mapping for (*) and that this information be included in a weed management plan. * Note: it appears that a word or phrase is missing from the DEC submission.	Flora and vegetation surveys of OES (2006c), OES (2006d), G&G (2006), G&G (2007a) and G&G, (2007b) all document weed distribution and abundance over the project area, service corridors, and borefields. As part of the overall vegetation assessment permanent plots have been established and coordinates documented and weed species presence, and cover values have been recorded. All the reports referred to above list the weed species recorded, and their status under relevant Acts and publications. o Eight introduced species were recorded over the Spinifex Ridge project area including *Datura leichhardtii* a declared plant under the Agriculture and Related Resources Protection Act 1976. o Eight introduced species were recorded within the proposed DeGrey River borefield and service corridor including *Parkinsonia aculeata* a declared plant under the Agriculture and Related Resources Protection Act 1976. o Seven introduced species were recorded within the proposed Canning borefield and corridor,

Submitter	Issue	Submission Issue	Response
			none of which are declared under the Agriculture and Related Resources Protection Act 1999. o Eight introduced species were recorded within the proposed service corridor to Woodie Woodie. Three specimens only of Ruby Dock (*Acetosa vesicaria*) were recorded at just one location, a degraded area surrounding Cracker pit at the Woodie Woodie mine site.
DEC	Weeds	The proponent should consider weed management as an integral part of the management commitments for the project. These commitments should relate particularly to management of buffel and other ubiquitous weeds within and surrounding the project area, borefields and service corridors, especially near water sources. The PER should then identify key weed species that require specific management, such as Declared and environmental weeds and indicate areas within or immediately surrounding the project area which present a risk of weed spread or invasion. As an example, eradication of Ruby Dock (*Acetosa vesicaria*), if it is found within the entire project area, should be included in these recommendations and the proponent commitments.	An EMP has been prepared (Appendix F of the PER), with weed management included as a component of the Flora and Vegetation Management Plan with a commitment to develop weed management procedures (Reference FVMP 18). Weed management procedures will be documented and implemented prior to commencement of ground disturbing works. The development of weed management procedures will include the identification of key areas or habitats in which weed spread presents a risk, identification of key weed species that require specific management strategies, and management and control of ubiquitous weeds. Note that: o Buffel Grass is a ubiquitous species that is already widespread in Coppin Creek over the project area, as well as drainage lines and flats over proposed service corridors and will require specific management measures. o Coppin Gap and the De Grey River will be assessed as areas which present a risk of weed spread. o Containment and eradication of isolated weed occurrences (eg Parkinsonia at the De Grey River) will be a priority. Further delineation of the current (and future) distribution of weed species over the project area and associated service corridors will be dependent upon the priorities identified in the weed management procedures with delineations and mapping regularly updated as a component of the weed monitoring program.
DEC	Weeds	The PER should include details on appropriate weed hygiene procedures which are required when moving from a weed infested into a weed free area *within* the project area, including borefields and service corridors, as well as when moving onto the project area. Additionally, vehicle clean down bays should be located strategically within the project area in order to avoid the spread of weeds. The proponent should be made responsible for the eradication of any weeds introduced or spread as a result of mining and related activities.	Weed management procedures will be developed as outlined in the EMP (Appendix F of the PER). Weed management procedures will include: o Weed hygiene requirements (including travelling within the project area, as well as travelling to the project area) (Ref FVMP 18) o Locations of vehicle clean down bays (Ref FVMP 18) Management procedures will focus on: o Preventing the introduction of new weed species over the project area and service corridors, o Eradicating specific species that occur in isolation (eg Parkinsonia and Ruby Dock),

Submitter	Issue	Submission Issue	Response
			○ Control of existing species, and ○ Prevention of weed introduction into areas identified as at risk to weeds. Moly Mines will take full responsibility for weed management, and enforce quarantine, hygiene and control procedures for Moly Mines staff and contractors over the Spinifex Ridge project area and associated service corridors, However, it should be noted that service corridors are located adjacent to public roads and that any hygiene, control, and quarantine procedures identified can only be imposed onto Moly Mines personnel and contractors, and that members of the public and other users, including other companies, also use these roads.
DEC	Weeds	Weed invasion is listed throughout the PER as a factor which may have a potential impact on flora, vegetation and fauna, however, there is no indication of the weed species which are likely to cause an impact on these environmental factors.	The weed species upon which Moly Mines will particularly focus its management activities are: • Buffel grass • Ruby Dock, and • Parkinsonia
DEC	Weeds	*DEC RECOMMENDATION* It is recommended that the project area (including the borefields and service corridors) is mapped according to weed species occurrence and this information, together with information on weed hygiene and control practices within the project area is incorporated in a weed management plan.	Weed Management is considered as a component of the Flora and Vegetation Management Plan (Appendix F of the PER). Previous flora and vegetation surveys have documented weed distribution and abundance over the project area, service corridors, and borefields, and plot based locations of various weed species are known. Weed management procedures implemented during the construction and operations phases of the project will take into account the current distribution of weed species, based on locations known from past surveys as well as targeted ground-truthing. Weed hygiene and control measures, as well as monitoring procedures, will all be included within the weed management procedures, as a component of the overall Flora and Vegetation Management Plan.
Cons Council	Fauna	Whilst it seemingly can be argued that mining Spinifex Ridge will not significantly contribute to the extinction risk for a number of threatened fauna species; it is none-the-less an important habitat and this needs to be given adequate weight in the EPA's determinations.	The PER has assessed important habitats at the local and regional scales. Key habitats have been identified over the project area, associated service corridors and borefields (OES, 2006e; OES, 2006f; OES 2007c) and have been discussed in the PER. Three key habitats at the local scale were identified over the Spinifex Ridge project area (Rocky Gully, Rocky Slope, and Riverine Community) with an assessment of impacts on these habitats finding that EPA objectives will not be compromised.

Submitter	Issue	Submission Issue	Response
DEC	Fauna	*DEC RECOMMENDATION* The proponent should further address the issue of road kill of fauna in the PER. Developing contingency strategies to better manage the issue of fauna road kill and implementing a road awareness program for employees is essential.	The issue of road kill of fauna is discussed in Section 8.6.2.3 of the PER under 'Secondary Impacts'. Eg: *"Strict speed limits will apply over the project area and all haul roads, and all fauna deaths will be reported through site incident management procedures"*. (p 263.) A Fauna Management Plan (Section 8.6.5; Appendix F of the PER) has been developed that further addresses the issue of road kill over the project area, service corridors, and water supply areas (Reference TFMP 25 and TFMP 26). Once road network design criteria has been finalised the designation of speed limits will be determined that consider fauna movements. As well as designated speeds (eg. 60km/hr during the day and 40km/hr at night) additional strategies will also be considered that include: reducing speed limits during high risk periods, or through high risk areas; positioning of appropriate signage; and, installation of fencing in strategic locations. If review of incidents reported through the incident management procedures indicates that fauna of conservation significance are being recurrently impacted preventative strategies will be revised. As part of standard mine-site induction, all employees and contractors will be briefed on the relevance of the area to fauna and potential impacts to fauna from daily operations, including a road awareness program (draft EMP Reference TFMP 28).
DEC	Fauna	*DEC RECOMMENDATION* The proponent should provide appropriately detailed information on the risk to fauna associated with molybdenum in groundwater, describe management measures to deter birds and other fauna from the TSF and include a mitigation strategy to be employed if molybdenum levels exceed pre-determined safe levels (eg 1mg/L) in the TSF. This should include consideration of the potential risk and impacts of bioaccumulation within the local fauna.	Tailings management has been reviewed and a description of a filtered tailings stacking system is presented in 2.2 of the Response to Submissions document. Under the revised design, no free water will be present on the surface of the tailings storage apart from intermittent temporary ponding associated with extreme rainfall events. The revised tailings disposal system will reduce the likelihood of generation of seepage from the TSF, as the tailings will be dewatered prior to conveying to the facility. Potential for fauna impacts due to molybdenum toxicity though ingestion of, or contact with, contaminated water is therefore considered extremely low. Similarly, the likelihood of significant plant uptake of elevated molybdenum in groundwater has been reduced.

Submitter	Issue	Submission Issue	Response
DEC	Fauna	*RECOMMENDATION* The proponent should address issues of managing light spill and attempt to reduce the incidence of powerline strike by fauna by installing visual/sonic deflectors on overhead powerlines within the project area, associated borefields and service corridors to minimise the risk that local populations of bat species of conservation significance are not injured or killed. Additionally the proponent should commit to not using barbed wire fencing within the project area or associated borefields and corridors.	Management strategies for the control of light spill are listed in Section 8.6.2.3 (p 258), and as part of the draft Fauna Management Plan (Appendix F - References TFMP 15 to TFMP 18). Powerline strike on bats is usually associated with the larger fruitbats of tropical Australia but microbats over the project area may also be at risk, particularly the larger Ghost Bat. Risk to bats and other fauna cannot be assessed until detail is refined regarding placement and design of on-site powerlines (eg. height, number, distance between lines, etc). Once all design criteria are finalised Moly Mines will further develop these strategies to reduce the impacts to bats from lighting, powerline strike, and roadkill, particularly focusing on lighting and powerlines in areas that bats may potentially be attracted, such as surface water. Options for stock and feral animal control will be reviewed based on potential impacts on fauna and with due consultation with the station leaseholder. As part of standard mine-site induction, all employees and contractors will be briefed on the relevance of the area to fauna, including threatened bats, and potential impacts daily operations, including a road awareness program (Reference TFMP 28 in the draft EMP).
DOIR	Fauna	Studies such as the Glossop Consultancy study of environmental health hazards, and the Bennelongia study of potential hazard of elevated Molybdenum levels in the TSF, should be provided in Appendices, to support statements made in the PER relating to this issue	Relevant information from the reports is included in the PER. Copies of the report can be provided to DOIR through the Mining Proposal approval process.

Submitter	Issue	Submission Issue	Response
DEC	SRE	DEC notes that there does not appear to be any discussion on SRE within the PER in regard to impacts and management. In addition, it is unclear exactly where the SRE surveying was undertaken in relation to the Project area and surrounds. The proponent needs to recognise the potential impacts of the mining development on SRE recorded in the area, and discuss strategies to manage these impacts. Development of management strategies will depend on results of further survey, however they would need to address factors such as protection of habitat in mine/pit design, changes in surface hydrology, fire (fire is recognised in Appendix G as being a significant threatening process for SRE), and weeds (invasion of buffel grass over *Triodia* is also a significant threatening process for SRE that inhabit the base of spinifex plants).	The EPA expects that environmental impact statements consider impacts on conservation of SRE (Guidance Statement No 56, 2004). Impacts to SRE, and habitats likely to support SRE taxa, are considered in the PER and appropriate mitigation strategies identified. Section 4.8.4 summarises results of a SRE survey at Spinifex Ridge. Results of the survey are attached as Appendix G (and referenced as OES, 2006f). All site coordinates and locations are shown in Figure 3 (p 9) and Table 4 (p 10). Of most relevance was an undescribed species of terrestrial snail "*Quistrachia* sp." SRE fauna and habitat are given consideration in regard to impacts and management in Section 8.6.2. Habitats more likely to support short-range endemism are identified, and impacts to SREs including *Quistrachia* sp. are considered under 1) 'Direct clearance or disturbance of fauna habitat and 2) 'Reduced connectivity of populations and/or isolation of local habitats'. The management strategies developed for terrestrial fauna include potential SRE groups and are discussed in Sections 8.6.2.3 and 8.6.3.2 of the PER. Impact management in respect to SREs considers potential changes to groundwater and surface water hydrology associated with pit-dewatering and the construction of a diversion. Maintaining the hydrological integrity of Coppin Gap, and maintaining/restoring connectivity attributes of the creekline diversion and the Talga Range, are all given high priority throughout the PER, and management strategies are listed in Sections 8.6.2.3 and 8.6.3.2. Inappropriate fire management is identified as an impact and discussed in Section 8.5.2.3, with a strategy listed: ■ "Fire management will be based upon fire exclusion within the project area. A regional approach will be adopted to fire management and suppression in liaison with neighbours, including the local pastoralist, DEC, and FESA." ■ The fire-fighting capability of the operation has the potential to significantly reduce the impact of fire in the area. ■ Buffel Grass is already widespread in Coppin Creek (p 235), as well as drainage lines and flats in the region and the current landuse is an operational cattle station. The potential to introduce or exacerbate the effects of weeds is mentioned throughout the PER and mitigating strategies are included within Section 8.2 Landforms and Soils, 8.5 Flora and Vegetation, and 8.6 Terrestrial Fauna. The Vegetation and Flora Management Plan includes weed management and include specific strategies for particular weeds. The exclusion of cattle over the project area and the implementation of a fire exclusion policy will also help prevent Buffel Grass invasion of *Triodia* grasslands.

Submitter	Issue	Submission Issue	Response
DEC	SRE	None of the SRE species collected at Spinifex Ridge during the current survey (Appendix G) were identified in previous surveys of the Pilbara (Biota, 2005; Johnston *et al.*, 2004), with the exception of an unknown *Quistrachia* sp. (p 20). This may indicate either that the SRE populations at Spinifex Ridge are distinct from those in surrounding areas in the region, or that there were sampling and/or identification inadequacies with the current survey. DEC requests further SRE surveys be undertaken within and outside the project area in order to assess the impact of the development on the SRE populations present at the ridge on a local and regional scale. Further surveys are particularly important for the undescribed terrestrial snail *Quistrachia* given that it only appears to occur in a small number of sites within the project area and is known to be a typical short range endemic. The proponent needs to demonstrate that the taxon occurs outside the project area, and that adequate habitat will remain outside the mine area to ensure the long term survival of the species.	Apart from *Quistrachia* sp. none of the specimens collected during the SRE survey were considered to possess known attributes associated with short-range endemism. All identifications were undertaken by specialists within WAM and/or UWA. Two Geophilomorph centipedes collected may possibly possess SRE attributes but Mark Harvey of WAM believes that not enough is known about the identification and taxonomy of these centipedes to be able to offer any more information. Habitats more likely to support short-range endemism have been identified in the PER, and impacts assessed. *Quistrachia* sp. was collected from rocky slope habitat of the southern flanks of the Talga Range, outside of the direct area of impact. However, it is assumed in the PER that some *Quistrachia* sp habitat will be impacted by the construction of the pit and mitigation strategies have been identified, such as positioning the pit, tunnel, and waste landforms such that they minimise impacts to rocky ledges typical of the upper slopes of the range to enable habitat use and dispersal routes to be maintained. The Talga Range is a dominant topographical feature of the region, extending for more than 75km east-west and is breached by more than eight creeks and rivers, and the rocky slope habitat of the project within which *Quistrachia* was found is widespread. Moly Mines will undertake further surveys for *Quistrachia* sp. and other potential SRE groups, both within and outside of the direct area of impact, during Autumn 2008 to clarify distribution patterns. Further discussions will be held with WAM staff to ensure appropriate monitoring methodologies and sample identification.
DEC	SRE	The report identified two other species of conservation significance recorded in the project area. o Two Geophilomorph centipedes o Aquatic mollusc from the Genus *Gyraulus* Given the limited knowledge regarding identification and distribution of these taxa, DEC advises that further studies within and outside the project area will be required to clearly establish whether the mine will have a significant impact on these taxa.	Neither the PER or SRE report (Appendix G) considered the two Geophilomorph centipedes, or the aquatic mollusc from the Genus *Gyraulus,* of particular conservation significance. The two Geophilomorph centipedes were referred to as <u>possibly</u> possessing SRE attributes. However, Mark Harvey of WAM believes that not enough is known about the identification and taxonomy of these centipedes to be able to offer any more information than this. This is common for a large number of invertebrate taxa whereby the propensity to short-range endemism is not clear, and is not particular to these species. The aquatic genus *Gyraulus* is not one of the identified SRE groups considered during the survey, which targeted terrestrial (land) snails. Shirley Slack Smith of WAM has suggested that this aquatic genus is widespread. Moly Mines will continue undertaking surveys for *Quistrachia* sp. and other potential SRE groups both within and outside of the direct area of impact during Autumn 2008 to clarify distribution patterns. Further discussions will be held with WAM staff to ensure appropriate monitoring methodologies.

Submitter	Issue	Submission Issue	Response
DEC	SRE	The survey for SRE was undertaken during August/September which is the dry period in the Pilbara. It is recommended that further surveys are undertaken during March/April, ideally during wet conditions or following a rain event. It is noted that no trapdoor spiders were recorded in the current survey. Trapdoor spiders (Nemesiidae family) are likely to be SRE and are best trapped after a significant rain event. Previous surveys of the Pilbara region indicate that it would be unlikely that Trapdoor spiders would not be found within the Spinifex Ridge survey area (B. Durrant *pers. comm.,* 2007). Appendix E also indicates that members of the Nemesiidae family are all likely to be present (Table 10; York Main, *pers. comm.*).	Limitations of the SRE survey are included with the report (Appendix G), and the PER summarises the main findings. The SRE report (Appendix G) discusses the lack of mygalomorhs recorded during the survey, and includes a summary table (Table 10) of mygalomorph genera known from the region. Six families (including Nemesiidae) may occur over the area. The report concludes that it is highly likely that species of mygalomorph spiders occur over the project area. Moly Mines will continue undertaking surveys for *Quistrachia* sp. and other potential SRE groups both within and outside of the direct area of impact during Autumn 2008 to clarify distribution patterns. Further discussions will be held with WAM staff to develop appropriate monitoring methodologies.
DEC	SRE	*DEC RECOMMENDATION* The DEC recommends that further surveys for SRE are conducted within and outside the project area at the correct time of year in order to allow assessment of the impact of the mining development on these SRE in the local and regional context.	Moly Mines will continue undertaking surveys for *Quistrachia* sp. and other potential SRE groups both within and outside of the direct area of impact during Autumn 2008 to clarify distribution patterns. Further discussions will be held with WAM staff to ensure appropriate monitoring methodologies. SRE fauna and associated habitat are given appropriate consideration in the PER in regard to impacts and management. Habitats more likely to support short-range endemism have been identified, impacts to SREs considered, and management strategies developed. Moly Mines will liaise with DEC concerning the results of the Autumn 2008 survey and the implications (if any) of the survey results for ongoing management of the project.

Submitter	Issue	Submission Issue	Response
DOW	Groundwater	Environmental risks of developing the De Grey borefield and the need to determine Environmental Water Requirements of local ecosystems in order to minimise impacts on vegetation,	Hydrogeological analysis of the potential impacts of abstracting water from the De Grey borefield has demonstrated that the risks to ecosystems that rely on flows in the shallow alluvial layer (the upper 6 to 10m thick layer of sands and gravels associated with the active river drainage channel) are negligible. Water will not be abstracted directly from the shallow aquifer, but rather from a deeper, more permeable layer which is separated from the shallow alluvial layer by a layer of sandy clays, approximately 30m thick. The seasonal recharge of the shallow alluvial layer from infiltration of rainfall and runoff from areas higher in the catchment will far exceed any minor leakage that might occur across the clayey confining layer between the upper and lower aquifers. It is possible, but not likely, that some vegetation may extract water not only from the shallow alluvial system, but also from the deeper palaeo-channel system which occurs at depths of about 35m to 40m below the ground surface. In order to minimise the risk of affecting ecosystems which may depend upon water in this deeper aquifer, Moly Mines has adopted a groundwater management strategy that will ensure that the deeper system will remain constantly saturated. This will be achieved through conventional borefield design to minimise interference effects between bores, and also by designing sufficient redundancy into the pattern of bores to allow for some bores to be "switched off" during dry periods to ensure that drawdowns at specific locations (for example, near riparian systems) will not interfere with vegetation. Sufficient baseline monitoring, hydrogeological characterisation and model calibration have been completed by Moly Mines to enable it to develop a clear monitoring regime that will allow regular checking that the system is performing as expected. The monitoring system has been designed to produce information that is required to trigger the operational contingency measures (such as shutting down of selected bores) that have been designed into the water abstraction network.
DOW	Groundwater	Uncertainties in water management planning at the mine site due to the complex nature of local hydrology and hydrogeology	Surface and groundwater management plans have been prepared and are presented in the PER. The proposed management outlined in these plans allows for review of monitoring data to modify management as knowledge increases. It is considered that any uncertainties caused by the local hydrological and hydrogeological conditions have been accommodated by using conservative assumptions in the modelling used to assess potential impacts of mining.

Submitter	Issue	Submission Issue	Response
DOW	Groundwater	Competing uses for the water resources in the Canning Basin	The WINSITES database indicates there are 129 groundwater sites located within 50 km of the proposed Canning Basin Borefield. 43 of these bores are listed as operational and the majority are shown as being used for livestock watering. The livestock bores are fairly shallow (7 to 27m) and are completed in the Broome Sandstone or Tertiary sediments. The Spinifex Ridge project does not propose to draw water from the Broome Sandstone. In the area of the proposed Moly Mines Canning Basin Borefield, the deeper Wallal Sandstone has been identified as an aquifer capable of delivering the required supply. The Wallal Sandstone, at this location, is hydraulically separated from the overlying Broome Sandstone by the Jarlemai Siltstone. The only known groundwater user who abstracts from the Wallal Sandstone is BHP Billiton Iron Ore, which operates the Shay Gap Borefield for its Yarrie Minesite. Borefield modelling, design and operation includes consideration of potential impacts on this user.
DOW	Groundwater	The need to determine the environmental impacts of the proposed borefields.	Environmental impacts of the water supply options have been presented in the PER, with more detail provided in the appended technical documents and the subsequent detailed Canning Basin hydrogeology report forwarded to DOW. These reports form the basis of supporting documentation for the abstraction licensing required prior to commencement of borefield operation.
DOW	Groundwater	Groundwater monitoring will be required at a very high intensity to allow careful management of the Coppin Gap water pool. The monitoring program provided in the Management Plan (Appendix F part B Sections 3,4 & 5) should provide a suitable regime, but this will be reviewed at the stage of assessing groundwater licence applications. The monitoring program would be reported and audited annually.	Moly Mines agrees that the monitoring programme outlined in the Management Plan is an appropriate regime, and that this should be reviewed regularly based on interpretation of monitoring results through annual reports reviewed by DOW.
DOW	Groundwater	A groundwater licence would not be issued unless the Groundwater Licence Operating Strategy identified clear triggers and responses as agreed between DoW and the proponent. The operating strategy will need to include: water infrastructure plans, monitoring programs, contingency plans, a mine water balance and a water use efficiency plan including improvement targets.	Moly Mines will prepare a Groundwater Licence Operating Strategy in consultation with DOW as part of the licensing process for groundwater abstraction.

Submitter	Issue	Submission Issue	Response
Cons Council	Groundwater	Further, engineering interventions such as grouting the aquifer are suggested as a methodology to avoid these impacts. However, this proposal comes from an assumption that any unpredicted interchange between the aquifer and the pools is an undesirable scenario. Certainly when viewed only from the perspective of the impacts of the proposed mine during its ten year life this is true, but what about post closure? This interchange may be what keeps the pools semi-permanent after rains and grouting may permanently destroy this system.	Grouting is considered only as a contingency response, given that detailed investigations have shown that significant impacts are unlikely. Grouting has been selected as a management response, if required, to prevent pool water moving down gradient toward the pit. It is anticipated that the water which currently feeds Coppin Gap will still continue to enter the pool via the stream diversion.
Cons Council	Groundwater	The EPA must consider if this is an acceptable scenario and if irrigation or other methods could realistically mimic the natural water balance – or if this is a critical flaw of the project	The detailed investigations show that no significant impacts are expected. The requirement for supplementary water is a legitimate contingency response.
Cons Council	Groundwater	Moly Mines is pushing the boundaries of computer modeling by claiming that there is little risk that the significant modifications to this system will result in negative impacts	Modelling is an accepted tool for assessing impacts in situations like Spinifex Ridge. The modelling assumptions are conservative, biasing impact assessment toward a worst case situation. Validation and refinement of the model is an ongoing process as more information is gathered prior to and during mine development.
Cons Council	Groundwater	Infiltration [of metallic contaminants] to groundwater systems could occur through the pit.	In the vicinity of the mine, both during mining and after closure, it is proposed that the surface water diversion bunds will remain in place and the mine void will behave as a “groundwater sink”, with evaporative loss exceeding surface and groundwater inflow. The groundwater gradient will, therefore, be toward the pit and pit water quality will not affect other locations. No significant groundwater aquifers are connected to the area of the pit.

Submitter	Issue	Submission Issue	Response
Cons Council	Groundwater	Infiltration [of metallic contaminants] to groundwater systems could occur through leaching from the base of the tailings dam or waste dumps	The risk of groundwater contamination by metals arising from waste dumps or tailings storages is related to 1) the solubility in water of metals contained in tailings or waste rock and 2) the amount of water seepage, throughflow or runoff from waste dumps or the tailings storage. Geochemical testing completed to date (described in Section 3.4.2, Section 4.3.4 and Appendix M of the PER) has found that tailings and some waste rock from the Spinifex Ridge project contain higher concentrations of silver, copper, cadmium, arsenic, bismuth, antimony, selenium and molybdenum when compared to un-mineralised soils and bedrocks. However, the degree of metals enrichment was not marked. Although it is unlikely that the process wastes from the Spinifex Ridge operation will contain substantial amounts of soluble metals (given the relatively low enrichment of metals in waste materials and the generally low acid-generating capacity of the materials), Moly Mines proposes to minimise the risk of contamination to groundwater primarily by adopting operational practices and designs aimed at preventing seepage, throughflow or runoff from waste dumps and tailings storage facilities. Section 8.12.1.3 described the use of store and release cover systems and other measures which Moly Mines proposes to adopt to minimise the potential for throughflow in waste landforms. The filtered tailings storage system now proposed for the Spinifex Ridge project will reduce opportunities for leachate generation by reducing the amount of water contained in the stored waste and also by enabling progressive capping of the waste throughout the life of the project. Details of the monitoring systems and contingency measures proposed by Moly Mines to allow routine checking of the effectiveness of its management measures are described in the Groundwater Management Plan provided in Appendix F of the PER.
Cons Council	Groundwater	The commitments made to the De Gray River monitoring program are too loose	The De Grey monitoring program is appropriate to determine impacts of water abstraction from the palaeochannel aquifer. Refinement of the monitoring programme will be undertaken based on monitoring results and through the licensing process prior to commencement of abstraction.
Cons Council	Groundwater	The management plan should include collection of climatic and flow data and be coordinated with other users of the water resource.	Climatic and flow data will be collected as part of the monitoring programme that will be used to prepare annual aquifer performance reports, required as party of the abstraction licensing through DOW.
Cons Council	Groundwater	The management plan must include enforceable stop pumping triggers.	The management plan will be modified if required, and additional responses identified, through the abstraction licensing process required by DOW

Submitter	Issue	Submission Issue	Response
DEC	Groundwater	Reservations regarding the feasibility of grouting as a strategy to avoid or manage impacts on groundwater dependent systems. More detailed information regarding the details and feasibility of this strategy should be provided and case examples explained (preferably within the Pilbara or WA) to illustrate the successful use of grouting in long-term mining operations to separate aquifers in order to avoid impacts of dewatering on the surrounding aquifers.	The investigation work undertaken to date strongly suggests that mining will not impact on Coppin Gap pool to any significant extent and that grouting will not be required. However, it is plausible that permeable structures or units that have not been identified by current work may be encountered. It is proposed that should these structures exist and if they allow water to flow back into the mine void at greater than expected rates, a system of in-situ barriers be installed to restrict the flow, effectively isolating the mine void from the regional groundwater system. A grout curtain is one barrier option to restrict groundwater flow to the pit. Curtain grouting involves progressively drilling a single or multiple rows of closely spaced boreholes in sequence and pumping grout into the holes to meet a pre-determined closure criterion. The concept for grouting at Spinifex Ridge is outlined in Appendix I of the PER. Grouting is routinely used in applications where water movement has significant potential for catastrophic loss of human life (eg dam construction). In addition to their extensive use in these civil engineering applications, grout curtains are also widey used to limit groundwater movement in the mining industry, particularly where groundwater must be restricted from contact with Acid producing rock or contaminants. The Queensland EPA's guideline on Exploration and Mining in Water Courses (1995) (available at www.epa.qld.gov.au/publications) recommends grouting for control of seepage. Specific examples and descriptions of the use of grouting for water control in mining and related applications are described in the following papers: **Gabr, M.A., J.J. Bowders, and M.S. Runner**. 1994. *Assessment of acid mine drainage remediation schemes on groundwater flow regimes at a reclaimed mine site. p. 168-177. In: Proceedings, International Land Reclamation and Mine Drainage Conference, 24-29 April 1994*, USDI, Bureau of Mines SP 06B-94, Pittsburgh, PA. **Houlsby, A.C.** (1990) *Construction and Design of Cement Grouting: A Guide to Grouting in Rock Foundations*. A Wiley-Interscience Publication. **ICOLD** (1985) *Filling Materials for Watertight Cutoff Walls. International Commission on Large Dams*, Bulletin 51.

Submitter	Issue	Submission Issue	Response
DEC	Groundwater	The proponent needs to clearly demonstrate, using relevant data to support the statements, that drawdown of the deeper semi-confined aquifer in the De Grey borefield will not affect the shallow aquifer and therefore not impact on the vadophytic or phreatophytic vegetation.	The De Grey borefield is planned for use as a start-up construction water supply and a peak demand water supply once the project is operating at full capacity. The field investigation and groundwater modelling completed to determine the groundwater resource associated with the palaeochannel and De Grey alluvial system has demonstrated that a water supply of 4 GL/annum is sustainable from the palaeochannel aquifer system for an operating life of at least 12 years. Full details of the hydrogeological assessment, including assumptions used in estimating sustainable yields and results of a range of sensitivity analyses were provided in Appendix J of the PER. The estimated sustainable water supply capacity is considered conservative, as the hydrogeological analysis assumed that there would be no recharge from the De Grey River to the palaeochannel system from which water will be abstracted. The aspects of the conceptual hydrogeological model that are less well understood or of comparatively lower confidence have been accounted for by the adoption of conservative values. The most significant of these is the recharge model, which does not include any provision for the very large volumes of water that will recharge the shallow aquifer during annual flood events. Moly Mines has committed to an operating strategy that will ensure that: • Water levels within the upper aquifer in the vicinity of the De Grey are maintained within natural variation; and • The lower aquifer remains fully saturated. In the event that drawdown within the upper aquifer as a result of pumping from the deeper palaeochannel sands is observed to be excessive (indicating more direct hydraulic connection between them) , a seasonal water management strategy will be implemented. Sufficient redundancy has been incorporated in the borefield design to enable selected bores to be turned off during dry periods to avoid drawdown effects in specific locations. A groundwater monitoring program (PER, Appendix F - Environmental Management Program) has been designed to ensure that the groundwater resource is able to be managed sustainably. This will be achieved by installation of monitoring bores within the palaeochannel aquifer, alluvial aquifer (DeGrey River) and surrounding basement. In addition to the monitoring bores, there will be monitoring of semi-permanent pools within the De Grey River, nearby pastoral bores, subterranean fauna sampling and phreatophyte monitoring. Data collected from the monitoring network will be utilised to further calibrate the De Grey numerical model. This will allow adaptive management of the borefield with establishment of individual bore abstraction rates, trigger water levels and a seasonal abstraction strategy.

Submitter	Issue	Submission Issue	Response
DEC	Groundwater	The proponent should address the cumulative impacts of the drawdown at the proposed borefield at De Grey, with the existing borefields at De Grey on river ecosystem and the Port Hedland town water supply.	The proposed Moly Mines De Grey Borefield is eighty kilometers from the location of the (proposed) Port Hedland town water supply on the De Grey River. Given the distances involved and the nature of the aquifers, the Moly Mines Borefield will not affect the Port Hedland town Borefield, and there will be no measurable cumulative impact. If water abstraction by other users were to affect water levels in the De Grey borefield region, the cumulative effects would be evident through the detailed environmental monitoring program that will be implemented for the Spinifex Ridge project. The management approach – and the management responses - proposed by Moly Mines aim to maintain saturated conditions in the deeper alluvial aquifer from which the De Grey borefield will draw water. This objective is absolute, not relative: if other factors (such as climate variation or water abstraction by others) contribute to the cumulative demand on water from the palaeochannel, the requirement to maintain saturation does not change.
DEC	Groundwater	The proponent must clearly explain and document the potential impacts of the mining and dewatering activities on the groundwater and surface water (and associated ecosystems) within all the impact areas (project area and borefields). This should include the impact of groundwater abstraction on the vegetation.	Potential impacts sections are included for all environmental factors in the PER and detailed discussion of management to address potential impacts outlined. In addition, the Environmental Management Programme includes issue specific management plans that cover all of the major environmental issues. The potential for mining and dewatering activities to affect groundwater is addressed in the Groundwater Management Plan. The plan details the intended monitoring and mitigation measures to be undertaken in the event that trigger values are exceeded or adverse impacts are detected.
DEC	Groundwater	The PER should address the question of the impact of not backfilling the pit on water quality within the pit and how this will affect the surrounding aquifer, including the De Grey River aquifer. This is particularly important as blasting will further fracture the aquifer and therefore potentially render the surrounding rock more transmissive. The proponent needs to indicate the final pit landscape and give evidence to indicate that the aquifer will not be polluted by changes in water quality in the pit over time.	With the closure option presented in the PER, the pit will act as a groundwater sink for the minor aquifers in the immediate area. Impacts of blasting on aquifer transmissivity will be extremely localised given the compact nature of the surrounding rock mass. The De Grey aquifer is extremely remote, separated from the pit by the Talga Range. There is no mechanism for pit water to impact the De Grey aquifers.
DOIR	Groundwater	Although other users are listed for the water sources Moly Mines will utilise, there is no indication whether there will be any impacts on public water supply in the area	No public water supply is sourced from areas near where Moly Mines plan to abstract water.

Submitter	Issue	Submission Issue	Response
DEC	Groundwater	Although the PER indicates that the predicted changes to the hydrology at Coppin Gap are minor (except in low rainfall years) (p 207), this does not appear to take into account impacts such as the potential reduction is groundwater seepage, particularly at the southern end of the gorge. This seepage not only maintains water levels in the pool but also creates constant movement and refreshment of water, preventing stagnation. It also creates riffle habitat (water flowing over rocks) which is critical to a component of the fauna. DEC requests that the proponent demonstrate that low flow levels, to maintain these ecological functions, will be maintained throughout the dewatering activities.	Coppin Gap does not meet the criteria normally accepted as defining "riffle habitat" The Commonwealth Department of Environment and Water resources describes a riffle habitat as "an area of broken water with rapid current that has some cobble or boulder substratum". Riffle habitats are lotic (flowing) systems. Coppin Gap does not show the attributes of a riffle habitat. It does not show continuous rapid flow. On two of the occasions when Moly Mines' consultants surveyed the aquatic systems at Coppin Gap only discontinuous pools of water were present. On one occasion, there was virtually no water in the pools at the gap: anecdotal information obtained from local residents suggests that the pools at the Gap dry up entirely in some years. The aquatic biota identified in Coppin Gap were not characteristic of lotic systems. The groundwater model predicts a modest decrease in seepage flow to Coppin Gap from 110 to 95 kL/d in average rainfall years, from 120 to 115 kL/d in wet years, and a more marked decline in dry years. In the PER, Appendix F (Environmental Management Program), it is proposed that the Coppin Gap pool be artificially recharged by mine supply water if excessive variation in the pre-mining hydrological regime occurs. It would not be appropriate to seek to maintain continuous rapid flow through Coppin Gap, as this is not the flow regime that currently exists.
DOW	Groundwater	In accordance with the draft Statewide Policy No 15 – Moving Water Between Management Areas, the proponent needs to demonstrate that no only are there not environmental impacts as a result of transferring the between groundwater management areas, but also demonstrate there are no social or cultural impacts.	Moly Mines through its consultants has tried unsuccessfully to access the draft statewide policy but have been advised that it is not available at this stage. Moly Mines believes that the use of Canning borefield water for the project is acceptable on environmental, social and cultural grounds. Stakeholder consultation, with regulators and the local community, including the indigenous community has outlined the intention to use this water source, and no concerns have been expressed regarding moving water between management areas.
DOW	Groundwater	The EPA should consider specific management measures to address: The identified risk that dewatering will impact on water levels in Coppin's Gap Pool, Determination of the Environmental Water Requirements for the Gap pools and groundwater dependent ecosystems, and use of these to define specific triggers and contingency actions to manage drawdown impacts on these sites; the environmental and cultural acceptability of supplementing the Coppin's Gap pool using a range of sources	Issues are appropriately addressed in the PER and can be managed through the actions outlined in that document and the appended EMP; as well as the approvals processes required through DOW and DOIR
DOIR	Groundwater	Monitoring of groundwater chemistry in TSF monitoring bores should be conducted quarterly at a minimum.	The monitoring programme for the tailings area will include appropriate quarterly monitoring

Submitter	Issue	Submission Issue	Response
DOIR	Groundwater	Groundwater monitoring bores should be placed around WRD1 and WRD2 with consideration given to direction of groundwater flow to detect any acidic or metalliferous drainage	Groundwater bores suitable for monitoring any acidic or metallic drainage will be established and monitored regularly
DOW	Water Management	The DoW also recommends that the Water Management Plans for groundwater and surface water are integrated under a single Water Management Plan that addresses the respective issues and points raised above in further detail. As part of this Plan a supplementation strategy for maintenance of Coppin's Gap Pool should be included.	MM will modify to the Management Plans based on discussions and input from DOW and other stakeholders.
DOW	Surface water	Monitoring of impacts on the Gap pools from altered surface water regimes, particularly relating to any increased sediment loading and changes to water quality,	Surface water monitoring of Coppin Gap pool is undertaken on a monthly basis for pH, EC, TDS, TSS, major cations, major anions and metals. The surface water monitoring will be reviewed during the detailed design phase of the operation with additional locations and monitoring parameters specified. (Spinifex Ridge Molybdenum Project: Public Environmental Review. Appendix F*, 4.5 Monitoring*)
DOW	Surface water	Uncertainties in water management planning at the mine site due to the complex nature of local hydrology and hydrogeology,	Surface and groundwater management plans have been prepared and are presented in the PER. The proposed management outlined in these plans allows for review of monitoring data to modify management as knowledge increases.
DOIR	Surface water	The extent of flooding caused by a 1 in 100 year, 72 hour rainfall event should be shown in a figure, for all creeks, and the creek diversion, in the project area. This figure should also show direction of creek flows, for example it is unclear whether the creek W of WRD1 & 2 will flow towards Kitty's Gap, or into the WRD.	The 1 in 100 year floodplains in Kookenyia Creek (downstream of Kitty's Gap) and Coppin Creek (upstream and downstream of Coppin Gap) are shown in the PER Appendix H, Surface Water Assessment. WRD1 is designed to be built to the western extent of the valley draining into Coppin Creek. WRD1 has been kept out of the catchment for Kitty's Gap. A single, revised, figure showing floodplains, surface water flows and the proposed locations for mining infrastructure is attached.
DOIR	Surface water	All permanent infrastructure (e.g. TSF, WRDs) should be outside the area flooded by 1in 100, 72 hr rainfall event, and armoured to withstand a potential maximum flood event (based on a geotechnical assessment of design), to ensure stability at closure. If the creek diversion will remain post-closure, the extent of flooding from this drainage line also needs to be considered. A figure showing the extent of the areas flooded by a 1in 100, 72 hr rainfall event, in relation to project infrastructure, should be provided.	A new figure has been drawn showing the floodplains and the proposed locations for mining infrastructure and is attached (see Figure 2). Permanent infrastructure such as the TSF, waste rock dumps, plant site, camp site and the open pit are located outside the main 100 year ARI floodways of Coppin and Kookenyia Creeks. Water in the flood fringe areas may pond against some structures, but with no erosive force. At these locations, bunding shall be used to divert flows downstream and armouring or other erosion protection will be provided as required. The diversion channel has been designed to cope with a 100 year ARI flood along Coppin Creek, with engineered bunding installed to ensure water is diverted down the channel and through Coppin Gap.

Submitter	Issue	Submission Issue	Response
DOIR	Surface water	Specific concerns are raised regarding: 1. W margin of WRD3 may be impacted by flooding of the creek diversion channel; 2. E margin of WRD2 may be impacted by flooding of Coppin Creek; 3. W margin of TSF impacted by flooding of Kookenyia Creek. If location of the TSF in this area cannot be avoided, geotechnically designed armouring to withstand a potential maximum flood will be required; 4. Topsoil stockpiles should be located outside the area flooded by 1in 100, 72 hr rainfall event, or appropriate bunding installed. Topsoil stockpiles 2 and 4 may be impacted by flooding of nearby creeks; **5.** The NE corner of WRD3 extends marginally over the creek to the N of the dump, the dump footprint should be expanded elsewhere to avoid this impact.	1. The western margin of WRD3 was incorrectly shown to intrude into the diversion channel. WRD3 is set back from the diversion channel and will not be impacted by this flow (Fig xx) 2. The eastern side of WRD2 above the diversion bund has been located outside of the floodplain. 3. The revised TSF has been positioned outside of the Kookenyia Creek floodplain 4. Topsoil stockpiles have been located outside 100 year ARI floodways. The potential for erosion will be considered for all topsoil stockpiles and appropriate bunding established. 5. The north east corner of the WRD3 footprint has been modified to ensure it does not intersect the creek flowing to the north of the dump.
DEC	Surface water	The actions to be taken to avoid significant permanent damage to ecosystems (particularly Coppin Gap) should be clearly documented and the timing of implementing these actions discussed.	Potential impacts sections are included for all environmental factors in the PER. The PER provided detailed discussion of management measures proposed to address the potential impacts identified in the PER. The Environmental Management Programme provided in Appendix F of the PER includes issue specific management plans that cover all of the major environmental issues.
DEC	Surface water	DEC requests that a Surface Water Management Plan be developed for the project area and associated borefields.	A Surface Water Management Plan has been prepared and was included in the Environmental Management Programme which was Appendix F of the PER. The plan covers the potential impacts on surface water of the mine infrastructure around Spinifex Ridge, in particular, the diversion channel, open pit and waste dumps south of the ridge, and the tailings storage facility north of the ridge. The diversion channel, which is required to divert Coppin Creek around the open pit, is designed to minimise impacts on natural surface water drainage through the catchment and Coppin Gap.
DOW	Surface water	Water to maintain Coppin Gap pool levels should be sourced from the pit dewatering as a preference. Recirculation needs to be considered in maintaining pool levels	Pit dewatering is one potential source of water for supplementary water for Coppin Gap pool if any is required. However the decision on which water to use would be based on a comparison of water quality. Canning borefield water for example, is very good quality water and may be more suitable.
DOW	Surface water	A number of water volume and quality criteria additional to those included in the draft Management Plans are required to tightly conserve the environment of this pool. The EPA should	The monitoring proposed in the Groundwater Management Plan is designed to gather appropriate information which will be reviewed and reported annually to DOW. A more formal project may be initiated during the detailed design phase, if the proposed monitoring programme has any

Submitter	Issue	Submission Issue	Response
		provide direction to the proponent and to regulatory agencies on the degree of management of Coppin's Gap which it sees as acceptable, given uncertainties in the hydrology and long-term climate. The Department recommends that a water level and chemistry monitoring project should be established using Kitty Gap pool as an analogue of the Coppin's Gap pool.	identified deficiencies.
DOW	Surface water	Works pertaining to the upstream and downstream Bunds required for diversion of Coppin Creek will require a permit to modify bed and banks under the *Rights in Water and Irrigation Act* (1914) including consideration of environmental social and cultural impacts and possible alterations to flows	Acknowledged. Moly Mines will apply for the appropriate permits for the project.
Cons Council	Surface water	On pg 207 the proponent claims that mine dewatering drawdown on water levels in Coppins Gap will be within the limits of a theoretical model that includes a made up scenario where the catchment experiences a number of drought years, and that therefore the drawdown is acceptable. This is a ludicrous construct that has absolutely no bearing on real life environmental impacts.	No data exists on natural variations in water levels at Coppin Gap. As a result, the only way to simulate potential impacts is to develop a model. The modelling undertaken, and documented in detail in Appendix I of the PER, looked at a range of climatic scenarios to ensure that impacts in the Coppin Gap area were addressed for all possible situations. The detailed report indicates that impacts from mining are within the range of natural variation that would be expected at Coppin Gap
Cons Council	Surface water	The question that needs to be asked is how much drawdown is ecologically acceptable? If the mine will dry out the semi-permanent pools in Coppins Gap, this is not an ecologically and socially acceptable scenario.	Moly Mines agrees that drying out of the pools more frequently than under natural conditions is not acceptable. The modelling undertaken indicates that the pools will not dry out the pools. However, despite this, Moly Mines has identified short term and long term contingency responses to ensure that this does not happen.
Cons Council	Surface water	It would seem that proposed management interventions are largely theoretical and hence a distraction from the fact that the mine will permanently alter the water balance in Coppins Gap	Detailed investigations undertaken to date have indicated that the mining impact will not significantly impact the water balance of Coppin Gap. Suitable management interventions have been identified for the situation where the monitored impacts differ from the expected impacts.
Cons Council	Surface water	Creek diversion is unlikely to provide the same flows into Coppin Gap as existing creek	The diversion channel has been designed to handle the same water volumes as the existing creek system. Although there will be a small reduction in the overall catchment, corresponding to the area of mining operations, this is a small section (~3%) of the catchment. As a result the reduction in stream flow is not seen as significant.
Cons Council	Surface water	Moly Mines should revegetate diversion channel rather than wait for this to occur naturally	The diversion channel design has been modified to include areas of low flow velocity which will be suitable for rehabilitation. Translocation of material from the section of Coppin Creek which will be mined is currently being considered for these areas.
Cons Council	Surface water	The proposed mine will permanently alter the water flows, water velocities and sediment flows into Coppins Gap in such a way that long term management after the mine life will likely	Detailed investigations undertaken to date have indicated that the mining impact will not significantly impact the water balance of Coppin Gap. Suitable management interventions have been identified for the situation where the monitored impacts differ from the expected impacts.

Submitter	Issue	Submission Issue	Response
		be required to maintain the values of Coppins Gap	These management responses are expected to prevent the requirement for ongoing long term management post mining
DEC	Aquatic Ecology	A consolidation of available survey information is required for the Coppin Creek and Coppin Gap to determine why there is such a discrepancy between the surveys undertaken by the proponent's consultant and those undertaken as part of the PBBS.	Moly Mines (through its consultant Outback Ecology) has requested access to the PBBS survey data, which are held by the Department of Environment and Conservation and are not generally available to the public. To date, the DEC has not granted Moly Mines or its consultants access to the PBBS data. However, Moly Mines will continue to pursue access to this data to allow consolidation of information. Discrepancies in surveys may be attributable to the high variability of macroinvertebrates in temporary systems. The distribution of aquatic invertebrates is correlated with hydrology (refer to Boulton *et al*. 2006). Because of their lifecycles the presence of macroinvertebrates in aquatic systems is highly variable (Hynes 1970).
DEC	Aquatic Ecology	DEC notes that the proponent's consultants identified the vast majority of the macroinvertebrates to only genera or higher taxanomic level. This is not considered adequate as full assessment of species diversity, distribution and conservation significance cannot be undertaken at this level of taxonomic resolution.	Moly Mines' objective is to conduct the Spinifex Ridge project in a way that conserves biological diversity and maintains ecological integrity (PER, Section 7: Environmental Principles, Sustainability and Management, Table 7-1, 3). Baseline studies carried out in support of these objectives do not necessarily require identification of macroinvertebrates to species level. Conservation of biological diversity can be assessed using surveys involving identification at lower taxonomic level and not always species specific. For example, in studies of rivers in north-western Australia, Kay *et al.* (1999) successfully used family-level identifications to demonstrate that the majority of the macroinvertebrate species encountered were widespread. Numerous studies based on family level have successfully described biogeographical patterns. In studies where the taxonomic level was reduced from species to family level the patterns in macroinvertebrate community were still evident (refer Kay *et al*. 1999). While every effort is made to identify macroinvertebrates to species level, the conservation significance, biological diversity and ecological integrity can still be undertaken at the taxonomic level of genera.
DEC	Aquatic Ecology	The PER and/or Attachment K do not contain any information regarding surveying and collecting vascular aquatic plants. While species diversity may be very low for ephemeral creeklines, the omission of vascular aquatics is significant.	Vascular aquatic plants were included in the survey. Apart from the Charales (Algae), no vascular aquatic plants were observed at the sampling sites during either sampling event. Macrophytes in temporary systems display risk-spreading strategies and their presence is dictated by hydrological regimes (Brock 1998). Depending upon the prevailing environmental conditions at the time of the survey, it is entirely possible that no vascular macrophytes were present during the aquatic surveys.
DEC	Aquatic Ecology	The sampling and identification of material for Charales does not appear to be adequate compared with the recent surveys	Moly Mines has not yet been granted access to the PBBS data held by the DEC. Without access to the PBBS data it is difficult for Moly Mines to compare the results of its surveys with those of the

Submitter	Issue	Submission Issue	Response
		undertaken during the PBBS.	DEC. The distribution and abundance of charophytes is determined by abiotic factors (Steinman *et al.* 1997). Therefore, any differences between the species collected during surveys conducted for the Spinifex Ridge baseline surveys and those identified during the PBBS may reflect the influence of factors such as flow rates, water levels and other abiotic environmental factors.
DEC	Aquatic Ecology	Both the sampling adequacy and quality of identifications are highly questionable for charophytes	Moly Mines is confident of the integrity and reliability of its survey results. Sampling for and identifications of the charophytes were conducted by experienced personnel with specific research background in charophytes.
DEC	Aquatic Ecology	The PBBS recorded ca. 15 species of filamentous algae from Coppin Gap pool alone. This is almost double the number of taxa recorded from the proponent's entire baseline study (Appendix K, Table 27 p 116). This is based on two samples in spring 2003 and autumn 2004. Direct comparisons are difficult since the collection methods may differ, but it strongly indicates the sampling or identifications has not fully captured the flora species present.	The distribution of algae and cyanobacteria in aquatic systems, are highly variable, especially in ephemeral or temporary systems. The occurrence of algae and cyanobacteria in aquatic systems is strongly influenced by abiotic parameters. Seasonal succession of different divisions within a water body is widely recognised. The variability of algal communities in temporary systems is acknowledged by Australian phycologists and limnologists. In the absence of the PBBS data, Moly Mines is unable to make any direct comparison to explain differences in the numbers of species found during the surveys. The sampling methods used by Moly Mines' consultants for the survey of microalgae and cyanobacteria in Coppin Creek and Coppin Gap were consistent with standard phycological sampling protocols. A number of habitats were sampled. Moly Mines surveys made good use of information on diatoms found in aquatic systems. Diatoms are the dominant component of periphyton in lotic systems and therefore one of the main primary producers. They are considered one of the most valuable monitoring tools in aquatic systems and their analyses requires skills in both technical and taxonomic aspects. They are true indicators of ecological integrity. They are a more reliable taxonomic group to use in the study of the ecological integrity of a system, as they do experience sudden crashes as do other forms of algae, such as filamentous chlorophytes or cyanobacteria. Forty-six diatom taxa were identified from the samples and the majority were identified to the highest taxonomic level (species). DEC has provided no indication on how this aspect of Moly Mines aquatic surveys compares with the findings of the PBBS. Diatom data could be used as a valid basis for comparing Moly Mines surveys with other study sites including other regional sites included in the PBBS.
DEC	Aquatic	The data in Appendix K is only presented at the genus level	As yet the Australian microalgae, other than the diatoms, have not been fully investigated to

Submitter	Issue	Submission Issue	Response
	Ecology	(Table 27). Species level identifications should be made where possible in order to assess the significance of the flora on a local and regional scale	species level (McCarthy & Orchard, 2007). Because of this and the high level of morphological variation and phenotypic plasticity in the Algae and Cyanobacteria, identification to species level is, at present, unreliable. The distribution of algal and cyanobacterial "species" in WA is therefore still unknown. Because of the lack of taxonomic information, the use of species level identification may result in many algal biota being incorrectly classified as "rare". The classification to genera is sufficient to assess the significance of the alga and cyanobacteria in the study sites.
DEC	Aquatic Ecology	It is unclear whether filamentous algae identifications were based on specimens derived from the periphyton scrapes, algal mats or both. The data presented in Table 27 only refers to benthic mats. Future methods need to include this information as other taxa may have been recorded if attached algae were identified from other substrates such as wood, rock, and as epiphytes on submerged vegetation.	As stated in the PER, algae were sampled from various substrates. Benthic microbial mats (BMCs) is a term that is often used synonymously with algal mats that are lithophytic, periphytic or benthic. Both periphytic and benthic microbial mats often display close community assemblages and are used interchangeably. Some of the mats were collected from dry sites and therefore they could have been a floating form that settled with the drying of the creek. In future, more specific terms will be used to acknowledge the wider audience.
DEC	Aquatic Ecology	It is recommended that a data review and risk assessment be undertaken to identify the potential impact of the mining operation on the aquatic ecology and biodiversity of Coppin Creek and Coppin Gap. This should include comparison with PBBS data and other available data and the results of further in-depth surveys as appropriate. Further surveys may be required in some cases to adequately characterise the biota of Coppin Creek	A review of available data and assessment of the potential impacts of mining on the aquatic ecology and biodiversity of Coppin Creek and Coppin Gap were provided in Sections 4.6.3 and 8.7 of the PER, respectively. The impact assessment concluded that the project could be implemented so as to maintain the integrity, ecological function and environmental values of Coppin Gap (refer Section 8.7.2.5 of PER). The Environmental Management Program provided in Appendix F of the PER provided individual management plans and contingency actions for management of groundwater, surface water and Coppin Gap. Data from the PBBS have been requested from the DEC, but this information has not yet been made available to Moly Mines.
DEC	Aquatic Ecology	Identification of invertebrate taxa and other biota should be undertaken to species level, wherever possible.	Taxonomic identifications were taken as high as possible at the time of sample analyses by experienced personnel. In the absence of appropriate literature the suffix sp. has been used and if there is more than one species a number added. This system adequately addresses the principal of conservation of biological diversity and ecological integrity and is consistent with the approach recommended in relevant scientific literature.
DEC	Aquatic	The PER does not clearly address the risk and conservation significance of potential impacts on the diversity and function	Because of the extremely variable climatic regime in the Pilbara, the aquatic systems in Coppin Gap are adapted to wide ranging fluctuations in hydrologic flows. The seasonal change in

Submitter	Issue	Submission Issue	Response
	Ecology	of aquatic ecosystems and communities of Coppin Gap. The proposed mining activities (particularly dewatering) have the potential to significantly change the water levels and therefore change or eliminate certain microhabitats within the Coppin Gap ecosystem (eg. Riffle habitat). When it is established that adequate sampling has been undertaken, the proponent should prepare a risk assessment to establish the potential risk and conservation significance of impacts of the mining activities on the aquatic ecology, species and assemblages of Coppin Gap.	biodiversity at Coppin Gap is one reflection of the ecosystem response to environmental variability. Consequently, the risk to system diversity and function that could arise in the unlikely event that dewatering results in some discernible change to surface or groundwater flows is considered to be low.
DEC	Aquatic Ecology	It is requested that further information is provided on the methods that would be used to "*supplement the water level with appropriate quality water*" (p 208). This should include, but not be limited to, information on the impacts of supplementing water on the receiving environment, the duration of water supplementation, and the volume/rate of water supplementation.	Water supplementation will only be required if water levels in the Coppin Gap pool fall in excess of natural variation levels. It is expected that this course of action will not be required based on the detailed investigations undertaken to date. The process for supplementing water, if required, would be discussed with DOW and DEC. Without knowing the extent of any change in water level outside normal variation, it is impossible to specify volume required and duration, however it would be expected to be relatively minor. The process of adding the water would be designed to achieve the purpose of the addition ie to maintain the environmental values of the pool.
DEC	Aquatic Ecology	Further information needs to be provided on the management and construction of the Coppin Creek diversion channel, especially the revegetation of the channel. Information including how the alluvium will be 'harvested' from the existing creek and deposited into the new creek should be provided. Additionally, methods for monitoring sediment loads in the new creek need to be discussed and the potential impact of these sediments on the Coppin Gap wetland-pools identified and appropriate strategies put in place to manage the impacts. Information on the rehabilitation proposal to 're-create' the Coppin Creek ecosystem through the creek diversion is also required to assist in assessing the feasibility of the rehabilitation/reconstruction proposal. DEC requests that the proposed Coppin Gap Management Plan is available for review well prior to commencement of site works.	The diversion channel will be constructed in competent rock for a significant portion of the initial length. This will use conventional mining techniques to create the channel consistent with the channel design provided in the PER. Some sections of the channel broaden out into existing drainage lines and will provide areas of low flow. A range of options will be reviewed to establish riparian vegetation along the diversion channel. One option for establishing vegetation along the diversion channel is to translocate vegetated alluvium from the creek section within the pit area using broad bucket front end loaders. This technique has been used successfully in other rehabilitation applications. The potential impact of sediment on Coppin Gap pool has been considered in the PER. The vortex effect created by the Gap results in sediment being deposited upstream and downstream of the Gap pool, and is evidenced yearly by sandbars. The flows through the Gap will not change significantly, therefore there is no expectation that sediment deposition regimes will change. The Coppin Gap Management Plan was appended to the PER and discussion will be held with DEC to review and modify the Management Plan as appropriate.
DEC	Aquatic	Hydrological modelling indicates that dewatering will have an impact on Coppin Gap water levels, particularly when	Modelling has indicated that there will be no significant impact on Coppin Gap water levels outside the normal range except in extended drought situations. Trigger levels will be determined

Submitter	Issue	Submission Issue	Response
	Ecology	coinciding dewatering with drought. It is requested that clearer, more detailed information be provided on the management strategies that will be implemented to address this impact. For example, the identification of trigger levels to be used to initiate a management response, the preferred response strategy, alternative response strategies, and follow up monitoring. This detail should be included in the Coppin Gap Management Plan, however, it should also be provided during the assessment in order to provide justification that an acceptable response/management strategy can be implemented if required. Additionally, information is required regarding the type of response strategy (eg. re-injection, surface discharge, grouting – p 246) that will be implemented under a defined set of conditions is required. DEC has previously identified risks associated with the discharge of water at the surface and creating an artificial environment.	based on the maximum amount of available information with data gathered over the next two summers supplementing existing information. The initial response to reduced levels, if required, will be determined in consultation with DOW and DEC and is likely to involve provision of supplementary water at a suitable rate to minimise an adverse impacts of creating an artificial environment.
DEC	Aquatic Ecology	The potential environmental impacts of grouting on subterranean fauna and other local biota such as vegetation should also be addressed.	The chemical composition of grouts varies, depending upon the grouting application and the local ground conditions where the grout is to be used. Typically grouts consist of a cement, with or without additives, such as bentonite (a clay mineral) or other gelling or binding materials. Once injected, grouts are relatively inert: in order to perform their function in controlling groundwater seepage it is important that the grout not be very water soluble after injection. Consequently, grouts are chemically benign and not likely to affect biota.
DEC	Subterranean Fauna	The boundaries of the project area are not well defined within the Subterranean Fauna Survey report which makes it difficult for the reader to determine the actual area surveyed. It would appear that the plan only covers the area directly affected by the pit and does not consider the drawdown area associated with dewatering or areas identified for the TSF waste dumps as potential 'impact areas'.	A map indicating the project area was presented in the PER. A new map is provided in this report (refer Figure 3). This figure shows that the locations sampled for subterranean fauna included areas directly affected by pit development, as well as surrounding areas which could potentially be affected through dewatering activities. The revised tailings management and storage strategy (stacking of filtered tails) makes it unlikely that subterranean fauna will be affected by the surface placement of tailings.

Submitter	Issue	Submission Issue	Response
DEC	Subterranean Fauna	The sampling that has been undertaken to date appears to be insufficient to fully characterise the stygofauna present	As stated in Appendix E in the PER – Baseline Subterranean Fauna Survey, section 5.1: " the adequate sampling of the areas has not been achieved to date, therefore further sampling of the three areas is required". Further sampling of the areas has since occurred. Sampling was conducted in August 2007 at De Grey and Spinifex Ridge and the samples are being processed.
DEC	Subterranean Fauna	The results of the Canning Borefields stygofauna surveys should have been included in the PER	Appendix E – Baseline Subterranean Fauna Survey states that it is a final draft to be updated with information from Canning borefield. This sampling has occurred, The Canning borefield stygofauna report was submitted to the DEC on 18th September 2007. No stygofauna were found in the survey sampling for the Canning borefield

Submitter	Issue	Submission Issue	Response
DEC	Subterranean Fauna	The aquifers to be impacted upon through processes of dewatering should be identified and related to the aquifers in which the stygofauna have been recorded. Further information is required regarding the potential loss of habitat in the context of the total potential stygofauna habitat (eg lowering of water table/reduction in size of the aquifer relative to depth of aquifer	The main aquifer to be impacted upon in a way that may be relevant to stygofauna is the flow system through *in-situ* calcretes formed over ultramafic rocks in or near the proposed pit location. This system is more likely than other water bearing layers to experience changes that would affect local populations of stygofauna because the aquifer is relatively thin (in the order of 10 m thick), and because parts of the system lie within the drawdown cone that will result from pit dewatering. Neither the extent of potential habitat loss, nor the total extent of habitat in the water-bearing calcrete can be easily estimated, because the calcrete in-filled drainage lines are relatively small scale features that can not been mapped in detail. A very conservative estimate of habitat loss would be to assume that any saturated zone, to a nominal depth of 10m and lying within the ultimate 1m drawdown contour surrounding the pit will constitute potential stygofauna habitat which will be lost. This approach to estimating habitat loss is unrealistically conservative, as the calcrete infill zones occur in localised areas within the 1m drawdown contour, and not throughout the pit dewatering cone of depression. (The 1m drawdown contour was selected as an arbitrary, but conservative, value that corresponds to a change that would equate to less than about 20% of the aquifer thickness.) The results of stygofauna surveys in the pit area to date have found a total of 24 species. Of these, only one has been identified as potentially of conservation significance. The species, *Leicandona quasihalsei*, has previously been found at one other location in the Pilbara (single recent record of a male specimen.) The distribution of this species is not well understood at the time of writing. Apart from the area immediately within the pit footprint and the immediately surrounding the pit, it is not proposed to allow uncontrolled drawdown in the upper alluvial or calcrete aquifers at Spinifex Ridge. If excessive drawdown (greater than natural variation) within the upper alluvial or calcrete aquifers is monitored during mining, artificial recharge of the aquifer(s) with water of equivalent quality could be initiated. Given that the water volumes required for dewatering are expected to be modest (5 to 20 L/s) it follows that the rates required to manage water levels within a required range, will not be excessive and well within the surplus capacity of the mine water supply (1 to 4% of total mine supply).
DEC	Subterranean Fauna	The proponent needs to address the potential impact of the >5m drawdown on the two stygofauna species of identified conservation significance	Moly Mines no longer proposes to use Woodie Woodie as a water supply source. Therefore there will be no impact on the aquifer.

Submitter	Issue	Submission Issue	Response
DEC	Subterranean Fauna	DEC has a number of comments and questions regarding the species identified in the stygofauna sampling to date (outlined in detail on page 6 of response)	Point 2A: "The majority of stygofauna recorded during the surveys conducted to date have a known distribution outside Woodie Woodie Borefield, according to current knowledge". The statement was made in relation to the surveys undertaken at that point and is deemed appropriate to the findings. The distribution ranges of the taxa identified was confirmed by experts in the field. Point 2B: The statement pertains to the majority of the species identified in the De Grey Borefield survey and identifies that not all the specimens could be identified to species level by the expert taxonomists engaged. The statement may read clearer as the majority of the stygofauna species identified from the De Grey Borefields are considered common within the Pilbara. Point 2C: Reference to the distribution of families is common in the literature and in reference to the biodiversity of the area. The survey acknowledges that unidentified and possibly new species have been found and further sampling will continue. Point 3: Woodie Woodie is no longer an option for water supply and the area will no longer be impacted. Point 4: Section 8.2.2.2 This statement is made in relation to the data collected to date. The sampling is ongoing. The species identified in this survey have been found to occur elsewhere in the locality or region. Refer to Appendix E, Table 7 and Table 8.
DEC	Subterranean Fauna	Further detailed stygofauna surveys are required both within and outside the various impact areas (including the project area and borefields) which should be undertaken in accordance with the methods outlined in the EPA Draft Guidance Statement 54a and with sampling designed in consultation with DEC.	The PER and survey work have highlighted that some further survey work is required and is planned to be undertaken. Nonetheless, the results to date have shown that EPA objectives for stygofauna can be met. All sampling has been conducted according to the methods outlined in EPA Guidance Statement 54a. The sampling design was developed in consultation with the DEC. Specialist taxonomists were engaged to identify the specimens. There was communication between the survey team and the DEC throughout the surveys conducted to date.
DEC	Subterranean Fauna	The portion of each stygofauna habitat unit in the aquifer that will be disturbed by groundwater extraction and any changes in chemical parameters should be provided.	As discussed above, the stygofauna habitat most likely to be disturbed by the project consists of the water-bearing calcretes near the proposed pit. Neither the extent of potential habitat loss, nor the total extent of habitat in the water-bearing calcrete can be easily estimated, because the calcrete in-filled drainage lines are relatively small scale features that have not been mapped in detail. No changes to groundwater quality are expected to occur in the shallow alluvials or in the calcrete aquifers as a result of mine dewatering
DEC	Subterranean Fauna	Taxa identification should be to species level where possible and this information needs to be available to DEC so that the potential impacts of the project on stygofauna biodiversity can be properly assessed.	All taxa have been identified by recognised experts to the appropriate taxonomic level (detailed in Appendix E). All type specimens and coordinates have been submitted to the DEC throughout the survey. All information requested by the DEC has been provided.

Submitter	Issue	Submission Issue	Response
DEC	Subterranean Fauna	DEC supports the preparation of a Subterranean Fauna Management Plan and suggests the proponent liaise with the DEC in preparation of this document	Noted. If further sampling indicates that stygofauna require management, Moly Mines will formalise a Subterranean Fauna Management Plan in consultation with DEC. The content of this plan will include: • Monitoring programme for stygofauna and for aquifer parameters • Trigger values that will signal the need for management actions • Management actions for stygofauna management
DEC	Subterranean Fauna	It is unclear as to the scope of the troglofauna surveys that have been undertaken within the project area. Identified areas of potential impact need to be clearly defined in documentation and should include the pit, tailings storage facilities, waste dumps, and associated infrastructure. The borefields should also be considered as potential impact areas for the project.	Figure 4 in Appendix E of the PER showed the locations which were sampled for troglofauna and stygofauna. Troglofauna surveys have focussed on the identified areas of potential direct or indirect impacts. Given that water abstraction at the proposed borefields draws from deeper, confined or semi-confined aquifers, the most likely cause of disturbance to troglofauna habitat is associated with pit development and/or dewatering activities. Surface placement of waste rock, filtered tailings or mine infrastructure is unlikely to significantly alter vadose zone water relations.
DEC	Subterranean Fauna	Future sampling for troglofauna should include areas inside and outside the pit as well as associated borefields	Further troglofauna assessment will be carried out prior to the commencement of ground disturbing works. The assessment will include a review of relevant geological and groundwater information, as well as targeted sampling. DEC will be consulted on the design of the assessment program. If troglofauna are found in the course of any future sampling, it will not alter the management controls and operating strategies that have already been proposed, but will merely underscore the need for careful and consistent implementation of the management approaches that have already been defined.

Submitter	Issue	Submission Issue	Response
DEC	Subterranean Fauna	Insufficient evidence is presented within Appendix E to indicate that the habitats present within the mine area and borefields are not suitable to support troglofauna. As a minimum, the proponent needs to undertake and document a scientific risk assessment of the potential for the geology of the project area and associated borefields to support troglofauna. For example, it needs to be clearly demonstrated that groundwater extraction does not have potential to adversely impact troglofauna, if present in the area, with reference to relevant factors including depth to groundwater and geological/habitat characteristics.	The minimum habitat requirements for troglofauna typically include: a humid (but not saturated) environment and sufficient porosity, permeability or connectivity to allow movement of animals and the food required by them. Published reports of troglofauna occurrence in Western Australia most often identify limestone systems as providing suitable habitat for troglofauna, although troglofauna have also been found in pisolitic valley fill iron deposits near Pannawonica. The surface conditions in and surrounding the proposed pit at Spinifex Ridge generally comprise a hard rock environment with minimal weathered material at the surface and with very little preserved primary porosity, as described in Section 4.5.1.2 of the PER. These conditions were assessed as inhospitable to troglofauna. In localised areas, a weak secondary calcrete deposit has formed where drainage lines overlie ultramafic units. Where present, the calcretisation typically extends to a depth of about 10 m. In order to allow for the possibility that troglofauna might occur in localised areas which could be impacted by pit development or dewatering, selected bores in or near the proposed pit were sampled for troglofauna. Troglofauna surveys were conducted in 18 bores within the Project Area in June 2006 (locations shown in Figure 4 of Appendix E in PER). Traps were collected in August 2006. No fauna were trapped during this sampling event, and no subsequent surveys were conducted. It is possible that the shallow unconfined alluvial deposits associated with the present-day De Grey river drainage system may provide troglofauna habitat. However, the proposed De Grey borefield will not abstract water from this stratum and is not expected to cause significant changes to the groundwater regime (or to the vadose zone) in the shallow aquifer. Sampling for stygofauna has been conducted in the De Grey borefield area on three occasions (October 2006, February 2007 and August 2007).
DEC	Subterranean Fauna	Further troglofauna assessment and surveys as appropriate (with the design developed in consultation with DEC) are required for all impact zones within the proposal area including the three borefields and associated service corridors, to adequately determine the extent and conservation significance of the troglofaunal communities on a local and regional scale. Where applicable this should include information on the quantity of habitat to be removed or disturbed through the mining process (through altered humidity, vibration, pollution) and an appropriate buffer to be applied around significant troglofauna habitat.	Further troglofauna assessment will be carried out prior to the commencement of ground disturbing works. The assessment will include a review of relevant geological and groundwater information, as well as targeted sampling, if required. DEC will be consulted on the design of the assessment program.

Submitter	Issue	Submission Issue	Response
Cons Council	Subterranean Fauna	If new species of stygofauna are discovered in surveys then this project must go through a second public review	No new species of stygofauna have been found to date for the areas that form part of the final proposal. In particular, the Canning borefield survey work, as expected, found no stygofauna present. Additional survey work will occur, and if new species are found, consultation with DEC will be undertaken to determine the appropriate course of action.
DOIR	Landforms	The zone of potential instability around the pit is not included in constraints for placement of waste rock dumps (WRDs). WRDs must be located outside the zone of potential instability around the pit, as defined by the DoIR publication '*Safety Bund Walls Around Abandoned Open Pit Mines*'.Key completion criteria for WRDs are 'safe' and 'stable', dumps located inside this zone will not fulfil either of these criteria. This is also relevant for any planned expansions of the mine, after the current 10 year mine life (P10). Any future applications for pit expansions will need to demonstrate the WRDs remain outside the zone of potential instability, or the affected sections of the WRD will need to be relocated. Incorporating potential future expansions into initial WRD location planning can assist in avoiding this issue. (This comment is also relevant to Section 9 Closure, Decommissioning and Rehabilitation, and to the Closure Plan)	The zone of potential instability has been considered in the Pit and dump designs presented in Figure 1. The dump location also considers potential pit expansion. Waste rock landforms will be constructed outside the zone of potential instability of future pit expansions.
DOIR	Landforms	*P291* states vegetation will be established "where possible" on the WRD's. One of the key requirements for rehabilitation to be considered acceptable is that self sustaining vegetation is established on rehabilitated landforms, of similar species, and at similar densities, to the surrounding environment. Availability of growth medium to enable revegetation is therefore critical. If there is likely to be a shortage of growth medium a commitment to investigating alternative sources of growth medium (such as crushed waste rock), and trials to establish the suitability of this material for this purpose, should be made.	The natural environment at Spinifex Ridge has many areas where vegetation is sparse or patchy. Locally there are also areas that are unvegetated. Rehabilitation objectives for the site are to establish self-sustaining vegetation of suitable local species at similar densities to the pre-mining environment. Natural slopes and ridges in the area have skeletal soils over rock, therefore the supply of growth media is limited. Suitable soil materials will be salvaged where practicable and Moly Mines is continuing to investigate options to use waste rock materials as growth media, and to re-create a soil profile that is functionally similar to the original. This aspect will be addressed further in the Mining Proposal.
DOIR	Landforms	*P292* refers to a basal layer of non-acid forming (NAF) waste rock, a minimum depth should be specified for the entire layer, not just in natural drainage lines.	Drainage lines represent the points where there is greatest risk of moisture entering the waste rock in the landforms. The proposed 15m minimum thickness above these drainage lines, together with a minimum of 10m laterally from natural surfaces, will ensure effective isolation of PAF wastes

Submitter	Issue	Submission Issue	Response
			from runoff. In addition, coarse fractions of the waste will concentrate at the bottom of the base layer, due to the inherent sorting of material during face dumping. This will further reduce the risk of upward movement of moisture. As a result, it is not considered useful to calculate actual depths above all surfaces.
DOIR	Landforms	*P292* states topsoil and growth medium placed on flat upper surfaces only, and vegetation established where possible. Refer to point on P291 above.	Natural slopes and ridges in the area have skeletal soils over rock, therefore the supply of growth media is limited. Suitable soil materials will be salvaged where practicable and Moly Mines is continuing to investigate options to use waste rock materials as growth media, and to re-create a soil profile that is functionally similar to the original. This aspect will be addressed further in the Mining Proposal. Existing natural vegetation at Spinifex Ridge includes unvegetated rocky areas. In rehabilitating to self-sustaining vegetation with similar and densities to pre-mining, there will be areas that are not vegetated, but which accurately reflect pre-mining conditions
DOIR	Landforms	There is no bund around the top surface of the dump, to prevent run-off discharging over the batters.	Moly Mines is committed to maximising the physical stability of the landforms, and to minimising moisture ingress into PAF waste rock. On-going characterisation of waste rock material will allow greater definition of the specific strategies required to achieve this. These strategies will include appropriate surface water management on the waste landforms, and will be detailed in the Mining Proposal
DOIR	Landforms	No details on management of water on the mid-slope berm are provided. Is this berm designed to prevent water discharging to the lower batter, and if so, will a bund be placed on the outer edge of the berm, and will the berm be compartmentalized.	Moly Mines is committed to maximising the physical stability of the landforms, and to minimising moisture ingress into PAF waste rock. On-going characterisation of waste rock material will allow greater definition of the specific strategies required to achieve this. These strategies will include appropriate surface water management on the waste landforms, and will be detailed in the Mining Proposal.
DOIR	Landforms	There is no commitment to progressive rehabilitation, and Figure 8-8 indicates rehabilitation will not occur until year 10. Dumps should be constructed in a manner that facilitates progressive rehabilitation, and trials of outer dump profiles. For example, the western end of WRD1 could be constructed to full height, with dump construction subsequently progressing eastwards. This would allow the western outer profile of the dump to be finalized, and the performance of the proposed outer profile to be trialled. This approach would also facilitate progressive construction of the store release cover, and allow the performance of the cover to be monitored.	Moly Mines agrees that progressive rehabilitation is desirable, including trialling of strategies for covers and rehabilitation. Opportunities to achieve this will be pursued during operations, and this will be detailed in the Mining Proposal
DOIR	Landforms	*P292* If possible, PAF material should be placed only under horizontal surfaces of the WRD dump, and not extend under	Moly Mines is committed to minimising moisture ingress into PAF waste rock. On-going characterisation of waste rock material will allow greater definition of the specific strategies

Submitter	Issue	Submission Issue	Response
		the batters, to reduce the potential for water infiltration to the PAF material. This is particularly relevant if the mid-slope berm is designed to promote water infiltration. Additionally, this will allow re-profiling of the outer dump profile (if necessary, following trials) without compromising the cover thickness above the PAF material.	required to achieve this on horizontal surfaces and batters. These strategies will include appropriate surface water management on the waste landforms, and will be detailed in the Mining Proposal.
DOIR	Landforms	*P292* The Landform Solutions report, that explains the rationale behind the dump design, should be provided.	Landform Solutions report will be provided to DoIR as part of the Mining Proposal.
DOIR	Landforms	Details of management of water on the surface of the WRDs should be provided, including measures to manage run-off from adjacent ridges. Of particular concern is the management of run-off from the Talga Range onto WRD1, given that the ridge will be approximately 80m higher than the dump at closure. As the risk of erosion of the cover system in areas adjacent to the Talga Range would be relatively high, it would be expected no PAF material would be located beneath these areas.	Drainage lines represent the points where there is greatest risk of moisture entering the waste rock in the landforms. The proposed 15m minimum thickness of benign waste rock above these drainage lines, together with a minimum of 10m laterally from natural surfaces, will ensure effective protection of PAF wastes. In addition, coarse fractions of the waste will concentrate at the bottom of the base layer, due to the inherent sorting of material during face dumping. This will further reduce the risk of erosion, or of upward movement of moisture.
Cons Council	Landforms	High risk of topsoil or loose material washing off Waste Dump 3 into diversion channel and Coppin's Gap	An appropriate minimum distance will be maintained between landforms and Coppin Creek or its diversion (see Section 2.3.1, and Figure XX). This will allow appropriate sediment control structures to be installed. In addition, measures to reduce erosion and loss of topsoil from batters of the landforms will be taken where practicable, and detailed in the Mining Proposal.
Cons Council	Landforms	There is little point in preserving most significant geological features without their aesthetic context	Mining activities have been designed to minimise any visual or aesthetic impacts for people accessing Coppin Gap. Although mining activities will be visible to some extent, this is not considered significant, or that it will detract significantly from the current reserve usage.
DOIR	Geochemistry	The concentrations of metals within the tailings and tailings slurry should be presented as a table within the PER and comparison made to DEC guidelines. Levels of Chromium, Nickel and Manganese are above Ecological Investigation Levels in the Department of Environment and Conservation publication "Contaminated Sites Management Series, Assessment Levels for Soil, Sediment and Water", dated November 2003	Moly Mines considers that the DEC "Ecological Investigation Levels" do not provide a relevant basis for evaluation or classification of tailings for two reasons. First, EILs relate principally to environmental media (soil, water or sediment) and not to process wastes. Secondly, the analytical method implicit in the EIL values relates to soils (or sediments) which have been sieved (or ground) to 2 mm, whereas the tailings samples tested were ground much finer, to 75µm. It is well known that grinding samples finer will result in the extraction of more metals during a strong acid digestion (which is used to extract most of the metals on the EIL list). Moly Mines considers a more appropriate set of guideline values is the DEC Solid Waste Classification criteria, which are presented in DEC's Landfill Waste Classification and Waste Definitions 1996 (as amended). The waste guidelines are relevant because they are designed to classify solid materials stored in engineered structures. The waste classification system involves examining both the total and the

Submitter	Issue	Submission Issue	Response

water-extractable concentrations of metals. Again, the samples tested for waste classification would not normally be ground as fine as 75um. The tables presented below compare the results of tailings analysis with EILs and with the criteria for solid waste classified as "inert". Inert waste may be disposed of in unlined landfills.

Parameter	Tailings Composite A, mg/kg	Tailings Composite B, mg/kg	DEC Environmental Investigation Guideline Value (EIL), mg/kg	DEC Solid Waste Concentration Limit, CL1, mg/kg
Antimony	11	8.9	20	--
Arsenic	81	63	20	500
Barium	120	180	400	50,000
Cadmium	1.2	1.1	3	100
Chromium (total)	250	220	50	--
Cobalt	41	25	50	50,000
Copper	830	650	60	50,000
Lead	10	8	300	1500
Manganese	820	560	500	50,000
Mercury	0.02	0.02	1	75
Molybdenum	420	300	40	1000
Nickel	110	70	60	3000
Tin	3.2	2.6	50	--
Zinc	79	68	200	50,000

Notes: A dash (--) means that no limit has been specified. Green-shaded figures under the "tailings" column indicate a result that exceeds EIL guideline values. No samples exceeded the CL1 solid waste criteria. Tailings results are taken from G Campbell report provided in Appendix L of the PER.

Parameter	Tailings slurry water Composite A, mg/L	Tailings slurry water Composite B, mg/L	DEC Solid Waste, Leachable Concentration, ASLP1, mg/L
Antimony	0.0076	0.0071	--
Arsenic	0.021	0.020	0.5
Barium	0.017	0.021	--
Cadmium	0.00070	0.00073	0.1
Chromium (total)	<0.01	<0.01	--

<table>
<tr><th>Submitter</th><th>Issue</th><th>Submission Issue</th><th>Response</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><td>Cobalt</td><td>0.0003</td><td><0.0001</td><td>--</td></tr>
<tr><td>Copper</td><td><0.01</td><td><0.01</td><td>--</td></tr>
<tr><td>Lead</td><td><0.0005</td><td><0.0005</td><td>0.5</td></tr>
<tr><td>Manganese</td><td>0.08</td><td>0.07</td><td>--</td></tr>
<tr><td>Mercury</td><td><0.0001</td><td><0.0001</td><td>0.01</td></tr>
<tr><td>Molybdenum</td><td>0.77</td><td>0.87</td><td>0.5</td></tr>
<tr><td>Nickel</td><td><0.01</td><td><0.01</td><td>0.2</td></tr>
<tr><td>Tin</td><td>0.0003</td><td>0.0007</td><td>--</td></tr>
<tr><td>Zinc</td><td>0.02</td><td>0.01</td><td>--</td></tr>
</table>
Notes: A dash (--) means that no limit has been specified. Orange-shaded figures under the “tailings” column indicate a result that exceeds Inert Waste leachability guideline values. Tailings results are taken from G Campbell report provided in Appendix L of the PER.
As shown in the tables, the tailings materials would meet all criteria for “inert waste”, except in relation to the water leachable concentration of molybdenum, which was estimated by using the results of testing conducted on supernatant tailings water. Given that the tailings water samples did not exactly match the procedure stipulated in the Australian Standard Leachate Procedure Test, it is not possible to say whether the results presented here over- or under-estimate the likely water solubility of molybdenum. As noted earlier, the tailings handling and storage procedures have been modified to a filtered stacking method. Nonetheless, provision is still included in the tailings facility design for leachate interception, if required. Accordingly, Moly Mines is confident that the characteristic of the tailings is consistent with all relevant environmental guideline values.</td></tr>
<tr><td>DOIR</td><td>Geochemistry</td><td>Molybdenum concentrations in the tailings are 60 – 80 mg/kg, whereas Table 4.1 in Appendix L, Tailings Geochemical Characterisation, indicates concentrations of 300 – 420 mg/kg. Clarify why the values in Appendix L are not utilized in this section</td><td>The figure reported in Appendix L is incorrect - 300- 420mg/kg is higher grade than some of the process plant feed. Based on more recent testwork, actual levels are expected to be in the range 60-150mg/kg.</td></tr>
<tr><td>DOIR</td><td>Geochemistry</td><td>The range in Total S%, and Net Acid Producing Potential, of each lithology of potentially acid forming (PAF) waste rock should be provided in this section of the PER. A pit cross-section, showing total S% measured in drill cores, and location of samples selected for further analysis, should be provided, to demonstrate that analysed samples are representative of the PAF lithologies.</td><td>Detailed geochemical characterisation for the various lithologies is provided in Appendix M of the PER. Total S% was in the range <0.01% to 1.2% and a maximum NAPP of 29 kg H2SO4/tonne was measured. Kinetic geochemical testwork is currently underway to supplement the static work already undertaken. Additional detail will be provided to DOIR through the Mining Proposal approval process.</td></tr>
<tr><td>DOIR</td><td>Geochemistry</td><td>A stand-alone acid rock drainage management plan, or a section on acid rock drainage management within the</td><td>Acid Rock Drainage management details will continue to be expanded, either as a stand alone plan or as part of other management prescriptions, through the Mining Proposal process</td></tr>
</table>

Submitter	Issue	Submission Issue	Response
		progressive rehabilitation and closure plan, should be prepared, in consultation with an appropriately qualified specialist. Requirements for plan detailed in submission.	
Cons Council	Geochemistry	The risk of heavy metal poisoning affecting both human health and wildlife has been understated. The PER does not mention the expected molybdenum levels or their health effects due to an assumption that this need not be addressed because molybdenum is less toxic than arsenic	The risk of molybdenum toxicity is considered in the PER with molybdenum levels outlined in various sections of the document. Maximum groundwater levels were expected for the tailings seepage at ~1mg/L Mo, based on the geochemical characterisation of the tailings, presented as Appendix L of the PER. However, with the revised tailings system, minimal seepage is expected from the tailings and no water levels are expected to reach this level. The crushed rock which constitute the tailings has a concentration of approximately 100ppm Mo, will be restricted to the 600ha TSF and will be progressively rehabilitated with no mineralised material. The waste rock dumps have been designed to isolate potentially susceptible mineralised rock from the wetting and drying cycles that could mobilise contaminants. Monitoring is designed to highlight any variance from the expected outcome and appropriate response will be initiated, in consultation with DEC, to any anomalous trends in molybdenum levels. Moly Mines is contributing to comprehensive research programmes currently underway to develop a technical dossier on molybdenum products for the European REACH legislation
Cons Council	Geochemistry	The presence of large quantities of PAF material in the ore and hence waste and tailings exacerbates the potential for releases of toxic metals. Potential impacts from heavy metals are: Impacts on human health for swimmers/campers at Coppins Gap or other users of the stream if there is an accidental or unpredicted release of heavy metals; Leaching from tailings dam into ground and surface water systems if cover design does not work as predicted; Introduction of molybdenum into the terrestrial ecosystem through uptake by plants (on waste dumps, tailings dams, or due to spills) and ingestion by animals, potentially including stock, or through animals drinking from the pit; Potential for ground water pollution to affect stygofauna or human health. Infiltration to groundwater systems could occur through the pit, or through leaching from the base of the tailings dam or waste dumps.	Moly Mines is committed to effectively encapsulating PAF waste rock, and to providing an effective cover over tailings. On-going characterisation of waste rock material will allow greater definition of the specific strategies required to achieve this on horizontal surfaces and batters of waste landforms. These strategies will include appropriate surface water management on the waste landforms, and will be detailed in the Mining Proposal. The waste rock dumps have been designed to isolate PAF rock from the wetting and drying cycles that could mobilise contaminants. As a contingency, drainage from waste rock areas containing PAF material is directed to a section of creek isolated from the diverted Coppin Creek catchment.
DOIR	Metal Toxicity	Concentrations of molybdenum causing toxic effects on vegetation should be provided, and referenced	Review of available literature did not identify papers outlining toxic impacts of molybdenum on vegetation, and no significant issue appears to have been identified despite a number of papers looking at plant uptake of molybdenum. The studies undertaken on vegetation uptake of molybdenum look predominantly at potential toxicity on domestic or wild fauna, many

Submitter	Issue	Submission Issue	Response
			summarised in Jones et al (1994). Some of the key findings from this work are: Mo plays an important role as a micronutrient; uptake of Mo is variable between plant species; uptake is more pronounced in legumes than grasses; and Mo uptake is greater where soil drainage is poor and soils stay wet. Moly Mines will undertake research into impacts of Mo on rehabilitation species, especially spinifex as part of development of rehabilitation prescriptions. Moly Mines is also contributing to comprehensive research currently underway into molybdenum impacts on human health and the environment as part of the European REACH (Registration, Evaluation, Authorisation and Restriction of Chemical Substances) legislation which applies to chemical use in Europe.
DOIR	Metal Toxicity	The potential for uptake of metals by vegetation established on the TSF at closure should be considered, in relation to both toxic effects on vegetation, and toxic effects or bioaccumulation in fauna/stock grazing on TSF vegetation	Toxic effects of Mo on vegetation are not expected to be evident for rehabilitation, but research will be undertaken to identify impacts on species to be used for rehabilitation of the TSF. Plant productivity in the Spinifex Ridge area is low and fauna or stock grazing vegetation on the rehabilitated TSF after closure will have an extremely small proportion of their overall feed from this vegetation, reducing the likelihood of any toxic effects from this source.
Cons Council	Geochemistry	The schematics of the encapsulation of PAF in the waste dumps are concerning in that a 10m cover over the pile of PAF is proposed without a buffer at the edges. Best practice guidelines such as the Australian Government DoTARs Leading Practice guidelines for Managing Acid and Metalliferous Drainage suggest that PAF should be more securely encapsulated with wide sides of NAF material and a base layer.	Moly Mines is committed to minimising moisture ingress into PAF waste rock. On-going characterisation of waste rock material will allow greater definition of the specific strategies required to achieve this on horizontal surfaces and batters. These strategies will include appropriate surface water management on the waste landforms, and will be detailed in the Mining Proposal. Drainage lines represent the points where there is greatest risk of moisture entering the waste rock from underneath the landforms. The proposed 15m minimum thickness of benign waste rock above these drainage lines, together with a minimum of 10m laterally from natural surfaces, will ensure effective protection of PAF wastes. In addition, coarse fractions of the waste will concentrate at the bottom of the base layer, due to the inherent sorting of material during face dumping. This will further reduce the risk of erosion, or of upward movement of moisture.
Cons Council	Geochemistry	The technology for store release cover designs and encapsulation of PAF remains unproven. The large amount of modeling and research that has gone into these designs is noted, but as yet the long term stability and performance of these structures has not stood the test of time. There is also a large amount of uncertainty, and hence risk, in geological modeling – especially over longer timescales - and this needs to be taken into account: Are we really encapsulating this material for all time, or creating “time bombs” that will be set off by natural	Both store and release covers and encapsulation are considered best practice approaches to managing PAF material. The risk of failure of any of these systems is considered unlikely. Design of the waste rock landforms has placed these structures outside of the Coppin Creek catchment as an additional management control to prevent drainage entering the environment.

Submitter	Issue	Submission Issue	Response
		processes such as erosion and weathering? What is the risk of this to the environment and human health from this project?	
Cons Council	Geochemistry	It is also questioned why a 0.32% sulphur content is taken as PAF. This is within the range of normal values, although sometimes contents as low as 0.25% are considered PAF. This basis of this value must be solid to avoid unpredicted AMD in material classified as NAF – potentially from waste dump 3 and directly into Coppins Creek	The generic assemblage of waste rock has been assessed to contain minute / trace sulphides in a groundmass containing calcite. In an arid zone weathering regime, the level of 0.32% S is viewed as a conservative cut-off for classifying waste rock material as PAF or NAF. As outlined in Appendix L of the PER, the work to date provides a useful working model for classifying waste material. As the geological and mining models evolve, additional work is required to confirm or refine these classifications. This geochemical kinetic testwork has commenced.
Cons Council	Geochemistry	The risk associated with heavy metals cannot be completely discounted by modeling that is by its nature imperfect. Modeling can give some comfort, but the consequences of incorrect modeling or unpredicted accidents need to be considered in a risk analysis	The risk of release of heavy metals in tailings seepage or in mine waters has not been discounted. If the risk of metals in throughflow or runoff had been discounted, the waste storage facilities would not have been designed to incorporate cover systems and seepage and runoff interception features. To date, geochemical testing of representative samples of tailings and waste rock has shown that the risk of release of elevated levels in mine drainage is generally low. On-going characterisation of waste rock material will allow greater definition of the specific strategies required to achieve appropriate protection through encapsulation of PAF waste material. These strategies will be detailed in the Mining Proposals submitted to DoIR.
DOIR	Greenhouse Gases	The PER states that in order to reduce vehicle greenhouse gas emissions the shortest route will be taken via a tunnel through the Talga Range. It is recommended to also consider other options such as biodiesel, the carbon neutral program, and carbon offsets	Management of GHG is outlined in the PER. Commitments have been made to compliance with EEO Act and to requirements as signatory to the Australian Greenhouse Challenge Plus. In complying with these requirements, Moly Mines will consider alternative fuel sources.
Cons Council	Greenhouse Gases	Greenhouse gas emissions of 631,614 tpa represent a 0.9% increase to WA's rising GHG emissions (based on 70 Mtpa for WA in the SoE Report). This is a significant contribution from one project. With the continued approval of projects with large GHG emissions and no mitigation, WA has no hope of meeting emissions reduction targets. Australia has largely met its current Kyoto commitment (an increase in overall emissions) by reducing land clearing. Land cannot be not cleared again.	The concept of mitigation includes actions taken to avoid, reduce, rectify or compensate for the environmental effects of an activity. Moly Mines has focussed on avoiding impacts of its operations by selecting energy efficient plant and energy efficient power generation facilities. This is an appropriate and effective mitigation strategy as more than 99% of the project's greenhouse gas emissions arise from power production and fuel burning.

Submitter	Issue	Submission Issue	Response
Cons Council	Greenhouse Gases	Standard proponent actions such as minimizing haul route distances are not legitimate claims to energy efficiency innovation or GHG mitigation. Real mitigation measures and offsets need to be applied	Moly Mines has selected the most energy efficient method of producing the required power to operate the project. Moly Mines has also committed to signing for the Australian Greenhouse Challenge Plus and registering with the Energy Efficiency Opportunities Act, both of which invoke processes to reduce greenhouse gas emissions. Many of the applications of molybdenum alloys and steels provide significant environmental benefits when compared with non-molybdenum bearing alternatives.
Cons Council	Greenhouse Gases	It is a scientific nonsense for the proponent to quote the AGO workbook guidelines and claim that no GHG emissions will come from land clearing because the height of the vegetation is below an arbitrary limit. This is not scientifically defensible given knowledge that these plants, their root systems and the soil will hold GHG's. Statements like this are pointless and merely serve to avoid responsibility for detrimental actions.	AGO workbook guidelines provide a consistent approach to estimate emissions. Although there are limitations to the workbook guideline, Moly Mines believes that the guidelines provide an appropriate tool to calculate an approximate emission value in this instance. The contribution to greenhouse gas emissions for the site from land clearing is an extremely small component of overall site emissions, and makes no significant difference to the greenhouse gas management that will be applied to site.
DOIR	Greenhouse Gases	The Environmental Management Program did not include a management plan for greenhouse gas emissions nor a pollution management plan. It is suggested Moly Mines develops individual plans for these and considers the Premier's Climate Change Action Statement and the National Pollutant Inventory	Management of greenhouse gas emissions is outlined in the PER. Commitments have been made to compliance with EEO Act and to requirements as signatory to the Australian Greenhouse Challenge Plus. In complying with these requirements, Moly Mines will consider the Premier's Climate Change Action statement and the National Pollutant Inventory.

3.2.3 Submissions on Survey Adequacy (Dr Graham Thompson submissions)

Submission Issue	Response
Given the serious problems and issues associated with this report, the fauna survey program would have benefited significantly from a review of the intended fauna survey protocols before the survey was undertaken.	Survey methodology was discussed and amended after discussions with DEC staff before the commencement of the survey. Draft reports were submitted progressively to the DEC and discussions held regarding approach, methodology, and further work required.
There is insufficient data collected per habitat type and therefore overall, to record or even estimate the terrestrial fauna species richness, assemblage structure or ecosystem function, all of which are required by EPA (2002) Position Statement No 3. Without these data it is not possible to adequately assess potential impacts to the fauna or fauna assemblage in the area.	In accordance with EPA (2002) and EPA (2004) robust data were collected over two seasons from a total of seven sites and six broad habitat types. Data was obtained not only from a variety of trapping methodologies but also hand-searching, spotlighting, bird censussing, bat detection and targeted searches. EPA (2002) states that surveys need to provide sufficient information to address biodiversity value at; o the genetic, species, and ecosystem levels; and o its ecological functional value at the ecosystem level. The report addresses biodiversity at the appropriate scales of genetic, species, and ecosystem as described, and defined, by EPA (2002) in Sections 5, 7 and 8. Sufficient data was collected to compare species richness and

Submission Issue	Response
	abundances between habitats in a general sense and a discussion of both is given in Section 4.2. Because of previous regional work and records from databases, it was also possible to augment site data with a high level of certainty. The species assemblage recorded was also compared and contrasted with comparable regional sites (in terms of habitats present) in Section 5: Regional Comparison. Species and species habitat of conservation significance at the International, National, State, Regional, and Local scale were adequately identified and defined. Potential impacts to fauna, fauna assemblages, and habitats as well as appropriate mitigation and management prescriptions are addressed in more detail in the PER, when compared to this report, as further refinements to development concepts were made after finalisation of the report as well as the completion of an additional fauna study focussing on proposed service corridors: *"Spinifex Ridge Molybdenum Project Fauna Assessment: Proposed Water Supply Areas and Service Corridors* (OES, 2007). It would be highly unlikely that additional survey effort would substantially change the outcomes of the work for the purposes of the *Environmental Protection Act 1986* impact assessment process.
Serious flaws in the survey protocol include: a) Non-use of PVC buckets as pit-traps which would have resulted in sampling bias; b) Non-use of funnel traps which would have resulted in significant sampling bias and under sampling of a number of taxa; c) Sampling is confined to a few areas, and issues of spatial variability in the fauna assemblage have not been addressed; d) At least one of the surveys should have been undertaken in summer (or spring) resulting in a significant bias and reduced catch rates; e) Inadequate number of traps in each habitat to adequately sample the fauna; and f) Inadequate survey duration in any habitat to adequately sample the fauna. Each of these issues has been addressed in the published literature (see Thompson *et al*., 2005, Thompson 2007 and the references therein) and other consultant reports over the past 3-5 years. The author should have been aware of these issues.	*Methodology* Methodology used for the survey was based on guidance obtained from EPA (2002) and references suggested therein including Burbidge *et al.* (2000a, 2000b), How *et al*. (1984, 1991) and Government of South Australia (2000). Survey methodology was revised after discussions with DEC staff before the commencement of the survey. Draft reports were submitted progressively to the DEC and discussions held regarding approach, methodology, and further work required. Trapping methodology adopted trapping techniques used by Government of South Australia (2000), How and Cooper (2002), and How and Dell (2004). However, trapping will never record all fauna species that may occur within a study area and this is a well-recognised limitation. Consideration must also be given to other strategies, and survey work incorporated a wide variety of additional techniques (see Points 2 and 6). Data from the Spinifex Ridge survey indicates that the number of taxa recorded (127 vertebrate taxa) is typical for a survey of this scale in this bioregion, and is comparable to additional comprehensive data collected at four sites within 50kms to the north (BHPB, 2005). Sampling was undertaken in all habitats identified over the survey area, and survey sites were adequately distributed to incorporate the zone of direct impact, zone of indirect impact and zone of wider interest. Trap numbers, placement, and number of days left operational per survey period, was consistent with other surveys in the region and the references above. Survey results were compared and contrasted with other similar surveys undertaken in the region. *Timing* Timing of surveys was planned with regard to all the major vertebrate groups (ie. Amphibians, Birds, Mammals, and Reptiles) with consideration also given to guidance in EPA (2002) p 12. That is, a preference for multiple surveys over a variety of seasons and advice that the season that follows the season of maximum rainfall (ie. Autumn in the

Submission Issue	Response
	Pilbara), is the most productive and important survey time in consideration of all the major vertebrate groups. (NB: Timing of surveys is considered further addressing Points 21, 26, and 29 below.)
Our data for the Pilbara indicate that Mulgara are not trap-friendly and an Elliott trapping effort of about 200 trap-nights is required to catch a single individual in known hot-spots. The trapping effort per site, and spatially was inadequate to detect the presence of Mulgara.	The Mulgara has been trapped in Elliott and cage traps in many biological surveys in the past (HGM, 1997; Pearson, *et al.* 2005). Elliott and cage trapping was undertaken during the Spinifex Ridge survey in all habitat types. Survey sites sampled that potentially provide conditions suitable for Mulgara include site SPS1, SPS6 and DLS7. 300 Elliott trap nights and 30 cage trap-nights (Totalling 330 trap-nights) were undertaken within these sites. Furthermore, Mulgara leave distinctive 'sign'. Evidence of Mulgara including tracks, diggings, scats, and burrows was recorded wherever and whenever possible during both survey periods. A bias during the survey was toward areas of unburnt spinifex. No evidence was recorded. An intensive survey approximately 50kms to the north of Spinifex Ridge (BHPB, 2005), similarly did not trap Mulgara. However, a single observation was made during spotlighting at 'Cattle Gorge'. Mulgara require areas of mature hummock grassland (spinifex) habitat. During the survey periods large areas of spinifex grassland habitat had been previously burnt, with the survey area experiencing four large fires within eight years, mostly over the spinifex sandplain habitat favoured by Mulgara. Only small and isolated areas of mature hummock grassland remained. The assessment concluded that although Mulgara were unlikely to be present during the time of the Spinifex Ridge survey, potential habitat is present, and with habitat recovery (ie. maturation of spinifex hummocks after fire and feral predator control) the species may colonise. The species is 'predicted' to occur in the PER and management and mitigation of impacts are described. This is a valid assessment given the survey data, habitat condition and regional record.
On what basis was it decided that 20 minute observations at each site was adequate to inventory the birds? Normally, the report would demonstrate the adequacy of this period using one of a number of techniques (e.g. species accumulation curves).	Five sites were assessed during each of the two survey periods. Twenty minute observations allowed all five survey sites to be censussed for birds during each morning period of the surveys. The order of site visitation was staggered to reduce bias due to timing of arrival at sites. The inventory of avifauna for the project area also included opportunistic observations over the entire project area. Site assessments allowed for a comparison of species between sites. Species accumulation curves for birds in consideration of separate surveys, and combined data, is included in the report.
Appropriate areas should have been grid searched for Mulgara and Bilbies, as both are potentially in the area. Development of the site without this level of assessment provides an unacceptably high risk of impacting on these two species, which are listed by both State and Commonwealth governments.	Targeted searches for species of conservation significance were initiated after a desktop assessment and reconnaissance survey was undertaken. Targeted searches focussed upon species that were known from the region, where suitable habitat was present, and/or where the particular attributes a species made it less likely to be identified through other techniques (eg. Olive Python and Rothschild's Rock-wallaby). Of the habitats present over the project area both the Mulgara and Greater Bilby favour spinifex sandplain habitat. The Mulgara is trappable (HGM, 1997; Pearson, *et al.* 2005), although the Bilby can be difficult to trap in certain situations (Moseby and O'Donnell, 2003). Both species leave distinctive sign. In addition to trapping, other techniques utilised during the survey that had the potential to record these species

Submission Issue	Response
	included: o 1,290 minutes of 'inventory searching' over survey sites measuring 100m by 100m. Survey sites, and particularly SPS1, SPS6 and DLS7, could be considered as 'grid searching' as they represented areas of suitable habitat for these species within a surrounding landscape that had been frequently burnt over previous years. o 1,020 minutes of spotlighting o 220 minutes of nocturnal road surveys traversing tracks over the project area at low speeds o Recording of secondary evidence of these species including tracks, diggings, scats, and burrows wherever and whenever possible during both survey periods for a combined 18 days. A bias during the survey was toward areas of unburnt spinifex. Both Greater Bilby and Mulgara leave distinctive 'sign'. The bilby in particular leaves distinctive burrows and extensive burrowing, with obvious diggings over foraging areas with which the author is familiar through involvement with reintroduction programs for this species. Specific additional searches to those above were not undertaken for these species because habitat considered suitable was not present at the time of the survey, few and scattered regional records exist, and techniques already employed could be used to record these species if present.
The trapping effort per habitat, and temporally, varied such that not one study site had the same protocol as another across both survey periods. This limits any reasonable comparative analysis among fauna assemblages in the major habitat types, which is a requirement of the EPA (2002) Position Statement No 3.	EPA (2002) does not specifically 'require' a comparative analysis among fauna assemblages between habitat types, but states that surveys need to provide sufficient information to address biodiversity value at; o the genetic, species, and ecosystem levels; and o its ecological functional value at the ecosystem level. Nevertheless, to enable a comparative analysis survey methodology was consistent across all survey sites and all data collected can be utilised. Trap effort varied periodically between sites due to unforseen circumstances such as the inability to install some pit traps in particularly hard rocky substrates, and changes to trapping regimes due to unexpected changes in logistics or weather. This is common during biological fieldwork and should not be unexpected. Similarly definition of "project area" and "area of impact" can change through time as a proposal develops, leading to sampling anomalies temporally, particularly when a proponent engages ecologists early in the proposal to guide project design. This should be encouraged. Comparative analysis using percentage trap success rates can adequately negate issues due to minor anomalies in trap effort between sites, or over time.
How did the survey team distinguish between *Pseudomys chapmani* and *Pseudomys hermannsburgensis*. The literature indicates that they are difficult to identify in the field. No voucher specimens were lodged with the	The author is familiar with these two species and identifications were facilitated by access to a draft key to Muridae being developed by the South Australian Museum: *P. hermannsburgensis* has a longer ear length (12.5mm to 15.75mm, compared to 9mm to 12.75mm), and longer pes length (15.5mm to 18.5mm, compared to 15mm to 16.6mm). Ratios of pes length to ear length are therefore

Submission Issue	Response
Museum.	different between the two species. *P. hermannsburgensis* also has posthallucal pads half the size of terminal pads, whereas *P. chapmanihas* posthallucal and terminal pads of almost equal size. The dorsal surface of the tail for *P. hermannsburgensis* has 3 hairs per individual scale. The two species occur in different habitats with *P. hermannsburgensis* more likely to be present in sandy substrates and *P. chapmani* more likely to be present in rocky substrates. Liaison was undertaken with relevant Western Australian Museum staff to determine which species were recommended for vouchering. Neither *Pseudomys chapmani* or *Pseudomys hermannsburgensis* were identified.
Elliott traps catch a different suite of terrestrial vertebrates to pit-traps. Placing more Elliott traps in an area does not compensate for using less pit-traps (p.12).	Although Elliott traps catch a different suite of fauna than pit-traps many species can be captured in both trap types (eg. small mammals and small to medium-sized reptiles). Additional Elliot traps were not added as surrogates for pit traps, but to augment overall trapping data. Inspection of fewer than expected pit traps allowed for additional time to inspect added Elliott traps. (The alternative would be to refrain from placing additional traps, with a subsequent reduced data set.) This is standard practice during fauna surveys.
A large number of statements of 'fact' are made without a cited reference, e.g. *the accumulation curve for mammals is reflective of that expected in the region with small mammals typically recorded in low numbers during biological surveys* (p. 24). In a recent survey of 210ha in the Pilbara using 9900 Elliott trap-nights we caught a total of 1864 small mammals, including 50 *Dasycercus cristicauda* (Mulgara), 395 *Dasykaluta rosamondae* (Little Red Kaluta), 179 *Mus musculus* (House Mouse), one *Notomys alexis* (Spinifex Hopping Mouse), 27 *Pseudomys desertor* (Desert Mouse) and 1212 *Pseudomys hermannsburgensis* (Sandy Inland Mouse). This is hardly a low number!! Comparatively, what is a high and low number? See How and Cooper (2002) for their catch rate for small mammals; is that low?	This statement was used in reference to a combined Species Accumulation Curve presented as Figure 4 in the report. The statement was used in the context of comparing numbers of species identified during the survey across all the major vertebrate groups (amphibians, reptiles, mammals, birds). Typically, more species of birds and reptiles are recorded than mammals (as reflected in the graph).
With an absence of fixed home ranges they (small mammals)are often considered serially nomadic, dispersing widely until favourable conditions are encountered (p. 24) – this only applies to a few species, and were the conditions at the survey site 'unfavourable' to the point that numbers would have been 'low'?	Point 10b has mis-read the sentence in the report. *With an absence of fixed home ranges they* (referring to small dasyurids) *are often considered serially nomadic, dispersing widely until favourable conditions are encountered.* The sentence refers to small dasyurids not all small mammals. After a 10 year study Haythornwaite (2005) reported that of the eight small dasyurids studied in hummock grasslands, all but one were 'serially nomadic'; able to move their temporary home ranges to local resource 'hot spots'. Gibson and McKenzie (2005) also acknowledged the serially nomadic nature of small dasyurids. Dickman, *et. al* (2001) described small Dasyurid captures over his study area as "*low, as in many other studies in the arid zone".*

Submission Issue	Response
	The sentences referred to in Points10a and 10b were simply intended to give the reader some ecological context to the species recorded.
With recently burnt areas mounds (presumably no long occupied) could be viewed from some distance' (p. 29) – this is not true as we have regularly found active Pebble-mound Mouse mounds in burnt areas. Each of the mounds referred to should have been inspected.	A large number of mounds were observed during the survey; with active mounds only observed in areas that were not recently burnt and completely devoid of all standing vegetation. From this observation it would seem reasonable to 'presume' that mounds in recently burnt areas were no longer occupied. Whether they were or not is unknown. Pebble-mounds covered much of the basalt hills of the project area over many kilometres and it was not possible to inspect each individual mound. The PER takes a conservative approach and acknowledges Pebble-mound Mouse habitat over 'Basalt Ridge' areas of the project area (which are mapped in the PER)
Species accumulation curves should have been prepared for each habitat type. The capture days should have been randomised and smoothed curves fitted (Thompson *et al.*, 2003; 2007). Estimates of species richness and percentage of species captured should have been reported in the text. Figure 1 is the species accumulation curve for all trapped data for SPS6 and Figure 2 is the species accumulation curve for all reptiles captured at all sites during both surveys. Given that these curves are developed using data sets with the highest number of captures, the results indicate that all habitats were inadequately sampled as neither curve shows an obvious asymptote. Data presented by How and Cooper (2002) and How and Dell (2004) for the Pilbara would also suggest the data for each habitat was inadequate to adequately describe the terrestrial fauna assemblage.	Neither EPA (2004), nor EPA (2002) suggest that species accumulation curves are required to be prepared for each habitat type. EPA (2004) gives an example of species accumulation curves being used as a means to assess the level of knowledge over an area. This was undertaken during the assessment and results are presented in the report. Species accumulation curves can be presented in a number of different formats and display the number of species accumulated as a function of the cumulative effort expended (eg. time, area, person-hours, or number of individuals). Standard species accumulation curves were produced showing number of species accumulated over the number of sampling days, consistent with How and Cooper (2002), and How and Dell (2004), rather than Thompson *et al.*, (2003; 2007) which plot number of species accumulated over numbers of individuals captured. Species accumulation curves are presented in the report for all major taxonomic groups, for the 2 individual surveys and combined data. An adequate interpretation of the species accumulation curves is given in the text. There is little doubt that additional species would be identified with increased survey effort (after nine separate survey periods over a number of years and seasons How and Dell [2004] predicted that additional species would be recorded). However, data obtained is sufficient to enable an adequate discussion and assessment of species assemblages between habitats and to identify habitats of significance. A discussion of differences in species richness and abundances between sites is discussed in the text and data is presented in Table 9.
The species accumulation curve in Figure 4 rises linearly from day 1 to day 9, not 1 to 5, as the report suggests.	Four species accumulation curves are presented in Figure 4, three of which terminate at day 7 (so therefore cannot rise linearly to day 9). The report does not suggest that the species accumulation curve (or curves?) in Figure 4 rise linearly from day 1 to 5.
Australian arid fauna is well adapted to fire. Given that none of the survey sites had been recently burnt; on what basis do the authors conclude 'the relatively low species count may also have been due to habitat disturbance and simplification through repeated and frequent fires' (p. 23)? For the survey effort applied and the sampling period (e.g. winter and autumn) was the species count lower than	It is acknowledged that Australian arid fauna is well adapted to fire. However, it is also acknowledged that numerous authors have highlighted the negative impact changes to traditional fire regimes, and particularly frequent broadscale fire, have had on ground fauna in hummock grassland habitats. Fire management in arid regions is a major conservation issue and the EPA has recently released an issues paper in an attempt to improve the situation: *"Fire in the Kimberley and Inland Regions of WA* [including the Pilbara]— *Issues Paper"* (EPA, 2005). At a local scale How and Dell (2004) p 91 report that in consideration of reptiles: *"On the burnt sites both the number of species and individuals declined in the nine months post fire and these areas had both a lowered species diversity*

Submission Issue	Response
what might have been expected? Based on data from other surveys and other sites? How do the authors reach this conclusion? The authors' assertions here are probably incorrect.	*and evenness"* and concluded that: "*Fire had a marked effect on abundance and composition of species in* Triodia *habitats".* The paragraph on Page 23 (that relates to the first round of sampling only) acknowledges that increased sampling, particularly in more favourable conditions, would result in more reptile captures. However, considering the frequency and scale of recent fire over the landscape it would be negligent to not state that this disturbance may also have had an adverse impact on both abundance and diversity of reptiles during the sampling period. It is unclear which particular group (mammals, amphibians, reptiles, birds) the second section of Point 14 is referring to. However, discussion in Section 4.1 (Sampling Adequacy) Section 4.2 (Fauna Habitats) and Section 5.0 (Regional Comparison) compares and contrasts results obtained from Spinifex Ridge, including reptiles, with other similar surveys undertaken in the region, particularly BHPB (2005).
A map of the site indicating the spatial distribution of the major fauna habitat types was required.	A map of the site indicating the spatial distribution of the major fauna habitat types is included in the PER document.
Table 10 does not make sense. Percentages normally add to 100. They don't for either rows or columns, and it is not clear what 'trap-rates' relates to.	Table 10 refers to Percentage Trap Rates. A "Trap Rate" or "Trap Success Rate" is a standard and well-known format used to express trapping data. It is the number of captures divided by the number of trap nights. A trap-night is one trap set for one night. Trap success rate is usually expressed as a percentage (Percentage Trap Success Rate), or number caught per 100 traps. If methodology is standard, comparisons can be made between sites or over time. Table 10 provides the reader with total percentage trap rates for the various trap types used during the survey.
It is no longer acceptable to report presence only data in tables (e.g. Tables 11, 13, 14 and 15). EPA Position Statement No 3 (2002) requires an assessment of ecosystem function values. To do this an understanding of the assemblage structure is essential. This is not possible based on presence only data, particularly when the survey probably only recorded 40-60% of the species in each habitat.	Tables 11 to 15 provide a clear summary of total species recorded during the surveys and within which sites they were recorded. This is a common format for presenting data that presents the reader with a clear summary of the primary findings of the survey and is on that is used by many authors (eg. the recent report by Ecologia for BHPB, 2005). A discussion of differences in species assemblages between regional sites is given in Section 5.0 (Regional Comparison), and data for Spinifex Ridge is summarised in Table 9. The report addresses biodiversity at the appropriate scales of genetic, species, and ecosystem in sections 5, 7 and 8 as described and defined by EPA (2002). Because of previous regional work and records from several databases, it was also possible to augment site data and provide lists of species with the potential to occur over the project area with a high level of confidence.
CALM changed to DEC in July 2006. The final report date was November 2006, long after DEC changed its name.	The report was written before the change in department structure and name, with a first draft released in July 2006, and a final draft released in November, 2006. Nevertheless, changes to departmental naming should have been made.
Advice from aboriginals in the area is that Golden Bandicoots were present in the area until recently. This	A recovery Plan for the Golden Bandicoot *(Isoodon auratus)* that summarises historical information has recently been prepared (Palmer, *et al* 2003). Although once known from the Pilbara it is now considered extinct in the

Submission Issue	Response
species is not mentioned. Marsupial Moles have been caught on the Telfer pipeline, Telfer, Nifty, etc and are likely to be present in suitable habitat in the vicinity of this site. This species is listed as Endangered under the *EPBC Act 1999*. This species has largely been ignored.	bioregion. The most recent record for central Australia is from the Granites (north Tanami), in 1952. Apart from offshore islands the Golden Bandicoot is now restricted to rocky sandstone spinifex habitats and vine thickets in the north coastal Kimberley region. It is extremely unlikely that this species still occurs in the Pilbara, particularly given the level of biological investigation undertaken for resource proposals, and its current range of over 500km to the north and in the tropics. This species is trappable and other techniques utilised during the survey that had the potential to record this species are summarised under Point 6. Given that the Northern Marsupial Mole *(Notoryctes caurinus)* is known from scattered records throughout the sandy deserts of inland Australia; that the only records from the Pilbara Bioregion given in the recovery plan for this species are "Aboriginal records located in stony habitat, that probably refer to the Great Sandy Desert region to the north" (Benshemesh, 2004, Appendix 1); and that the locations mentioned under Point 19 are all over 170km to the east-southeast of the project area in the Great Sandy Desert Bioregion; it is not considered by the author "likely" that this species is present in suitable habitat in the vicinity of Spinifex Ridge. However, a separate fauna report *"Spinifex Ridge Molybdenum Project Fauna Assessment: Proposed Water Supply Areas and Service Corridors* (OES, 2007) assesses fauna over proposed service corridors associated with the project. As these corridors are located closer to regional records OES (2007) considers this species as potentially occurring and impacts and appropriate management are documented in the report as well as in the PER.
The recording of *Dasykaluta rosamondae* at this site probably represents a range extension that perhaps should have been discussed.	Records for this species are known from both the north (BHPB, 2005), and the west (How and Cooper, 2002); as well as numerous records from the south and east (FaunaBase, 2007). The record from Spinifex Ridge, therefore, is not considered a range extension and a discussion of bioregional endemism and species close to edges of distribution (pertaining to this species) are discussed in the report.
Day time temperatures are not the only driving factor for reptile activity. Surveys in July-August, and April-May in the Pilbara are not appropriate for recording all the species (How and Dell 2004). A 30oC day in the south-west of WA in summer may be adequate for all reptiles to be active, but this is not the case for reptiles in winter in the Pilbara.	Survey timing considered all vertebrate groups (mammals, birds, amphibians, Reptiles), not just reptiles (see Point 26). However, given the recognized biodiversity of reptiles in the Pilbara it was important that this component was adequately considered. Day time temperatures are not the only driving factor for reptile sampling, with other factors including nighttime temperature, humidity, cloud cover, wind and rainfall (Read and Moseby, 2001), as well as pyric successional sequences (How and Dell, 2004). How and Dell (2004) do not advise nor recommend surveys be undertaken in any particular season. Although they report that higher numbers were recorded during summer, an inspection of Table 2 in their report shows that alpha diversity (that is, species richness recorded at the survey site level) was in reality highest during May, September and March. In addition, frog numbers were also included in their figures, and made up a significant component of summer samples (eg. over 33% of all Summer 1989 captures were, indeed, not reptiles but frogs). Frog captures were reliant upon summer rainfall events that are more likely to occur during late summer-autumn. Clearly, the timing of surveys is not clear-cut and dependent upon a number of prevailing site conditions, and maximum species richness recorded at the site level, even for reptiles, is not restricted to summer months.

Submission Issue	Response
	It is unclear where the data and reference for a *"30ºC day in the south-west of WA in summer may be adequate for all reptiles to be active, but this is not the case for reptiles in winter in the Pilbara".* However, the Autumn survey at Spinifex Ridge corresponded with EPA Guidance and followed the season of maximum rainfall, and both surveys were undertaken during maximum temperatures of 30ºC or greater. Thirty reptiles were identified from Spinifex Ridge compared to between 24 and 32 recorded by BHPB (2005) at four individual locations in similar habitats within 50kms. Differences and similarities in species make-up are discussed in Section 5 (Regional Comparison) of the report. Survey timing is also discussed under Point 26.
Species lists in Tables 11, 12 and 15 should have been organised based on families.	Species lists that are based on families are provided in Appendix A
No scientific names of birds are provided in Table 13.	Most readers would refer to birds by their common names. Scientific names are provided in the report as Appendix A
The relevant data from BHPB (2005), Biota Environmental Sciences (2004;2005a; b), ecologia (2004), How and Cooper (2002) and How and Dell (2004) should have been included in an appendix. These data would enable the reader to test the authors' claim that the Spinifex Ridge mammal fauna is 'comparable to that at BHPB Goldsworthy sites' Why not use estimates of species richness for mammals and similarity indices to demonstrate similarity. Elsewhere in the Pilbara (and the Goldfields) mammal, reptile and bird assemblages vary significantly spatially within a habitat type and among habitat types, yet the authors' claim they are similar across sites at Spinifex Ridge and with BHPB sites, based on very small samples. These statements either need to be supported with data and analysis, or corrected.	The author is not aware of additional raw data being included as appendices in other reports of this nature, other than when the data was collected by the same organisation. This was not the case here. All relevant texts are publically available if referencing is required to be verified. EPA (2002) states that surveys need to provide sufficient information to address biodiversity value at; o the genetic, species, and ecosystem levels; and o its ecological functional value at the ecosystem level, and that site-specific data should be interpreted in a local or regional context. Information and discussion is provided in the report that addresses the points above. Biodiversity values have been discussed at the genetic, species, and ecosystem levels. Differences in species makeup between sites at the local scale has been discussed. Comparisons with fauna documented at Spinifex Ridge and four BHPB sites have been made, including an interpretation of differences and similarities between the data collected and probable reasons. Site data has been placed in the local and regional context, including the identification of locally and regionally-significant fauna and habitats. Ecological function has been considered, and locally significant habitats important for ecological function identified.
How is the comment about DEC recent surveys in the Pilbara (p. 38) relevant if no data are available? The DEC surveys are also being conducted for a different purpose and it is likely that these data will be of little values for site specific developments.	Reference to a multi-disciplinary five year regional study pertaining to fauna of the Pilbara Bioregion is relevant information for inclusion in a fauna report that assesses a resource proposal in the regional context, whether information is currently available or not. For example, range extensions for particular species may come to light in the immediate future that could change the outcome of the regional or local significance assessment for a particular species. The author is aware that data collected during regional surveys may not be consistent with local surveys and this is the reason the survey is not 'dot pointed' with other local surveys on the page and is considered in a separate paragraph.

Submission Issue	Response
The report indicates the seasonal conditions were excellent for surveying mammals, birds and amphibians and adequate for reptiles. Based on what data and cited references? Spring and summer surveys are generally much better survey periods in all areas of WA except the Kimberley including the Pilbara (see How and Cooper 2002; How and Dell 2004; Thompson 2007).	How and Cooper (2002) and How and Dell (2004) do not advise nor recommend surveys be undertaken in any particular season (see Point 21). Indeed, How and Cooper (2002) report numbers of most mammals were lowest during the summer of 1988 in their study. The notion that spring and summer surveys are better survey periods in all areas of WA except the Kimberley and including the Pilbara is overly simplistic, contradicts the recommendations of the EPA (2004), and has a primary focus on reptiles. Site conditions prevailing at the time probably have more influence on capture rates than any general guidance on timing. For example, of the references cited How and Cooper (2002) present significant changes in capture rates correlated to previous local rainfall and How and Dell (2004) report a similar correlation with fire. The Spinifex Ridge study site is located in one of the hottest regions in Australia. The average summer temperature during summer is over 40ºC with temperatures during many days often exceeding this. Mammal and reptile capture rates are severely compromised by temperatures of this scale (eg Biota, 2005a report low capture rates attributed to extreme temperatures). Survey timing conformed with EPA (2002) with a preference for multiple surveys over a variety of seasons with the season that follows the season of maximum rainfall most productive. Seasonal conditions were excellent for surveying mammals, birds and amphibians. Recent rains prior to both survey periods enabled frogs to be sampled (a rare event in arid regions). Both migratory and nomadic birds were present during the July-August 2005 survey due to habitual patterns of movement responding to seasonality, and the prolific flowering over the site at the time that attracted nomadic species. Species of birds and frogs were recorded during the surveys that were nor recorded previously at other surveyed sites within 50kms of the project area. Similarly seasonality and local conditions were excellent for sampling mammals due to favourable previous rainfall, with ideal temperatures and an abundance of seeding and fruiting vegetation. Conditions were considered “adequate” for reptiles, only due to lower than expected nighttime temperatures. Note that the seasonality of surveys in consideration of all individual groups (amphibians, reptiles, birds, and mammals) complied with that recommended by Sanders (1999).
Biota (2004) is a Flora and Vegetation survey – How is this useful for comparisons of fauna assemblages?	The title in the reference section of the report: Biota (2004) Biota Environmental Sciences Pty Ltd. Vegetation and Flora Survey of the Proposed FMG Stage A Rail Corridor. Published in Pilbara Iron Ore and Infrastructure Project: Stage A Port and North-South Railway Public Environmental Review for Fortescue Metals Group, Appendix H. Document prepared by Environ Australia Pty. Ltd, September 2004. Should be replaced with: Biota (2004). Biota Environmental Sciences. Fauna Habitats and Fauna Assemblage of the Proposed FMG Stage A Rail Corridor. Perth: Fortescue Metals Group, unpublished report.
Section 8.4.1. Should refer to the WA Wildlife Conservation (Specially Protected Fauna) Notice of 2006, not 2004.	The first draft of the report was released in July 2006, with a final released in November, 2006, before the release of the December 2006 notice (therefore 2004 is appropriate).

Submission Issue	Response
The rainfall in July 2005 and April 2006 potentially influenced the sampling yet in the limitations this was not considered a constraint. See comments on p. 23 about unfavourable conditions for reptiles and p. 34 about exceptionally strong winds but these issues were not addressed in the limitations.	Previous rainfall to surveys enhanced local site conditions. Page 23 in the report refers to the first survey in respect to reptiles only. The limitations table refers to all groups over both surveys and overall this is not considered a constraint. Similarly the reference to strong winds related to birds at a few sites only and during one survey period, and overall is not considered a constraint to the survey. References to these local site conditions affecting particular vertebrate groups are presented in the appropriate section of the report rather than in the 'summary of potential constraints' table that summarises both surveys overall.
When the limitations section indicates resources were not a limitation, it is not appropriate to indicate 'time constraints reduced' the trapping effort.	Table 17 is accurate and valid. 'Resources' were not a constraint, and 'remoteness/access' is flagged as a 'limited constraint' only; because all habitats were adequately surveyed.
The authors claimed the survey was systematic, equal and standardised, yet there are temporal variations, trap number variations, survey duration variations between and among sites. This claim is incorrect.	From the report: *"Systematic sampling was that collected over a fixed time period in a discrete fauna habitat, using an equal or standardised sampling effort".* This statement is correct. o Survey grids of equal size (100m by 100m) were established in all habitats identified. o Bird censussing was undertaken by the same person, using the same methodology, for the same amount of time on all occasions o Inventory sampling was undertaken over survey grids using standard methodology o Spotlighting was undertaken over survey grids using standard methodology o Trapping layout was standard over all survey grids except over two sites where it was impossible to install the planned number of pit traps. Trap effort varied periodically between sites due to unforseen circumstances such as the inability to install some pit traps in particularly hard rocky substrates, and changes to trapping regimes due to unexpected changes in logistics or weather. This is common during biological fieldwork and is not unexpected. Similarly, definition of "project area" and "area of impact" can change through time as a proposal develops, leading to sampling anomalies temporally, particularly when a proponent engages ecologists early in the proposal to guide project design. This should be encouraged. Comparative analysis using percentage trap success rates can easily overcome issues due to minor anomalies in trap effort between sites or over time. Minor inconsistencies in time spent at various sites can be overcome by ignoring data obtained from additional sampling. There is nothing unusual or unexpected in the minor irregularity of data collection reported during a survey of this scale.
Table 17 overstates the case in the following areas: a) *Proportion of fauna identified* on a habitat basis - It is clearly incorrect to suggest that the data presented records	Table 17 is considered accurate and valid a) Table 17 does not refer, nor intend to refer, to *'on a habitat basis'*. Data from the Spinifex Ridge survey indicates that the number of taxa recorded (127 vertebrate taxa) is typical or exceeds a survey of this scale in

Submission Issue	Response
a high proportion of the total vertebrate fauna per habitat or even overall (see Thompson 2007; Thompson *et al.* 2007 and references contained within); b) *Timing and weather* – the authors of the report indicate limitations in the text yet these are not disclosed in this table; c) *Intensity* – the survey effort was inadequate to assess species richness, assemblage structure or ecosystem function values at the habitat level. This is a serious constraint; and d) *Resources* – were not limiting yet Table 17 indicates time constraints stopped field staff from doing the survey properly.	this bioregion, and is comparable to data collected at four sites within 50kms to the north (BHPB, 2005). Because of previous regional work and records from databases, it was also possible to augment site data and provide lists of species possibly occurring over the project area with a high level of certainty. b) See Points 29 and 20. Minor local limitations affecting particular survey sites or individual vertebrate groups during a particular survey period are correctly referred to in the text and overall are not considered a constraint to the survey. c) In accordance with EPA (2002) and EPA (2004) robust data was collected over two seasons, with one following the season of maximum rainfall, from a total of seven sites and six broad habitat types. Fauna trapping will never record all fauna species that may occur within a study area and this is a well recognised limitation. Data was also obtained using other techniques. Total trapping effort over the two surveys was 1,890 trap-nights. Inventory searches, spotlighting searches, and avifauna censussing of survey sites totalled 3,210 minutes. Targeted searches were also made for specific or significant terrestrial fauna within specified habitats at a total of 870 minutes. Bats were sampled by the recording of echolocation calls using an Anabat system over 14 nights, and opportunistic sightings of all fauna were documented over the entire survey periods. EPA (2002) states that surveys need to provide sufficient information to address biodiversity value at the genetic, species, and ecosystem levels and its ecological functional value at the ecosystem level. Data from the Spinifex Ridge survey indicates that the number of taxa recorded (127 vertebrate taxa) is typical for a survey of this scale in this bioregion, and is comparable to data collected at four sites within 50kms to the north. Because of previous regional work and records from databases, it was also possible to augment site and provide lists of species possibly occurring with a high level of certainty. Sufficient data was collected to compare species richness and abundances between habitats in a general sense and a discussion of both is given. The report addresses biodiversity at the appropriate scales of genetic, species, and ecosystem as described, and defined, by EPA (2002). d) Table 17 does not indicate that time constraints stopped field staff from doing the survey properly. 'Resources' were not a constraint, and 'remoteness/access' is appropriately flagged as a 'limited constraint' only, because all habitats were adequately surveyed.
Table 18 – Based on the available data there is no way that the knowledge of the vertebrate fauna in the vicinity of Spinifex Ridge could be assessed as 'high'. High would mean providing an accurate species list and a detailed description of the assemblage structure for each of the major habitat types. Clearly these data are not available.	Table 18 addresses "Factors influencing the design and intensity of the fauna survey". This is an assessment of the level of knowledge known before the survey commences. A direct quote from Table 18 is below: o "Bioregion and level of existing survey/knowledge" o "Level of existing knowledge moderate in IBRA region due to prior surveys undertaken. Knowledge high in the vicinity due to ongoing surveys for the mining industry" This assessment is valid. When compared to other bioregions in Western Australia the existing knowledge of the

Submission Issue	Response
	Pilbara bioregion is at least "moderate" due to the level of biological survey work undertaken for resource assessments. Considering that data was available from a comprehensive survey undertaken over four areas in similar habitats within 50kms of the project area, in comparison to other areas of WA knowledge of vertebrate fauna in the vicinity was considered high. Accurate species lists from these areas were available prior to the commencement of the Spinifex Ridge survey.
Because of the low survey effort, the authors are unable to describe the terrestrial vertebrate assemblage in any of the major fauna habitat (e.g. estimate species richness, assemblage structure). They are therefore not in a position, as required by Position Statement No 3 (EPA, 2002), to 'provide sufficient information to address biodiversity conservation and ecological function values' (p. 12).	Moly Mines and its consultants consider that the fauna survey and assessment adequately addresses the requirements of EPA (2002). EPA (2002) states that surveys need to provide sufficient information to address biodiversity value at; o the genetic, species, and ecosystem levels; and o its ecological functional value at the ecosystem level, and that site-specific data should be interpreted in a local or regional context. Adequate information and discussion is provided in the report that addresses the points above. Biodiversity values have been discussed at the genetic, species, and ecosystem levels. Genetic: Species complexes, species at or near the edges of their distributions, geographically restricted species and specific habitats that are important for genetic connectivity have been identified. Additional detail of these habitats is provided in the PER. Species: Endemism, biodiversity hotspots, diverse assemblages and significant habitats for species not necessarily of conservation significance have been identified and appropriate management of these areas is expanded upon in the PER. Species of conservation significance at various spatial scales have been identified. Ecological Function at the Ecosystem Level: All fauna habitats have been identified and a map is provided in the PER. Three habitats have been identified as having particular functional attributes that are important at the local scale such as mesic qualities, routes for immigration and emigration, or patchy distribution and local refugia. Site data has been placed in the local and regional context, including the identification of locally and regionally-significant fauna and habitats. Differences in species makeup between sites at the local scale has been discussed. Comparisons with fauna documented at Spinifex Ridge and four BHPB sites have been made, including an interpretation of differences and similarities between the data collected and probable reasons.
From the perspective of assessing the potential impact on the terrestrial biodiversity, a comprehensive Level 1 fauna assessment (that does not include trapping) with a bat survey would have provided the EPA and Moly Mines with the same level and quality of information. This would have saved Moly Mines a considerable expense and time, and resulted in the same conclusions and management recommendations.	The Level 2 survey added considerable knowledge of the vertebrate fauna occurring over the project area including evidence of 26 mammals, 63 birds, 34 species of herpetofauna, and 3 fish. Documentation of the species assemblage present combined with additional data allowed comparisons to be made between habitats, and with comparable regional sites. Seven species of conservation significance were recorded including the Northern Quoll, Orange Leaf-nosed Bat, Ghost Bat, Western Pebble-mound Mouse, Australian Bustard, Bush Stone-curlew and Rainbow Bee-eater, and known locations and habitats were identified. The level of information obtained significantly informed and influenced development concepts.

Submission Issue	Response
Should the EPA require Moly Mines to comply with the EPA Position Statement No 3 and Guidance Statement No 56 and to provide adequate information about the terrestrial vertebrate fauna in each of the habitat types so that it can understand the likely impact on biodiversity and in particular species of conservation significance, then the area will need to be properly surveyed. This means doing it again. The choice is for the EPA to either 'fly blind' and approve of this as an adequate assessment or require that the job be done properly. My strong recommendation is for the EPA to direct that Moly Mines Pty Ltd have the job done properly.	Moly Mines and its consultants consider that the fauna survey report and assessment documented in the PER complies with EPA (2002) and EPA (2004). All habitats and fauna of conservation significant have been identified, and those important to ecological function highlighted. Relative abundances of all but the most common species cannot be determined without an enormous survey effort over many years, and it is doubtful that such information would be particularly useful as abundances vary greatly from year to year. An appropriate environmental impact assessment has focused on potential impacts to ecological processes, significant habitats and fauna of conservation significance at various spatial scales. It would be highly unlikely that additional survey effort would substantially change the outcomes of the work for the purposes of the *Environmental Protection Act 1986* impact assessment process.

3.2.4 Submissions on Closure, Decommissioning and Rehabilitation

		Submission Issue	Response
DOIR	Closure	The information on progressive rehabilitation and closure is limited, and should be expanded	Additional detail will be included with the Mining Proposal which will be submitted to DOIR for approval prior to project commencement.
DOIR	Closure	The closure plan could potentially be renamed the 'Progressive Rehabilitation and Closure Plan', and incorporate planning for progressive rehabilitation of the site. At present, there is no plan that specifies how progressive rehabilitation will be implemented	Options for progressive rehabilitation have been reviewed and this process will continue through the detailed design phase of the operation. Additional detail will be included with the Mining Proposal which will be submitted to DOIR for approval prior to project commencement. Opportunities for progressive rehabilitation that have been identified to date include the filtered tailings storage area and waste landform slopes.
DOIR	Closure	The 'Closure Plan' should include a section for each project component or domain at the site (e.g. TSF, WRD1, WRD2, WRD3, plant area, pit, access roads, airstrip etc), and state the closure objectives, preliminary completion criteria, management actions, rehabilitation specifications and planned monitoring for each domain.	The Closure Plan is conceptual at this stage of the project with additional detail to be included through the detailed design phase and in preparation of the Mining Proposal which will be submitted to DOIR for approval prior to project commencement.
DOIR	Closure	As part of the rehabilitation/closure plan a pit cross section should be provided showing the various lithologies to be mined, based on drill logs. A preliminary assessment should be made of the volumes of each lithology that will be mined, and an	A cross section is included in the PER (Figure 4-4). Additional detail, including lithology volumes will be included with the Mining Proposal which will be submitted to DOIR for approval prior to project commencement.

		Submission Issue	Response
		assessment should be made of:- volumes of competent lithologies likely to produce hard, blocky wastes; volumes of softer lithologies likely to be susceptible to erosion; volumes of potentially sodic/expansive clays.	
DOIR	Closure	A breakdown of volumes of materials required for construction/rehabilitation should be provided (e.g. TSF embankment, ROM pad, WRD1 & 2 basal layer and cover system, TSF cover, erosion resistant material for waste dump armouring), indicating the likely lithology they will be sourced from, to establish that sufficient suitable material will be available for rehabilitation.	Additional detail, including volumes for construction and rehabilitation, will be included with the Mining Proposal which will be submitted to DOIR for approval prior to project commencement.
DOIR	Closure	The anticipated volumes of growth media required to rehabilitate each facility should be estimated. The estimated volume that can be recovered via pre-stripping should be provided.	Detailed volumes of growth media will be determined as part of the Mining Proposal, with approval required from DOIR. The approach for determining volumes has been to attempt to strip 0.3 m of growth medium and replace to a similar depth. Given the large area that will not require rehabilitation (ie the pit slopes), sufficient material should be available, even with the skeletal soils that are common over much of the area. Where a greater depth of suitable material is available, this will be stripped prior to placement of the waste rock and tailings.
DOIR	Closure	If there is likely to be a shortage of growth medium a commitment to investigating alternative sources of "growth medium" (such as regolith, or crushed waste rock), and trials to establish the suitability of this material for this purpose, should be made.	Rehabilitation trials are planned for the major mining components, and these trials will include other suitable growth medium material, including tailings.
DOIR	Closure	The sequence of waste extraction should be considered, to determine if stockpiling of waste for later use in rehabilitation is required (such as competent waste suitable for rock-armouring outer waste dump slopes, or waste with higher water retention properties suitable for use in construction of the store/release cover system), or if selective placement of material is required (such as encapsulation of material susceptible to erosion).	Moly Mines is continuing to investigate options to use waste rock materials as growth media, and to re-create a soil profile that is functionally similar to the original. The information gained, will be integrated with information on other properties such as the potential for acid formation, and where practicable the sequence and placement of wastes will be managed to optimise all aspects of the final landform. Characterisation work undertaken to date has indicated that some stockpiling will be required, eg to ensure that the PAF encapsulation can be achieved. Further characterisation work is continuing and material handling schedules will include consideration of this work.
DOIR	Closure	Material for use in construction of the cover system on the TSF will presumably be sourced from waste rock generated from the pit. The location of the TSF to the N of the Talga Range, and	The tailings disposal concept has changed and the new approach is detailed in Section 2.2 of this response to submissions report. One of the beneficial consequences of the new tailings design approach is that it is will allow for

		Submission Issue	Response
		the pit to the S, will require waste rock for the TSF cover to be transported through the tunnel or hauled around the ridge, representing a significant liability if the mine unexpectedly closed. Material required to construct the TSF cover system should be stockpiled adjacent to the TSF, prior to discharge of tailings to this facility. If the active area of the TSF increases progressively, then potentially stockpiling of cover materials could also occur progressively, provided sufficient cover material for the active area of the TSF is stockpiled adjacent to the facility. If the TSF could be operated with a series of cells that could be progressively rehabilitated, this could reduce the liability associated with the facility compared to having the entire facility active.	progressive rehabilitation of the tailings storage facility, as recommended by this submitter.
DOW	Closure	The acceptability of leaving a saline open void a short distance from a significant natural water feature, Use of water from Woodie Woodie as process water at Coppin's Gap, and impacts from construction and management of supply lines,	Upon closure it is proposed that the surface water diversion bunds will remain in place and the mine void will behave as a groundwater sink, with evaporative losses exceeding surface and groundwater inflow. The void water quality will, with time, increase in salinity but, based on the geochemical characteristics of regolith, waste and low-grade ore samples, is not expected to acidify. Water levels within the void are expected to rise to between -90 and -30m AHD (~200-250m below surface) over a period of up to 1000 years. As ids the case with natural water currently in the Coppin Creek system, metals such as Molybdenum and Arsenic are likely to be present at levels that exceed guidelines for some uses. Since the groundwater gradient will be toward the void, pit void water quality will not affect water quality in other locations, such as Coppin Creek. A flow-through closure option has been considered, however, with the information currently available, is considered higher risk. For a water storage "reservoir", the lack of data on stream hydraulics results in risks and uncertainties related to demonstrating that the system will operate sustainably and without impacts, after closure. During the mine operating life, more data will become available and will be used to assess the option for a flow through system based on a more detailed understanding of the hydrology, hydrogeology and void geochemistry.
DOIR	Closure	The issues associated with a pit lake following closure do not appear to have been considered, or are not clearly stated. Clarify whether the pit lake will be a sink or a throughflow system; present results of modelling to predict likely pit-lake water quality following closure, with consideration given to exposure of any potentially acid forming material in pit walls;	Upon mine closure it is proposed that the surface water diversion bunds will remain in place and the mine void will behave as a ground water sink, with evaporative loss exceeding surface and groundwater inflow. The water levels within the void are expected to rise to between -90 and -30m AHD (~200-250m below surface) over a period of up to 1000 yrs, depending on climatic variation. The void water quality will, with time, increase in salinity but, based on the geochemical characteristics of the regolith, waste and low-grade ore samples, is not expected to acidify. Metals

		Submission Issue	Response
		what depth will the pit lake recover to, will there be potential for overtopping following extreme rainfall, if so, what impact will overtopping have on surface water quality	such as molybdenum and arsenic are likely to be present at levels that exceed guidelines for some uses; this is currently the case with natural Coppin Gap water. (PER Appendix I. *Spinifex Ridge Mine: Groundwater Response to Mining*, PER Appendix M, Campbell, G., 2007. *Spinifex Ridge Project. Geochemical Characterisation of Regolith, Waste-Bedrock and Low-Grade-Ore Samples. Implications for Mine-Waste Management).* A flow-through closure option has been considered, however, with the information currently available, is considered higher risk. For a water storage "reservoir", the lack of data on stream hydraulics results in risks and uncertainties related to demonstrating that the system will operate sustainably and without impacts, after closure. During the mine operating life, more data will become available and will be used to assess the option for a flow through system based on a more detailed understanding of the hydrology, hydrogeology and void geochemistry.

3.2.5 Submissions on Environmental Health and Socio-Economic Issues

		Submission Issue	Response
DOH	Environmental Health	DOH considers that the report *"Occupational and Environmental Health Hazard Identification for the Mine and Processing Plant at the Spinifex Ridge Molybdenum and Copper project*" prepared by Glossop Consultancy for the proponent in June 2007 should be translated into a formal Health Risk Assessment and subsequent Health Risk Management Plan	The work undertaken will be incorporated into the site risk assessment and management actions assigned. Information from this work will also be included in the Project Management Plan that requires approval from DOCEP prior to commencement of mining
DOH	Environmental Health	An integrated mosquito management program needs to be developed, to ensure that exposure of employees to mosquito-borne diseases (Ross River virus; Barmah Forest virus; Murray Valley Encephalitis) is minimised. The program should address management of mosquitoes breeding on-site and off-site (but dispersing on to the site) including: monitoring to warn of the risk of nuisance/disease carrying mosquitoes and to inform the location and timing of control measures; chemical control of larval mosquitoes in man-made breeding sites and in natural breeding sites in close proximity to residential quarters and the workplace; adult mosquito control using fogging and/or residual surface sprays; source reduction (removal or modification of mosquito breeding habitat);appropriate location, design and maintenance of project infrastructure that may breed mosquitoes (e.g. wastewater, stormwater infrastructure); and provision of advice, seasonal warnings, insect screens, personal repellents, appropriate clothing, etc to enable employees to reduce their exposure to biting mosquitoes; Alterations of topography that enhance retention or impoundment	Potential for mosquito borne viruses will form part of the site risk assessment and management actions developed for the design, construction and operational phases of the project. Advice from DOH will be sought in developing appropriate actions in managing the risk of these diseases.

		Submission Issue	Response
		of rainwater and runoff, or that promote scouring should be avoided so as to minimise opportunities for mosquitoes to breed; Constructed water bodies (e.g. constructed wetlands, tailings dams, potable water tanks, storm water management etc) must be designed and regularly maintained so as to minimise the potential for mosquito-breeding; The potential public health risk for visitors to Coppin Gap from exposure to mosquito-borne disease (from mosquitoes dispersing to the tourist destination from breeding habitat on the mine-site or on land surrounding the mine-site	
DOH	Environmental Health	All on-site wastewater treatment/disposal and reuse systems serving the administration buildings and accommodation camp will need to be approved by the local government and the Department of Health and be designed and installed in accordance with the requirements of the Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974.	Acknowledged. Approvals for these systems will be obtained from relevant authorities prior to construction
DOW	Dust	Consideration should be given to product loading at the port to ensure that it does not result in increased dust levels at the town of Port Hedland. This "downstream" impact of the project should be addressed as part of the project proposal	The issue of dust at Port Hedland is recognised and operation and management of the shed facility will be an important component of the approval and ongoing management of the proposed multi-user facility, which will be subject to separate approval processes.
WFS	Tourism	Environmental and tourism values will be destroyed by the project	Management of the project has identified and addressed the environmental issues for the project. Tourism is a small but important landuse and this will continue to be undertaken at Coppin Gap. Currently an estimated 60 – 100 vehicles visit the Coppin Gap each year. Environmental values are discussed throughout the PER. Moly Mines considers that effective management will result in development and operation of the project with no significant adverse environmental impacts.
DOIR	Visual Amenity	To reduce the visual impact of the pit face cut into the Talga Range, the progressive revegetation of pit benches on the range face should be considered. Establishment of "bands" of vegetation on this exposed face, as is common on steep ridges in the Pilbara, will reduce visual impact of the pit face. This revegetation will most likely need to be conducted progressively during operations, as access to benches at completion of the mine may be unsafe. Revegetation of these benches may also have positive benefits via re-establishment of fauna habitat	This is agreed in principle, and progressive rehabilitation of pit benches will be included in the Rehabilitation Management Plan as a task to be investigated, and strategies to be developed as practicable.
DOIR	Visual amenity	Two of the main public viewing points of the project following closure will be from the access road to Coppin Gap, and from Coppin Gap itself. Simulated views of the project area from the access road, and from the northern and	Views of the waste dumps, pit, TSF and creek bund will not be available from Coppin Gap due to the riparian vegetation along the creeks there. There are sections of Reserve 31047 where views of mining infrastructure will be available, but these

		Submission Issue	Response
		southern end of Coppin Gap, should be provided.	require walking away from the main focus of the Reserve (ie Coppin Gap and the pool) and will not be dominant features of the view at these points. The access road to Coppin Gap will be oriented to minimise views of the mining infrastructure.
Wildflower Society	Visual amenity	The views from Coppin Gap will be significantly impacted by both waste dumps, tailings storage facilities and probably the bund for the diverted creek and also a massive pit will also be left	Views of the waste dumps, pit, TSF and creek bund will not be available from Coppin Gap due to the riparian vegetation along the creeks there. There are sections of Reserve 31047 where views of mining infrastructure will be available, but these require walking away from the main focus of the Reserve (ie Coppin Gap and the pool) and will not be dominant features of the view at these points. The access road to Coppin Gap will be oriented to minimise views of the mining infrastructure.
Cons Council	Visual amenity	The scenic value of Coppins Gap will be significantly reduced. Large manmade landforms (the pit and waste dumps) will become dominant landscape features in the area immediately adjacent to Coppins Gap	Views of the waste dumps, pit, TSF and creek bund will not be available from Coppin Gap due to the riparian vegetation along the creeks there. There are sections of Reserve 31047 where views of mining infrastructure will be available, but these require walking away from the main focus of the Reserve (ie Coppin Gap and the pool) and will not be dominant features of the view at these points.
Cons Council	Access to Coppin Gap	It is highly unlikely that the aesthetic and indirect impacts on Coppin Gap will be viewed as acceptable by a majority of stakeholders following mine construction. There is no sense in decision makers talking themselves out of this reality during the assessment process. The local community, indigenous community and conservation community are raising this as an issue now, the project will be judged based on the real life impacts, not on documentation produced pre-mining; however well informed it appears to be.	The vast majority of stakeholders, in particular members of the local and indigenous communities, have expressed an opinion that the project is acceptable provided that activities are kept out of the reserve and mining infrastructure is kept as far as practicable away from Coppin Gap. These views have been incorporated into the project. Aesthetic and indirect impacts have been considered in the project design and will continue to be a consideration as detailed design progresses.
WFS	Access to Coppin Gap	The Company has not shown in the PER how access to Coppin Gap and significant sections of Coppin Creek will be maintained	Access to Coppin Gap will use the track to be established to the east of the mining infrastructure. Access to sections of Coppin Creek upstream of Coppin Gap will be restricted due to the presence of mining activities. This area has restricted access at present due to the project exploration activities
WFS	Tourism	The project will infringe on Coppin Gap as there will be restricted access from the danger of fly rock during blasting	Blasting will be undertaken at regular times with appropriate consideration for people visiting Coppin Gap. Restriction to Coppin Gap will be minor and only to the extent necessary to ensure public safety
WFS	Tourism	Access to Kitty's Gap will not be maintained and access between Coppin's Gap and Kitty's Gap will be blocked with a waste dump	Access to Kitty's Gap will not be available during the life of the mining operation due to potential public safety issues. Access will be re-established following mining using the track that will be used by the light vehicles associated with the project. Currently many visitors to Coppin Gap do not continue through Kitty's Gap as the road condition is significantly worse than the Coppin Gap access and the landscape at Kitty's Gap is much more subdued.

		Submission Issue	Response
Cons Council	Tourism	Coppins Gap is promoted by local tourism operators who run regular day tours. This tourism relies on its natural beauty and would be severely compromised by this proposed mine that dwarfs the natural features and will impose restrictions on activities such as walking and swimming. Safety signs will be required that will reduce the aesthetic values;	Day tours are run infrequently, not regularly. The natural landscape of Coppin Gap will not be impacted by the mining project and mining infrastructure has been planned with appropriate consideration for minimising visual impact. Restrictions on activities will be minor and consistent with the requirement to ensure public safety. Similiarly signage will be positioned with primary consideration for public safety as well as the visual impact of signs
Cons Council	Tourism	The tourism amenity of Coppins Gap, Kitty Gap and the ranges will be permanently deteriorated by the loss of scenic amenity and the loss of the road to Kitty Gap between the ranges.	It is not anticipated that the use of Coppin Gap for tourism will change significantly during or following mining. Access to the Gap will remain open throughout the operation and restriction of access in the area will be only to the extent necessary to ensure public safety. Usage of the area for tourism is estimated at 60 -100 vehicles per annum.
WFS	Integrated factors	A Community Reference Group should be set up to liaise with interested groups to see that community expectations are met.	Community Reference Groups can be an effective way to involve community representatives in the operation of a project. Moly Mines has developed a close relationship with the community to date and will gauge the interest in formalising a Community Reference Group at the next public meeting for the project
WFS	Integrated factors	There are several commitments made as to management plans. We request that these all be made publicly available and also that each one is covered by a legally enforceable condition. We would expect to see these details outlined in the EPA Bulletin including any proposed bond levels	Management Plans are available as they were presented as part of the PER and were distributed with all copies of the document. In addition the plans are available on the company website. Bonds will be determined by the relevant government department using established procedures Information on bonds imposed by the Department of Industry and Resources is freely available to the public through the DoIR website.
WFS	Integrated factors	Concern that the proponent has not taken into account the following issues:- Location of the project in relation to Coppin Creek and Coppin Gap; Proposed impact on Coppin Creek; Proposed size and location of the waste dumps; Proposed size and location of the pit; Proposed size and location of the tailings dam	These issues have been addressed in detail in the PER with assessment of impacts indicating that these components can be managed in an acceptable manner.
WFS	Integrated factors	After the company leave Coppin Creek will have an artificial alignment; access between Coppin Gap and Kitty's Gap will be destroyed. A waste dump will be over the area and the natural ambience of Coppin gap will be destroyed	Changes to the landscape during and after mining, given the management proposed and effective closure of the site, are not considered to significantly detract from the ambience of the area. Rehabilitation prescriptions will recreate a landscape that blends in with the existing terrain.
Cons Council	Integrated factors	The proponents commitment not to impact on Coppins Gap reserve is clearly window dressing, impacts are inevitable	Mining activities, with the exception of environmental monitoring, will be outside the reserve. As outlined in the PER, no significant impacts on Coppin Gap are expected.

		Submission Issue	Response
DEC	Offsets	As previously advised, DEC notes that the proposed development has the potential to result in residual detrimental impacts to significant biodiversity values. The proponent should consider clearly identifying and describing residual impacts and potential offsets linked with the identified residual impacts in the final PER. Proposed offsets should be discussed with DEC (Environmental Management Branch) in the first instance.	Moly Mines believes that there is minimal potential for the project to have significant residual impact on biodiversity values, and that this has been outlined in the PER. As such, Moly Mines considers that application of EPA Position Statement No.9 - Environmental Offsets does not result in a requirement to prepare an environmental offsets package. Nevertheless, many of the management actions and commitments constitute valid offsets, including the substantial increase in scientific knowledge
WFS	Environmental Protection Principles	The PER has a trivial response to some of the Principles of Environmental Protection. The response to the principle of Intergenerational Equity has disregarded the overall impact on the natural environment of an area set aside for tourism and recreation. The mine could be there for as little as 10 years, destroy the natural values and this project is described as "sustainable development".	The area is not set aside for tourism and recreation and no facilities have been developed at Coppin Gap to cater for these activities. The vesting purpose of the reserve is for the "Preservation of Natural Formations" and these values will not be compromised. Moly Mines management of the project and subsequent closure is directed toward minimising impacts on the natural values identified for the area, and future generations will be able to continue to visit Coppin Gap and the surrounding area.

		Submission Issue	Response
Cons Council	Environmental Protection Principles	The proposed mine at Coppins Gap represents a significant impact on peoples' ability to enjoy the natural values of the Pilbara. The immeasurable benefits of maintaining places of natural beauty that are valued by local communities, indigenous communities and tourists in the face of increasing industrial pressure on regional Australia are very difficult to address through the Public Environmental Review process; hence the Submitter's letter of the 17th August 2006 recommending a PUEA level of assessment for this project. Project proposals such as this challenge us to decide on what we value; are the export dollars of yet another mining project worth jeopardizing permanent natural features that are enjoyed by the community? Coppin's Gap is a unique feature, but more than that it is a unique feature that is uniquely placed to be valued by the community, and to allow visitors to the region to appreciate and understand the natural values of the Pilbara. A large scale industrial facility is simply not compatible with these values. Arguments and modeling by the proponent do not, and cannot, address the fundamental concerns of the Submitter on this matter. It is a choice between what places like Coppin's Gap currently stand for in the eyes of the community, and a paradigm that supports industrial development over preserving these natural values. Whilst the Submitter believes that the values of Coppin's Gap stand alone, even if they are judged to be inadequate to outweigh the likely income from this project; the issue of the message that an approval would send to the local and WA community must be considered by the EPA and Government.	Moly Mines recognises the range of values of Coppin Gap and the surrounding area and has consciously planned to minimise impacts to these values whilst developing and operating a mining operation which will provide significant benefits to the local, regional and state community. In addition, the uses of molybdenum internationally provide enormous global environmental benefits. These benefits include: • use of molybdenum steels in cars to reduce overall weight resulting in reduced fuel use, lower greenhouse gas emissions and safer vehicles for same body weight • use of molybdenum as a catalyst in sulphur removal from diesel resulting in reduced sulphur emissions from vehicles, reducing greenhouse gases and general pollution. • use for anti-corrosion properties in desalination plants to reduce ground and surface water usage • use in hydrocarbon pipelines to reduce risks of catastrophic pipeline failure Moly Mines firmly believes that development of this world class molybdenum deposit can be achieved with global environmental benefits and with environmental impacts that are not significant when effectively managed as outlined in the PER and supporting documentation.

Figure 2 1 in 100 year flood levels

MOLY MINES LIMITED

Western Australia

Spinifex Ridge project

Figure 2
1 in 100 Year Flood Level

0 2500m

Map Projection: MGA 51 (Australia GDA94)

File: j:\3100 spinifex ridge mo\14 gis\mining\infrastructure\site layout\proposed\ moly designed 20071105\mol20071105-a3-05.wor

Compiled: 6 / 11 / 2007 Compiled by: JS

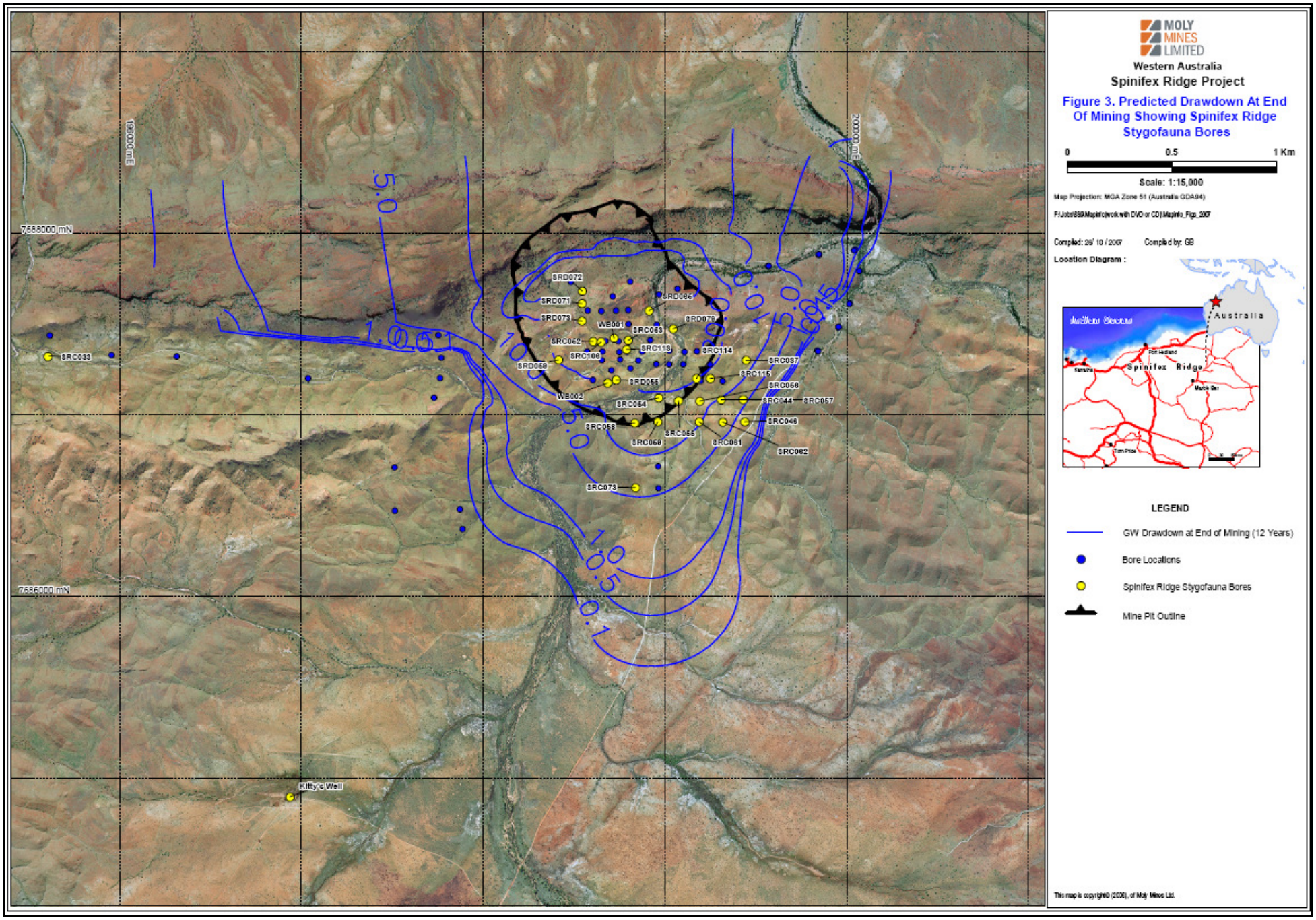
Updated : 8 / 11 / 2007 Checked by : GK

Plan No : Revision No : A

Location Diagram :

- Well or Bore
- Watercourse
- Road
- Highway
- 4WD Track
- Moly Mines Mineral Tenement
- 10 Year Proposed Design Layout
- Nature Reserve 31047

Figure 3 Spinifex Ridge Stygofauna Monitoring Sites


MOLY MINES LIMITED
Western Australia
Spinifex Ridge Project
Figure 3. Predicted Drawdown At End Of Mining Showing Spinifex Ridge Stygofauna Bores
0
0.5
1 Km
Scale: 1:15,000
Map Projection: MGA Zone 51 (Australia GDA94)
F:\Jobs\899\Maps\cwork with DVD or CD\Mapinfo_Figs_2007
Compiled: 29/ 10 / 2007
Compiled by: GB
Location Diagram :
Australia
Spinifex Ridge
Port Hedland
Newman
Marble Bar
Tom Price
LEGEND
GW Drawdown at End of Mining (12 Years)
Bore Locations
Spinifex Ridge Stygofauna Bores
Mine Pit Outline
This map is copyright© (2006), of Moly Mines Ltd.
7688000 mN
7686000 mN
Kitty's Well
SRD072
SRD071
SRD073
SRD066
SRD078
WB001
SRC063
SRC062
SRC113
SRC114
SRC106
SRD059
SRC037
SRC115
SRD055
SRC068
WB002
SRC054
SRC044
SRC057
SRC058
SRC055
SRC061
SRC046
SRC069
SRC082
SRC073
SRC038

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