Government of **Western Australia**
Office of the **Environmental Protection Authority**

Mulga Rock Uranium Project

PUBLIC ENVIRONMENTAL REVIEW
ASSESSMENT NO. 1979

SUMMARY OF PUBLIC SUBMISSIONS – 27 June 2016

This document forms a summary of public submissions and advice received regarding the Public Environmental Review (PER) for the Mulga Rock Uranium Project (MRUP) proposed by Vimy Resources Limited.

The public review period for the proposal commenced on 14 December 2015 for a period of 12 weeks, ending on 8 March 2016. A total of 1192 submissions were received.

The principal issues raised in the submissions and advice received included environmental and social issues as well as issues focussed on questions of fact and technical aspects of the proposal. Although not all of the issues raised in the submissions are environmental, the proponent is asked to address all issues, comments and questions, as they are relevant to the proposal.

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1. The Proposal – General comments

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Department of Health (DoH)	*Public Health Scoping Tool - Mine Sites and Construction Villages* Although previously raised during the scoping exercise, it is prudent to reiterate the potential public health issues that may arise with such a development. The proponent has been provided with a scoping tool that highlights public health issues that should be addressed and incorporated into the proposal. The proponents can use the scoping tool as a checklist of public health issues.	Public health and safety is the highest priority for Vimy. The public health factors listed in the Department of Health (DoH) Scoping Tool include air quality, water quality, land and hazard management, radiation safety, workforce health and communities. These have all been addressed in the PER and will continue to be considered in the development of the Mining Proposal, Mine Closure Plan, Project Management Plan and Radiation Management Plan.
DoH	The proponent should consider developing a Disaster Management and Emergency Response Plan (DMERP) addressing potential disasters within the plant (e.g. facility fire) and external threats (e.g. bush fire, cyclone). The DMERP should consider specific regional requirements and integrate with appropriate authorities (e.g. local governments) and services.	Vimy Resources have prepared an Emergency Response Plan (ERP) for the site as part of the conditions for undertaking the geotechnical investigative trenching program. This ERP addresses bush fires, storms, including cyclones, vehicle crashes and evacuation of personnel from site. The existing ERP will be further developed (and possibly renamed the Disaster Management and Emergency Response Plan) as the project evolves and will be submitted to the Department of Mines and Petroleum (DMP) for approval prior to mining to ensure all relevant health and safety aspects are covered.
Department of the Environment (DoE)	There has not been a Radiation Management Plan (RMP) presented as part of this submission. Information Required – A RMP will need to be included with any license application. It would be useful if a provisional plan were presented in this Public Environmental Review (PER).	Vimy Resources has prepared a Radiation Management Plan (RMP) for the site as part of the conditions for undertaking the geotechnical investigative trenching program. This RMP addresses the health and safety issues, and the management of exposing, handling and utilising radioactive material, such as the orebody. The existing RMP will be updated as the project develops to include tailings management, processing and transport of this material. The RMP for the larger proposal will be developed in accordance with the Radiological Council of WA and DMP Resources Safety to ensure all relevant health and safety aspects are covered.

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DoE	*General comments on readability of entire document* The document is made up of 58 files (corresponding to distinct sections or appendices). Many of these have been produced independently by several authors. A table of contents is not included. Some cross-referencing is provided, however in some cases this does not correspond to the released version of the document. Information Required – A more integrated document with accurate referencing and table of contents would make the reviewing process much easier.	Vimy agrees that the existing PER is large and at times cumbersome. This document attempts to compile over two years' worth of work that has been undertaken by numerous consultants / authors. Simple formatting of such a large document (427 pages, excluding Appendices) is technically challenging, with most word processing programs likely to struggle with such a complex document, particularly when it comes to cross-referencing. However, this format is set by the EPA and Vimy have adhered to the requirements.
DoE	*Executive Summary- - Table E.4 (p ix, x and xvii)* Internal inconsistency. Information Required – 'Subterranean Fauna' highlights some potential impacts on stygofauna in the extraction borefield. However, 'Hydrological Processes' states 'No flora or fauna of any sort will be impacted', and 'Offsets' states 'no subterranean fauna will be threatened as a result of water extraction or water reinjection in borefields. - Clarify which is correct.	In Table E-4 of the Executive Summary there is a statement that relates to potential impacts on Subterranean Fauna which states "Groundwater extraction from the proposed borefield may potentially impact on subterranean fauna present". This is not a statement about actual outcomes but effectively represents a review of the risks to Subterranean Fauna. Later in Table E-4, there is a statement that relates to Hydrological Processes and in particular what the potential impact of the proposed extraction of water would be upon terrestrial flora and fauna. The term 'terrestrial' was not present but should be evident from the context. Terrestrial fauna is different from subterranean fauna. Again in Table E-4, in the section dealing with Offsets the statement is made that "No subterranean fauna will be threatened as a result of water extraction or water reinjection in borefields". This is a statement about whether water extraction or water reinjection threatens subterranean fauna in a manner that would be relevant to any offset assessment. All three statements are correct in their context.

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DoE	*5.3 Project Description Overburden Landforms (Resulting non mineralised landforms) (Pg. 43)* Inadequate coverage: Scale of the landforms created exceeds that of the existing landscape Information Required – The PER (pg. 43) discusses the possible impact of wind erosion and whether the final design should be altered depending upon the results of trials undertaken. The submitter notes that erosion of the overburden landforms could be exacerbated by the elevation differential resulting from the height of the landforms created in excess of the existing landscape (30m high, so 16m above existing dunes).	This issue appears to relate to a height differential between the overburden landforms being constructed and the height of immediately proximate dunes (which were described as local) which are not as high – with the concern being that excessively high dunes may be subject to wind erosion. However, it is incorrect to assume that there are not dunes of the same height or higher within the same area, because dunes equal in height to the highest overburden landforms exist about 1.5 kilometres to the south and dunes 10 metres higher exist about 5 kilometres further south. Moreover, Vimy is committed to rehabilitating the overburden landforms and once rehabilitated the vegetation would give an element of protection against wind erosion. Given that other higher dunes exist in the area, there is no reason to suppose that the overburden landforms, once rehabilitated, would be subject to excessive wind erosion. There will be trials to determine likely erosion characteristics, and if appropriate, overburden landform profiles will be adjusted in light of those results. Those trials include the geotechnical investigation work currently being undertaken which involves Light Detection and Ranging (LiDAR) surveying of landform profiles.
DoE	*5.3 Overburden classification Description Overburden Landforms (Classification of material for the overburden landforms) (pg. 43)* Information gap: Potential for mineralised/radiogenic material to enter the overburden waste stream. Information required – At first glance the mineralised/radiogenic material appears obviously different from the waste rock (ie light compared to dark coloured) however, it is likely that differences may be more subtle at the margin or with oxidation of the reduced material over time, with the resulting lower grade ore material somehow being disposed of as inert waste rock. The submitter suggests that detailed precautions will need	Vimy acknowledges that mineralised / radiogenic material exists in the area immediately above the redox boundary and that light coloured overburden may contain some low grade material. The layer immediately above the ore zone will be preferentially excavated and placed at the base of the pit and will not be part of the material used to construct the overburden landforms. This is illustrated in Figure 5.1 in the PER document. The risk of radiological or Acid and Metalliferous Drainage basal overburden material being stockpiled out of pit is therefore considered low.

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	to be designed and employed to prevent mineralised/radiogenic material from accidentally reaching the overburden waste stream.	
DoE	*5.6.2 Project Description Byproducts Resource Estimates (pg. 45-46)* Information gap. Information Required – Resource estimates for the base metal component of the project are not aligned with the uranium resource estimates. Similarly, the base metal resource estimate (Indicated 13.0 million tonne (mt), Inferred 15.1mt) for the Ambassador deposit does not align with the uranium resource estimate (Indicated 13.2mt, Inferred 16.1mt) presented for the deposit.	The estimates referred to are separate estimates of the same deposit using different wireframe models to estimate contained resources. One estimate was designed purely to assess the amount of uranium, the other was designed to estimate the amount of base metals but also effectively shows the amount of uranium that would be extracted if the ore body was mined for the base metals. There is considerable overlap as they are highly correlated but they do not give identical estimates.
DoE	*General comment Section 13 and Appendix F1* It is quite difficult to follow the assessments in Section 13 because of the way they are presented. Important factors are often not listed, and equations are not set out in a readable fashion. Information Required – More detail on assumptions, factors applied and assessment methodologies is required so that the reader can reproduce the calculations provided. Please see Appendix B of Appendix F1 for an example of what is required. This is set out with the key assumptions, factors and equations used in the assessments provided, so they are clear and easy to follow.	Additional information regarding assumptions and formulae is provided in specific responses to submissions, in particular with regards to submission by the DoE on Section 13.5.1, Section 13.5.1 and Appendix F1 – 6.1 and Appendix F3, Section 13.5.3-4, Section 13.6.1 and Appendix F1 – 6.3, Section 13.6.1 and Appendix F1 – 6.1, Section 13.6.1 and Appendix F1 – 6.3, Section 13.6 and Appendix F1 – 5.1.4.
DoE	*General comments* Whilst there are numerous modelled data provided, there appears to be an assumption that the model predictions will not change with time. In practice, when operations start the assumptions and models will need to be continually updated based on the status.	Vimy acknowledges that models often represent a 'snapshot in time' and are only as good as the input data used. This limitation, and the impact of varying input parameters, is typically addressed through scenario testing. In addition, calibration of models, where possible (eg hydrogeological model to measured water table levels), ensures that they accurately model the target environmental processes.

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	Information Required – Uncertainties in model predictions should be investigated, or at least discussed. Such uncertainties can be due to assumptions made, lack of data overtime and changes in environmental conditions.	For the Mulga Rock Uranium Project (MRUP), validation of existing models will be undertaken as quantitative data becomes available through continued environmental monitoring. Discrepancies in monitoring data, against predicted values, will be investigated to determine why the discrepancy occurs, and if required re-modelling will be considered to refine their long-term predictions.
DoE	*General comment – Information Gap* Information Required – There is no discussion of the management of waste material or overburden during mining. Unless the proponent intends to process all material extracted from the reduced zone of the Eocene sediments, there is a potential that waste material from this zone will have significant sulphide content (in the absence of information indicating otherwise) and should be characterised for acid forming potential. It is also possible that overburden from above the present day water table will contain reduced material, and a clear definition of where the ore zone begins is required to prevent reduced material being stored in overburden stockpiles. Clarify how much waste material from the reduced Eocene sediments is expected to be produced during mining, and how this potentially acid-forming material will be handled and stored. Additionally, provide data relevant to the geochemical characterisation of overburden material and the transition from overburden to ore in the 2-5 m above the water table to support any claims in this regard.	The management of the overburden materials has been addressed in the Materials Characterisation report (PER Appendix H2), and in the Mine Closure Plan (PER Appendix H1). All overburden materials to within 2-5m of the orebody (this representing the completely oxidised portion of the profile) will be segregated from the basal portion of the overburden material and the underlying orebody. This segregation will ensure that no mixing of oxidised overburden sediments, with reduced equivalents or ore, will occur, and thus prevent any reduced material being stored in the overburden stockpiles. The basal layer thickness of 2-5m is based on the likely maximum capillary wetting front expected for sand (2m) and clay (5m), and is confirmed in the pH, EC and pH_{FOX} (oxidisable pH) depth profiles presented in Figures 4.17 to 4.19 of PER Appendix H2. These depth profiles clearly show that the degree of weathering or oxidation within the capillary wetting front is diminished and thus there is a potential for Acid and Metalliferous Drainage (AMD) materials to be present in this layer. All overburden material in the basal 2-5m of the profile will therefore be mined separately from the overlying oxidised overburden, and will be preferentially deposited at the base of the mine pit, along with the beneficiated material. Consequently, the basal overburden materials will not leave the pit. The potential for residual unoxidised sediments to remain above the basal 2-5m of the overburden profile is considered unlikely given the regional geochemical processes that have formed the current orebody. The entire Eocene profile represents a contemporary Acid Sulphate Soil process, whereby groundwater levels have gradually declined (due primarily to uplift) resulting in a sequential oxidation and leaching of metals. This oxidation process, and subsequent acidification, has decomposed all of the organics in the upper Eocene profile

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		(converting it from black to white) and resulted in a bleaching of all available sulphides and metals; hence all overburden materials above the identified 2-5m basal layer are considered geochemically inert. Assuming that the basal 5m of the overburden is considered Potentially Acid Forming (PAF), and the total area of the minepits (based on the pit crest area) is 2,036ha, then 101.8Mm^3 of PAF will be excavated. But, as mentioned above, all of this material will remain in the base of the mine pit and will rapidly be covered by rebounding groundwater levels; hence the potential for oxidation and release of AMD is minimised. Within the reduced Eocene material, there is negligible waste material as the uranium and/or base metal orebodies are laterally continuous within the proposed pit shells and the small volume of non-mineralised reduced Eocene material that may be present will likely be processed to dilute some of the higher grade areas. Any non-mineralised reduced Eocene material not used for dilution will be preferentially deposited at the base of the pit and rapidly covered by rebounding groundwater.
DoE	*Proponent Details* Section 136 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) states that the Minister, in deciding whether or not to approve the taking of an action, may consider the person's history in relation to environmental matters. Information Required – Please provide further information on the environmental history of the proponent. Where this is not applicable, please provide a brief discussion on the potential capacity of the organisation to recruit appropriate expertise in uranium or other mining ventures.	Under s.136(4) of the EPBC Act in deciding whether or not to approve the taking of an action by a body corporate, and what conditions to attach to an approval, the Minister may consider whether the body corporate is a suitable entity to be granted approval having regard to the history of the body corporate and of its executive officers in relation to environmental matters. Vimy has been involved in exploration and development activities related to this project for more than 8 years and during that time has demonstrated that it manages its activities in an environmentally responsible manner. There have been no reportable environmental incidents during this time. In relation to Vimy's executive officers: Mike Young, Chief Executive Officer and Managing Director, was previously Chief Executive Officer of BC Iron Ltd and was responsible for overseeing the development of the company from start up through to the production and export

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		of iron ore including obtaining all the necessary environmental and mining approvals. Tony Chamberlain, Chief Operating Officer, has previously worked in consulting /management positions in relation to uranium projects including: • Yeelirrie Uranium Project Pre-Feasibility Study for WMC Resources • Ion-exchange supply package for Paladin Energy's Langer Heinrich expansion. • Resin-in-pulp and uranium precipitation process design package for Mega Uranium • Daejon Uranium-Vanadium project in South Korea for Stonehenge Metals. Julian Tapp, Executive Director of External Affairs, previously held a similar position at Fortescue Metals Group and had responsibility for managing government relations and all associated approvals. Vimy has recruited appropriate expertise to assist in the development of the PER and associated studies, and will have the capacity to employ the requisite expertise during the implementation phase.
DoE	*1.8 Proposal Justification and 13.7.9 Product Transportation* The transport of uranium is of interest and concern to regulatory authorities and the public. Best practice experience shows projects are well served by minimising risk from the transportation component of the production cycle. Logistical and permitting circumstances at Western Australia (WA) ports, which are much closer than Adelaide (for example, Port Hedland and Fremantle) preclude these ports as an option. The relatively lengthy mileage to Adelaide, relative to WA options, increases the risk of road accidents and could potentially raise public concerns with transportation of the product while also increasing personal and environmental risk and carbon dioxide emissions for the road transport.	As the Department of the Environment correctly observes, Vimy is currently precluded from exporting uranium from WA ports. Vimy acknowledges that exporting from such ports would be preferable in terms of reducing the distance the product needed to be transported by road with the attendant risk of road incidents and accidents. Vimy also agrees that the increased transport distance to the Port of Adelaide increases the likelihood of an event occurring, but with all required controls in place, as specified in the Uranium Council (2012) *Guide to Safe Transport of Uranium Oxide Concentrate*, the risk (in terms of both the likelihood and consequence of any environmental impact) is assessed as low. Vimy needs to transport its uranium via a port that deals with shipping containers, is capable of handling Class 7 goods, and that has a regular throughput of vessels capable of and prepared to ship Class 7 goods within

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	Information Required – Please provide a brief discussion around alternative transport routes and further justification for the chosen option. Please provide further detail into the proposed emergency response procedures should an incident occur during transit.	shipping containers. The only port in WA that has sufficient container traffic to meet Vimy's requirements is Fremantle. Vimy does not believe that there is a realistic prospect of Fremantle being prepared to accept uranium shipments transiting through the port within the 16-year lifetime of the Project. Even raising it as an option is likely to provoke a hostile response and unnecessarily raise fears about Vimy's intentions. The transport route chosen to haul the Uranium Oxide Concentrate (UOC) to the Port of Adelaide is already an existing haulage route that is heavily utilised by transport companies, often hauling other Class 7 Dangerous Goods. Given UOC is a low volume product, the Project will add only an average of less than one truck movement per week onto the existing roads; it is therefore considered that this additional utilisation will not change the risk to the public or raise public concerns. Furthermore, the estimated carbon dioxide equivalent emissions (CO_2-e) likely to be generated from an average of less than one truck per week will be insignificant compared to the CO_2-e emitted from the existing transport activities, and will be completely offset by the CO_2-e savings achieved by displacing power generation using coal. Vimy will develop an Emergency Response Management Plan (MRUP-EMP-023) to deal with the management of any incidents should they occur during the transportation phase. This plan will be developed in consultation and collaboration with local and regional authorities.
DoE	*Socio-economic setting* Discussion does not discuss the impacts of the proposal on the communities in terms of social or economic impacts or benefits. Information Required – How many jobs will be created during construction and for ongoing operation? Are any opportunities being offered for indigenous development programs? How is the proposal likely to impact the local community in terms of economic benefits? Are there	The number of jobs that will be created during the construction phase depends upon the outcome of the Definitive Feasibility Study (which is currently underway) and, in particular, the optimal balance between offshore procurement and local fabrication. However, the expectation is that around 2,500 FTE jobs will be created during the construction phase.

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	likely to be any social issues resulting from a fly-in-fly-out community verses local employees?	During the operational phase there are expected to be around 320 jobs based at the minesite and a further 170 in associated logistics, and additional administration in Perth – resulting in the creation of around 490 permanent jobs. There is no local community in the sense that there are no local communities located within a radius of 100 kilometres from the centre of the minesite – see Figure 4.1 within PER document. Vimy will be implementing measures to maximise local procurement with Kalgoorlie-Boulder being considered the local area from which goods and services would be provided. Vimy will be working with its contractors and with local service providers to maximise procurement from the region and to maximise local employment. Within the context of maximising local procurement and local employment, Vimy will also be seeking to maximise the involvement of local Aboriginal service providers and to offer employment to local Aboriginal people. Vimy will be working with entities such as the Goldfields Aboriginal Workforce Development Centre to maximise Aboriginal engagement. The distance by road between Kalgoorlie and the minesite is approximately 240 kilometres which is important to appreciate when discussing impacts upon the local community. Economic benefits will flow to the local community to the extent that goods and services are procured from Kalgoorlie-Boulder and labour is sourced from that area. However, any employees from Kalgoorlie-Boulder and the surrounding area will work the same rosters as the fly-in fly-out workforce as the distance is too far to commute and all minesite workers will reside within on-site accommodation whilst working at the site. There are not expected to be any social issues that result from differences between fly-in fly-out workers and local employees as they will all have the same work conditions and the same rosters, and live in the same accommodation facilities.

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DoE	*9.4 Potential Impacts* The introduction to this section discusses the proposal in relation to the Significant Impact Guidelines 1.1. However, as the proposal has already been determined a controlled action these guidelines are not applicable to assessing the acceptability of impacts. The distinction needs to be made clear that potential impacts should be discussed in terms of their acceptability rather than their level of 'significance' as they have already been determined to be significant under the EPBC Act controlled action decision.	There is no reference in the introduction to section 9.4 or indeed anywhere else within the PER documents to the Significant Impact Guidelines 1.1. In the Commonwealth's EPBC Act*: Environmental Offsets Policy* (October 2012) as published by the then Department of Sustainability, Environment, Water, Population and Communities – in the first paragraph in section 4 ('What are environmental offsets?') the following statement is made "*For assessments under the EPBC Act, offsets are only required if residual impacts are significant*". In section 4.1 in the fourth paragraph a similar sentiment is expressed in the following statement "*Avoidance and mitigation measures can reduce and, in some cases, remove the need for offsets if the residual impact is not significant*". The issue of whether 'residual impacts are significant' after the application of the mitigation hierarchy therefore has a bearing on whether or not the application of the *Environmental Offsets Policy* requires there to be any offsets. Vimy respectfully suggests that if the residual impacts after mitigation and rehabilitation measures have been applied are not significant then the project should be considered acceptable and offsets should not be required. Section 9.4 makes clear that the development of the Project is highly unlikely to have any impact upon the identified Matters of National Environmental Significance (MNES) species. Vimy appreciates that the acceptability of a proposed action is determined by a weighted consideration of many factors, including economic and social matters and the likelihood of whether the action will have a significant impact on a particular listed threatened species or a particular listed threatened ecological community, but believes that it has demonstrated that the action should be considered acceptable.
Main Roads WA	Main Roads is responsible for operating and maintaining the tate road network. The proponent Vimy Resources propose to use State roads to transport the product to market and for fuel, construction machinery and general freight to the project site. Development of the project to date	Vimy will liaise with Main Roads to discuss the project and additional road usage that may result from the development of the Project.

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	does not appear to have involved Main Roads nor recognise Main Roads role in the management of the 1300 kilometre (km) of road network allowing transport to the South Australian border. As there appears to have been little dialogue with Main Roads the proponent is encouraged to begin dialogue to discuss the impact transport operations will have on the road network particularly if the project receives approval to proceed to construction.	
Main Roads WA	Main Roads should be consulted on traffic management planning and emergency management planning particularly with the management of risks on the road network. As part of the emergency management planning, Vimy Resources should develop suitable traffic management plans to operate under emergency conditions. Main Roads should be consulted during the detailed design and construction of entry and exit points onto the public road network for construction and operation. Any accident, incident or near-miss on public roads should be reported to Main Roads within 24 hours.	Vimy will liaise with Main Roads in the development of the Traffic and Emergency Management Plans for the Project. These management plans will be submitted as part of the Mining Proposal to ensure the health and safety of the community and workforce, and that the integrity of the existing road infrastructure is not compromised by this Project. In addition, Main Roads will be consulted during the Definitive Feasibility Study for the detailed design and construction of the entry and exit points onto public roads.
Conservation Council WA (CCWA)	Vimy state that; *"Once all environmental and other approvals have been obtained, Vimy will initiate the detailed design process."* The submitter considers that approval should not come before a detailed plan. It is further evidence that the proposals presented to the Environmental Protection Authority (EPA), the public and the Department of Mines and Petroleum (DMP) vary from what may actually occur. For example, the scoping document stated they would not clear more than 2,000 hectares (ha) – and the current proposal has plans to clear 3,709 ha. There is ongoing project creep, which usually entails increased impact, increased water take and increased land clearing. This is a poor process for assessment. The push for premature environmental approval is in conflict with best practice. Again the submitter stresses that the drain	Vimy does not accept the assertion made by the CCWA that approval should not come before a detailed plan. Vimy has done sufficient work to establish what its impact on the environment is expected to be and approval for the project is being undertaken on that basis. The inference that because Vimy changed the amount of area it proposed to clear between the Environmental Scoping Document and the final draft of the PER, that somehow other aspects of the proposal might also change, is not correct. The proposed area changed because the economics of the project improved, which resulted in it becoming possible to economically mine areas that included slightly lower grades of ore and this resulted in a larger area being mined over a longer period. Vimy then remodelled all aspects of its PER, where required, in order to encapsulate any changes that had an impact upon the environment.

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	on regulators and the public throughout this premature process is irresponsible and unjustified.	This impact assessment was document in the Section 43A Application, under the EP Act 1986, and was subsequently assessed and approved by the EPA. Vimy completely rejects the assertion that there was a push for premature environmental approval or that the Environmental Impact Assessment has been anything other than best practice.
Wildflower Society	*Risk Assessment Whitewash* Across the management plans, there are approximately 70 "Risks and Key Impacts" identified and approximately 200 "Management Actions" proposed to manage those risks. It is assumed that "Risk-based Priority" represents residual risk after "Management Actions" have been applied. To state that for 70 identified risks that almost every one has a (residual) risk level of 'Low' is not plausible. Even with good management, the risk is still high for such things as weed invasion. This is an illustration of how low the standards in Environmental Impact Assessment (EIA) in WA have got to, the degree to which sound concepts such as risk based assessments have been so extensively bent to purpose that they've lost all meaning. No one can possibly take at face value, a risk assessment where every risk is dismissed as 'Low' out of hand. This is far from the only concept misapplied in the PER either. All matters to do with ecosystem integrity are 'High' risk. Virtually no mine sites manage issues like weeds effectively, partly because they don't commit to it. The one exception is Barrow Island, which has made stringent quarantine commitments.	The risk analysis process utilised by Vimy in regard to potential environmental impacts is described in detail within the MRUP PER Appendix K1 Section 5.2, which follows the Australian Standard Guidelines [AS/NZS ISO 31000:2009 Risk Management]. The effective implementation of the environmental and operational management plans will indeed reduce the risks to 'Low'. Vimy does not agree with the philosophical argument espoused by the Wildflower Society in regard to 'whitewashing'. The Environmental Impact Assessment of the MRUP PER has included many long term baseline data studies – such as 13 botanical surveys in 7 years – that has greatly increased the knowledge base of biological diversity in the region. All risk analyses have been completed by consultants whose professional integrity maintains their independence. The risk to the vegetation associations and conservation significant species of the MRUP are determined to be low (when following the AS/NZS ISO 31000:2009 Risk Management standard as described within the MRUP PER Appendix K1 Section 5.2). No vegetation associations or conservation significant flora species are unique to the Disturbance Footprint of the site. Management protocols have been committed to within the MRUP PER document, aiming to avoid or minimise any potential environmental impacts. Across the Environmental Management Plans detailed in Appendix K1 there were 73 'Risks and Key Impacts' identified and 176 'Management Actions' proposed to manage those risks. The 'Risk-based priority' does indeed represent an assessment of the residual risk after application of the identified 'Management Action'.

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		Vimy does not accept the assertion made by the Wildflower Society that it is not plausible for most of the identified risks to be reduced to a residual risk level of 'Low'. The categorisation of 'Low' represents a rating based upon an assessment of both the likelihood and the consequences attached to a particular risk as shown in Table 5.3 of Appendix K1. Good management should reduce the 'Likelihood' of weed invasion to L2 (Unlikely) and the 'Consequence' to C2 (Moderate) which gives a risk rating of 'Low'. Vimy does not accept the assertion made by the Wildflower Society that every risk is dismissed as 'Low' out of hand – a more accurate description would be that after the application of proposed 'Management Actions', most risks were reduced to 'Low' levels taking into account both the likelihood and consequences involved. Vimy does not accept that the proposal represents a threat to ecosystem integrity or that any matters related to ecosystem integrity should automatically be accorded the category of 'High' in relation to risk.
People for Nuclear Disarmament PND(WA)	The mine and its processing facility would take 15 million litres of groundwater a day. 3,709 ha of native vegetation would be cleared for the mine. There would be much overburden from its open pits. Fourteen waste rock piles would appear in the landscape. How would this affect the local flora and fauna?	It is incorrect to assert that the mine and processing facility will require 15 million litres of groundwater per day. The average rate of gross extraction (i.e. ignoring the amount that is reinjected) over the life of the mine is about 6.2 million litres per day. In relation to the issue of how this (the gross extraction of 6.2 million litres of water per day) would affect local flora and terrestrial fauna – the answer is not at all. There are no terrestrial Groundwater Dependent Ecosystems (GDEs) on-site and all flora and terrestrial fauna are reliant in the thick unsaturated (vadose) zone. There is the potential for limited impact upon the small number of subterranean fauna that exist at Kakarook North, but given the size of this aquifer (> 167GL) and the small amount expected to be extracted from it (~ 29GL over 16 years) there are not expected to be any significant impacts on the aquatic worms present in some parts of it. The total amount of native vegetation that may be cleared is up to 3,709ha and a further 78ha disturbed. Vimy is committed to rehabilitating all areas to an agreed stakeholder standard once they are no longer required.

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		The figure of 3,878 ha of disturbance includes not only areas cleared for the mining of the open pit areas, it includes clearing prior to establishing the overburden landforms. There will not be any waste rock piles – there will only be overburden landforms (which are composed primarily of sand and do not contain rocks) and there will only be eight of these. Again, for the avoidance of doubt the 3,878 ha of disturbance includes all clearing for all of the mines, all of the overburden landforms and all the associated infrastructure (including the processing plant area, the airstrip, the accommodation village and all water infrastructure – borefields and pipelines). Any flora and fauna present in the area where clearance occurs will be affected – but all areas cleared will subsequently be rehabilitated (once the areas are no longer required) and flora and fauna habitat will be re-established to a standard that resembles the pre-mine environment.
Public Submitter (P) 3	The area of mine voids + waste rock + evaporation ponds + temp tailings at Mulga Rocks is 1476 ha = 14.76 million square metres of material emitting previously trapped and sequestered Radon gas + the spontaneous decay of Radium into Radon gas. How many cubic meters of air will be contaminated with levels of radon activity above 74 becquerels per cubic metre ($Bq/m^{3)}$ per hour, per day and per month? What period of time will elapse between first exposure of a square metre of ore and the final covering and sealing of the mill tailings from that 1 tonne of ore? Will this emanation of Radon gas continue unabated for the 15-year life of the mine? How many Kilograms (kg) of Polonium214 and Po210 will be produced and distributed over the plume area over the life of the mine as a result of Radon emissions and decay? How many tons of toxic lead206 will be distributed over the plume area and how big will that plume area be?	The figure of 1,476ha does not represent any proposed clearance numbers taken from the final version of the PER. It appears to represent the area estimated to be cleared for 'Open cut pits and dewatering infrastructure', 'Waste rock landforms and soil stockpiles' and 'Water storage/evaporation ponds' as described in the original Environmental Scoping Document. The submitter appears to be concerned about the total area being exposed that would be capable of emitting radon gas. Emissions of radon gas are dealt with in Sections 12 and 13 of the PER and Appendix F1 and F3. The estimated rate of radon emanation from exposed ore within the open cut pits is estimated at about $2BqRn/m^2/sec$. Given the movement of air across the pit area and an element of mixing, the maximum concentration is estimated at around $20Bq/m^3$ – this is significantly lower than the ARPANSA recommended action level of 1,000 Bq/m3 (RPS #1, Annex C) above which active controls should be considered. The submitter asks the length of time between first exposure of an area of ore and the final covering and sealing of the mill tailings from the ore contained within that area. There is an implicit premise in the question that supposes that

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		radon emanation is not effectively stopped until the tailings have been finally capped and sealed – but that is not correct. Tailings will be deposited sub-aqueously and maintenance of a layer of water above the tailings will largely limit radon emanation. The length of time before tailings will be finally covered and sealed also depends when the mining takes place and which tailings facility it is deposited in. The longest length of time that is expected to elapse between ore being mined (and tailings from it pumped to the tailings facility where it will be deposited sub-aqueously) and its being finally capped and permanently sealed will be about 8 years. The submitter asks whether this radon emanation (presumably the radon emanation from tailings facilities) will continue for the life of the mine. At all times over the 16-year mine life there will be a facility that is accepting tailings – however at all times the active tailings facility will have a layer of water covering its surface and absorbing any radon gas. The submitter asks how many kilograms of Polonium-214 and Polonium-210 will be produced and distributed over the plume area over the life of the mine as a result of Radon emission and decay. Radon gas (Radon-222) has a half-life of 3.8 days and so will be capable of spreading a large distance depending on the speed of the prevailing wind. Radon-222 decays into Polonium-218 and then Lead-214 and then Bismuth-214 before decaying into Polonium-214 the first of the two substances the submitter was enquiring into. Polonium-214 has a half-life of 160 microseconds, after which it becomes Lead-210 which has a half-life of 22 years. This decays to Bismuth-210 and then Polonium-210 which was the second of the substances the submitter was interested in. As a rough approximation over the entire 16-year mine life less than 1µg of Polonium-214 (that is less than 0.000000001 kg) is expected to be produced as a result of all Radon emanations (including mining, processing and tailings) and less than 0.1 µg would have come from tailings. However, with a very short half-life (0.16 seconds) only a vanishing small amount would exist at any one time. The figures for the amount of Polonium-210 produced in total would be even smaller.

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		No Lead-206 would be created during the life of the Project from the emanation of radon gas as Lead-206 is at the end of the Radium decay chain and none would be created within the 16-year lifespan (the half-life of Lead-214 one of the intermediate daughter products is more than 22 years). However, the same quantity that became Plutonium-214 would eventually decay to Lead-210 and it would be located over the same plume area as well. The size of the potential plume would depend upon the wind direction and speed and its ability to spread the initial radon gas. The expected concentration distribution is shown in Figure 12.6 within the PER.
P3	3.8 Inhalation of Radon Decay Products (Radon Daughters, RnD) This pathway will be only of minor importance for the Mulga Rock Project. Radon daughter dose is only of importance when workers are in close proximity to large masses of radon-generating material. With Alpha particle emission and energy of 5.5 Mev it does not appear to be of "minor importance" Radon 222 (gas) α 5.5 Me 3.8 days (1/2t) Sonter Table 1 *https://consultation.epa.wa.gov.au/seven-day-comment-on-referrals/mulga-rock-uranium-project/supporting_documents/12%20%20Radiation%20Advice%20%20Solutions%20%20Radiation%20and%20Occupational%20Hygiene%20June%202010.pdf* Sonter suggests the use of High-efficiency particulate arrestance (HEPA) filter dust masks in some areas of Uranium processing. How effectively do these masks filter Radon Gas if at all?	The submission discusses the alpha energy of radon, but this is irrelevant to the actual hazard, which is risk of lung cancer arising from inhalation of radon decay products (RnD, radon daughters). RnD are charged atoms of heavy metals and readily attach themselves to airborne particles such as dust and diesel fumes. Being particulate, they are captured by cabin air conditioning air filters and by dust masks. As such, HEPA masks (and other lower efficiency filters) will not filter out radon gas but only particulates including both attached and unattached RnDP. But this is completely adequate and appropriate, as the hazard resides solely in the filterable radionuclides. To meet HEPA specifications, filters need to remove at least 99.97% of particles sizes of 0.3 µm (and likely much greater efficiency for particles sizes more typical of AMAD in open pit mining, somewhere between 2 and 5 µm). Some of the best rated HEPA masks have an efficiency rating of 99.995% for particles sizes of 1 µm, increasing to greater than 99.999% for particles greater than 2 µm. *https://en.wikipedia.org/wiki/HEPA* Particles size distribution of dust samples generated in the course of excavating the geotechnical investigations trenches will be used to derive Activity Median Aerodynamic Diameter (AMAD) values to be used for the update to the air quality model discussed above.

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		Other options to capture particular radionuclides in dust include the use of activated carbon, which can be used in parallel with HEPA filters.
Proforma	Concern that most people are unaware what is actually being proposed.	Vimy is proposing to clear just under 4,000ha of native vegetation and this clearance will also involve disturbance of fauna residing in the area. Every effort will be made to ensure that the disturbance impacts are minimised. Vimy is proposing to rehabilitate all areas as soon as they are no longer required for the project. Vimy will be dewatering the area where it is mining but this water is hypersaline and not connected to any groundwater depended ecosystems (GDEs). Any surplus water will be reinjected into the same aquifer downstream. Vimy will also be extracting process water from a borefield – but over the length of the mine life it will not remove more than 20% of the water currently estimated to be in the aquifer. The aquatic worms that live in part of this aquifer will not be significantly impacted and there are no other GDEs associated with this water body. All tailings will be permanently isolated from sensitive environmental receptors and the majority of the heavy metals will effectively be sequestrated by the same carbonaceous material that captured them in the first place. Vimy respectfully suggests that if people were better informed about what is being proposed then that would assuage their concerns.
Proforma	We have a poor understanding of the ecological systems in the area and the species associated with them. The flora and fauna surveys are just 'drops in the bucket' of our knowledge.	It is agreed that the knowledge on the ecological systems of the Great Victoria Desert is incomplete. However, the fauna and flora surveys commissioned to date by Vimy have vastly increased the knowledge on the ecology of the MRUP area. Adequate biological surveys were required before effective environmental impact assessment could be made. The potential environmental impacts by the proposed MRUP were discussed in each appendix (provided in Appendix A & B in the MRUP PER) and provided by experts in the relevant fields. Thus, although the understanding of the ecological systems in the Great Victoria Desert will

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		continue to be improved upon, the baseline information of the biological systems at the MRUP supplied by commissioned surveys was adequate to enable the prediction of environmental impacts by the proposed project. Vimy's proposal is located within the Yellow Sandplain communities of the Great Victoria Desert – an area that covers approximately 1,692,000ha (s.6.3.4 of PER). The total disturbance footprint of the Project is 3,797ha; this represents less than 0.2% of the Yellow Sandplain communities. Vimy acknowledges that the flora and fauna surveys undertaken have not attempted to assess the entire Yellow Sandplain communities area, but Vimy is confident that the surveys were adequate to assess the proposal's likely impacts.

2. Flora and Vegetation

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Department of the Environment (D)oE	The conclusion has been made that because 78% of proposed disturbance footprint has been burnt, it is not suitable habitat for species. Information required – Please provide further discussion around the length of time it is likely to take for regrowth to be deemed suitable habitat for conservation significant flora and fauna? When is the action due to commence, is the landscape likely to have had time to develop habitat? Has the proponent considered the individual species' abilities to adapt to fire affected habitat (e.g. pyrophytes/pyrophiles)?	At the current time, the information on the response of vegetation, and therefore habitat, in the MRUP region to fire and the difference in response in relation to the intensity and frequency of the fire, is not known. Further investigation of the response of native species to fire will be undertaken to improve the knowledge base of the local ecosystem. Species not previously recorded, and which disappeared within 10 months of the fire, have been recently surveyed. A review of the plant species list of the MRUP, investigating the potential pyrophytic ability, has indicated very few endemic species have lignotubers. Whilst it has previously been considered that it will take 10-15 years for the post-fire vegetation to restore to a level that can support Sandhill Dunnart (i.e. dependant on the growth and life cycle of spinifex), camera trapping of burnt sites following the 2014 fire has shown the Sandhill Dunnart utilising the recovering vegetation within 2 years of the fire. It is therefore considered that whilst the ecosystem was 'temporarily degraded' immediately after the 2014

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		bushfire, the Sandhill Dunnart habitat is rapidly returning to its pre-fire distribution of 1,456ha.
Wildflower Society	The project is located in an area that supports conservation significant ecosystems. The submitter's primary concern is that this is not reflected in the management commitments in the PER. In particular, why important preventative measures like weed control is treated lightly when weed invasion represents the greatest risk to ecosystem integrity over the longer term. The submitter believes that the management commitments need to better reflect this.	Vimy acknowledge that the area supports conservation significant species, which have a high affinity for the identified S6 (dunal) vegetation type. Minimal disturbance of this vegetation type will occur as a result of this proposal, and no significant residual impact on any conservation significant species or habitat is expected to occur as a result of this project. With regards to the comment on weeds, please see the specific comments on weeds directly below.
Wildflower Society	*Weed Management and Ecosystem Integrity* The surveys recorded no introduced flora species (weeds). This is highly unusual and represents very intact if not pristine ecosystem(s). The ecosystem(s) in and around the project area are highly conservation significant and have been listed as Priority Ecological Community (PEC) 54: *"Yellow sandplain vegetation of the Great Victoria Desert with diverse vertebrate fauna"*. The threats to PEC54 are listed as *"Mining and exploration, extensive summer wildfire, feral predators"* (Department of Parks and Wildlife (DPaW), 2015). It is a Priority (P)3 community, which means that it is poorly known (which also invokes the Precautionary Principle under the EP Act). Fourteen Priority Flora species were recorded from the sandplain (or sand dune) habitat in and around the project area. This is a relatively high number of uncommon species, indicating a restricted and specialised habitat. These species include *Hibbertia crispula*, which is also listed as Vulnerable under the EPBC Act. The threats to this species are listed as exotic weeds, grazing by feral animals and fragmentation of habitat (DoE, 2016).	Vimy agrees with this initial statement. The site was rated as Excellent – Pristine. This is discussed in the section within the MRUP PER 5.3.4 on vegetation condition. Definitions on vegetation condition by Keighery (1994) are provided as Appendix E2 within the Appendix A1 of the MRUP PER. <u>PEC 54</u> The MRUP PER does give due consideration to the location of the proposed project within the Yellow Sandplain Boundary. There are no threatened ecological communities (TECs) within or adjacent to the MRUP. The shrubland vegetation community S6 defined by Mattiske Consulting Pty Ltd (MCPL) on the MRUP floristic data (MRUP PER Appendix A1 Table 6.4) was found to 'have affinities to' the broadly defined Yellow Sand Plains of the Great Victoria Desert. This Priority Ecological Community is classified as a PEC 3(ii) which indicates that the yellow sandplain community has been listed as a PEC due to it being 'a poorly known community known from a few widespread occurrences that are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat' (DPaW 2010). The definition of the community as being 'very diverse mammalian and reptile fauna, distinctive plant communities' has come from a personal communication and this broad definition has not been updated since 2001 (Barton & Cowan 2001).

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The sandplain itself is also a distinct and discrete landform. It is clearly visible on state scale aerial photography and it is restricted to a single occurrence.

According to EPA (2015), a landform only has to meet one of the criteria in Table 1 to be considered significant and the sandplain more or less meets all criteria.

Table 1: Criteria for significance of landforms as defined in EPA (2015)
<table>
<tr><td>1. Variety</td><td>Is the landform considered a particularly good or important example of its type?
How adequately is the landform represented over the local, regional or national scale? How does the landform differ from other examples at these scales?</td></tr>
<tr><td>2. Integrity</td><td>Is the landform intact; being largely complete or whole and in good condition? To what extent has the landform been impacted by previous activities or development?
For example; has part of the landform been removed?</td></tr>
<tr><td>3. Ecological importance</td><td>Does the landform have a role in maintaining existing ecological and physical processes? For example; does the landform provide a microclimate, source of water flow or shade?</td></tr>
<tr><td>4. Scientific importance</td><td>Does the landform provide evidence of past ecological processes or is it an important geomorphological or geological site? Is the landform of recognised scientific interest as a reference site or an example of where important natural processes are operating?</td></tr>
<tr><td>5. Rarity</td><td>Is the landform rare or relatively rare, being one of the few of its type at a national, regional or local level?</td></tr>
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The definition of the PEC and the exact boundary location requires greater definition by Department of Parks and Wildlife (DPaW), as does the key elements. The strength of the affinity between the S6 MCPL vegetation community and the Yellow Sandplain Community will be better defined with improved baseline data, such as that supplied by the MRUP surveys. Vimy has committed resources to determining significant baseline data to define the vegetation communities of the MRUP area and has done the best with the current DPaW listing to determine the impact upon the greater region, and the S6 vegetation community which is thought to be a key element of the PEC.

The Great Victoria Desert1 (GVD1) subregional area is 5,422,741ha. The PEC boundary is represented visually in Figure 6 of the PER (as was supplied by the Tropicana Gold Mine to the DoE in 2010) with the total area of the Yellow Sand Plain Community PEC being 1,692,000ha. Of this area, approximately 0.76% will be the comprised of the S6 vegetation community upon the yellow sand dune crests. Within the MRUP area approximately 965ha of the S6 community has been mapped, with only 1.87% within the Disturbance Footprint. As the S6 community extends well beyond the MRUP area (MRUP PER Appendix A1), only a small proportion of this vegetation association will be impacted by the MRUP.

The listed threats for the Yellow Sand Plains Ecosystem include camels, rabbits, foxes, cats, extensive fires and mining (Barton & Cowan 2001 and DPaW 2014). There will be no cumulative mining effects upon the Yellow Sand Plans Community, as Tropicana, the nearest mining operation, lies to the north of the ecosystem.

Due consideration of the other threats was provided in detail within the MRUP PER in Section 6.4.2 discussing indirect impacts from such factors as altered fire regime and feral animals, along with the proposed management protocols for prevention or minimisation of such impacts. Details of such management protocols are provided within the environmental management plans located in the MRUP PER as Appendix K1.
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	The landscape is naturally fire-prone, and introducing weed species that are able to colonise bare soil following fire will have a devastating impact. Sandy soils are particularly vulnerable to weed invasion. Species like Buffel Grass **Cenchrus ciliaris* spread fast and can destroy entire ecosystems, as has already happened in other arid areas across Australia. Once weeds are present, they also can change fire regimes, creating a vicious cycle. The loss of perennial vegetative cover due to the combination of inappropriate fire regimes and weed infestation could destabilise the landform itself. Bare, unconsolidated sandy soils are fragile and prone to wind erosion. This project consists of many linear disturbance corridors, including extensive roads and bore fields along which weeds can spread along, and then outwards from. Taking all this into account, the PER does not take weeds seriously enough. Commitments are weak. The Environmental Objective given in the Weed Management Plan is as follows: *"it is Vimy's environmental objective to prevent, identify, control and limit the introduction and spread across the MRUP"* (PER – Weed Management Plan page (Pg.) 5) The term *"control and limit"* in the above statement is a classic 'out' and it needs to be removed and replaced with 'and eliminate'. Another example is in the Flora and Vegetation Management Plan (MRUP-EMP-001), where Management Target 5 is to *"Avoid or minimise the introduction and spread of weed species."* (Pg. 1). In this case, "or minimise" is another 'out'. It should simply state "The introduction and spread of weeds will be prevented".	<u>Priority species</u> Fourteen Priority listed flora species were recorded in the MRUP area, and are listed with details in Table 6.3. Locations are provided in Figure 6.4, and reflect the survey effort indicated in Figure 6.3. Thus, the priority listing of many species may simply reflect a restricted number of surveys in the region to date. Never the less, the fourteen species are currently regarded as conservation significant, and are given the commensurate protection within the environmental planning of the operation, with specific management protocols provided within the MRUP EMP 002 – Conservation Significant Flora and Vegetation Management Plan. Actual numbers of individual plants that may be directly affected by clearing have been calculated and are provided on page 77 of the MRUP PER. The proportion of the total of each recorded in the region to date are also provided. Due to reasons mentioned previously, this proportion may decline when more information on the regional distribution becomes available. The vegetation associations at MRUP are broadly represented in the region and are not project site specific (and do not indicate a restricted habitat as the Wildflower Society submission indicates). *Isotropis canescens (P2),* for example, had not been recorded at the MRUP site for the previous seven years of sampling, but was detected after the November 2014 fires. It appeared to germinate and then disappear in the landscape in a 10-month period post-fire. Targeted surveys for *Hibbertia crispula* have occurred, and are detailed within Appendix A2 of the MRUP PER. Only 0.27% of the regional total (with current mapping knowledge) may be affected by the clearing of vegetation. Further investigation into the fire tolerance of native species and the successional processes will improve the understanding of the local ecosystem following bushfire disturbance. The potential indirect impacts from the proposed operations, such as dust, weeds and feral animals, were considered with corresponding management plans listed within the MRUP-EMP-002, and discussed in the body of the PER in Section 6.4.1.3 and 6.4.2.

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	The PER consistently fails to demonstrate a meaningful understanding of weeds and their significance in terms of maintaining the integrity of the sandplain. One example of this is that it implies that they will only concentrate on 'listed weed' species (Weed Management Plan, pg. 8). The Weeds of National Significance (WONS) is a grossly deficient list of environmental weeds for Australia. Species listed under the state *Biosecurity and Agriculture Management Act 2007* represents predominantly economic weeds and does not necessarily take into account environmental weeds. For example, Buffel Grass **Cenchrus ciliaris* is not mentioned on either list, despite being the worst environmental weed in arid Western Australia. Neither are many similarly invasive species. Another example is that the Fire Management Plan (Section 2.2, pg. 3) does not even mention weed invasion as a potential indirect impact of fire management practices. A lack of coordination across Management Plans is not reassuring. Also, in this document 'Pristine' vegetation is described as being 'Degraded' once burnt, which is incorrect. If vegetation was 'Pristine' before fire it is still 'Pristine' after being burnt. The Australian landscape is adapted to fire and a burn isn't in itself a degrading factor. Weeds are not mentioned in Section 15: Rehabilitation and Closure either. There should be a commitment to keep any area associated with the project weed-free, both during operation and as a closure requirement. These are just a few examples of the lack of comprehension that pervades the PER. The specific monitoring and management actions are inadequate. To say that someone will do a comprehensive survey once a year, with 'ad hoc' investigations in between is not enough (Section 6 Flora and Vegetation, Section 6.5.3 pg. 75). Statements like this are written with no concept of how much time is required to do biological surveys	<u>Landform</u> Vimy agrees that the EPA (2015) definition of a landform can be a small scale feature, such as a cliff or dune, or of larger scale, such as a dune field. The EPA considers the defining feature of a landform to be the combination of its geology (composition) and morphology (form). Landforms were not allocated as a separate key environmental factor within the EPA prepared Environmental Scoping Document (ESD) (as the EPB 23 was released after the formulation of the ESD) but were duly considered within the Rehabilitation and Decommissioning section of the PER. Landforms are also considered within the MRUP PER Sections 2.2, 6.2.1, 7.3.4.1 and Appendix H2. The most obvious landform feature of the MRUP is the very gently undulating sandplains to well-defined dunes up to 30m in height. Regolith dating at the MRUP has shown that the dunes of the southwest portion of the Great Victoria Desert likely stabilised by around 6,700 years ago (other than through minor localised Aeolian redistribution following bushfires) (PER Section 14.2). There are also flat areas of depression where water drains to between the dunes, with occasional claypans. The landforms of the MRUP did not represent any social or cultural values. The development of the MRUP does not represent a permanent loss of the landform features as sand is not being removed per se. The MRUP is designed to have a low residual impact. The post-mine landforms will be generally congruent with the surrounding land surface, consisting of an undulating surface of large Aeolian dunes separated by localised topographic depressions and flat plains. This incorporation of the post-mine land surface into the surrounding environment will ensure that the broad surface hydrological and pedogenic processes of the region are maintained. Progressive backfilling will occur during operations within each pit and progressive rehabilitation will be taking place (of all areas of disturbance) as soon as practicable thereafter (PER Section 15.2 & MCP in PER Appendix H1). There will be no cumulative effects of mining upon the Yellow Sand Plains as it does not occur within the Tropicana Gold Mine footprint. There are no other activities, such as pastoral or mining, in the area under consideration.

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	effectively across a survey area as large and sprawling as this project will be. The submitter requests that the EPA make it a condition, that the project be required to employ a dedicated full time quarantine control employee (not a contractor), whose sole responsibility is to ensure that no pest plants or animals are introduced as a result of this project. And if they are introduced, to control them immediately before they naturalise. A dedicated position with a regular programme of surveying the entire project footprint with the dedicated purpose of recording and controlling all introduced flora (and fauna). It may be appropriate for the project to fund a DpaW officer for this position, as has happened for other projects. The main requirement is that they are a competent person, experienced and/or appropriately trained. If this is considered too onerous, the submitter asks that both the EPA and the proponent read the discussion about priorities in Section 2. And across the entire PER and associated management plans, the wording needs to reflect a clear and unambiguous directive, that the project area in its entirety will be left weed-free as they found it.	<u>Weeds / Fire</u> Within the PER, Vimy reiterates the potential issues of altered fire regimes, and the introduction and spread of weed species at MRUP. The issue of weeds is discussed with the PER, with the aim to keep the site weed-free preventing the indirect impacts such as reduced diversity and quality of faunal habitat. Fire management protocols are discussed in the MRUP-EMP-025 provided in the Appendix K1 of the MRUP PER and discussed within Section 7.2. The bushfire scars of the region are demonstrated in Figure 6.2.7 with wildfires of various ages and intensities having burnt large sections of land around the MRUP area in the recent past. In August 2014, approximately 8% of the vegetation mapped in the MRUP area was rated as recently burnt. In November 2014, a large (of low to moderate intensity) bushfire affected 74% of the MRUP Development Envelope and 78% of the Disturbance Footprint. The fire burnt over 79,000ha and a number of 'refuge' areas (approximately 1,800ha) within the fire scar remain intact and unaffected to a certain extent (Figure 7.3). The protection of these sites will be given specific consideration within the Ground Disturbance Activity Permit (GDAP) system; the natural bushfire cycle demonstrates major episodic denudation of understorey. It is agreed that the potential for weed infestation is increased at such times. Vimy agrees that cleared land plus weeds plus increased fire frequency could be detrimental on the local landscape. However, Vimy is aware of the potential impacts, and aims to not modify the local incidence of fire (MRUP-EMP-025 Fire Management Plan), aims to not introduce weeds to the site, but has contingency protocols in place to remove any infestations as soon as monitored (MRUP-EMP-003), and to minimise the area of disturbance at any one time on the site. The progressive rehabilitation will aid in the stabilisation of disturbed sites as soon as is practical. The linear disturbance corridors, such as borefields roads, will be the easiest to monitor for presence of weeds. Regular environmental monitoring, plus the education of other on-site personnel to the importance and identification of weeds, will increase the vigilance in the detection of any such infestations. The

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		importance of vehicle sterilisation will be emphasised to all on-site personnel before commencement of on-site duties. Vimy does take the issue of weeds, and the potential impacts that the introduction of weeds to the area, seriously. Site wide education and protocols will be instigated to achieve Vimy's aim to prevent the introduction of weeds by the MRUP operations. However, contingencies need to be established to ensure effective protocols are in place for the identification of appearance of weeds, for the minimisation of the extent of spread of an infestation, for the immediate elimination of the population of weeds and for the quarantine of that site to prevent translocation of weed seeds. It is not possible to state that the introduction of weeds will be prevented, as suggested by the Wildflower Society submission. The strict enforcement of all weed management protocols will aim to prevent the introduction of weeds. There must be contingencies in place to minimise the spread of any infestation in case an infestation does occur. Therefore, Vimy believes that the original terminology of prevent, identify, control and limit the introduction and spread of weeds is correct, and follows the mitigation hierarchy concepts. Vimy disagrees with the Wildflower Society submission statement that the MRUP PER fails to demonstrate a meaningful understanding of weeds. The example provided (MRUP PER MRUP-EMP-003 Page 8) does not state that only WONS species will be targeted. It states that the species should be identified. As well as taxonomic identification, the listing of the species as a declared pest, for instance, will initiate specific requirements in the control and reporting of the species. It is agreed that all weed species require vigilance in monitoring and control, it is just that if the species is listed in particular categories, extra requirements may be needed to be met. Also, these listings may provide the most up-to-date method for the species eradication. Again Vimy disagrees with the statement that the link between fire denudation of vegetation and weed infestation is not made in the PER. The risk and key impact in Table 3.1 on page 7 of the MRUP-EMP-003 states just that, and is to be considered during construction, operation and closure stages of the project. The interconnection between the fire and weed management plans is made in

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		the Weed Management Plan, but not within the Fire Management Plan. This will be added in the next review of the Fire Management Plan (MRUP-EMP-025) to reiterate the importance of the inter-relationship. Weeds are also discussed in a number of other management plans including: Flora and Vegetation (MRUP-EMP-001), Terrestrial Fauna (MRUP-EMP-004), Conservation Significant Fauna (MRUP-EMP-005) and Rehabilitation and Revegetation (MRUP-EMP-030). Vimy disagrees with the premise in the Wildflower Society submission that vegetation condition is still 'pristine' immediately after a fire. The vegetation condition scale adapted from Keighery 1994 is supplied as Appendix E2 in the MRUP PER Appendix A1. 'Pristine' relates to no signs of disturbance to vegetation structure. It is true that the structure of the vegetation will return after a bushfire, the rapidity of which is often dependent upon rainfall. However, if surveyed when a recent fire has burnt through the area (<5 yrs), then it is recorded by Mattiske Consulting Pty Ltd (MCPL) as 'Good-Very Good condition' (MRUP PER Appendix A1 pg. 62). However, it is still mapped according to the original vegetation association, and 'disturbed' areas on the vegetation mapping includes only disturbed areas such as existing tracks. Also, it must be considered that the fauna habitat conditions present after a fire are 'disturbed' and not pristine, when very little of the vegetative structure pre-existing a fire remains initially, removing food sources and shelter for fauna (see plate 6.1 on page 71 of the MRUP PER). Although weeds are mentioned in the following offsets chapter, and in the flora and vegetation and fauna sections, weeds are not mentioned in the section of rehabilitation and closure in the PER. This was an oversight, but will not prevent the implementation of a site-wide weed prevention strategy, as protocols are detailed within the Flora and Vegetation Management Plan and the Weed Management Plan. The Rehabilitation and Revegetation Management Plan indicates that it is to be implemented in accordance with the Weed Management Plan. The monitoring methods, locations, parameters and frequencies of an ongoing weed monitoring programme will be finalised within the Environmental

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		Monitoring Management Plan (MRUP-EMP-032) (as indicated in the MRUP-EMP-001 Section 3.4 in Appendix K1 of the MRUP PER). It will be finalised and included within the Mining Proposal for the operation, and will be approved by the DMP before commencement of any disturbance. The wording of the PER did not intend to portray that all monitoring will be ad hoc. It meant to indicate that although ongoing specific botanical monitoring will occur, the environmental officer will be ever vigilant during daily activities and will be on the lookout for the presence of weeds. The officer will also ensure the stringent adherence to the Weed Management Plan, including the hygiene stations for vehicles. Other site personnel, such as those regularly travelling the borefield routes, will be educated in identifying weed species so that they can also be aware of the importance in identifying any weed infestations. It is recognised that the monitoring section on page 75 of the MRUP PER indicated that the Rehabilitation and Revegetation Management Plan would specify monitoring protocols and schedules. This was not the case. Such details will be provided within the Environmental Monitoring Management Plan still to be finalised. Vimy does recognise that the prevention of the introduction of weeds to the MRUP site requires a strict implementation of the environmental management system, including the Weed Management Plan. Such duties would be written into the job description of an on-site Environmental Officer. Vimy believes that this role can be incorporated with other duties, such as water sampling, and does not require a full-time Environmental Quarantine Officer. The KPI for weed management protocol implementation is allocated to the Environmental Manager in the Weed Management Plan to ensure the engagement of upper management in the implementation of the Weed Management Plan. Similarly, the enforcement of the protocols within the Feral Animal Management Plan (MRUP-EMP-006 in Appendix K1 in the MRUP PER) will ensure that the activities of the MRUP does not increase the presence of feral animals (noting the pre-existence of such species at the site) (MRUP PER Section 7.3.2 pg. 116).

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		As discussed earlier, it is Vimy's aim to leave the MRUP weed free. The contingencies in place to minimise the spread are worded as such to meet the standard mitigation hierarchy structure. The aim is for no weeds, and the implementation of all the protocols in the Weed Management Plan aims to achieve that. However, if a weed presence does occur on-site, then those same protocols are aimed to reduce the impact and remove the infestation immediately.
Conservation Council WA (CCWA), proforma	One of the greatest risks to this pristine area is the spread of weeds. The consultants Mattiske Consulting Pty Ltd (MCPL) describe the area as an *"excellent-pristine area of the Great Victoria Desert".* Like all ecological functions there are tipping points where impacts escalate. Areas like Mulga Rock that have been largely preserved due to a lack of activity are particularly vulnerable to these changes in ecosystem function. Dust also presents a significant risk to vegetation – either through dust deposition on plants, or through dust suppression with saline water, changing surface salinity. See the section on dust for more details. Priority Species under threat: *Hibbertia crispula* P1 & vulnerable *Dampiera eriantha* P1 *Neurachne lanigera* P1 *Isotropis canescens* P2 *Malleostemon sp*. Officer Basin P2 *Stypelia sp*. Great Victorian Desert P2 *Baekckea sp*.Sandstone P2 *Labichea eremaea* P3	Vimy agrees that the risk of weed introduction to the area is real and requires strict management. The Flora and Vegetation Management Plan acknowledges that increased disturbance can increase the potential for weed species establishment, and the associated risks of decreased floristic diversity and reduction or loss of native fauna habitat and food resources). The Weed Management Plan details a site-wide vehicle hygiene strategy, a weed monitoring programme, an incorporation of any weed infestations into the Ground Disturbance Activity Permit (GDAP) database (to intensify vigilance and limitation of movement of such soil which could be a weed seed source) and weed eradication protocols (MRUP PER Appendix K1 MRUP-EMP-003 Section 2.2). The ultimate aim of the management of the issue would be to avoid the introduction of weeds onto the MRUP site. As a contingency, management protocols will be in place to minimise the introduction and spread of such weeds, and to have a feedback mechanism so that the weed management plan can be modified to attempt to prevent further such introduction/infestations. Another management target is to progressively rehabilitate all disturbed areas as soon as is possible. This will reduce the total area of disturbance and reduce the conducive environment for weed establishment. Seed supplies brought onto site will be stringently checked to prevent the introduction of weeds through this avenue. Details on the commitments on weed management by Vimy for the MRUP are provided within Table 3.1 of the Weed Management Plan (MRUP PER Appendix K1 MRUP-EMP-003 Section 3.1) where it states, "It is Vimy's environmental

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	Ptilotus blackii P3 *Comesperma viscidulum* P4 *Conospermum toddii* P4 *Dicrastylis cundeeleensisglossum* P4 *Grevillea secunda* P4 *Olearia arida* P4 The submitter notes that in the A1 Assessment of Flora and Vegetation that the consultants caution that *"undescribed species have the potential to become priority or threaten flora if not adequately surveyed, described and understood"* they recommend that *"flowering specimens of the undescribed Hakea specimens be collected in future surveys to resolve their taxonomic placements."* Having scanned all relevant sections of the PER and Appendix there is no discussion on further describing or identifying of any of the undescribed species. The submitter is concerned that the proponent has failed to properly identify and has made no clear commitments to properly identify Hakea sp. (LAC 139/13/04/14), Hake asp. (LAC140/13/04/14), *Leucopogan aff. Planifolius* (other). *Brunonia ? australis* var. A. Kimberley Flora (K.F Keneally 5452) formerly (*Brunonia? Suffruticose ms*), E*uphorbia drummondii, Ophioglossum polyphyllum, Schoenus sp.* A1 Boorabbin (K.L Wilson 2581) (other range extensions). The consultant clearly identified that some of these species occur within the development envelope but not in the disturbance footprint – however for a number of these species that have not been completely identified there is no description of where they were found. The submitter is concerned that the absence of this level of detail shows a deficiency in the scope of the surveying.	objective to prevent, identify, control and limit the introduction and spread of invasive weed species across the MRUP". Air quality / dust is also recognised by Vimy as an environmental factor for the Project that must be recognised, monitored and maintained within particular parameters. As stated in the PER, Vimy's Environmental Objective is to ensure that dust emissions generated from the MRUP do not adversely affect surrounding environmental values or the health and amenity of people and surrounding land uses (MRUP PER Appendix K1 MRUP-EMP-024 Section 1.0). Dust is considered and discussed in detail in the PER MRUP Section 12. However, the discussion of dust in relation to the potential indirect impact upon vegetation is discussed within Section 6.4.2.1. The condition of vegetation, particularly adjacent to transport routes and areas of mining activity, will be monitored throughout the life of the mine, and protocols will be detailed within the Environmental Management Monitoring Plan (MRUP-EMP-032). This will be written for inclusion within the Mining Proposal before the commencement of operations (and thus must be approved by the Deparment of Mines and Petroleum (DMP) before the commencement of operations, and if accepted, will form a record of commitments by Vimy in this matter). All results of such monitoring will be presented within an annual environment report to the DMP and will be publically available. Vimy is very cognisant that the use of saline water for dust suppression is another factor that will require diligent management. It is not airborne salt that will be an issue, but the containment of any surface runoff from saline water treated surfaces and the prevention of the overspraying of saline water onto vegetation adjacent to areas such as roadways requiring dust suppression (MRUP PER Appendix K1 MRUP-EMP-009 Surface Water Management Plan). Dust is a natural factor in the Great Victoria Desert environment and dust suppression measures are required. The recycling of a quantity of the mine dewatering water for dust suppression is an integral part of the MRUP water operating strategy to minimise the required water from the Kakarook Borefield. Adequate bunding with sumps will be installed as part of the site construction,

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	It is possible some or all of the described species have only been found in the disturbance area. If these species are newly discovered species this should be established before any environmental approval for the project is given. There is no description about where in the development envelope or disturbance footprint the following species were found: • *Brunonia ? australis var.* A. Kimberley Flora (K.F Keneally 5452) formerly (*Brunonia*? *Suffruticose ms*) • *Euphorbia drummondii* • *Ophioglossum polyphyllum* These species were identified in the disturbance footprint: • *Hakea sp*. (LAC 139/13/04/14), • *Hakea sp*. (LAC140/13/04/14) The submitter is concerned that there is no commitment to identify or class these species. The consultant has indicated there is potential that some of these species may be vulnerable or threatened. Without proper identification the submitter is not confident that the proponent can or will manage the threat to these species. The submitter has serious concerns about the removal of singletons and unidentified species from the dataset. The submitter would like to know which singleton species were found and what their distribution outside the proposed mine site is. Without this information and detail they have no confidence in the validity of removing singletons from the data set. *Relevant sections from the PER Appendix A1:* *"Based on the methodology present in MCPL (2014), to down-weight the relative contribution of quantitatively dominant species, a fourth root transformation was applied to the 2014 data set. Singletons were removed from this dataset prior to analysis. Taxa unable to be accurately identified past family or genus in 2014 were also removed as it is*	and these will be continually monitored for competency. Any loss to the integrity of the bunding will be repaired immediately. Sumps will be emptied as required. Such management protocols will be detailed within the Operational Management Plan (MRUP-EMP-020) (still to be finalised, but will be required to be approved by the DMP as part of the Mining Proposal before the commencement of operations). Vimy disagrees with the statement made that dust is a significant risk to vegetation. The risk analysis process utilised by Vimy in regard to potential environmental impacts is described in detail within the MRUP PER Appendix K1 Section 5.2, which follows the Australian Standard Guidelines [AS/NZS ISO 31000:2009 Risk Management]. Utilising this process, the risk of impact of dust upon vegetation is considered to be low. In the MRUP PER Appendix K1 Table 5.1, the rating for dust would be considered to be Unlikely (with proposed management strategies in place - as described in the MRUP-EMP-024 Dust Management Plan). The qualitative measure of consequence would be minor, or perhaps moderate if the management protocols were not implemented effectively. Combining these in the risk rating table, the risk is either Very low (expected and protocols will be strictly implemented) or Low (if implementation of EMP is poor). Plant species that are recorded during surveys on a site cannot always be identified to species level. Sometimes key identifying characteristics, such as the fruiting body, may not be present due to the season, or if the specimen is a juvenile and has not developed the taxonomic indicators. Therefore, even Western Australian Herbarium taxonomists may not be able to supply an identification with a specific name. Further investigation may be undertaken to assist with identification. It is true that until identified, it is not known if the Hakea species are representative of a conservation significant species. The Vimy PER has made the commitment to ongoing monitoring. The Environmental Monitoring Management Plan has not been formulated yet, but will include revisiting the sites of such partially named species to assist in specimen identification. As indicated in the PER Appendix A1 on page 71, both Hakea

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	uncertain as to whether they represented unique taxa, or taxa that were recorded based on other specimens and already existed within the data. All Triodia specimens were treated as a single "Triodia group" due to lack of defining flora characteristics. Computation of similarity matrices was based on the Bray-Curtis similarity measure. Data were analysed using a series of multivariate analysis routines including Similarity Profile (SIMPROF) Hierarchical Clustering (CLUSTER), Analysis of Similarity (ANOSIM) and Similarity Percentages (SIMPER). Results were used to inform and support interpretation of satellite imagery and delineation of individual plan communities, where were aligned to those described in MCPL (2013) where deemed similar." A1 Assessment of Flora and Vegetation. *"One Priority 3 (ii) ecological community (see Appendix A.4 for conservation code definitions) as defined by DpaW (2014c) is likely to occur within the survey area. This PEC is described as the 'yellow sandplain communities of the Great Victoria Desert', containing very diverse mammalian and reptile fauna, with distinctive plant communities. Threats to this PEC including mining activities, however is not well understood and to date little information is available".* A1 Assessment of Flora and Vegetation. While Vimy has clearly shown the mining project area within the Yellow Sandplain PEC, they have not described the impact to the ecology or biodiversity of the PEC. Vimy has not clearly identified the risks of clearing 3709 ha of this PEC, nor does there appear to be a comprehensive plan to remediate or restore this PEC. The submitter would like to highlight that threats to the PEC are not well understood and Vimy has not made any attempt to fill this knowledge gap and address those risks. The only risk identified for this PEC is mining and yet there is a mine proposal over the bulk of the PEC and the proponent makes hardly any mention of it. Given the EPA's mandate to follow the precautionary principle the submitter urges that the EPA recommend that this proposal is rejected	sites were revisited in the following (and most recent) sampling trip by botanists, but fruiting material was still not apparent on the specimens. As indicated above, Vimy recognises the importance of clarification on the taxonomic identification of this species. The *Hakea* sp. will therefore be considered a conservation significant species, and included within the protocols in the Conservation Significant Management Plan (MRUP PER Appendix K1), until otherwise indicated. Its locations will be entered into the Ground Disturbance Management Plan data management system, so individual specimens can be avoided (4 specimens within the Disturbance Footprint (MRUP PER Appendix A1 pg. 71)), if possible. The specific locations of the recorded specimens are provided in the vegetation maps – Figure 10 (within legend Figure 10.2). Appendix H of MRUP PER Appendix A1 lists the detailed information of this species, with localities provided for every specimen recorded. As explained within the text of the assessment of the flora and vegetation of the MRUP area (MRUP PER Appendix A1), this *Leucopogan* aff. *planifolius* specimen was identified by the WA Herbarium as aff. due to the variation to currently held specimens. The species is known as being morphologically variable, and so future specimen collections submitted to the WA Herbarium may confirm the 66 individuals recorded at 16 locations as being the *L.planifolius* species (MRUP PER Appendix A1 pg. 26 Section 5.2.2). None of these occur within the Disturbance Footprint. The specific locations of the recorded specimens are provided in the vegetation maps – Figure 10 (within legend Figure 10.2). *Brunonia australis* var. A. Kimberley Flora (K.F. Keneally 5452) is the correct name for the species (DPaW 2016). Future site monitoring will confirm the identification of this species (which is not threatened, and found throughout the state), and likely remove the '?' from the currently allocated name (MRUP PER Appendix A1 pg. 70/71). Appendix H of MRUP PER Appendix A1 lists the detailed information of these species, with localities provided for every specimen recorded.

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	as there is a Priority Ecological Community that is under threat and the proponent has failed to identify the risks to the PEC and further failed to develop a strategy to mitigate those risks or to remediate and preserve the PEC. Where there is a lack of information or knowledge the default position is to err on the side of caution. The submitter urges the EPA to choose caution over ill-considered developments that threaten highly sensitive and pristine desert ecosystems.	*Euphorbia drummondii* and *Ophioglossum polyphyllum* have been identified, and these names are listed within Florabase (DPaW 2016). They have been listed within Section 5.2.2 in the PER Appendix A1 as 'species of interest'. *Euphorbia drummondii* is listed as the presence of this species at MRUP is a new population of this plant, although not outside of the known range. It is widespread throughout WA. *Ophioglossum polyphyllum* is listed as the nearest previous record is 300km from the nearest WA Herbarium lodged specimen. The species also occurs in the Carnarvon, Coolgardie, Murchison and North Kimberley regions (MRUP PER Appendix A1 pg. 70/71). Appendix H of MRUP PER Appendix A1 lists the detailed information of these species, with localities provided for every specimen recorded. *Schoenus* sp. A1 Boorabbin (K.L Wilson 2581) has been identified, with the provided name as the current one listed within Florabase (DPaW 2016). It is listed within the Appendix A1 of the MRUP PER (pg. 27) as a species of interest due to the range extension from that previously known. The specific locations of the recorded specimens are provided in the vegetation maps – Figure 10 (within legend Figure 10.2). None occur within the Disturbance Footprint. Appendix H of MRUP PER Appendix A1 lists the detailed information of this species, with localities provided for every specimen recorded. Further information on locations is provided in Appendix H of the MRUP PER Appendix A1 (Section 5.2.2 pg. 26). The location of the species of interest and conservation significance, which had specimens occurring within the Development Envelope or the Disturbance Footprint, was discussed in Section 5.2.2 of the Appendix A1 of the MRUP PER. The exact location of species of interest is provided in Appendix H of the MRUP PER Appendix A1. A number of these species are included as individual entries on the vegetation mapping in the MRUP PER Appendix A1 Figure 10 series (refer to legend in Figure 10.2). Vimy disagrees strongly with the statement that there was “a deficiency in the scope of the surveying”. The survey effort, with thirteen field trips made in an eight-year period, has provided detailed baseline data for the MRUP area with a total of 239 permanent plots established and 622 relevé mapping sites (MRUP

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		PER Appendix A1 pg. 1 & 71). The details of these trips are provided in Table 6.1 of the PER (page 51). The ongoing monitoring of analogue sites will continue to add to the knowledge base for the Great Victoria Desert region (particularly with regard to changes in vegetation communities through time). There were no recorded species that were found only within the Disturbance Footprint. The individual mapping of the species of conservation significance is provided within the MRUP PER Appendix A1 Figure 10 series. This was one of the objectives of the flora and vegetation assessment report (MRUP PER Appendix A1 Section 3.0). The figure of Priority Flora (Figure 8 - Appendix A1) includes the 'other' species of interest. The numbers of specimens within the Development Envelope, and Disturbance Footprint (if any), are discussed within Section 5.2.2 of Appendix A1. Any changes in taxonomic identification of specimens will not change the recorded locations of these plants. Whilst it is correct that Section 5.2.2 of the Appendix A1 of the MRUP PER did not mention that there were no specimens of these species located within either the Development Envelope or the Disturbance Footprint, this is evident from the locations provided in the Appendix H of the PER MRUP Appendix A1. As the numbers of specimens located within the Disturbance Footprint were discussed for each of the other species of interest, the author of Appendix A1 likely assumed that the reader would make the assumption that no species within these zones was indicated by no comment. A comment that no specimens were present within the Disturbance Footprint and/or Development Envelope could have been made within these particular 'species of interest' sections to assist in reader clarity. The two *Hakea* sp. are discussed above. Vimy will continue to resolve the taxonomic identification of these Hakea specimens. As mentioned, the location of these species will be entered into a GIS database that will ensure that minimal disturbance will occur to individual specimens within the Disturbance Footprint (1 + 3 individual plants within the Disturbance Footprint of a total of 10 + 25 specimens recorded to date).

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		Species that require future taxonomic verification, such as *Hakea* sp. (LAC 139), are still included in the presentation of data, such as in Appendix H of the MRUP PER Appendix A1 where information on individual records are provided. These species are also included within the vegetation mapping (Figure 10 series). As described within the MRUP PER Appendix A1 Section 4.3.1 'Analysis of Site Data', and exemplified in Figures 9.1 and 9.2, the analysis of data required the removal of the specified data to allow for the delineation of individual plant communities. The data analysis has been clearly defined within the methodology. Singletons are removed from the statistical analyses performed by the consultant due to the parameters such testing requires. This data analysis is utilised to formulate the vegetation communities, and are mapped in the Figure 10 series and described in MRUP PER Section 5.3.2. This data analysis has been clearly defined within the methodology, and such singletons are still presented within the site species lists (Appendix I). The MRUP PER does give due consideration to the location of the proposed project within the Yellow Sandplain Boundary (MRUP PER Table 6.7). There are no threatened ecological communities (TECs) within or adjacent to the MRUP. The shrubland vegetation community S6 defined by MCPL on the MRUP floristic data (MRUP PER Appendix A1 and MRUP PER Table 6.4) was found to have affinities to the broadly defined Yellow Sand Plains of the Great Victoria Desert. The Priority Ecological Community is classified as a PEC 3(ii). This classification indicates that the yellow sandplain community has been listed as a PEC due to it being 'a poorly known community known from a few widespread occurrences that are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat' (DPaW 2010) (MRUP PER Section 6.2.3). The definition of the community as being 'very diverse mammalian and reptile fauna, distinctive plant communities' has come from a personal communication and this broad definition has not been updated since 2001 (Barton & Cowan 2001).

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		The strength of the affinity between the S6 MCPL vegetation community and the Yellow Sandplain Community will be better defined with improved baseline data, as is being supplied by the MRUP surveys. The GVD1 subregional area is 5,422,741ha. The PEC boundary is represented visually in Figure 6 of the PER (as was supplied by Tropicana Gold Mine to the DoE in 2010) with the total area of the Yellow Sand Plain Community PEC being 1,692,000ha. Of this area, approximately 0.76% will be the comprised of the S6 vegetation community upon the yellow sand dune crests. Within the MRUP area approximately 965ha of the S6 community has been mapped, with only 1.87% within the Disturbance Footprint. Therefore, only a small proportion of this PEC will be impacted by the MRUP (MRUP PER Section 6.4.1.2). The threats for the Yellow Sand Plains Ecosystem are listed as camels, rabbits, foxes, cats, extensive fires and mining (Barton & Cowan 2001) or solely mining (DPaW 2014). There will be no cumulative mining effects upon the Yellow Sand Plans Community as Tropicana, the nearest mining operation, lies to the north of the ecosystem. Due consideration of the other threats was provided in detail within the PER in Section 6.4.2 discussing indirect impacts from such factors as altered fire regime and feral animals, along with the proposed management protocols for prevention or minimisation of such impacts. Details of such management protocols are provided within the environmental management plans located in the MRUP PER as Appendix K1. Vimy disagrees with the CCWA assertion that Vimy failed to demonstrate understanding of the issues relating to the PEC, as indicated by the discussion above. Ongoing flora and fauna monitoring of analogue sites surrounding the proposed Project will continue to add to the regional knowledge base which in turn will assist DPaW in better defining the PEC and its own management strategies.

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Wildflower Society	*Over-prioritisation of Revegetation in the Mitigation Hierarchy* 'Revegetation' is third in the EPA's mitigation hierarchy, behind 'avoid' and 'minimise', yet even when the first two are possible, management commitments still focus more heavily on revegetation. This is a backwards approach to the mitigation hierarchy. The reality is that Western Australian ecosystems are far too complex to be recreated. Revegetation is often a failure and is at best a pale imitation of what used to exist. It often even leads to more damage, such as the (accidental or deliberate) introduction of non-local flora to the area in seed mixes. However, time and again, revegetation is used in EIA as leverage to demonstrate that something will be done to 'fix' up any mess after the fact. Except that as discussed, ecosystems are not fixable. The reason for this discussion as a separate section is to impress why preventative measures such as concentrated weed monitoring and control ('avoid') should be prioritised over more expensive and less optimal management options like revegetation (and also 'offsets', as the last option in the hierarchy). The resources are not being used where they are most effective. The EPA needs to follow their own guidelines on this and apply the principles and policies as they were intended.	It is a reality of mining that there is a minimal area of disturbance required to extract the ore. Vimy will avoid any disturbance of areas other than those necessary for the establishment of the pits and infrastructure. Thus the amount of ground disturbance will be minimised to that essential for the project to proceed. The next step of revegetation is very important in the minimisation of the impact of the ground disturbance. Vimy is committing to either completely or partially backfilling all of the pits and greatly reducing the footprint of the overburden landforms required. Similarly creating in-pit tailings storage reduces the size of the TSF above ground, and thus reduces the overall disturbance area required for the site. The minimisation of impact continues with the flora species of conservation significance, and preferred habitat of the Sandhill Dunnart (SHD) being included on the GIS database for ground disturbance approvals on-site. The next step in the mitigation hierarchy is the progressive rehabilitation of disturbed sites as soon as is available. This will reduce the total area of disturbance at any one time. It will ensure that there is the progression of vegetation establishment to a climax community so that habitat for fauna is re-established throughout mine life. The completion criteria established for the MRUP minesite, in conjunction with regulators, will ensure that rehabilitation will be unable to be a 'failure'. Progressive rehabilitation and trials will ensure best practice and continual improvement in the rehabilitation methodology. Recalcitrant species will be investigated to improve species diversity, and direct transfer of the 'seed storage layer' of the sites to be disturbed to the sites to be rehabilitated will also improve the species diversity. Annual reporting to the DMP will make monitoring results of the rehabilitation available to the public so that the process is transparent. The use of native seed for revegetation will be strictly limited to within the Yellow Sand Plain Boundary provenance. Seed supplies brought to site will undergo such testing as purity to ensure that no accidental introduction of species occurs. It is true that the disturbed areas will be rehabilitated and not restored. However, a self-sustaining ecosystem that consists solely of local vegetation, with a replicated stratum structure and proportion that supplies habitat for local species

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		of fauna will be achievable (based on knowledge to date) to provide a safe and stable landform consistent with the surrounding landscape. Preventative measures, such as the weed management plan, will be implemented and are essential to the environmental goals of Vimy. However, the disturbance of over 3,787ha of area requires rehabilitation, so an adequate level of detail describing how this will be achieved on overburden landforms is required in the PER document. It does not mean that this is given greater priority than avoidance, it just takes into account the requirements for progressive rehabilitation of this area of disturbance.
Wildflower Society, Proforma	*Extent of clearing* The proposed direct impact from clearing to some plant communities appears to be high. It is to be commended that Level 2 Surveys – Comprehensive were completed in order to demonstrate that plant communities were at least represented outside the Development Envelope (DE) and the Disturbance Footprint (DF). However, what those surveys also demonstrated was that these are highly conservation significant and probably restricted plant communities. An example is Vegetation Community E5. It supports six Priority Flora. It is also likely to have a very localised range considering that of its dominant species, *Eucalyptus gongylocarpa, Grevillea juncifolia* and *Acacia helmsiana* are at the southern extent of their known range, *E. rigidula, Westringia cephalantha, Triodia rigidissima* and *Chrysitrix distigmatosa* are at the eastern extent and *Cryptandra distigma* is at the northern extent of its known range. This indicates that this plant community is not likely to be found much further afield than the records in the vicinity of the project area. Yet 63.2% of its demonstrated range is within the DE and 25.09% is within the Disturbance Footprint (the DE and the DF effectively representing the same thing, considering that clearing and/or secondary impacts may occur in either).	Vimy disagrees that the Disturbance Footprint and the Development Envelope represent the same in potential environmental impacts. The Disturbance Footprint defines the area within which ground disturbance will be approved. The area of disturbance will be limited to the 3,787ha, and the zone of clearance will be limited to within the specified boundary. The Development Envelope is an area beyond the Disturbance Footprint where indirect impacts such as dust may be a potential risk, albeit low with the enforcement of management protocols. Vimy agree that based on the current vegetation mapping, several communities have more than 30% of its mapped distribution within the Development Envelope and Disturbance Footprint. Although this is the case the total area mapped for the project (29,962ha) is only a fraction (<2%) of the Yellow Sandplain Community (1,692,000ha), and thus the area of these 'restricted' communities is expected to be significantly larger than currently mapped. It is therefore considered that the project will not result in the removal of a significant portion of any vegetation community type and sufficient areas of all identified communities exist outside of the Project area. To repeat the discussion above concerning mitigation hierarchy: Vimy will avoid any disturbance of areas other than those necessary for the establishment of the pits and infrastructure. Thus the amount of ground disturbance will be minimised to that essential for the project to proceed. The

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	Overall, of the 26 plant communities recorded, 10 have more than 30% within the DE and a further 11 have over 10% within the DE. Two plant communities (E6 and E7) have over 30% of their demonstrated extent within the DF. Up to 3787 ha of native vegetation is to be cleared for this project. This represents a substantial amount and does not even include the likely secondary impacts. When considering the EPA's mitigation hierarchy again, it is not clear that enough effort was made to 'avoid' and 'minimise' the amount of vegetation clearing. We request that the EPA look closely at this as a part of their assessment.	next step of revegetation is very important in the minimisation of the impact of the ground disturbance. Vimy is committing to backfilling of pits to at least 10m below ground surface, greatly reducing the footprint of overburden landforms required. Similarly creating in-pit tailings storage reduces the size of the TSF above ground, and thus reduces the overall disturbance area required for the site. The minimisation of impact continues with the flora species of conservation significance, and preferred habitat of the SHD being included on the GIS database for ground disturbance approvals on-site. The next step in the mitigation hierarchy is the progressive rehabilitation of disturbed sites as soon as is available. This will reduce the total area of disturbance at any one time. It will ensure that there is the progression of vegetation establishment to a climax community so that habitat for fauna is re-established throughout mine life.
CCWA	The submitter notes in Appendix F1 report to ANSTO on existing radiological environment there is some baseline on radon, gamma and long live alpha emitters. The submitter has been unable to identify any baseline studies on radiological and heavy metal content in flora and fauna. The study presented in Appendix B1 was conducted in 1986 and while samples were collected there is no evidence that they were ever analysed. In the study they collected 86 samples from 14 species of plants and 96 species of small mammals and ten grey kangaroos. The consultants decided not to analyse the samples – pending project development and the hope of better technology. The original report states *"The samples collected for radionuclides and heavy metal analysis should be stored and not analysed yet because analytical methods are likely to improve."* They go on to say the analysis of samples *"is not necessary until there is a more definite proposal to commence mining".*	The ashed samples were sent to the Western Australian Museum for storage, but could not be retrieved despite repeated requests. Whilst the approach of former proponent (PNC of Japan) was sound, all of the kangaroo specimens were shot, leading to potential contamination of the various soft tissues collected. Of all the samples collected during that survey, those specimens would have been the only ones qualifying as a reference specie under ARPANSA's guideline for Non-Human Biota base line study purposes (body weights and gender were recorded); they were the only genuine bush tucker collected with a large enough number of samples (10) from the same specie (Western grey Kangaroo); and that specie is also known to be fairly sedentary and easy to capture. As pointed out by Martinick in the 1985 report, other medium (dingos or cats) and small mammals (rabbits) are either very hard to catch or irregular in distribution, with reptiles also very seasonal in their activity. Given the complicated ecological fluctuations of the very small mammals (and their lack of longevity), it would not have made any sense to study those concentrations, even if those samples had been found. The majority of the small mammals' tissues collected weighed between 0.07 and 0.2g, posing a real challenge to getting reliable measurements of

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	The PER is now an actual proposal and the proponents appear eager to commence mining and yet no progress has been made to analyse the samples. There was no comment regarding these samples in the report to ANSTO in Appendix F1. If indeed the samples were analysed the studies for radiological content would be questionable given the long period of time between collecting the sample and analysing it and the nature of the decay chain of radiological material. The radiological content at the time of collecting the sample is likely to be different to the current content of the sample. The submitter could not identify any studies or analysis of existing samples of flora and fauna for radiological and heavy metal base line content. The submitter still cannot identify in this report the radiological content and heavy metal content in flora and fauna. Without these samples there is an unacceptable level of uncertainty and a disturbing lack of real baseline data. There is a need for actual data, which is an important tool for environmental monitoring to identify changes in the environment and identify when there may be a leak, or deficient containment of radionuclides and heavy metals. We would not expect that there would be anything unusual in the samples given how pristine the environment and given that there is a low surface radiation signature in the area as identified in the report to ANSTO. Appendix F1 the Radiation Report suggests that *"Environmental and occupational radiation monitoring by Vimy/Energy and Minerals Australia (EAMA) has been ongoing since 2007 and summarised in various annual reports."* Reference is made to a number of studies conducted by Coffey and GHD – the submitter could not identify these studies, annual reports or base line data in the PER. The submitter calls on the EPA to recommend that further sample collection and analysis be conducted on the radiological and heavy metal	radionuclide concentrations. By comparison, the NATA-accredited lab routinely used by the proponent requires solid masses of 1g or greater in order to achieve meaningful precision in measuring radionuclide concentrations. Details of the tissues collected for analysis for the small mammals' samples were also not recorded nor were gender, body size or maturity (unless this was provided to the WA Museum when or if vouchered). In addition, the surface sands and overburden materials are radiologically benign, and there is no radiological signature at the surface. Consequently, flora and fauna within the Project area are not expected to have elevated levels, beyond those of species occurring outside the Project area. There is therefore no requirement to assess the radiological concentration of flora and fauna within the Project area, as it will not yield any valid or reliable data.

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	uptake in a range of flora and fauna species to create a clear baseline understanding to measure changes in the environment. The submitter requests and expects that this information be made publicly available.	
United Church WA	A large area of vegetation disturbance (3,787 ha of native vegetation), dewatering (1.8 Gigalitres per annum) (GL/a)) and increased activity across the mine's proposed footprint will cause significant impacts on the ecosystem in what is a unique and beautiful natural environment.	All areas where vegetation is disturbed will be rehabilitated as soon as practicable. The total area disturbed will be less than 0.2% of the Yellow Sandplain Community that characterises the area. There will be no significant residual impacts upon this area. The extraction of water which is taken from deep aquifers has no impact upon the unique environment that characterises the ecosystem as it is not groundwater dependent, and relies solely on water stored in the thick unsaturated (vadose) zone.
P4	This is a unique high conservation area of the goldfields.	The area of the MRUP does lie within the boundary of the Priority 3 Yellow Sandplain Communities of the Great Victoria Desert. The PEC is poorly described, but the MCPL botanical surveys of the MRUP found affinities with the S6 vegetation community described at MRUP with the Yellow Sandplain Communities. The Yellow Sandplain Communities PEC boundary encompasses 1,692,000ha (as submitted to DoE by Tropicana in 2010). Of this, 0.76% is comprised of the S6 vegetation community. Within the MRUP area approximately 965ha of the S6 community has been mapped, with only 1.87% within the Disturbance Footprint. Therefore, only a small proportion of this PEC will be impacted by the MRUP (MRUP PER Section 6.4.1.2). The total area disturbed will be less than 0.2% of the PEC that characterises the area. There will be no significant residual impacts upon this area.

3. Terrestrial Fauna

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Department of the Environment (DoE)	*Executive Summary – Matters of MNES table, 9. Matters of National Environmental Significance (MNES) Species* The proponent may wish to note that the Southern Marsupial Mole is no longer listed under the EPBC Act.	In late 2015, the conservation listing classification for both *Notorytes* was altered. Neither species are listed as Endangered under the *EPBC Act 1999*, and so are no longer considered MNES species. In WA, the Southern Marsupial Mole is no longer listed under the *Wildlife Conservation Act 1950*, and Department of Parks and Wildlife (DPaW) lists the Southern Marsupial Mole as Priority 4 (rather than Endangered as previously). Vimy notes that the Southern Marsupial Mole was removed from listing under the EPBC Act in November 2015.
DoE	*Table 9.8 Summary of Potential Impacts, Management Strategies and Predicted Outcomes for the Matters of National Environmental Significance (MNES) Species at Mulga Rock Uranium Project (MRUP), 16. Offsets – Table 16.1 Conservation significant fauna species* It is stated that 24 ha of prime Sandhill Dunnart habitat remains within the disturbance footprint, however this is not discussed in terms of its elevated importance post-fires, and the potential for residual impact if there is a lack of availability of other suitable habitat in the region post-fire. Information Required – Further discussion is required around the importance of species habitat unaffected by fire in the region. Further discussion is also required around the time lag between clearance of habitat for the Sandhill Dunnart and the recovery of fire affected habitat in the region.	<u>Fire refuge area:</u> Following the 2014 bushfire, seven refugia remained in the Project area covering an area of approximately 1,800ha. Within these refuge areas, over 120ha of 'prime' Sandhill Dunnart (SHD) habitat (defined as E3 and S6 vegetation communities) remained, of which only 24ha occurred within the Disturbance Footprint. Monitoring of permanent vegetation plots within burnt areas clearly shows that the vegetation is re-establishing faster than originally thought and results from recent camera trapping has shown that there is appreciable utilisation of the burnt areas by SHDs after two years from the fire. It is therefore considered that the 24ha of 'prime' SHD habitat to be directly disturbed by the proposal represents a minor portion of the total habitat area available and thus it does not have an elevated status – in reality there is over 120ha of 'prime' habitat available for the SHD and this area is rapidly growing as the vegetation recovers after the 2014 bush fire and will likely recover to its pre-fire area of 1,467ha. <u>Time lag for habitat restoration:</u> A time lag will exist between progressive rehabilitation of disturbed sites and the re-establishment of habitat for the SHD, due to the preference for spinifex of 8 – 10 years of age. The burnt areas of the MRUP region will also take that length of time (ten years), or longer depending on rainfall, to re-establish spinifex where

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		previously present. This was acknowledged within the PER Offsets chapter. Unfortunately, although progressive rehabilitation of disturbed sites will occur as soon as is practical, there will still be the time lag for the growth of the spinifex to be of the preferred size for utilisation by SHD as a nesting site. As stated in the PER pg. 391 "*It is acknowledged that there is a time lag between the loss of potential fauna habitat as a result of clearing and its restoration as part of rehabilitation to a habitat capable of supporting fauna, and that this temporary loss may be regarded as an adverse impact*." Field crews on-site clearly observed greater utilisation of the unburnt refuge areas both during and immediately after the fires, and reported a greater level of predation of selected fauna species seeking shelter. The importance of these areas is therefore acknowledged. Within the 79,204ha bushfire in November 2014, 1,806ha remained unburnt (refuge areas), of which only 118.7ha (6.6%) occurred within the Disturbance Footprint and 410.5ha (23%) occurred within the Development Envelope; hence the majority of the refuge areas are unlikely to be disturbed as they occur outside of the proposed Disturbance Footprint. With respect to the 24ha of prime SHD habitat, this represents a preserved section of an E3 community located within the proposed Emperor mine-pit. Within the immediate vicinity of this area, there is a 91ha area of an unburnt E4 vegetation, and a further 261ha of unburnt E4 vegetation at the adjacent Shogun deposit. The E4 vegetation community is similar to the preferred E3 habitat and thus it is therefore considered that there is sufficient available habitat to support the SHD in the refuge areas. It is important to note that the camera trapping program that is being undertaken throughout the Project area, has identified fauna, including SHD, utilising the burnt areas. It is therefore now considered that a bushfire only results in a temporary (short-lived) impact on fauna species, and that the reintroduction of species back into these burnt areas occurs relatively rapidly (within 2 years), based on the results of the camera trapping since the 2014 bushfire. It is known from flora and vegetation surveys of the area (MCPL, 2015), and from the Landgate Fire Watch website, that the recurrence of fires occurs every

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		10–15 years and is closely related to the re-establishment of an interconnected Triodia tussock system. Given this frequency, it is expected that large-scale impacts on fauna species does not occur and that they are well adapted to this fire regime.
Department of Parks and Wildlife (DPaW)	It is recommended that in considering and addressing the impacts of the proposal on the threatened Sandhill Dunnart, the assessment includes recognition of the immediate, medium and long term value of burnt and unburnt areas of 'prime' Sandhill Dunnart habitat.	Noted. This aspect of environmental management will be specifically managed under the proponent's Conservation Significant Fauna Management Plan (MRUP-EMP-005; PER Appendix K1). Vimy agrees that a reclassification of the 2014 burnt area, with regards to SHD habitat is required, given the greater than expected utilisation of these areas. It is fair to say that immediately following the bushfire, only 24ha of suitable SHD habitat was left within the refuge areas in the Disturbance Footprint, but that a further 111ha occurred within the Development Envelope and over 120ha was mapped in the fire refuge areas. Furthermore, within one to two years the vegetation has regrown to such an extent so as to support SHD utilisation of the burnt areas, and it is expected that the pre-fire habitat of 1,456ha will be restored in the medium term. Following the 2014 bushfire there were seven refuge areas remaining in the general vicinity of the Project area covering over 1,800ha. The two refuge areas that traversed the mining area covered a combined area 650ha, of which over 120ha has been mapped as 'prime' SHD habitat (ie incorporated the E3 and S6 vegetation communities). It is therefore considered that whilst only 24ha of 'prime' SHD habitat remained within the Disturbance Footprint immediately after the 2014 bushfire, there is still a considerable area within the Development Envelope and surrounding area that is accessible to the SHD.
Department of Parks and Wildlife (DPaW)	It is recommended that the proponent develops and documents project design and management plans that avoid or minimise impacts from proposed ancillary infrastructure development on 'prime' Sandhill Dunnart habitat, particularly unburnt habitat.	Noted. Please see earlier comment referring to the proponent's Conservation Significant Fauna Management Plan.

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		Vimy's Conservation Significant Fauna Management Plan will apply the following Mitigation Hierarchy to minimise the disturbance on the Sandhill Dunnart (SHD): <u>Avoid</u> Where practicable Vimy will avoid disturbing 'prime' SHD habitat with all disturbances electronically tracked using a Ground Disturbance Activity Permit (GDAP), to provide a quantitative and transparent system for assessing direct impact. With regards to moving the accommodation camp (approximately 4ha in area), it is considered that this represents a negligible impact on the 'prime' SHD habitat as it represents <3% of the total area of 'prime' habitat in the immediate vicinity of the Project area, and <1% of the refuge areas traversing the Project. It is considered that with the camp in this region, this will provide a greater level of protection for this refuge area (313ha in size) and ensure the continued development of this area. There is also the possibility of undertaking long-term monitoring in the 'protected' area to gain greater insights into the functioning of this system. <u>Minimise</u> Vimy has already, in the process of designing the layout of facilities, endeavoured to minimised those areas regarded as being the highest value habitat for SHD – namely S6 vegetation communities. Vimy will endeavour to minimise the proposed clearance areas and to rehabilitate those areas that have been cleared as quickly as possible once they are no longer required. Vimy will utilise the application of a GDAP to ensure that environmentally sensitive areas (including 'prime' SHD habitat) are avoided where practicable and that the areas disturbed will be progressively rehabilitated as soon as is practicable. As noted above, once full rehabilitation has been achieved Vimy believes that there will be a small net creation of prime SHD habitat.

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		Vimy will also ensure that indirect impacts upon SHD are minimised through the application of its: • Dust Management Plan • Fire Management Plan • Feral Animal Management Plan • Weed Management Plan • Radiation Management Plan • Radioactive Waste Management Plan • Rehabilitation and Revegetation Management Plan Vimy will also be developing a Construction Environmental Management Plan to ensure that any trenches created during construction have a mode of egress and are regularly checked to avoid SHD being trapped. In addition, Vimy will ensure that unnecessary disturbance to SHD is limited by: restricting off-road driving; enforcing vehicle speed limits; and monitoring feral animal numbers to ensure that Vimy is not responsible for encouraging feral animals that would also then prey on SHD. More details can be found in Vimy's Conservation Significant Fauna Management Plan (MRUP-EMP-005) which can be found within Appendix K1. Vimy will continue to monitor for SHD under its established Camera Trapping Protocol and relevant information will be used to inform and update management strategies associated with protecting SHD and their habitat where practical. Vimy will also ensure that all site based employees are educated about the SHD as part of their site induction and encouraged to report observations for inclusion in its central database system used for monitoring and management purposes <u>Rehabilitate</u> Over the Disturbance Footprint, the vast majority of all rehabilitation will be back to a vegetation community that resembles an E3 community. It is therefore expected that the proportion of 'prime' SHD that is disturbed will be reinstated

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		during the development of the project, whilst negligible S6 vegetation community will be disturbed as a result of this project
Department of Parks and Wildlife (DPaW)	It is recommended that any conditions of approval for the proposal ensure that the proponent implements specific management and monitoring measures to minimise impacts on Sandhill Dunnart and its habitat, developed in consultation with Department of Parks and Wildlife.	Noted. Any conditions placed on Vimy aimed at minimising impacts on SHD will be integrated into the Conservation Significant Fauna Management Plan (MRUP-EMP-005; PER Appendix K1).
Department of Parks and Wildlife (DPaW)	*Sminthopsis psammophila* (sandhill dunnart) is listed as threatened fauna, ranked endangered. The sandhill dunnart is one of 19 species in the carnivorous marsupial genus *Sminthopsis* (Dasyuridae) that occurs predominately throughout the arid and semi-arid regions of Australia and is one of five dunnart species recorded in the greater Mulga Rock (proposal) area. The sandhill dunnart is nocturnal and insectivorous and differs from other members of the genus by several features, most noticeably its larger size and distinctive tail. Sandhill dunnarts are within the critical weight range for terrestrial mammals and therefore have an elevated likelihood of extinction or significant decline, especially in arid areas. The species is currently known to occur in three disjunct populations (consisting of five known sub-populations) in Western Australia and South Australia. The Mulga Rock proposal affects the area inhabited by the Western Australian population located near Queen Victoria Spring Nature Reserve in the south-western corner of the Great Victoria Desert (sub-population one). In South Australia, the two other populations are located at Yellabinna Regional Reserve in the south-eastern Great Victoria Desert (sub-population two) and on the Eyre Peninsula (sub-populations three, four and five). All sub-populations are considered very important for the long term recovery and survival of the species and while the extent of occurrence for the species is currently stable, the	Noted. The proponent notes that extensive consultation on the matter of the SHD habitats has been ongoing since 2013, involving specialist ecologists with relevant experience of the Great Victoria Desert environments, as well as officers of the DPaW, as recorded in the Stakeholder consultation file (Appendix J1). The extensive analysis of potential habitats for the SHD is ongoing, with regional trap sites (using the proponent camera trapping methodology detailed in Appendix B3) currently in operation. Upon completion of that program, a final report will be submitted to the relevant regulatory authorities with an assessment of the potential for sustained used of burnt habitats by SHD and potential implications for land users. This report will also assess the implications of the overall bushfire regime in the southwestern portion of the Great Victoria Desert on habitat availability and implications for management of a mining operation at MRUP. This will also capture related factors identified as critical (presence of large hummock grasses and relate these to Churchill (2009) assessment of areas suitable SHD habitat.

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	area of occupancy for the species is thought to be declining (Woinarski *et al.* 2014). In the Great Victoria Desert, predation by feral cats and foxes and altered fire regimes are considered the key threats to sandhill dunnart survival. Other threats may include predation by native carnivores and declining habitat quality caused by introduced herbivores (especially sheep, goats, rabbits, camels, and cattle) and weed colonisation. Habitat – In Western Australia, fauna survey and collection records indicate that sandhill dunnarts have been found exclusively in areas supporting vegetation association 84 (Beard 1974), which comprises marble gum *(Eucalyptus gongylocarpa),* mallee and *Triodia* spp. Between sand dunes of the Great Victoria Desert (Gaikhorst and Lambert 2014). Locations where the species has been recorded are most consistently characterised by the presence of spinifex (*Triodia* spp.) hummocks associated with parallel sand dunes and sheets (Churchill 2001; Ward 2009; Moseby *et al.* in press). Surveys undertaken in the Great Victoria Desert over the past 30 years in a range of habitats have recorded very low numbers of sandhill dunnarts. In 1985, the first record of a sandhill dunnart in Western Australia was documented in the Mulga Rock project area. Since this first discovery, several more studies have been undertaken on the Western Australian population [e.g. Pearson and Robinson 1990, Churchill 2001a, 2001b and 2009, Gaikhorst and Lambert 2002, 2006, 2007, 2008 and 2009, Ninox 2010 and Turpin 2014]. As indicated in the PER (Appendix B3, pg. 9), sandhill dunnarts in Western Australia are currently known from *"An estimated (some capture data has not been published)...44 captures, including seven captures in the MRUP area."* The proposed development appears to be located centrally within the area of known survey capture and voucher records for this species in	

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	Western Australia. The PER indicates that survey effort for the sandhill dunnart in Western Australia to date has resulted in an average of *"...one capture per 1,103 trap nights..."* (pg. 164), suggesting that individuals of the species are *"...difficult to trap, are low in abundance and exhibit patchy distribution or seasonal fluctuations..."* (pg. 164). Habitat availability may not be a limiting factor for the sandhill dunnart in the southern Great Victoria Desert, due to information suggesting relatively high mobility and probable low density. However, large areas of suitable habitat are considered likely to be needed to sustain the population (McLean 2015). Noting this, it is important to acknowledge that the first study involving a detailed regional habitat assessment for the species across the Great Victoria Desert is currently at the planning stage. Impact assessment – The PER indicates that approximately 3,787 ha of native vegetation will be impacted by the proposal, including an approximate 1,395.93 ha of the E3 vegetation community and 70.98 ha of the S6 vegetation community. These communities are identified as supporting 'prime' sandhill dunnart habitat, which is described on page 164 of the PER as *"Core habitat that is functional and able to meet all the needs of a breeding population."* The PER also indicates (pg. viii) that a recent large bushfire (November 2014) has resulted in approximately 80 per cent of the 'prime' sandhill dunnart habitat located within the disturbance footprint being burnt, leaving 24 ha of the identified 'prime' sandhill dunnart habitat within the disturbance footprint unburnt. The PER also includes the following statement in table 9.8 (pg. 178): "Given the loss [our emphasis] of the high proportion of suitable habitat by recent fires and the recordings of only nine SHDs [sandhill dunnarts] over a 30-year period at MRUP, it is most likely that the SHD occurs in	

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	very low numbers in its preferred habitat. It is therefore considered that the impact [of the proposal] on the SHD will be minimal." Parks and Wildlife recognises that sandhill dunnart habitat in the Great Victoria Desert is prone to widespread and commonly hot bushfires, which can have an impact on the quality of habitat in the short to medium term by reducing the structure and density of spinifex and ground cover. While fire history and intensity is likely to be a factor influencing sandhill dunnart habitat condition and presence at any given point in time, it is the view of Parks and Wildlife based on experience and the scientific literature, that the effects of the 2014 fire on core sandhill dunnart habitat in this region are unlikely to be permanent. Indeed, survey work conducted in 2015 for the proposal recorded sandhill dunnarts and other native species using recently burnt areas within the proposal area. Specifically, the GHD (2015) camera trap report (Appendix B4) indicated that *"...Sandhill Dunnart...were recorded at camera MR11a...The MR11a site* was *burnt in November 2014..."* (pg. 4) affirming that the species is present and may be utilising the burnt habitat at Mulga Rock. Noting this and on the basis of available information on species habitat requirements, there is a high likelihood that key vegetation related characteristics of core habitat will return to the burnt areas within one to two decades, subject to rainfall and other climatic conditions. A conclusion that the burnt habitat within the proposal area is of low significance / suitability for the species in the medium to long term is not consistent with the scientific information available to the department. Given the level of scientific uncertainty surrounding the distribution, abundance and conservation significance of the sandhill dunnart in the Great Victoria Desert and Western Australia overall, it is not possible to determine with certainty the significance of the impacts of this proposal on either the resident population at Mulga Rocks or the identified 'prime' habitat for this species at either a local or regional scale. Broadscale vegetation mapping appears to indicate that habitat suitable for sandhill	

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	dunnarts is located outside the area impacted by this proposal and on this basis it would appear unlikely that the impacts would threaten the regional population of the sandhill dunnart. Nonetheless, the impacts of the proposal on 'prime' sandhill dunnart habitat as identified in the PER warrant appropriate monitoring, management and mitigation measures. Management and mitigation actions should be developed with the primary objectives of maintaining the local resident population and improving the understanding of the species' local distribution and ecological requirements. As the proposal would impact on a substantial area of 'prime' habitat within an apparently significant area for the species, it is recommended that the proponent: • avoids and minimises its impacts as far as practicable on 'prime' sandhill dunnart habitat in the disturbance footprint, particularly the 24 ha of retained unburnt habitat; • implements management and monitoring measures developed specifically to minimise, measure and document impacts on the sandhill dunnart and its habitat; and • considers commitments to conservation actions to mitigate the impact of the proposal on the approximately 1,467 ha of 'prime' sandhill dunnart habitat (both burnt and unburnt). It would also be beneficial to the species if mitigation included actions that provided conservation benefits for the species. Mitigation actions to benefit the species could include: • contributions towards the Great Victoria Desert Biodiversity Trust, for targeted and regional surveys of sandhill dunnart in alignment with the planned monitoring guidelines in the Great Victoria Desert in Western Australia; • contributions towards further work, assisting in the resolution of identified knowledge gaps including, distribution, threats,	

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	effectiveness of mitigation strategies, monitoring, habitat requirements, diet and life history, and appropriate management; and/or • contributions towards implementing recovery actions such as fire management, to secure and enhance the conservation status of the sandhill dunnart in the wild through on-ground management actions (drafting of the sandhill dunnart recovery plan has recently been completed in preparation for Government agency endorsement).	
DoE	*Section 6.3 Assessment of Non- Human Biota* Results for a Tier 2 Environmental Risk from Ionising Contaminants: Assessment and Management (ERICA) assessment are compared directly with the ERICA screening value (10µGy/h). It is usual practise to specify an environmental reference level in order to compare to biological effects data (for large mammals in the range 4-40µGy/h, from International Commission on Radiological Protection ((ICRP) (2008)) DCRL values). However, on the basis of the low calculated dose rates, the conclusion on Pg. 9 that wildlife are protected is considered valid. Information Required – Future assessments should include a discussion around effects data and Environmental Reference Levels.	Noted. However, for the purposes of impact assessment, it is usual to compare the ERICA outputs with the screening level rather than Environmental Reference Levels (ERLs). This is because the ERLs are more relevant as target criteria when emissions are occurring. Vimy Resources will incorporate ERLs into the operational Radiation Management Plan that is submitted for final project authorisation.
DoE	*Section 6.3 and Appendix F1 Assessment of Non-Human Biota* The assessment is heavily depended on the calculation of dust and the influence it has on soil concentration. It is difficult to assess the accuracy of dust dispersion calculations due to the lack of information made available. Information required – More detail required on calculations of dust concentrations.	As noted in Section 4 of Appendix B of Appendix F1, the non-human biota assessment was based on dust deposition as the only source of continuous release of radionuclides into the environment during operations. Section 4.4 of Appendix B of Appendix F1 notes that the change in soil radionuclide concentration is 0.862Bq/kg and the assumptions for this figure are outlined in Table 10 of the same document (as part of a broader Section 3.4 on ingestion dose estimates).

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		The dust deposition rate is referenced as GHD2015a and supplied as Appendix E1. The source terms, model parameters, assumptions and conclusions that lead to the dust deposition rate are provided in this document (Appendix E1). No dilution through contribution from bushfire and other non-anthropogenic dust sources have been made in the modelling documented in Appendix E1, highlighting a conservative approach in the associated impact assessment.
PND (WA), Proforma	*Fauna species that should be considered include:* The unique Marsupial Mole (*Notoryctes typhlops*) occurs in the proposed mine area. The females have a backward-facing pouch, a necessary adaptation to a life as a digger – or rather a "swimmer" which better describes how these fascinating little animals move through sand. This blind, pale silky-furred creature lacking visible external ears and possessing spade-like claws on its forefeet, has a horny shield protecting its snout and a stubby leathery tail. It is magnificently adapted for its burrowing life in its habitat in sandy desert country. The Australian Museum's Complete Book of Australian Mammals, edited by Ronald Strahan, states that it provides a striking example of convergent evolution when compared to Africa's Golden Mole. The two species are physically very similar in appearance and size but are unrelated. The Marsupial Mole only occasionally comes to the surface and is more inclined to do so after rain. Their food includes ant pupae, sawfly larvae, beetles, scarabeid and longicorns beetles' larvae and the larvae of cossid moths. The Sandhill Dunnart, (*Sminthopsis psammophila*) is another inhabitant of the proposed Mulga Rocks uranium mine area. It is the largest of the dunnarts and rarely seen. It eats a variety of adult and larval insects, is very agile, and is adept at evading danger according to the reference in Complete Book of Australian Mammals published in 1983. More might be known of this small native animal now. Brush-tailed Mulgara, Dasycercus – another of the native mammals living in the arid sandy	All fauna, and especially conservation significant fauna, were provided with commensurate consideration by MRUP PER. All conservation significant species were considered in detail within the PER in Section 9.0 (MNES species) and in Section 7.3.5 Conservation Significant Fauna, and within the Environmental Management Plan for Conservation Significant Fauna (MRUP PER Appendix K1). The Southern Marsupial Mole (SMM) is discussed in detail in Section 9.3.3 of the PER, and on pages 159, 177 and 387 utilising more up-to-date information that that of Strahan's text published in 1983. Further details on the biology of the species was provided within the PER Appendix B5. Since the preparation of the PER document, conservation listings have been modified. The SMM is no longer listed under the EPBC Act, and is listed by DPaW as Priority 4 (previously Endangered). The preferred habitat of the SMM is sand dunes, and particularly, the upper slopes of these dunes. Mine planning has avoided the proposed disturbance of these areas wherever possible. Linear infrastructure, such as pipeline corridors, will be routed around sand dunes where possible. The low density of the species in the region, combined with a restricted area of habitat proposed to be disturbed (~11ha of suitable dune country), will result in minimal impact to the species by the MRUP. This submission quotes details on biology from a 1983 reference and admits that the data may be dated. Two full reviews on the most current information to date on the Endangered SHD are provided within Appendix B3 (reviewed by DPaW) and B4. A discussion on the species is provided within the MRUP PER in Section 7.3.5. The species has been observed in MRUP area in 1985 and

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	area of the proposed Mulga Rock uranium mine site and surroundings. It is a very attractive, small mouse-like native animal. The elusive Night Parrot was rediscovered not long ago in South West Queensland where it will be protected by a special reserve being established in its honour. The reserve's location is unknown to the general public. Bush Heritage Australia has raised funds for this protection of this bird which was suspected of having gone extinct for many years. It is possible that the Night Parrot could occur in the area of interest to Vimy Resources. The survival of the Brush Tailed Mulgara will be threatened by this proposal. Mulga Rock has great diversity of fauna species. Mining uranium will have deleterious impact on habitat values, and likely favour animal scavengers.	more recently recorded two individuals by camera trapping.The species is likely to be highly mobile and has a preferred habitat of spinifex plants of approximately 8-20yrs of age. Therefore, with the recent removal of a large proportion of spinifex in the MRUP area from the November 2014 bushfire, it is likely that the numbers of SHD in the area have been further reduced. There is a small risk of vehicle strike if individuals return to the Project area (after post-fire regeneration) whilst it is operational, although noise and activity are likely to discourage such return in the short term. As discussed within the PER (Table 9.2) there is unlikely to be any suitable habitat for the ground dwelling Night Parrot present in the Project area, with a lack of surface water supply, and therefore the species is not likely to occur in the area and there will be no direct or indirect impact upon the bird by the operations of the MRUP. A single specimen of the Priority 4 Brush-tailed species was captured in 1985; with no captures since, except for observations of Mulgaras during camera trapping targeting Sandhill Dunnarts. It will not be threatened by the MRUP proposal. PND (WA) suggest that the following fauna species should be considered: • *Notorcytes typhlops* or the Southern Marsupial Mole was considered in section 7 and 9 and in particular is section 9.3.3 of the PER • *Sminthopsis psammophila* or the Sandhill Dunnart was considered in section 7 and 9 and in particular in section 9.3.2 of the PER. • *Pezoporus occidentalis* or the Night Parrot is not believed to occur in the area nor is there thought to be suitable habitat. • *Dasycercus blythi* or the Brush-tailed Mulgara is discussed in section 7 of the PER; it will not be threatened by this proposal. All habitat clearance will be rehabilitated as soon as the area is no longer required. To the extent that the proposal encourages animal scavengers – these will be dealt with appropriately under the Feral Animal Management Plan (MRUP-EMP-006).

<table>
<tr><th>Submitter</th><th>Submission and/or issue</th><th>Response to comment</th></tr>
<tr><td>Conservation Council WA</td><td>In general, the fauna studies were inadequate and did not consider seasonal change. More rigorous scientific monitoring is required. Desktop studies are no replacement for infield scientific surveying. The documentation provided by the proponent shows that there has been a lack of infield scientific studies. Without this data the EPA has not got sufficient information to base their assessment or make recommendations.</td><td>See specific comments below: Vimy does not agree with this statement. There have been multiple fauna site surveys, and these are documented in the MRUP PER Appendices B1, B2, B3, B4, B5, B6, B7 & B8.</td></tr>
<tr><td>Conservation Council WA</td><td>The desktop and reconnaissance studies on the presence of Short Range Endemic (SRE) species at MRUP and their range are inconclusive. Bennelongia identify that there are seven species that are considered SREs and another 16 that are potentially SREs that have only been collected in the DE – the consultants suggest that this is not of concern because there is suitable habitat outside the project area. The presence of suitable habitat outside the project area does not mean that those species will move to those areas.

SREs<table><tr><th>Taxonomic Groups</th><th>Species</th></tr><tr><td>Arachnida
Araneae (Mygalomorphae)
Barychelidae</td><td>Synothele yundamindra</td></tr><tr><td>Arachnida
Araneae (Mygalomorphae)
Idiopidae</td><td>Eucyrtops eremaea</td></tr><tr><td>Arachnida
Araneae (Mygalomorphae)
Nemesiidae</td><td>Kwonkan goongarriensis</td></tr><tr><td>Arachnida
Araneae (Mygalomorphae)
Nemesiidae</td><td>Swolnpes darwini</td></tr></table></td><td>Vimy disagrees with this statement because the Level One survey for Short Range Endemic (SRE) species did not justify further investigation. The consultants (Bennelongia 2015) indicated within Appendix B8 of the MRUP PER (pg. 31) that there is unlikely to be more diversified SRE fauna than sampled, and they do not appear to be MRUP site specific. Analysis of species accumulation curves indicate that 70-80% of the SREs were collected during the survey.

The SRE survey and report satisfied all of the objectives of the EPA in regard to SREs, as stated within the EPA Guidance Statement No. 20 (EPA 2009). The MRUP proposal will not destroy specific key habitats of SRE fauna, will not interfere with the distribution and abundance of the SRE taxa and will not affect the conservation status of any SRE taxa.

The Conservation Council WA (CCWA) comments made an incorrect representation of the facts presented within the Bennelongia (2015) report: “there are seven species that are considered SREs and another 16 that are potentially SREs that have only been collected in the DE”. After this statement, the table inserted within the text of the CCWA Assessment submission does not have a title but can be assumed to be these 7 + 16 species said to be identified within the Development Envelope as there are 7 + 16 species listed. The Bennelongia report is provided within the PER as Appendix B8 and discussed within the body of the PER report as Section 7.3.4. These 7 + 16 species listed are not those sampled at the MRUP site, but those identified from a desktop survey of all SRE surveys done in the general area to date that may potentially</td></tr>
</table>

Submitter	Submission and/or issue		Response to comment
	Diplopoda Polydesmida Paradoxosmatidae	Antichiropus sp. 'Butterfly'	occur in the MRUP site. A relatively wide search area, 250km by 250km, was used. The data presented in the CCWA submission appears to have been derived from Table 2 of the Appendix B8, which indicates clearly that this is a literature search – not the results of MRUP site sampling. For example, the Aganippe 'Topicana sp.' (submission typo – should read Tropicana) were sampled during Tropicana minesite surveys by ecologia (2009) (MRUP PER Appendix A8 pg. 6). Although noted to have been recorded in the general vicinity of the MRUP site, the Appendix B8 of the MRUP PER provides clarity on the difference of the SRE habitats at the Tropicana and MRUP sites. Thus although these 7 + 16 species have been found in the 250km x 250km area around the MRUP, they will not necessarily occur at the MRUP, and will be less likely to occur in such densities or diversities as at the Tropicana site as there is less diversity of landforms and soil types at MRUP, and Tropicana has rocky outcrops, lateritic breakaways and deep ferruginous hard caps that may provide a refuge for SRE fauna due to the higher moisture holding capacity (MRUP PER Appendix B8 pages 7 & 9). Table 4 in the PER Appendix B8 (page 18) and the Table 7.6 in the PER (page 121) detail the actual SRE groups recorded within the MRUP area. Vimy considers "the presence of suitable habitat outside the project area does not mean that those species will move to those areas" as an incorrect interpretation of presented information. Neither the MRUP PER nor PER Appendix B8 implies that individual SRE will necessarily move from the area of disturbance to the adjacent habitat. It is indicating that, because there is no habitat unique to the MRUP Disturbance Footprint, then although individual specimens may be impacted with disturbance, there will be no negative impact on the conservation status of these species. "In reality, all seven species are likely to be more widespread than currently documented, with ranges both within and outside the Development Footprint, because the habitats they occupy have wide occurrence." (PER Appendix B8 pg. 30-31).
	Diplopoda Polydesmida Paradoxosmatidae	Antichiropus sp. Tropicana 1	
	Diplopoda Polydesmida Paradoxosmatidae	Antichiropus sp. Tropicana 2	
	Possible SREs		
	Taxonomic Groups	**Species**	
	Arachnida Araneae (Mygalomorphae) Barychelidae	Mandjelia sp. 'Wanjarri'	
	Arachnida Araneae (Mygalomorphae) Barychelidae	Synothele 'megaspiral'	
	Arachnida Araneae (Mygalomorphae) Idiopidae	Aganippe 'Topicana sp. 1'	
	Arachnida Araneae (Mygalomorphae) Idiopidae	Aganippe 'Topicana sp. 3'	
	Arachnida Araneae (Mygalomorphae) Idiopidae	Aganippe 'Topicana sp. 4'	
	Arachnida Araneae (Mygalomorphae) Idiopidae	Aganippe 'Topicana sp. 5'	

Submitter	Submission and/or issue		Response to comment
	Arachnida Araneae (Mygalomorphae) Idiopidae	Aganippe 'Topicana sp. 6'	As discussed above, it cannot be expected that the species from a wide 250km x 250km data search will be present in a site specific survey at MRUP with SRE habitat that differs to that of the Tropicana site. Thus Vimy supports the Bennelongia consultant's findings, and not the CCWA contention. It was estimated that 79-80% of the species belonging to SRE groups at MRUP and its immediate surrounds were collected (MRUP PER Appendix B8 pg. 28). Bennelongia discussed the conditions for collecting (MRUP PER Appendix A8 page 16), and noted that there were a number of indicators of relatively high moisture levels, and that day and night-time temperatures were relatively moderate. When examining the Bureau of Meteorology Laverton data (BOM 2016), the annual rainfall for the year was 318mm compared to the average mean rainfall of 233.5mm/yr. Thus, the timing of the survey was not considered a limitation. The foraging methods for sampling at 21 different sites were also varied and thorough, and supports an effective sampling effort (MRUP PER Appendix B8 pg. 17). As described above: The interpretation within the MRUP PER Appendix B8 does not imply that individual SRE will necessarily move from the area of disturbance to the adjacent habitat. It is indicating that, because there is no landforms or microhabitats unique to the MRUP Disturbance Footprint (or the MRUP in general), then although individual specimens may be impacted with disturbance, there will be no negative impact on the conservation status of these species (MRUP PER Appendix B8 pg. 30-31). Both the direct and indirect impacts to SREs were considered within the MRUP PER Section 7.4.2, and within the Appendix B8 Section 9.0. There have been no listed SREs recorded in the general area to date, nor were any located in the MRUP survey. There are no landforms or microhabitats unique to the Project area and the two landforms that may contain specialist SRE species, salt lakes and closed/tall Eucalyptus woodlands, are more widespread outside the Disturbance Footprint. The 2014 fire affected 78% of the Disturbance Footprint, reducing the habitat and numbers of SRE current in the proposed disturbance
	Arachnida Araneae (Mygalomorphae) Idiopidae	Aganippe 'Topicana sp. 8'	
	Arachnida Araneae (Mygalomorphae) Nemesiidae	Aname 'Tropicana sp. 2'	
	Arachnida Araneae (Mygalomorphae) Nemesiidae	Kwonkan 'Tropicana sp.l'	
	Arachnida Araneae (Mygalomorphae) Nemesiidae	Kwonkan 'Tropicana sp.2'	
	Arachnida Araneae (Mygalomorphae) Nemesiidae	Nemesiidae n. gen. n. sp. 1	
	Pseudoscorpiones Chthoniidae	Tyrannochthonius sp. Indet.	
	Crustacea Isopoda Armadillidae	Pseudolaureola sp. Nov.	
	Chilopoda Geophilomorpha Chilenophilidae	'Genus indet. Sp. Indet.'	
	Chilopoda Geophilomorpha Chilenophilidae	Orphnaeus brevilabiatus	

Submitter	Submission and/or issue	Response to comment
	In addition to these seven species of SRE and 16 species of suspected SREs it is possible that there are more SRE species but the on-ground surveying has been limited. Bennelongia discredit the possibility of some of those seven SRE species from occurring at the site because none were present during their reconnaissance, however we contend that the reconnaissance was inadequate to support this position. Bennelongia make reference to on the ground surveying over four consecutive days in October 2014. The WA EPA Guidance for the Assessment of Environmental Factors in defining SRE species make the observation that SREs "usually have highly seasonal activity patterns, many species (are) only being active during cooler, wetter periods. Vimy notes that the months April – October have a lower chance of rainfall than the months from November through to March with the average monthly rainfall for October at less that 20 millimetres (mm). October average temperatures are around 30 degrees Celsius. Typically, October is neither cool nor wet. In figure 7 of Bennelongia's report they also identify that October is generally getting hot and likely to be dry. Claims that these species are unlikely to exist in the area, based on one short survey during hot dry conditions should not be considered as conclusive and further surveys should be required. The WA EPA define SRE as "having poor dispersal powers; confinement to discontinuous habitats; and low levels of fecundity". These characteristics of SREs make them particularly vulnerable to local impacts from mining and land clearing. Vimy tend to refer to closely related species elsewhere, surrogates, this does not equate to the same species elsewhere and does not provide sufficient evidence of the likelihood or possibility of SREs being relocated or migrating to other areas not affected by the mining activities.	area. It is recognised that individual SREs, and habitat, may be lost during the disturbance of the proposed operations footprint. However, with progressive rehabilitation, and with no SRE habitats specific to the areas proposed to be disturbed, there will be no SRE species threatened by the proposed MRUP (MRUP PER Section 7.3.4.2 pg. 119, Appendix B8 pg. 1, 7 and 30).

Submitter	Submission and/or issue	Response to comment
	The risks to SREs have not been sufficiently identified or addressed. The surveys are deficient and raise more questions than they provide answers for. The submitter urges the EPA to require further survey's conducted under different conditions to: • clarify which SREs actually exist in the area; • further identify if the same species exist elsewhere; • identify what the risks are to those species; and • categorise the seriousness of those risks on the survival of those individual species.	
Proforma	I have worked surveying the mulgara and know that we still have very little knowledge on their favoured habitat and population status. The marsupial mole we know almost nothing about and the sandhill dunnart is also fairly limited in our understanding of its status.	All fauna, and especially conservation significant fauna, were provided with commensurate consideration by MRUP PER. All conservation significant species were considered in detail within the PER in Section 9.0 (MNES species) and in Section 7.3.5 Conservation Significant Fauna, and within the Environmental Management Plan for Conservation Significant Fauna (MRUP PER Appendix K1). The Southern Marsupial Mole (SMM) is discussed in detail in Section 9.3.3 of the PER, and on pages 159, 177 and 387. Further details on the biology of the species was provided within the PER Appendix B5. Since the preparation of the PER document, conservation listings have been modified. The SMM is no longer listed under the EPBC Act, and is listed by DPaW as Priority 4 (previously Endangered). The preferred habitat of the SMM is sand dunes, and particularly, the upper slopes of these dunes. Mine planning has avoided the proposed disturbance of these areas wherever possible. The low density of the species in the region, combined with a restricted area of habitat proposed to be disturbed (~11ha of suitable dune country), will result in minimal impact to the species by the MRUP. Two full reviews on the most current information to date on the Endangered Sandhill Dunnart (SHD) are provided within Appendix B3 (reviewed by DPaW) and B4. A discussion on the species is provided within the MRUP PER in Section

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		7.3.5. The species has been observed in MRUP area in 1985 and more recently recorded two individuals by camera trapping. The species is likely to be highly mobile and has a preferred habitat of spinifex plants of approximately 8-20yrs of age. Therefore, with the recent removal of a large proportion of spinifex in the MRUP area from the November 2014 bushfire, it is likely that the numbers of SHD in the area have been further reduced. There is a small risk of vehicle strike if individuals return to the Project area (after post-fire regeneration) whilst it is operational, although noise and activity are likely to discourage such return in the short term. A single specimen of the Priority 4 Brush-tailed species was captured in 1985; with no captures since, except for observations of Mulgaras during camera trapping targeting SHD. It will not be threatened by the MRUP proposal. Both the SMM and the SHD were dealt with in Sections 7 and 9 of the PER. The impact of the development of the Project on the SMM is expected to be negligible and the impact upon the SHD minimal – see Table 9.8 of PER.

4. Subterranean Fauna

Submitter	Submission and/or issue	Response to comment
Department of the Environment (DoE)	Executive Summary- Residual Impacts and Offsets (p v) Lack of clarity Information Required – It is unclear what 'no significant stygofauna present' means – Clarify 'significant'	There is no sentence containing the words 'no significant stygofauna present' on 'page v' within the Executive Summary. The slightly different statement 'no significant stygofauna were present' is made on 'page vi'; Vimy assumes that this is what is being referred to. This is an executive summary and does not contain detail. A description of the stygofauna that were present in the borefield which is the only place where any stygofauna were detected is detailed in Section 8 of the PER (Subterranean Fauna). As is made clear in section 8.4.1.2, of the twelve sites sampled no stygofauna were located in ten of them. In the two where stygofauna were located they were aquatic worms. The term 'significant' in this context is intended

Submitter	Submission and/or issue	Response to comment
		to convey that they are not considered to be threatened species requiring special protection. It is perhaps worth adding that the locations where the stygofauna were found to be present were in the aquifer from which the borefield will draw water but were not located in the same area as where the bores will be located.
Proforma	Water extraction may threaten rare endemic groundwater species.	The discussion of the potential impact upon stygofauna habitat in the Kakarook North borefield is discussed fully on page 141 of the PER. "The Kakarook North aquifer has been modelled as containing around 167GL of water and the MRUP is expecting to extract up to 3.6GL/a (with an average of 1.8GL/annum over the life of mine). The cone of depression around the borefield (the area where the level of the water would fall) is not expected to significantly extend to the limits of the basin, and there will, therefore, be areas where any resident stygofauna will be unaffected. The relative small amount of water being extracted (when compared to the size of the aquifer) is not expected to represent a threat to any species present. Indeed, the amount of drawdown is not expected to exceed natural variations in the level occurring in the aquifer as a result of varying rainfall and will be small compared to the thickness of the associated habitat. Accordingly, no significant impact upon stygofauna is expected to occur as a result of the extraction of water from the Kakarook North borefield." Page 387 is a summary of this information. PER pg. 398 indicates that there are no stygofauna located in the proposed reinjection borefield due to the high salinities. PER pg. vi indicates that there will be no stygofauna in the pit dewatering due to the high salinity also. There are no groundwater species (stygofauna) of any description present in the groundwater underlying the area where ore will be mined and so water extraction associated with mine dewatering will not threaten any rare endemic groundwater species. Two species of groundwater oligochaetes (worms) were identified in sampling undertaken in the area where groundwater will be extracted to supply the

Submitter	Submission and/or issue	Response to comment
		process plant with water. These species were identified in only two of the twelve holes sampled and these two holes were both just over one kilometres from where the bores are expected to be situated. Given the relatively small rate of extraction ~1.8GL/yr. from >167GL this is not expected to threaten these groundwater species.

5. Hydrological Processes

Submitter	Submission and/or issue	Response to comment
Department of Water (DoW)	The Hydrogeological Assessment is at a H3 Level and complies with Operational *Policy 5.12 – Hydrogeological reporting associated with a groundwater well licence* (DoW, 2009). The hydrogeological studies indicate that future impacts on the environment, other users, and the groundwater resource can be maintained at an acceptable level. In the unlikely event that the proposed groundwater supply cannot meet the predicted long-term requirements then the suggested alternative groundwater supply options will need to be investigated.	Continued monitoring during extraction of the Kakarook North Borefield will establish how the aquifer responds and how water levels change overtime. The Kakarook North aquifer has a measured capacity of 167GL (based on current drilling extents), and only 29GL will be used over the Life of Mine (LoM) of the project, with no other beneficial uses of this water source. There is sufficient sustainable capacity to meet the water requirements of the Project and no requirement to source another aquifer to supplement this water supply.
DoW	The DoWs concerns raised in the assessment of the preliminary Draft PER in correspondence dated 21 August 2015 have been addressed in the PER dated December 2015.	Vimy made sure that all concerns expressed by the Department of Water (DoW) in the preliminary Draft PER were addressed in the Final PER document. The comments provided enabled Vimy to remove the uncertainty and improve the environmental outcomes of the Project.
DoW	The proponent will be required to apply to the DoW for a licence to take water for dewatering and process water requirements. The DoW will require additional information including a detailed operating strategy, to support the licence application.	Vimy is aware that a 5C Licence is required to take water under the *Rights in Water and Irrigation Act 1914*. As part of this licencing, and in accordance with Operational Policy 5.08 – *Use of Operating Strategies in the Water Licensing Process*, a detailed operating strategy will be prepared and issued to the DoW for approval. Vimy will comply with all commitments specified in this operating strategy.

Submitter	Submission and/or issue	Response to comment
Depatment of Environment (DoE)	*Section 10 Hydrogeological Processes* Uncertainty remains regarding estimates of aquifer recharge, leading to uncertainty in the timing of return of the aquifer to its original state post mining. Information Required – Either improved estimates of recharge through measurements or through ongoing groundwater monitoring and transient model calibration. As part of reporting include update of predictions of time for aquifer to return to natural levels post mining.	The Kakarook North graben-style sandstone aquifer is recharged directly by rainfall. Assuming that direct recharge is as low as 1% of the annual average rainfall (223mm), and that this is applied to the spatial extent of the aquifer (at least 80km^2), then the volume of annual recharge replenishing the aquifer is around 0.2GL/a. This represents approximately 10% of the total volume of water proposed to be extracted over the 16-year life of mine (LoM) (29GL). Assuming no other groundwater inflows, then complete recharge is expected to occur within 145 years; however rapid rebound of water levels is expected to occur in the first few years after pumping is ceased, with rebound rates expected to slow as the hydraulic gradient becomes flatter. Actual recharge rates are expected to be higher than 1% of annual rainfall given the sandstone-nature of the vadose zone, and the subsequent high permeability of this material. This was evident during pumping trials, where stored water in unlined Turkey's Nests began recharging the aquifer and being recycled during the testing period. The relatively low salinity of the aquifer is also likely to be reflective of higher recharge rates. The H3 Level Hydrogeological Model developed by Rockwater (2015; PER Appendix D1) involved both steady-state and transient calibration to more accurately estimate actual recharge rates. Sensitivity analysis was further undertaken, with average annual recharge rates (2.23mm/a) varied by ±30%. This variation only resulted in small variability in the predicted groundwater levels by only 0.3m; hence improving the accuracy of the recharge rates is unlikely to vary the predicted model results, which show that the Kakarook North aquifer can be sustainably managed during the Project.
DoE	*Section 10 Hydrogeological Processes* There is uncertainty regarding the capacity of the Kakarook North aquifer for the long term supply of suitable quality processing groundwater to the project (proponent indicates a separate area	There is no uncertainty when it comes to the volume of water within the Kakarook North aquifer (over 167GL), and that this supply is sufficient to sustainably meet the LoM water use requirements of the project, which is 29GL. There is therefore no requirement to source another groundwater supply.

Submitter	Submission and/or issue	Response to comment
	as a back-up, BP bore area). Decreasing water quality may potentially impact on supply. Additional groundwater reserves have been identified in a trough to the south/southwest (pg. 212) (BP bore area) – though an assessment of impacts of take in this area (where groundwater is reportedly shallow at 1.5 metres (m) below ground level, groundwater discharge has occurred in the past, and therefore there is a likelihood of Groundwater Dependent Ecosystems GDEs) has not been fully considered in this PER (discussed in Appendix D1). The proponent has indicated they would update modelling in the production area with results of monitoring data – it is not clear if that includes water quality monitoring and modelling. Information Required – Assessment of GDEs and potential impacts to GDEs from extraction in the BP bore area.	No adverse impact on the environment is expected to occur from the extraction of 29GL from the Kakarook North aquifer.
DoE	*Section 10 Hydrogeological Processes* There is uncertainty regarding the suitability of the high hydraulic conductivity value chosen for modelling of the reinjection area, and the relatively low vertical hydraulic conductivity (0.5 metres per day (m/day)). Without a trial reinjection, it is not clear as to exact mounding and clogging issues that may arise, though risks of major issues appear low. The proponent indicates likely suitable space when the unsaturated zone is also included. Information Required – The uncertainty associated with actual outcomes of reinjection would be reduced through an injection. This could either be a trial (prior to mining) or from reinjection during mining as part of the proposed project. Regardless, the proponent can manage through monitoring and management plan	The actual reinjection process will be trialled in Q3 of 2016, with the results used to validate the existing H3 Level Hydrogeological Model developed by Rockwater (2015; PER Appendix D2). This trial will involve extracting 3,000 kL/d of water, allowing the aquifer to recover and then reinjecting the water to determine how the aquifer responds. During this trial a portion of the reinjected water will be preferentially released into the overlying vadose zone Eocene Sands to confirm the storage capacity, transmissivity and overall suitability of this upper sandy material to be reinjected into. It is important to recognise that in hydrogeological modelling of paleodrainage aquifers an anisotropic ratio of 0.1 is typically used to estimate the vertical hydraulic conductivity (Kv) from measured horizontal hydraulic conductivity (Kh) value. Consequently, a Kv of 0.5 m/d equates to a Kh of 5 m/day. This is considered an accurate representation of the paleodrainage aquifer at Mulga Rock.

Submitter	Submission and/or issue	Response to comment
	which outlines trigger/mitigation/management options should excessive clogging/mounding occur.	The operation of the reinjection borefield will be in accordance with the *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) Managed Aquifer Recharge; Document 24* (NRMMC-EPHC-NHMRC, 2009). This document specifies the optimal operational parameters to prevent or minimise clogging of reinjection bores as a result of filtration of suspended particles, microbial growth, geochemical reactions and air entrapment and gaseous binding. It is considered that clogging prevention is a better option than bore renovation or redevelopment, and given that reinjection will only occur in two years over the LoM, in Year 3 and Year 10, and that multiple reinjection bores will be rotated during these periods, the risk of clogging impacting the operation and efficacy of the reinjection bores is considered low. Required monitoring of the reinjection borefield, including frequency, triggers/mitigation and management, will be specified in the Groundwater Operating Strategy (GOS) to be developed / approved by the Department of Water. Vimy will ensure that all requirements and licence conditions are met.
DoE	*K1 Environmental Management Plans (water)* There is a risk of greater than expected groundwater mounding. The only 'management action' associated with groundwater mounding is monitoring of groundwater levels (Managed Aquifer Recharge Management Plan: pg. 6). Information Required – A level of maximum acceptable mounding should be nominated together with specific monitoring to measure mounding. Potential management actions should also be described.	A maximum acceptable mounding or trigger level will be set at the Miocene-Eocene contact boundary, which represents the base of the identified Biologically Active Zone (BAZ). This geological boundary represents the maximum rooting depth of the vegetation, and thus any rise in water level below this point will not have any detrimental long-term impact on the vegetation of the area. As part of the monitoring of the proposed reinjection borefield, Vimy will monitor the rate of change in response to the volume of water reinjected to predict whether groundwater levels will approach or intersect the trigger level. If an intersection is predicted, then reinjection will cease to allow the mounding to subside and provide a renewed recharge capacity to sustainably accommodate any additional reinjection. Given that reinjection will only occur in two of the 16 years of operation (Years 3 and 10), and that the oxidised Eocene sands above the existing groundwater level have a specific yield of around 30% (or $0.3m^3/m^3$), then the likelihood of exceeding this trigger level is considered unlikely.

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DoE	*K1 Environmental Management Plans (water)* There is a risk that clogging of reinjection bores will limit reinjection. If this occurs, it is presumed that another method of water disposal will need to be found, which may have environmental consequences. The only proposed management action is redevelopment (ie attempting to unclog the bore (Groundwater Operating Strategy: pg. 9)). Information Required – The proponent needs to describe what actions they would take if their reinjection bores clog and their redevelopment is unsuccessful.	The reinjection of excess dewatering water from the mine-pits, into the downstream paleodrainage channel, will be managed in accordance with the *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) Managed Aquifer Recharge; Document 24* (NRMMC-EPHC-NHMRC, 2009). This document specifies the optimal operational parameters to prevent or minimise clogging of reinjection bores as a result of filtration of suspended particles, microbial growth, geochemical reactions and air entrapment and gaseous binding. It is considered that clogging prevention is a better option than bore renovation or redevelopment, and given that reinjection will only occur in two years over the LoM, in Year 3 and Year 10, and that multiple reinjection bores will be rotated during these periods, the risk of clogging impacting the operation and efficacy of the reinjection bores is considered Low. If, however clogging of the reinjection bores does occur during these periods, and redevelopment is not successful then additional bores will be installed. Monitoring results of the reinjection bores and surrounding observation bore network will be used to pre-empt bore failure, and allow sufficient time to obtain the necessary DoW licences to install the additional bores. If additional reinjection bores cannot be installed rapidly, to offset the declines due to clogging, then lined evaporation ponds will be used to supplement the reinjection borefield. The actual reinjection process will be trialled in Q3 of 2016, with the results used to validate the existing H3 Level Hydrogeological Model developed by Rockwater (2015; PER Appendix D2). In addition, further work will be undertaken to confirm the physical, chemical and biological suitability of the dewatering water to be reinjected, in accordance with the Australian Managed Aquifer Recharge Guidelines (NRMMC-EPHC-NHMRC, 2009).
DoE	*K1 Environmental Management Plans (water)*	Groundwater quality triggers will be established based on the baseline water quality of the existing or surrounding aquifer system (eg either the Kakarook North aquifer or the Narnoo Paleodrainage aquifer system). It is typical practice to set a groundwater quality trigger of two standard deviations from the

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	Groundwater quality triggers are referred to in the Groundwater Management Plan, but it is unclear how they are to be defined, or whether limits are envisaged. Information Required – A method for determining (based on baseline information) groundwater quality limits and investigation/action triggers.	equivalent baseline data, as this provides the upper and lower tolerable limits to prevent environmental impact. This approach was approved for the nearby by Tropicana Gold Mine during their PER assessment. If groundwater quality changes by more than two standard deviations from the background, over three consecutive readings, then an investigation will be undertaken to establish why the quality has changed and to identify potential management strategies to restore groundwater quality within the acceptable background range.
DoE	*K1 Groundwater Operating Strategy (pg. 4)* Inadequate coverage. Information Required – The groundwater system has a low horizontal hydraulic gradient across the project area with little to no recharge or discharge and subsequent slow groundwater flow. The PER relies heavily on the attenuation of potential contaminants in reject process water through dispersion, and predicts altered groundwater flow regimes which may affect the attenuation process. The PER requires greater confidence in the predicted altered groundwater processes, which can be met mostly by addressing comments in this report relating to modelling and the hydrogeochemical processes.	Given the nature of the orebody, the impacts on hydraulic gradients and flow directions will be minimised as the majority of mining only occurs 2-5m below the water table. In addition, dewatering of only the active mining front will be undertaken, as a result of the mining technique to be implemented, and consequently any drawdown in water level will be short-lived and rebound to original groundwater level is expected soon after the mining front has past and backfilling of the profile occurs. It is only during Year 3 and Year 10, when deeper segments of the ore are mined, that drawdowns of 6–10m will occur, but again these will be temporary and rebound to pre-mine levels will occur once the mining front has moved past. It is therefore considered that the planned dewatering activities will not result in significant changes to the hydraulic gradient in the paleodrainage channel, and thus no impact on dispersion process or the attenuation of potential contaminants is expected. It is also important to note that any drawdown that does occur will change the hydraulic gradient towards the pit (i.e. becoming a temporary groundwater sink) and this will further restrict the release and spread of any potential contaminants. During the Geotechnical Investigative Trenching (GIT) program groundwater levels restored to their pre-disturbance levels within 24 hours – see photos below (top photo is the dewatered pit allowing mining, whilst the bottom photo is the pit 24 hours after mining).

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		  It is therefore considered that similar rebound rates will occur during actual mining. The mining of the ore will be similar to mineral sands mining, whereby only small sections of ore will be exposed at any point in time and thus dewatering will only impact small areas. It is not economically feasible to dewater

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		large areas of the pit and keep water levels down in areas where no mining occurs, and thus there are economic drivers to minimise groundwater drawdown. It is also important to establish that dewatering can only remove water stored in the macro- and meso-porosity (i.e. drainable porosity or specific yield), and thus dewatering can only drop water contents down to field capacity. Given the carbonaceous nature of the orebody, and thus very high water holding capacity, the field capacity of these materials is likely to be >30%, and at this moisture content oxygen diffusion into the exposed ore profile will be limited which will further constrain any oxidation of the organic material and sulphides. Based on the above observations, the potential for significant oxidation of the exposed ore profiles, and thus the potential for Acid and Metalliferous Drainage (AMD) to occur, is considered low and will not impact on groundwater quality. Vimy are planning to undertake further quantitative dewatering trials using the GITs and the results from this work will be used validate the groundwater model.
DoE	*K1 Groundwater Management Plans (pg. 2)* Internal inconsistency. Information Required – States "*... additional environmental and safety risks arise from the formation of a pit lake in the remaining mine void after the cessation of mining. This will not occur at the MRUP, as the open voids will be backfilled with mine waste rock or tailings material prior to closure.*" PER claims some pit voids will remain as not all overburden placed back into pit. This requires analysis and needs to be incorporated more widely into PER.	Although some pit voids will remain at closure, all mine- pits will be backfilled to above the maximum winter groundwater level to avoid the formation of a pit lake. In addition, the side walls of the pit will be pushed in to avoid the need for an abandonment bund, as specified in the Department of Mines and Petroleum (1997) *Safety Bund Walls Around Abandoned Open Pit Mines Guideline*. The so-called 'pit void' will therefore represent a topographic depression that is congruent with the pre-mine environment.
DoE	*Section 10.2.1, Paragraph 3* The PER states *"This is supported by observations made during a recent high rainfall event in February 2011"*. A single event does	The February 2011 storm event was associated with the tail-end of Tropical Cyclone Carlos and represented an actual 1:100-year 72-hour storm that resulted in close to 160mm of rainfall occurring over the Project area. In total

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	not constitute enough evidence for the statement regarding activation of the surface drainage system. More information is required.	250mm of rain fell over the site in an 8-day period. This cyclone represents one of the largest storm events to impact the area, resulting in the flooding of Lake Rebecca and Lake Raeside, and reactivation of Ponton Creek, the only surface water feature in the broader region (70km southwest of the Project). Lower magnitude storm events, resulting in surface water flows in Ponton Creek, were reported in February 1976, associated with Cyclone Trixie, and February 1995 due to Cyclone Bobby. These storm events represent the only time in recorded history that the Ponton Creek has flowed and therefore represents the likely worst-case rainfall scenario for the Project area. The 2011 cyclone was the largest event, and Vimy personnel were present on-site to record the impact. It is therefore known that no interconnected surface water flows occur in the Project area, with only the interdunal topographic lows filling-up, with no overtopping. It is therefore considered that no surface flows are likely to occur even under a 1:100-year 72-hour rainfall event, with the hydrological modelling (Rockwater, 2015; PER Appendix D9) showing that even under a Probable Maximum Precipitation event, which results in 270mm of rainfall occurring in a 72-hour period, no surface water flows are expected to impact on the site.
DoE	*Section 10, Plates 10.1 and 2* These appear to contradict the statement in 10.2.1 that there are no permanent or ephemeral surface water features. More Information – Clarification needed.	The statement that there are no permanent or ephemeral surface water features refers to typical climatic years, when no free-standing surface water occurs across the site. The surface water features shown in Plates 10.1 and 10.2 relate to a major cyclonic event (Tropical Cyclone Carlos) that delivered 250mm of rainfall in 8 days, including a 1:100-year 72-hour event (i.e. 160mm of rainfall). Surface water has only ever been recorded in the Project area three times, in February 1975 (associated with Cyclone Trixie), February 1995 (associated with Cyclone Bobby) and February 2011 (associated with Cyclone Carlos).
DoE	*Section 10.2.1 Surface Water* Information gap.	The absence of well-defined creek lines or riverbeds in the area (as described in section 10.2.1) should be regarded as sufficient evidence that regardless of the time interval being considered surface water flows are highly unlikely. In terms of considering possible flooding, Appendix D11 (the Surface Water

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	Information Required – The proponent may also consider incorporating a 1:1000-year Average Recurrence Interval (ARI) event or Probable Maximum Precipitation (PMP) Event for the purposes of assessing water management structures and long-term landscape stability and surface water hydrological impacts. Given the post-closure pit voids, this may be desirable to reduce operational and post-closure risks to rehabilitation.	Assessment and Management Plan) considered a 1:2000-year Average Recurrence Interval (PMP) and noted that "when compared to measured infiltration losses, it is postulated that in all probability most of the precipitation will be lost through infiltration". Post-closure pit voids (which have been backfilled, and even where there are depressions will be at least 10m above the underlying aquifer) are not expected to be subject to surface water inflows even in a 1:2000-year rainfall event – but in the unlikely event that such flows were to materialise the rate of infiltration would be very high due to the unconsolidated sand that would be used as backfill and the water would simply infiltrate and quickly descend into the underlying aquifer. Vimy does not believe there are operational risks or post-closure risks to rehabilitation in the event of a 1:1000-year rainfall event.
DoE	*10 Hydrological processes (pg. 203)* Unclear language. Information Required – It is unclear what is meant by there being "some" drainage or seepage of tailings liquor. The qualitative use of "some" needs to be quantified with a potential or predicted volume.	The tailings that are pumped to in-pit tailings facilities are expected to consist of about 40% solids (i.e. 60% will be water). They are expected to drain freely into the local aquifer which sits at the base of the pits. The 60% water component will consist of around 1.9GL/a – some of this will evaporate and the remainder will drain into the aquifer. When the tailings have drained to field capacity there is expected to still be around 30% water in the tailings. Thus of the 1.9GL of water pumped to tailings each year around 1.36GL will eventually evaporate or drain into the aquifer. Given a mine life of 16 years, the total amount of evaporation and drainage from tailings would therefore be expected to eventually amount to 21.8GL but spread over a longer period. Water balance calculations suggested that about 80% would evaporate and only 20% would drain. Based upon this calculation only about 4.5GL would eventually drain into the aquifer.
DoE	*10 Hydrological processes (pg. 203)* Information gap. Information Required – The disruption of aquifers due to geological structures should be better described, and the	The disruption to aquifers due to geologic structures ("fault-induced disruption of aquifers and associated groundwater flow paths within that aquifer") operates only in the lower levels of the aquifer that is the old palaeochannel. Vimy's in-pit tailings facilities sit mostly above the aquifer and drain only into its upper layer. The combination of the fact that horizontal transmissivity is much higher

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	implications and impacts to in-pit storage integrity investigated/assessed.	than vertical transmissivity and that the level of salinity in the tailings water will be lower than the water in the aquifer into which it drains (and hence density stratification will keep tailings fluids in the upper layers) means that the geologic structures referred to will have no impact upon in-pit storage integrity.
DoE	*10.2 Hydrogeological processes- Reinjection Borefield- (pg. 205)* Inadequate coverage. Information Required – Salinity of reinjected water is stated to be slightly lower than the receiving aquifer. It is also mentioned briefly at section 10.4.2 that reinjected water will be no more acidic than receiving environment. This needs to be clarified with data or predicted water quality information.	The salinity of the water is variable, as is the acidity. Estimated contours of the salinity and acidity in the groundwater were shown as Figures 11.2 and 11.3 in the PER respectively. As a generalisation, both the salinity and acidity increase in a southerly direction. However, there is the additional complication that the salinity and acidity also appears to increase with depth in most individual locations. Mine dewatering water will always be taken from near the top of the aquifer and in most cases the water only needs lowering by a few metres – the maximum extent required is likely to be around 6m. There are areas where the acidity recorded from ground water samples was quite high but these were all samples taken from greater depths than is likely to be associated with mine dewatering. The salinity in the area of the reinjection borefield where the bores are expected to be located has an average salinity of 47,951mg/L TDS and pH of 4.96 – see Table 11.1 of PER. In contrast, the salinities within the Princess and Ambassador deposits, where the reinjection water will come from in Years 3 and 10, has an average TDS of 22,047mg/L and a pH of 6.36– see Table 11.1 of PER. It is therefore considered that the water to be reinjected has a better quality then the receiving environment. Although water samples taken from Emperor and Shogun Deposits show high variability, with average salinities of 64,860 and 58,289mg/L respectively, negligible water from these pits will be reinjected as the volume of extracted water only exceeds 0.85GL in Years 3 and 10 when two deeper sections in the Ambassador Pit are being mined.
DoE	*10.2- Hydrogeological processes and 10.3.2 (pg. 204 and 211)* Inadequate coverage.	Vimy cannot establish to a level beyond doubt that the graben-style aquifer at Kakarook North has no connection to the main palaeochannel underlying Ambassador or the tributary to that palaeochannel that underlies the Princess deposit. If they were to be connected in some way, the connection would likely

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	Information Required – The area is well characterised and while the submitter agrees that the paleochannel is unlikely to be connected to Kakarook North aquifer, it is unclear on what information and data the proponent has relied on to establish that the paleodrainage channel is geologically and hydraulically separated from Kakarook North. This requires substantiation.	be between the Kakarook North borefield and the tributary. However, the relatively high difference in salinity and pH (and in dissolved oxygen present) between these two bodies of water would appear to be inconsistent with any substantial flow from one to the other.
DoE	*Hydrogeological processes (pg. 205)* Inadequate coverage. Information Required – The reinjection borefield has a low utilisation rate. In the event that overflow occurs, the overlying thick, unsaturated clean sand sequence may be used to inject overflow water. The reinjection borefield capacity is planned only to be used in years 3 and 10. Clarify how the overlying water quality in the unsaturated clean sand sequence and reinjection target has been identified as separate to the paleochannel (where present) and what the potential effects of injecting at a higher level (in the overlying sequence, closer to land surface) are with respect to groundwater flow and potential groundwater - surface water interactions.	It is correct to say that the reinjection borefield is currently estimated to have only a low level of utilisation. Based upon the current mine schedule (which determines the quantity of dewatering that needs to occur) the reinjection borefield would only be utilised in certain years (currently estimated to be Years 3 and 10). For the avoidance of doubt (because the question appears to link these separate issues) the low utilisation rate significantly reduces the chances that overflow may occur. There is effectively no free water in the unsaturated clean sand sequence and therefore it is not possible to discuss the quality of this water. Currently the only water that has been identified in the area is the water sitting at various levels in the aquifer (palaeochannel). If water were to be injected into higher levels above the palaeochannel (noting that it would be some distance above the water table as illustrated in Figure 10.8) it would spread laterally and descend down to the layers of clay that sit above the water table in the area. The water would perch on the clay layers and eventually seep through them back down into the aquifer. The time taken for this water to seep through the clay layers back down to the aquifer would be sufficiently long that it would have no measureable impact upon groundwater flows. There are no ground water-surface water interactions in this area and therefore nothing for the reinjected overflow water to be interacting with in that respect. The ‘lush’ vegetation across the site is simply relying on moisture stored within the deep unsaturated (vadose) zone. The majority of the vegetation have a deep root system (i.e. to the base of the Miocene, which is typically 8-10m) and this is

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		required to access a significant volume of the soil profile to extract sufficient soil moisture to meet their transpiration requirements. Vegetation cannot access 'free' water and can only access moisture stored in the micro- and ultramicropores (i.e. between field capacity and permanent wilting point). Moisture contents of soils to at least 6m depth, obtained during the Soil Characterisation work (PER Appendix H2) shows that the roots of the native vegetation have extracted soil moisture levels to below permanent wilting point, and this enables them to have a shallower rooting system than would typically be expected (although it is still relatively deep). The native vegetation is therefore reliant on the unsaturated (vadose) zone, which is replenished following large rainfall events, and thus they are non-GDE. Although the actual composition of the soil and pore water was not measured, and is difficult to do so, given the geochemically benign nature of the soils it is expected to be dominated by base cations and anions.
DoE	10.2 Hydrogeological processes (pg. 208 at Figure 10.6) Conclusion missing. Information Required – There is a low groundwater hydraulic gradient in the paleochannel across MRUP Project area. Mounding at the reinjection-site (288 m Australia Height Datum (AHD) up to 290 m AHD) could reverse the hydraulic gradient back towards the Ambassador pit (289 m (AHD). This is identified at 10.4.2. Clarify if mounding could reverse hydraulic gradient during reinjection, for how long this reversal will occur, and indicate the likely effects on mining operations, if any.	If there were to be mounding at the reinjection site then it is true that it would likely reverse the hydraulic gradient locally. Mounding is actually unlikely, not merely because the transmissivity of the sand is quite high but also because the area around the water table is not expected to be slotted so that if the bores were to become clogged the water would rise higher and then overflow into the unsaturated clean sand above (see discussion above). It has been suggested that if mounding were to occur and that there was to be two metres of mounding (up from 288m AHD to 290m AHD) this could potentially affect water levels at Ambassador Pit (which were around 289m AHD at their lowest level). Note that in section 5.5 of Appendix D2 (Results of Hydrogeological investigations and Numerical Modelling, Mulga Rock Uranium Project) it was stated that "The rise in water levels around the reinjection borefields is less than 2m", let us assume that the rise is indeed 2 metres. The total amount expected to be reinjected in Year 10 (which is the highest year) is about 1,800kL/day which if maintained for a year would equate to about 0.66GL. The palaeochannel is more than 5km wide the reinjection bore is located more

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		than 5km from the southern end of Ambassador Pit. An amount of 0.66GL of water spread over an area 5km by 5km equates to a depth of less than 3cm. There is simply insufficient water involved for it to be able to flow back and interfere with mining activities and therefore there simply cannot be any impact upon mining activities.
DoE	*10.2 Hydrogeological processes (Figure 10.7)* Information gap. Information Required – Unclear what the potentiometric surface of Kakarook North aquifer looks like, and if there is any potential seasonal variation or recharge. Show potentiometric surface. Possibly merge with Figure 10.6 to show comparison and support claim that it is not hydraulically or geologically linked. Show the extent of the paleochannel. Show OEM underlying map to assist in interpretation.	Kakarook North is an unconfined aquifer and therefore the potentiometric surface is the same as the water table which is illustrated in Figure 14 of Appendix D1. Recharge of this aquifer is expected to occur during high rainfall events either locally or located upstream; these do not happen every year and are not necessarily confined to a particular season. Clearly the gradient shown in Figure 14 of Appendix D1 suggests that there is recharge from the north and the relative freshness of this water is consistent with there being regular recharge. It also suggests that the water flows in a south easterly direction which is away from the proposed mining area. The differences in salinity, pH and dissolved oxygen suggest that the water from Kakarook North does not flow to the tributary that feeds the main palaeochannel that underlies the mining area. There is no risk associated with water flowing from Kakarook North across to the palaeochannels underlying the mining area and Vimy has not claimed that they are not hydraulically or geologically linked, merely that it is considered highly unlikely. Nothing changes if they do turn out to be linked in some unexpected way.
DoE	*10.3.1 Hydrogeological processes (pg. 211)* Justification. Information Required – Unclear if predicted surface water runoff using ARI account for potential future variation or intensification due to climate change. Cyclone Carlos in February 2011, delivered 250mm over 8 days. The 1:100-year 72 hour event is defined as 158.4mm. Clarify basis of predictions for likely surface	The expected mine life is approximately 16 years. Any variation or intensification in rainfall as a result of climate change over a 16-year period is not expected to be significant. This matter was discussed in section 10.2.2 of the PER, where it was noted that the observed trend in rainfall approximates to an annual increase of 2-3mm per year. Cyclone Carlos in 2011 did lead to localised flooding where water collected in local clay pans but there was no surface water flow associated with it. The rate of infiltration in sandy area is estimated to be around 5m/day – the analysis

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	flow re climate change. Outline why a different ARI event, such as the 1:1000-year 72 hour, or the PMP were not used. Reassess whether major flood mitigation measures are appropriate, especially when considering altered topographical features. This is partially met in 10.10.2 Climate Change (page 220).	undertaken suggest that there is no problem with surface water run-off even if 1:2000-year events are considered (as discussed previously). The use of a 1:100 year 72-hour event is illustrative and the analysis suggested that using a 1:2000-year event was still not expected to result in surface water flows. It is therefore considered that there is no reason to reassess whether major flood measures are appropriate.
DoE	*10.3.1 Hydrogeological processes (pg. 212)* Information gap. Information Required – Drilling results outside Kakarook North area suggest the aquifer may extend to the North, South and South West. This is towards the upper reaches of the paleochannel in the MRUP area. Clarify the extent of aquifers and likely connection if any.	Drilling outside the modelled area of Kakarook North has suggested that the aquifer may extend further than the area that has been modelled. Given the extent of the water already located there is no need to undertake further drilling to establish whether the aquifer is any larger. To the extent that the aquifer underlying Kakarook North may extend a significant distance to the north and given that the contributory palaeochannel that lies under Princess appears to come from a similar area (assuming that the channel continued for at least a further 30km in the same direction) it would be possible that there could be some connection between the two water sources. However as already explained the significant differences in water quality (salinity, pH, and contained oxygen) do not suggest that there is any connection.
DoE	*10.3.1 Hydrogeological processes (pg. 226 at Figure 10.12)* Information gap. Clarify statement 'available drawdown of around 40m' given saturated thickness of Kakarook North Aquifer is stated to vary between 35m and 40m.	The deepest part of the aquifer as measured was 42m at the production bore NWB3. The thickness of the aquifer as measured at all boreholes is shown in Table 4 of Appendix D1. The area where the modelled drawdown is expected to be around 14m is roughly the area between NGW18 (40m deep) and NGW16 (35m deep). The statement concerning the available drawdown being around 40m related to this area. Since the maximum amount of drawdown in Kakarook North was modelled to be 14m – there will be ample drawdown regardless of whether the total amount available is 40m or 35m.

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DoE	*10.3.2 Hydrogeological processes (pg. 212)* Term definition. Information Required – The PER states that the 14m of drawdown in Kakarook North will gradually recover after extraction ceases. Define the timeframe over which recovery occurs, and what the re-equilibrated water level will be, particularly with reference to pre-mining conditions and time to recover incorporating likely recharge rates.	After pumping ceases, the centre of the drawdown area will start to fill up as water flows back into the area but the cone of depression will continue to spread outwards whilst getting shallower as it does. The speed with which the water will flow depends upon the hydraulic gradient, which means that the rebound in the inner area will be quite quick to begin with but then will slow down as the hydraulic gradient gets shallower. The drawdown in the deepest area would be expected to have rebounded to within a few metres of its initial level in less than 20 years. Recharge rates depend upon the frequency of high rainfall events. Assuming that only 1% of average annual rainfall (of 223mm) over the approximate 80km^2 of the Kakarook North aquifer that was modelled makes its way into the aquifer that would amount to approximately 0.2GL/a. Over the 16-year mine life that was modelled, a total of around 29GL is expected to be extracted from the aquifer which at 0.2GL/a of recharge would take about 145 years to fully replace. However, the catchment area may be substantially larger and it is likely that more than 1% of the rainfall will infiltrates down into this aquifer during the high rainfall events that constitute most of the rainfall that falls in this area. If the catchment area were assumed to 40 x10kms (400km^2) and 2% of rainfall infiltrated down, then the annual increase from flow-in and direct infiltration from above would equal the expected rate of extraction at 1.8GL/a.
DoE	*Section 10.4.1* Complete reliance on models in these situations can be misleading. The model predictions are dependent on the information and assumptions used in the model. Information Required – The consequences of the assumptions changing in the future should be discussed, as should the limitations of the models applied.	Vimy agree that the validity and reliability of a model is only as good as the input data, and that uncertainties in model assumptions and parameters can have a significant effect on the predicted results. For the surface water modelling, the use of 1D single channel models (eg HEC-RAS) to predict surface water flows in relatively flat landscapes, similar to the Project area, is often challenging as it is difficult to define the actual channel dimensions leading to inaccuracies in predicted water levels. The alternative is to use more complex 2D modelling (eg MIKE 21, TUTFLOW) to accurately reflect the topographic surface that drives surface water movement. The surface water modelling undertaken for the Project by Rockwater (2015; PER Appendix D9) was limited to HEC-RAS given

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		the low risk to the Project. Irrespective of the model used, inaccuracies in rainfall intensity data (often due to the need to interpolate from a recognised Bureau of Meteorology weather station) and surface roughness coefficients (including the infiltration properties of the surface soils) can influence the predicted model results. It is difficult to overcome these inaccuracies, but the modelling used for this Project utilised actual site weather data to constrain the regional data, and actual measured surface soil parameters were used in the estimation of Manning's surface roughness coefficient. Although the above factors are likely to influence accuracy of the surface water modelling that was undertaken for the Project, the model results have been validated, to an extent, by actual field observations, and historic recordings, during large-scale rainfall events, and show that no impact on the Project will occur and that there is no requirement for surface drainage management structures to control surface water movement and protect the site infrastructure. The analysis of surface water flows was based upon the use of IFD (Intensity Frequency Duration) rainfall curves combined with local rainfall data, topological data, and evaporation and infiltration rates. The analysis by Rockwater showed that even if a 1:2000-year flood event were to occur, most of the precipitation would be lost in infiltration. Rockwater's analysis also showed that there were many low-lying inter-dunal areas that would provide large storage capacity for surface water to pond and infiltrate. This modelling work is supported by the fact there simply are no observed dry creeks or any evidence of any past water flows. To give some perspective to the risk being discussed here, the lowest estimate of the rate of infiltration into the sandy soil that characterises the area was 44mm/hr (estimates ranged up to 530mm/hr) and this should be compared to a 1:2000-year flood event that is currently assumed to involve 268mm falling over a 72-hour period which is equivalent to less than 4mm/hr. The highest likely level of rainfall over a 72-hour period is an order of magnitude lower than the rate of infiltration associated with the sandy soil in the area. Water will collect in

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		local depressions with a higher clay content but there is basically no risk of surface water flows being generated. Assumptions changing in future will therefore not change the modelled outcome namely that there will not be any surface water flows.
DoE	*Section 10.4.2* The PER states *"The nature of the tailings confers a low hydraulic conductivity"*. It is unclear what this means. Does it refer to the design of the tailings dam, or the physico-chemical characteristics of the tailings, or some other feature of the tailings storage system? Information Required – More detail is required.	This reference to the low hydraulic conductivity of the tailings in Section 10.4.2 refers to the in-pit TSFs, and not the above-ground TSF. It subsequently relates to the physical-hydraulic characteristics of the tailings. The tailings materials will be ground and screened to a P80 of 150µm (i.e. 80% passing 150 µm diameter), and after beneficiation it will have around 35% silt (20-2 µm) and 25% clay (<2 µm) sized particles. The tailings will therefore act like sandy clay loam with a predicted saturated hydraulic conductivity of <0.1 m/day, which will drop to 0.001 m/day as it approaches field capacity. The tailings will therefore have a low hydraulic conductivity.
DoE	*10.5 Sustainability of water sources* Term definition. Information Required – *"Clearly a greater abstraction could be accommodated."* It is unclear whether 'accommodated' is used to account for sustainability of extraction, the length of recharge time, or stygofauna habitat considerations. Clarify if greater abstraction is likely or planned and the volumes and impacts considered.	Greater abstraction is neither likely nor planned and therefore there are no associated volumes or impacts. The term 'accommodated' in this context referred to sustainability of extraction.
DoE	*Section 10.6* No allowance appears to have been made for the situation that the characteristics of the material(s) returned to the mining pits will be different from those of the original materials. Information Required – The proponent should demonstrate that this is highly unlikely to lead to problems.	The majority of the overburden to be backfilled, to reconstruct the soil profile after mining, will be an apedal (i.e. structureless) sand to clayey sand material. Only a small portion of the overburden material will exist as aggregated lumps, associated with the surficial lateritised calcrete and deeper silcrete layers. Given the predominance of relatively uniform sand, this material does not undergo significant compaction, and thus the physical and hydraulic properties of the backfilled material will resemble those of the pre-mine condition. The potential for compaction will be further reduced by the proposed backfilling strategy

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		involving conveyor spreader and dozer push. This process removes continual trafficking by heavy machinery on the backfilled material and reduces the potential for compaction to occur. The overburden materials to be used in backfilling of the mine voids are laterally homogeneous across the Project Area, and thus the same lithological and / or stratigraphic profile occurs across all four deposits. Internally within each lithological sequence the sediments exhibit a narrow range of properties, and they can therefore be considered as homogeneous. Accurate survey data (ground-based LiDAR) obtained on overburden stockpiles constructed during the development of the Geotechnical Investigation Trenches (GITs) in the Ambassador Deposit identified that the sandy overburden material will have a bulk density, and corresponding permeability, similar to that of the pre-mine material, with less than 3% swell identified. Consequently, the backfilled mine-pits and overburden landforms will not exhibit any physical limitations to plant root growth, and given their original hydraulic properties will be re-established, the overall functioning of these landforms will be restored. The ability of revegetation to access the backfilled soil profile was clearly observed during soil trenching in the previous rehabilitation area at the Shogun Deposit. In this backfilled pit (backfilled in 1995) good eucalypt (mallee) growth occurs, with the roots of this vegetation exploring the entire soil profile down to the base of the soil trench at 6m. Roots extended below the base of the trench, and given the density of the trees, it is likely that the roots extended to around 10m depth in order to obtain sufficient plant available moisture to meet their transpiration requirements.
DoE	*10.8 Water Supply Options (pg. 217)* Inconsistency. Information Required – The PER states that the 17% predicted utilisation of Kakarook Aquifer volume is over-conservative as it does not consider recharge or inflows. This statement over states	The statement made in section 10.8 of the PER was as follows – "… the current aquifer has an estimated volume of 167GL, of which only 1.8GL/a will be extracted over the 16 year LOM (i.e. 28.8GL in total or 17% of the total aquifer volume). This estimate does not consider recharge over the catchment area or inflows from upstream area; hence it is over-conservative".

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	the conservative nature of the approach, given that recharge is predicted only in central areas of the aquifer and at rates of up to 1 % of annual precipitation. Transient groundwater model likely incorporates these inputs and predictions and sensitivity to recharge estimates should be discussed here.	DoE suggested that: "This statement overstates the conservative nature of the approach, given that recharge is predicted only in central areas of the aquifer and at up to 1% of annual precipitation". Vimy respectfully disagrees with the DoE assertion because what was stated was that 1.8GL/a would be extracted over 16 years, which amounts to 28.8GL, which is 17% of the volume of water in the aquifer, ignoring all recharge and flow through. The fact that flow through and recharge were ignored makes the estimate conservative. It is incorrect to assert that recharge was predicted only in the central area and at rates of up to 1% of annual precipitation – that was simply an assumption made for modelling purposes. These assumptions are not included in the calculation by which 17% was derived. A sensitivity analysis of the groundwater modelling was undertaken (which included a sensitivity relating to recharge assumptions) and is discussed in section 4.5 of Appendix D1 of the PER.
DoE	*10.8 Water Supply Options (pg. 217)* Lack of certainty. The PER states that other similar graben-hosted sandstone aquifers occur closer to the mine area and may be used. If the planned extraction borefield changes location or extent, this would limit the ability to assess the potential impact on the hydrogeological regime due to limited data and consideration in any newly identified water supply area.	As discussed above, the Kakarook North aquifer has a capacity of over 167GL, of which only 29GL is required for the LoM of the Project. There is therefore no requirement to source an alternative water supply option.
DoE	*10.9 Management of Hydrogeological impacts (pg. 219)* Internal inconsistency. Information Required – Potential impacts upon subterranean fauna and GDEs are included in monitoring programs, but the	What was stated was that "the potential impacts upon subterranean fauna and GDE are monitored" as a part of a description of what the Groundwater Management Plan (GMP) (MRUP-EMP-010) will ensure. The GMP is a management plan that applies to all aspects of Vimy's operations and is part of the overall Environmental Management Plans. It has been designed to apply not

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	proponent states that there are no GDEs in the project area. Requires clarification.	only to what is known to be there, but also to potential impacts even in cases where none is currently expected based upon current information. Based upon current information there are no Ground Dependent Ecosystem in the Project area. However, the Environmental Management Plans are designed to deal with all eventualities including any GDE's that might be discovered that were not previously known about.
DoE	*10.9.2 Management targets and contingency actions (pg. 219)* Term definition. Information Required – *"A deviation from expected values that would be significant to warrant concern..."* Define significant with reference to specific water quality parameters that might cause such concern (eg acidity, salinity, trace metals).	The quotation given is not correct – the actual words were "a deviation from expected values that would be sufficient to warrant concern…". The exact extent of the deviation from expected values that would give cause for concern is specific not only to particular parameters but also to context. For example, on occasions when mine dewatering water is being reinjected into the reinjection borefield (which only happens in certain years), a deviation from expected values that would be sufficient to cause concern would be a deviation (in either salinity or pH values or both) that was sufficient to make the quality of the water being reinjected worse than the receiving environment into which it was going. However, increases in the salinity of the water going to tailings would expected to be under 20,000mg/L TDS and any increase up to 40,000mg/L TDS would be essentially immaterial, but if it increased beyond this level to the point where it became denser than the water in the existing aquifer into which it will drain (which would undermine the assumed density stratification) that would be sufficient to cause concern.
DoE	*10.11 Residual impacts after mitigation measures (pg. 221)* Clarification needed. Information Required – States *".. not expected to exceed 20% of the available volume and this rate of extraction may not exceed the amount of recharge over the same period".* Clarify if this sentence means that recharge will offset this 20% drawdown, or if extraction will not exceed 20% of available water volume, taking into account recharge. It is unlikely that recharge will offset the	Extraction from the Kakarook North borefield (over a 16-year project life) is estimated to amount to only about 17% of the water contained in the aquifer 28.8GL/167GL (= 17.2%) assuming no recharge or flow through from elsewhere. On this basis it was asserted that extraction is not expected to exceed 20% of the available volume. The modelling assumed no flow through and only limited infiltration from directly above in the central area. Both of these were very conservative assumptions. The exact size and location of the overall catchment area that feeds this

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	extraction, given recharge is estimated at 1% of annual precipitation.	particular aquifer is unknown. The exact rate of infiltration from above is also unknown and although assumed conservatively to be around 1% of annual rainfall, the results of the pump testing suggested much higher rates of infiltration would be appropriate during high rainfall events. As discussed above, using less conservative assumptions the amount of recharge flowing in from outside the central area and infiltrating from above is likely to be much higher and could easily equal or exceed the amount expected to be extracted. On this basis it was stated that the rate of extraction may not exceed the amount of recharge over the same period.
DoE	*10.11 Residual impacts after mitigation measures- (pg. 221)* Term definition. Information Required – States no significant residual impacts on groundwater at Kakarook North. Define 'significant'.	The reference to there being no significant residual impacts on groundwater at Kakarook North utilises the concept of 'significant residual impacts' as defined in WA Environmental Offsets Guidelines (August 2014) namely that: "In general, significant residual impacts include those that affect rare and endangered plants and animals (such as declared rare flora and threatened species that are protected by statute), areas within the formal conservation reserve system, important environmental systems and species that are protected under international agreements (such as Ramsar listed wetlands) and areas that are already defined as being critically impacted in a cumulative context. Impacts may also be significant if, for example, they could cause plants or animals to become rare or endangered, or they affect vegetation which provides important ecological functions".
DoE	*10.12 Predicted Outcomes (p 222)* Term definition. Information Required – States that the water level "*will eventually recharge back to approximately the initial conditions*". Define 'eventually' with reference to transient groundwater model outputs (if any). *"Significant portion of aquifer will be essentially undisturbed"*- Define 'undisturbed' and 'significant'.	The expected rate of extraction from this aquifer is estimated at 1.8GL/a over a 16-year period making a total amount extracted of 28.8GL. The expected rate of recharge depends upon the assumed catchment area and the assumed percentage of the total rainfall that falls in the catchment area that gets down to the aquifer. Assuming a constant average annual rainfall of 223mm and a catchment area of between 80km^2 and 400km^2 the total rain falling would be between 17.8GL and 89.2GL. Assuming somewhere between 1% and 3% infiltrates down to the aquifer the total recharge would be anywhere between 0.18GL/a and 2.7GL/a. 'Eventually' as defined with reference to the amount of recharge (transient groundwater outputs – that probably should have been

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		'inputs' not 'outputs') could be considered to be the length of time it would take recharge to replace water that had been extracted. Under the most conservative assumption (80km^2 and 1%) it would take approximately 145 years from the end of mining for the amount of water in the aquifer to return to its initial level. Under the most optimistic assumption (400km^2 and 3%) the amount of recharge exceeds the rate of extraction and the amount of water would not have been depleted at all. The statement that a "…significant portion of the aquifer will be essentially undisturbed" was qualified in context by being preceded by the following "Modelling work suggest that the cone of depression will mostly not extend to the boundaries of the trough". The cone of depression contours were 2m contours (from 2m to 14m). In that context 'undisturbed' meant 'a drawdown of less than 2m' and 'significant portion' meant 'more than half' of the surface area of the aquifer.
DoE	*D1 Hydrogeological investigations and numerical modelling kakarook (pg. 10-12)* Inadequate coverage. Information Required – It is unclear how the sensitivity analysis was carried out, or whether the numerical groundwater model was subject to a peer review. It is unclear whether a 30% increase in K or recharge as part of sensitivity analysis represents field-validated data. If this range is not supported by data, or data are unavailable, GA suggests that a wider parameter range, of up to 3 orders of magnitude, might be more robust. Transient model discussion does not present the length of time for aquifer recovery post abstraction.	Section 4.5 of Appendix D1 explains how the sensitivity analysis was carried out. It was carried out by running the model in steady-state mode and then varying the two main parameters (hydraulic conductivity and recharge) and calculating the water level changes in different parts of the aquifer. The numerical model was not subject to a peer review – however it is worth noting that there are no potential environmental risks associated with inaccurate modelling of this aquifer as there are no receptors of other beneficial users of this water supply. The 30% increase in the assumed hydraulic conductivity does not represent field-validated data and nor could it. The initial value adopted was based upon field validated data as was discussed in section 4.4 of Appendix D1 (Model calibration). The variation of 30% represented judgement by an experienced modeller about how far the actual values were likely to vary from the field-validated initial assumptions. The rate of recharge was set at a very low level in order to be conservative. A 30% increase was then tested to see what effect this change in the assumptions would make – it gives an indication of sensitivity. Whilst it is accepted that rates

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		of recharge could be considerably higher, the model also shows that the impact is merely that with a higher recharge the extracted water would be replenished quicker, and given the assumption in the model that recharge only takes place in the central area by infiltration from above it would simply mean that the cone of depression would not be as deep. It is acknowledged that the model discussion does not present the length of time for aquifer recovery post abstraction – but it should be noted that there is no environmental risk associated with the speed of recovery or otherwise of this aquifer. As was previously explained, the rebound in the aquifer will proceed quickly at first and then slow down as the hydraulic gradient lessened but full recovery to pre-extraction levels will depend upon actual recharge which will be different from the very conservative assumptions used in the modelling which suggested that it might require as long as 145 years for levels to fully recover.
DoE	*D2 Hydrogeological investigations and numerical modelling* Inadequate coverage. Information Required – Model is shown be most sensitive to horizontal hydraulic conductivity (Kh) and specific yield (Sy) parameters (D2, Table 16). Parameterisation is only subjected to moderate variability as a sensitivity analysis (doubled or halved), there is no investigation of the impact of a wider range. Rockwater notes the range represents the expected likely variation derived from field investigations. Rockwater notes layer 1 has a mode of 0.1 m/d, layer 2 of 1 m/d and layer 3 of 9 m/d. Recharge is specified as a constant value of 0.000001. Episodic recharge should be investigated Given the potential range of Kh values, the doubling/halving in the sensitivity analysis constitutes a limited sensitivity analysis, particularly given the sensitivity of the model to what are effectively small changes in Kh. Further effort should constrain the	It is acknowledged that the sensitivity analysis showed that the modelling of the main aquifer under the mining area was most sensitive to changes in horizontal hydraulic conductivity (KH) and specific yield (SY). However, Vimy does not accept that varying the parameters by doubling and halving is subjecting the model to only moderate variability and that there should be an investigation of the impact of greater variation. It was the judgement of experienced hydrogeological modellers that this amount of variation was appropriate given the amount of variation that could be expected to occur. The submitter appears to be suggesting that Rockwater adopted particular values for each layer, namely: 0.1 m/d for layer 1; 1 m/d for layer 2; and 9 m/d for layer three; however, this was not what Rockwater described when explaining how the model parameters were determined. As Rockwater explained in section 5.3, Appendix D2, the model was set up with initial parameters determined from the pumping and slug tests and assumed values based upon grain sizes and their prior experience of modelling similar environments. For layer 1, the assumed parameters varied between 0.02 m/d and 0.7 m/d depending upon location, with the predominant value being 0.1 m/d; for layer 2, the assumed parameters varied between 0.2 m/d and 9 m/d depending upon location, with the

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	performance to better represent the likely variation in Kh and hydraulic conductivity (Kv) as well as Sy values encountered in the system under assessment.	predominant value being 1 m/d; and finally for layer 3, the assumed parameters varied between 0.2 m/d and 140 m/d depending upon location, with the predominant value being 9 m/d. So the assumed horizontal hydraulic conductivity was set for each block modelled, and for each of the three layers within each block. The sensitivity analysis then varied these assumed parameters by +100% and – 50% to determine how sensitive the model was to changes in these parameters. The submitter suggests that the recharge rate was set at constant value of 0.000001 m/d. This is not a correct description of what Rockwater described. As Rockwater explained in Section 5.3, Appendix D2, recharge was assumed to be zero over most of the area and was only set at 0.000001 m/d at the boundary on the north-western edge of the basin and in part of the north-eastern tributary. In effect Rockwater was merely simulating a small amount of groundwater inflow in areas where such inflow is believed to occur. There is no evidence to suggest that this aquifer receives any recharge from local infiltration and a substantial episodic recharge would have to be modelled as occurring elsewhere and feeding in through the groundwater coming in at the exiting boundary areas modelled. Given the low horizontal conductivity of the upper layer it would not reach the mining area over the time period being modelled. The modelling and sensitive analysis undertaken by Rockwater was conducted in accordance with the *Australian Groundwater Modelling Guidelines* (June 2012) such that sensitivity analysis should be performed using 'reasonable parameter estimates' (Guiding Principle 5.5) and Vimy consider that 100% variation above adopted values is reasonable; we therefore do not accept the assertion by DoE that a 100% increase represents a "limited sensitivity analysis". The functional relationship between flow rates and hydraulic conductivity is such that it passes through the origin (i.e. if hydraulic conductivity were zero the flow rate would also be zero) and the sensitivity analysis shows that the second differential is negative ($\delta^2y/\ \delta x^2 < 0$; where y = flow rate and x = hydraulic conductivity). This means that the sensitivity of flow rates to changes in hydraulic conductivity decreases with increases in the assumed value of hydraulic conductivity; in other words, if a sensitivity greater than 100% had been

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		tested the flow rate would increase less than proportionately compared to the value associated with the 100% used. So for example, if a sensitivity of 200% had been used the flow rate would increase by a value less than 84% (2 x 42%). However, the flow rate is being modelled to determine how much dewatering is likely to be associated with dewatering the area being mined. All surplus water extracted is reinjected back into the same aquifer downstream and has no adverse impacts upon any environmental receptors. Since there are no potential adverse consequences associated with flow rates higher than those modelled there is no reason to model greater variations in the assumed value used for modelling purposes. In direct response to the questions: The reasons a wider parameter range was not tested were that: • A 100% increase is actually a large increase to use for sensitivity analysis. • Sensitivity analysis usually only tests relatively small variations – since larger variations can be inferred from the results – in this case that the second differential is negative so that larger increases will have a relatively smaller impact. • Experience modellers had already estimated the assumed value of hydraulic conductivity based upon in-situ tests and based upon their experience (with building models and subsequently validating the results); their prior experience suggested that the actual outcome was highly unlikely to be more than 100% above estimates based upon the *in-situ* results. • In the unlikely event that the parameter is more than 100% above the assumed value there is no adverse environmental consequence that results; so there is no need to check higher values. The effect of higher parameter value would be: • The rate of flow of water produced by mine dewatering would be larger than assumed.

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		• The excess water would be sent to the reinjection borefield and reinjected back into the same aquifer from which water had been drawn. • Additional reinjection water would be of a quality no worse than the receiving water so there would be no adverse impact. • The additional water could lead to higher mounding but not to the extent that it might rise to the point where it could interact with surface vegetation.
DOH	*Water Supply and On-site Wastewater Disposal* The development is to have access to a sufficient supply of potable water that is of the quality specified under the *Australian Drinking Water Quality Guidelines 2004.* The proponents should develop (if not already completed) a *Drinking Water Quality Plan* including a drinking water quality monitoring program for chemical and microbiological analysis. The plan should include routine evaluation of the 12 elements of the *Drinking Water Quality Plan.* The proponent is advised that approval is required for any on-site waste water treatment process. This amendment needs to reflect this regulatory requirement and reference DoH publications as appropriate.	The exploration camp at the Mulga Rock Project currently operates a small Reverse Osmosis (RO) plant that can support up to 100 personnel. Water for this RO plant is sourced from the Kakarook borefield, which is brackish, with a TDS around 7,000 mg/L. The operation of the RO plant and the testing regime for water quality is undertaken in accordance with the Department of Health (DoH) (2011) *Minesite and Exploration Camps Drinking Water Quality Monitoring Requirements*. This document requires that all mining companies and mining operators who supply drinking water to employees are obliged to: • Comply with Australia Drinking Water Guidelines 2004 (ADWG), as published by the National Health & Medical Research Council (NHMRC) • Provide results of routine monitoring of treated water to the DoH • Establish a drinking water quality monitoring program which involves both chemical and microbiological analysis of drinking water. As the project develops, a specific Drinking Water Quality Plan (DWQP) will be prepared to fulfil the 12 elements of the ADWG, which includes review and continued improvement. Vimy understand that under the *Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974*, a licence to construct or install an on-site waste water treatment plant to meet the project requirements is required, and that a 'Permit to Use' will need to be sought from the local government authority (Shire of Menzies). The licence application will be completed in accordance with DoH (2011) *Guidance on applying for approval of installation of a commercial on-site wastewater system*.

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PND(WA), P3, P4, P5, Proforma	Submitters raised the following concerns about the impacts of drawing large amounts of groundwater from arid zone systems: 15 million litres of water a day for a dangerous unnecessary industry is a reckless waste that the EPA should absolutely block, considering the fact that we live in a desert and water is sacred. The proposal to extract up to 15 ML/d of water in this arid environment could have devastating impacts on the region, particularly on the downstream environment the Queen Victoria Spring A Class Nature Reserve. This is absolutely absurd considering the fact that we live in a desert and water is sacred. Water is our most precious resource and the effects of climate change are making our country drier. Shouldn't we be protecting and preserving what precious water we have left? I personally think that it is more important that the people of Western Australia have water to drink than the rest of the world have uranium which is inherently dangerous and will only harm people and our planet. Water is a big concern. Uranium mining is a thirsty business trying to muscle in on this water-constrained continent. Water is our most precious resource and the effects of climate change are making our country drier. Shouldn't we be protecting and preserving what precious water we have left? It is more important that the people of WA have water to drink that the rest of the world to have uranium? Uranium mining and other mining that uses large amounts of water is shortsighted because of potential impacts on water supplies far from proposed mines. Our country and Mulga Rock environment needs the water.	Vimy acknowledges that it will be drawing groundwater from below an arid zone system but since the arid zone system does not contain any Groundwater Dependent Ecosystems that utilise any of this water – it does not accept the assertion that any water will be drawn from an 'arid zone system'. Vimy has sought approval for the extraction of up to 5.5GL/a, of which up to 2.5GL/a will come from mine dewatering and up to 3GL/a will come from the borefield (PER Table 5.3). The water will be extracted from groundwater that sits at depth and is not connected to any Groundwater Dependent Ecosystems. Vimy does not accept the assertion that responsible uranium mining can be characterised as being part of a dangerous unnecessary industry or that any water taken can be characterised as a reckless waste. Nobody lives within 100 kilometres of the proposed mining area – so it isn't clear who the 'we' that lives in the desert is being referred to; moreover, the water being extracted as part of mine dewatering is hypersaline and would not be characterised as 'sacred' by anybody. The extraction of up to 5.5GL/a will have no impacts upon the region as the water is not connected to the biosphere that characterises the surface in the area. In particular, it should be noted that the Kakarook North borefield (from where up to 3GL/a will be extracted) is located around 80km from the Queen Victoria Spring. It should also be noted that the dewatering infrastructure associated with dewatering of mining areas (from which up to 2.5GL/a of hypersaline water will be extracted) will be located approximately 50km from the Queen Victoria Spring. The actual volume of water extracted as a result of dewatering the mine varies with the mining schedule and is currently estimated to be at its maximum in Year 10 when it reaches 1.5GL/a (PER Table 10.1). However, the average rate of water extraction over the life of mine works out at 0.46GL/a, which equates to only 1.26 million litres per day.

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	Groundwater reserves are unlikely to be replenished in the foreseeable future. Depletion of water resources may impact on health of vegetation in an already arid and fragile environment. There is concern that the use of the water will threaten areas of high ecological significance. The water resources may take thousands of years to replenish. In a time of climate change, we need to be doing what we can to conserve water. Drawing this amount of water from the aquifer and from natural streams to use in their operations will have devastating repercussions on all fauna and flora for hundreds of kilometres around each site. The amount of groundwater used during mining will affect the sustainability of the surrounding environment, not just the immediate site. Extracting groundwater always impacts the natural environment after a while. This is irresponsible. Where is the Water going to come from for this proposal? Is it going to be mined and therefore depleted to the detriment of graziers and others, or will it come from renewable energy sources? Please don't allow damage and waste to groundwater, it might never be replaced.	The water extracted from the borefield was estimated at up to 3GL/a – but on average 1.8GL/a over the life of the mine (PER- Table E-3); this equates to around 4.93 million litres per day. Adding these two totals together the gross rate of extraction is estimated to average 6.19 million litres per day over the life of the mine. This is the estimate of the average of gross rate of extraction – however surplus mine dewatering water will be reinjected downstream into the same aquifer that it was extracted from and processing water (once it becomes too saline for continued use) will be pumped to tailings for disposal – so the net extraction will be much lower at approximately 2 million litres per day. There will be absolutely no impact upon the Queen Victoria Spring A Class Nature Reserve. The submitters have implied that water is precious – but the water being discussed is not fresh water and is considered too saline to be used for drinking water. Some of it is not only hypersaline but also acidic and would be toxic to all forms of life. Even if this water were to be fresh enough to supply drinking water, it is too distant from any population centres to be sensibly considered as a potential supply. It is also important to appreciate that this water is mostly not being removed from the environment – it is taken from deep below the ground level and whilst some evaporates, the vast majority is returned to the aquifer that sits under the mining area. Vimy does not accept the assertion that water is a big concern in relation to the development of this proposal. None of the water being used is drinking quality water. None of the water being used will ever be used for any other purpose other than to support of mining and mining related activities. Vimy acknowledges that water is a precious resource and that the effects of climate change may make some areas in Australia drier. However, Vimy does not accept that this has any relevance to water in the Mulga Rock area or the implied assertion that the proposal would in any way result in profligacy with regard to water and notes that it has a number of Management Plans dealing

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	The proposed vast waste of underground waters, one of Australia's most valuable resources, should on its own make this unacceptable to all thinking Australians. Uranium mining at Mulga Rocks will have devastating impacts on the downstream environment. You can build an artificial waterfront pleasure zone in the city and name it "Elizabeth Quay", What about respecting the environment of Queen Victoria's namesake, the 'A Class' Queen Victoria Spring Nature Reserve. We currently have water shortages and restrictions in Perth, our dams are at record lows. This should be a clear reason to say no. To gift water to a miner who will leave it toxic is unacceptable. This is a waste of water. It is important for us to preserve water resources rather than consume them.	with water – see Section 10.9 of PER – and that water will be protected and preserved as much as is practicable. Vimy does not accept the implied assertion that the development of this proposal and the resulting supply of uranium to the rest of the world will in any way lessen the amount of water available that is suitable to supply water to the people of WA. Vimy acknowledges that its proposal (uranium mining) will use a large amount of water (expected to average about 2.3GL/yr over the life of the mine), but does not accept the assertion that this is "shortsighted because of potential impact on water supplies far from proposed mines". Vimy notes that there is not expected to be any significant residual impacts upon the environment, and that includes any 'water supplies far from the proposed mines'. Vimy acknowledges that 'Our country' and the 'Mulga Rock environment' both need water. In the case of the Mulga Rock environment, that water is supplied predominantly by low levels of rainfall annually as high rainfall events happen only occasionally. There is also normally no surface water flow, no rivers or riverbeds, nor any creeks or creek beds in the area. The water levels in all aquifers impacted are expected to return to approximately the same levels within about 20 years. To the extent that water levels are below previous levels (i.e. until the levels have fully rebounded) – there is no impact upon flora and vegetation because the biosphere that characterises the surface is not connected to the deep groundwater. The extraction of water will not threaten the health of vegetation nor any areas of high ecological significance. It is incorrect to assert that the replenishment of water may take thousands of years. Using very conservative assumptions it was estimated to take 145 years, but in all likelihood it will take far less. The important issue is whether the lowered water levels affect any environmental receptors and the answer is that they do not. There are no impacts flowing from lowered water levels or the use of this water.

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		Vimy appreciates that one of the implications of climate change is increased evaporation and the need to use more water. Certainly in urban areas this lead to an implied need to conserve water. However, it is incorrect to translate this requirement to conserve water across to the use of low quality water taken from below the reach of any GDEs and to imply the need to conserve this water. If there are any implications from climate trends in the region of the proposal, it is that rainfall may actually increase in this area and increase the associated recharge of local groundwater aquifers. The amount of water drawn from the underground aquifers expressed in gross terms is expected to average about 2.3GL/yr over the life of the project. No water will be taken from natural streams as none exist in the area; there is no evidence of any surface water flow in the area. The groundwater from which water will be extracted is not connected to any surface ecosystems. It is simply incorrect to assert that water taken from the deep underground aquifers will have any impact upon any fauna or flora, let alone there being devastating repercussions on all fauna and flora for hundreds of kilometres around each site. Vimy does not accept the assertion that extracting groundwater always impacts the natural environment after a while or that it would be in any way irresponsible. Vimy notes that the only life connected to the groundwater from which water will be extracted, that was located by Vimy's surveys, was two species of aquatic worms found in small numbers in only a small part of the Kakarook North aquifer and they were not expected to be significantly impacted by the relatively small amount of water expected to be drawn from that aquifer over the life of the mine. The water for this proposal will exclusively come from borefields that will extract water from the groundwater that exists at depth in the area. There will be no impact upon flora and fauna either locally or regionally; there will be no impact upon graziers as there is no pastoral activity in the area; and there will be absolutely no impact upon the Queen Victoria Spring or its associated Nature Reserve.

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		Vimy does not accept the implied assertion that the extraction of water associated with this proposal might damage the groundwater systems or that it might be used wastefully. Vimy notes that the proposal is not expected to result in any significant residual impacts to the environment (including groundwater) and that all water extracted from the local aquifers will be subject to Management Plans that will ensure that the water will not be wasted. Vimy does not accept the assertion that what is proposed constitutes a 'vast waste of underground waters' or the premise that the waters that will be accessed (and are too saline to be considered suitable for drinking water) can sensibly be considered to make up a valuable Australian resource. Vimy does not accept the assertion that uranium mining at Mulga Rock will have devastating impacts on the downstream environment and it utterly rejects any assertion that there will be any impact on the Queen Victoria Spring Nature Reserve from the development of this proposal. Vimy notes that there are not expected to be any significant residual impacts upon the environment (which includes the Queen Victoria Spring Nature Reserve). Vimy acknowledges that there are water shortages and restrictions in Perth and that the total amount of water stored in Metropolitan Dams is sitting at a low level (currently about 146 GL; only 23% of capacity) almost as low as prevailed in May 2011 which averaged 141 GL. However, Vimy does not accept that this is a valid reason to reject the proposal. Vimy does not accept the premise that it will leave any body of water anymore toxic than it currently is or the assertion that allowing Vimy to use water is unacceptable. Vimy does not accept the assertion that any water will be wasted or that the water resources that it will be using require preservation in a manner that would suggest the proposal should be refused.
Conservation Council WA	*Cumulative Impacts from water extraction from Kakarook* Appendix D1 looks at the water take from the Kakarook bore. Rockwater consultants identify that *"The volume of groundwater*	The CCWA has suggested that 167 divided by 93 equals 1.7. This is not correct. 167 divided by 93 equals 1.7957, which rounded to 2 decimal places equals 1.80. This is not less than Vimy stated that it would use in the PER. In Section 10.2 (sub-heading Kakarook North (Extraction) of the PER it was stated that

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	in storage in sandstone beds in the area of Kakarook North that has been drilled by Vimy Resources, is calculated to be about 167 Gigalitres (GL) (93 times the annual water requirement for the proposed project)." 167GL divided by 93 = 1.7GL annually (which is less that the proponent states they intend to use in the PER) this would mean the consumption of 27.2 GL over the 16-year life of the project. Rockwater consultants suggest that the rate of recharge is *1%* of annual rainfall, there is no indication over what area that 1% recharge occurs. *"The groundwater is recharged following high rainfall events when rainfall and runoff readily infiltrates the surface sand, and then moves down to the water table. During typical climatic periods, recharge rates are low, probably less than 1% of the average annual rainfall. The groundwater flows to the south.* *"The water table is typically around 20m below the ground surface."* Appendix D1. They separately state that the annual rainfall is 222.6mm - we can therefore assume that they are suggesting the annual recharge on average is likely to be around 2.3mm per cubic meter = 0.0023m. If we consider that recharge occurs over 4000 ha - the project area (4e+7 square meters) this is 92,000 cubic meters or 92 million litres (ML) (1 cubic meter is 1000 litres). Based on this information we assume that on average the total yearly recharge is 0.092 GL, or about *5%* of the annual proposed borefield extraction. Yearly extraction will be 20 times the annual average estimated recharge and that this is expected to continue for 15 years. While the consultants have given some indication about the low levels of recharge and large volume of water to be extracted they have not clearly identified the long term impact on the environment from this huge water deficit in the environment.	"Preliminary estimates suggest that groundwater abstraction for process water will occur at an average rate of 1.8GL/a, and that the aquifer has a proven resource of around 167GL". This same figure of 1.8GL/a, is given in sections 10.8 and 10.11. It is incorrect to assert that Rockwater suggested that the rate of recharge was 1%. Rockwater asserted that in typical periods the recharge rate was probably below 1%; this needs to be seen in the context that most recharge takes place when unusually high rainfall events occur at which time the rate of recharge is likely to be greater than 1%. For modelling purposes Rockwater assumed that recharge only took place within the central area of the area modelled at Kakarook North. This was a conservative assumption and not regarded as an estimation of the actual catchment area – the exact area of which is unknown. The statement that related to the annual rainfall being 222.6mm/yr was taken from Table 1 of Appendix D1 and represents the average annual rainfall taken from the nearest long-term climate station at Edjudina and is the annual average for that location (170km west of Kakarook North) estimated over the period 1900 to 2014. The amount of recharge calculated by CCWA is based upon an approximation of the disturbance area associated with the proposal (4000ha) but there is no logical reason for using this assumption. Most of the ~4000 ha of proposed disturbance is located in the mining area that is at least 30km from the Kakarook North borefield and the two aquifers are not believed to be connected. The catchment area associated with Kakarook North is not known but will certainly be much larger than 4000ha, given that the modelled area is at least 8000ha and the catchment area is expected to be much larger than the modelled area. Vimy acknowledges that in typical years the rate of recharge will likely be less than the amount being extracted from the Kakarook North aquifer. However, when calculating the ratio of the amount of water being extracted from the aquifer to the overall amount of water held in the aquifer it was assumed that there would

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	In the PER 12.3.2 Vimy identify that *"Pan evaporation (around 2,650 millimetres per year (mm/yr)) greatly exceeds rainfall throughout the year and thus the environment exists in a water deficit condition".* *Daily pan evaporation rates vary from 11-12mm/day (330-360mm/month) in summer to 2-3mm/day (75-100mm/month) in winter. The MRUP region therefore exists in a water deficit condition throughout the year, which will strongly influence the functioning of the ecosystem."* The Appendix D1 hydrogeological investigations of the Kakarook bore, Rockwater state that *"The planned pumping rate of about 4,900 kilolitres per day (kL/d) may be more than the rate of recharge to the aquifer, and the aquifer through-flow."* Given the evidence or claims made above on recharge rates vs the rate of consumption it would seem that the planned rate of pumping would be significantly more than the recharge rate - about 20 times more and possibly more than that. Rockwater make the claim that this is sustainable because there are no other users in the area, that the rate of consumption will be finite and that there are other parts of the bore that can be used. The submitter questions the understanding and application of the term sustainability when applied to reducing the water in an environment for hundreds of years. The submitter maintains that the taking water from a pristine environment that will take hundreds of years to recover is not sustainable - in fact it dramatically impacts on that water source and any future potential use of that water resource and the surrounding environment, which is constantly competing for the small amount of water that exists. There is another major user of water in the region, the Tropicana Goldmine. The Anglo Gold Ashanti project proposal included	be no recharge at all – so the figure of 93 times the amount of water currently in the aquifer does not assume that there is any recharge. The premise on which the CCWA is criticising Rockwater's use of the term 'sustainable' is incorrect. The water is not being extracted from a pristine environment, it is being taken from 20m below the environment that characterises the surface and there is no interaction between these two systems. The Tropicana Goldmine is acknowledged to be another major user of water in the region, but the main Anglo Gold Ashanti project does not extract water from the same aquifer and is located at least 100km away. The Tropicana project does have a bore that extracts water from the same area as Vimy will be mining in later years, but this bore is for use in road maintenance and is not expected to exceed 0.018GL/a. Once again, there is an incorrect premise in the assertions made about the unacceptability of taking so much water and the associated need to undertake further investigations when it is assumed (incorrectly) that the water that is being taken supports many priority and threatened species, unique flora and PECs. There is no connection between the groundwater and the fauna and flora existing at the surface in the same area, and the water being extracted from the mining area (including the water taken by Tropicana) is so saline that it would destroy any vegetation were there to be such interaction. Whatever limitations there may be in the knowledge about the flora, fauna, SREs and the Yellow Sandplain PEC, it does not detract from our clear understanding that the water that is being extracted is being taken from groundwater that does not interact with the surface environment and that there are no GDEs that depend upon this water. The water in the local aquifer is also completely unconnected to the ephemeral water that exists near surface at the Queen Victoria Spring and the same aquifer that underlies the mining area of the proposal is estimated to be at around 60m deep in the area of the Queen Victoria Spring Nature Reserve.

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	plans for 14 million litres per day (ML/d). In the Mulga Rock proposal there is no assessment or discussion about the cumulative impacts of water consumption from both mines. While the bulk of the water for the Tropicana is taken from an area around 100km North East of the Mulga Rock proposal there is some indication that Tropicana have a bore at Mulga Rock *"Extraction from Tropicana mine's bore located in the Emperor pit (MSWB02) was included at a rate of 50 kL/d (the average for the period (July 2011 to November 2014);"* Appendix D2. While this fact is presented in the Appendix there is no discussion about this in the proposal and no identification of this increase in water taken from the environment at the proposed site. Given the large quantities of water either being taken, or proposed to be taken, in this arid region which supports many priority and threatened species, unique flora and PECs it is unacceptable to not investigate or outline any interconnecting aquifers or ecosystems. Given our limited knowledge of the flora, fauna, SREs, potential GDEs, and the Yellow Sandplain PEC the submitter maintains that to take such huge volumes of water from this pristine environment without a clear understanding of the impacts is reckless. The submitter is concerned that there is a lack of understanding about the impacts of the water take on the environment and the Yellow Sandplain PEC at the site and the environment downstream at the Queen Victoria Springs A Class Nature Reserve. Appendix D2 indicates there is a desalination plant, there is one other mention of desalination in the PER - there does not seem to be a consolidated plan. The submitter seeks formal clarification as to whether or not there is a proposal for a desalination plant?	Appendix D2 mentions a desalination plant as there is a requirement to generate 'drinking quality' water from the water that is extracted from Kakarook North because it is too salty to be used for drinking purposes without first removing some of the salt. This will be a small unit designed to provide water for the accommodation village. There is already a very small unit in operation that provides water for people undertaking the existing exploration and development activities, which is just considered part of camp facilities. Vimy does not accept the assertion made by CCWA that the project will create a 'marginal amount of short-term jobs'. Vimy believes that the creation of approximately 490 jobs should not be characterised as 'marginal'. Vimy also refutes the suggestion that there are any impacts either in the short term or the long term on any significant environmental receptors resulting from the proposed water extraction.

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	For a commodity worth with a depressed market and a project that offers a marginal amount of short-term jobs we are of the view that the long-term impact of water consumption far outweighs any perceived benefits.	
Conservation Council WA	*Downstream impacts on water* The proponent has suggested that there is low permeability - 0.02 to 0.7 metres per day (m/day) (Pg. 4) however this is not actually low permeability. We are concerned that the proponent has miscalculated the permeability and underestimated the impact of seepage from tailings. The groundwater flow direction is from north to south, towards the Queen Victoria Springs. Appendix D2 *"The Queen Victoria Spring Nature Reserve lies down-gradient of the MRUP: the northern boundary of the reserve is 14 km south of the planned injection borefield and 24 km south of the Ambassador deposit."* If the aquifers that will be impacted by the project are connected with the springs at 'Queen Victoria Springs' there is a possibility that water quality and quantity in the A Class nature reserve could also be impacted. For example, changing the pressure in the aquifer by pumping and/or injection could have a rapid and noticeable impact on spring flow (as pressure changes in an aquifer are transmitted rapidly, as opposed to the actual time required for flow of groundwater from point A to B). Thus, if a GDE assessment has not been conducted as part of the hydrogeological investigation, this is an area that requires further investigation. We have been unable to identify any clear studies or assessment of impact on downstream GDEs particularly in reference to the Queen Victoria Springs.	The permeability values of 0.02 to 0.7 m/d (only 2-70 cm/d) are considered low as sands typically have saturated permeability values in the order of metres to tens of metres per day. Loamy materials typically have permeability values in the range of 0.5 to 1 m/d, whilst clays generally have permeabilities <0.2 m/day. Hence the values used in the tailings seepage of 0.02 – 0.7 m/d are reflective of a clay to loam material. Vimy acknowledges that the northern boundary of the Class A Queen Victoria Springs Nature Reserve occurs 14km south of the planned reinjection borefield and within 24km of the Ambassador Deposit. The actual spring, however, occurs at 41km south of the reinjection borefield and 51km south of the Ambassador Deposit. The spring represents a surface expression of a local ephemeral perched water source that has no hydraulic connection with the underlying groundwater aquifer. Consequently, it is not considered “an environmental receptor that could be impacted by the planned mining at Mulga Rock” (Rockwater, 2015; PER Appendix D2). Furthermore, the terrestrial vegetation within the nature Reserve are not groundwater dependent and thus any change in water levels will have no impact on this vegetation. Hydrogeological modelling undertaken by Rockwater (2015; PER Appendix D2), for the proposed reinjection borefield, showed that the maximum rise in water level will be less than 1m during the 16-year Life of Mine (LoM), and that a rise of only 0.5m will likely extend approximately 2.5km from the borefield. The reinjection of excess dewatering water will therefore have no impact on groundwater levels below Queen Victoria Springs. Furthermore, modelling of a conservative tracer showed that reinjected water will only travel 2.2km after 1,000 years, due to the low hydraulic conductivities, and thus it would take

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	In the conceptual model figure (Fig 1.4) there is reference to an injection bore field however there is no clear discussion about how this will control the hydraulic gradients and contain seepage to within proximity of the site. Re-injection schemes around the world provide an engineering challenge and they are notorious for suffering problems with clogging (of the injection bores and/or aquifer), loss of efficiency and even structural/geological instability (e.g. re-injecting waste-water near faults seems to set them off). Given the lack of discussion about how the bore field would operate there are concerns about how it would be managed, what barriers or challenges there might be and therefore what risks and impacts could arise because of the borefield.	approximately 6,400 years to reach the northern boundary of Nature Reserve and around 18,600 years to reach the spring. It is important to reiterate that reinjection will only occur in two of the 16 years of mining and that reinjection will be undertaken in accordance with the *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) Managed Aquifer Recharge; Document 24* (NRMMC-EPHC-NHMRC, 2009). This document specifies the optimal operational parameters to prevent or minimise clogging of reinjection bores as a result of filtration of suspended particles, microbial growth, geochemical reactions and air entrapment and gaseous binding. It is considered that clogging prevention is a better option than bore renovation or redevelopment, and given that reinjection will only occur in two years over the LoM, in Year 3 and Year 10, and that multiple reinjection bores will be rotated during these periods, the risk of clogging impacting the operation and efficacy of the reinjection bores is considered low. Based on the above information, the risks to reinjection of excess dewatering water in Year 3 and Year 10 of the operation, and the potential impacts, are considered negligible, and require no specific management.
Conservation Council WA	*Flooding and Surface Water* While it is true that the low rainfall in remote WA reduces the risk of tailings dam overflows, there have been some significant rain events in recorded history (eg ~115mm in 48 hours in 1974). It can often be that where the risks are under estimated there the problems can arise. Large tailings facilities like the one proposed – 106 ha above ground - can be problematic and should be considered in detail. Appendix D9 - *"The Trend Maps for rainfall given in the Bureau of Meteorology website under Climate Change and Variability indicate that total annual rainfall at Mulga Rock has increased by about 20 mm every 10 years from 1970 to 2014."* The consultants say this will have negligible impact on the project or the	In accordance with the Department of Mines and Petroleum (DMP) (1999) and ANCOLD (2012) Tailings Dam Guidelines, Vimy will maintain a Total Freeboard of 1m for the above-ground TSF. This height exceeds the likely rainfall expected in a 72hr Probable Maximum Precipitation (PMP) event (around 270mm; PER Appendix D9). This freeboard is considered sufficient to store the total volume of rainfall landing on the above ground TSF, without overtopping the embankment walls. Vimy agrees that as a result of climate change, and following the past rainfall pattern from 1970 to 2014, the average annual rainfall for the site may increase from its current 280mm to 320mm. Even if this increase in rainfall occurs, the hydraulic analysis undertaken by Rockwater (2015; PER Appendix D9) included the 72hr PMP event (defined as an ARI event of 1:2,000-year) of 270mm, with no surface water impacting the site. The small surface water risk likely to come

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	environment but do not describe how they arrived at this conclusion. The consultants discuss high rates of infiltration in similar areas so describe the build-up of surface water as unlikely - high levels of infiltration have other potential impacts on seepage from tailings which is discussed later, this is likely to be problematic with increased rates of rainfall. The consultants suggest the only surface water risk is from flows from Catchment A, but claim that flows are unlikely to pose a serious risks. This is not discussed further in relation to mine closure and changes over time. For the operational life of the mine we suggest some flood mitigation measures should be considered for a worst-case scenario, and indeed there should be some articulation of what a worst-case scenario would be. In the documents provided by Vimy there is no indication that they are considering any flood mitigation strategies at all. In the case that we continue to get less frequent but more intense rainfall the risk of surface water build up over short periods is a real risk. These scenarios should be considered and in so doing should identify key risk factors. If there are issues with acidic rocks in the overburden or tailings and flooding occurs there could be some very problematic issues – not only of spreading radionuclides and heavy metals but also Acid Metalifferous Drainage.	from Catchment A, was in response to this worst-case PMP event, and thus the likelihood of surface water impacting the project during its 16-year LoM is unlikely. It is therefore considered that no flood mitigation is required. Across the Project area, the interdunal swales have sufficient capacity to store all rainfall, which is then rapidly infiltrated, as a result of the build-up in hydraulic head, such that no continuous surface water flow occurs. It is acknowledged that during intense storms events, particularly after a dry long spell, when the infiltration of the surface soils is rate limiting (as a determined from the Hydraulic Conductivity Function presented in Figure 2.2 of PER Appendix D8), there is likely to be considerable infiltration-excess overland (or sheet) flow with all runoff draining into the interdunal swales and subsequently recharging the deeper soil profile. The hydraulic analysis undertaken by Rockwater (2015; PER Appendix D9) clearly shows that no overtopping of these swales is expected even under a worst-case scenario. The impact of infiltration-excess overland flow, likely to occur during intense summer rainfall events, and its potential for water erosion and landform instability, will be factored into for any post-mine landform design. These landforms will be constructed so that surface water is retained on them, allowing any ponded water to infiltrate into the predominately sandy soils. The overburden stockpiles will not contain any AMD or radiological materials as the overburden is geochemical and radiologically benign to within 2-5m of the orebody. All basal overburden (i.e. within 2-5m of the orebody) will be preferentially mined and backfilled at the base of the mine-pit. It is also important to highlight that tailings deposition will occur subaqueously and thus the additional water likely to be added in response to an intense rainfall event will not impact on seepage.

6. Inland Waters Environmental Quality

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Department of Mines and Petroleum (DMP)	It is noted that there is expected to be seepage from the tailings into the paleochannel groundwater environment (from the in-pit tailings in particular). No lining of the in-pit tailings storage facility is proposed; however, the modelling discussed in Section 11 indicates that the plume from the tailings will not result in significant changes to the groundwater quality, and no expected impacts to environmental receptors. It is noted that more detailed characterisation of the ore, tailings and overburden materials is planned to fully characterise the potential and magnitude of the various materials to generate acidity and metalliferous drainage. It is expected that the outcomes of these studies and proposed management measures will be included and discussed in the Mining Proposal and Mine Closure Plan submission under the *Mining Act 1978.*	It is correct that the in-pit tailings will drain directly into the paleodrainage aquifer and that this is considered the best environmental outcome by Vimy. The quality of the paleodrainage channel is already degraded as a result of past and present oxidation of sulphides within the channel, and subsequent metalliferous drainage. The quality of proposed tailings seepage water will therefore be similar to the existing groundwater quality as the processing of the ore simply replicates the oxidation and acidification that is occurring in the natural environment. Vimy completed a range of static geochemical tests to establish the likely impacts that may result from in-pit tailings deposition, and the results from this test work was used as the basis for the environmental impact assessment of the project. In addition, kinetic (both laboratory and field scale) tests on ore, tailings and overburden materials, are also planned to refine the results from the static test work, and with these additional results to be included in the Mining Proposal and Mine Closure Plan to further inform the environmental impact assessment for the study and rehabilitation and closure planning of the post-mine landforms.
Department of Environment Regulation (DER)	The solute transport modelling has been carried out in a sound manner and has generally been undertaken in accordance with the Australian groundwater modelling guidelines. However, it is likely that sensitivity analysis that was carried out has underestimated the level of uncertainty associated with simulated solute concentrations. *Modelling of contaminant transport in groundwater from the proposed in-pit TSFs* In previous advice provided to the Office of the EPA in September 2015, the submitter indicated that there were significant limitations with geochemical modelling that had been undertaken to determine the fate and transport of contaminants in groundwater	Vimy agrees that whilst the model results are likely to be realistic, through the use of worst-case scenarios, the sensitivity analysis undertaken for the solute fate and transport modelling likely underestimates the level of uncertainty with the simulated solute concentrations. This being due to the models not effectively capturing the full range of spatial and temporal discretisation of the various input parameters, as specified in Guiding Principles 10.8 and 10.9 in Chapter 10 of the Australian groundwater modelling guidelines. Although the level of uncertainty has likely been underestimated, the risk of environmental impact is considered low given the nature of the existing groundwater system and the lack of downstream environmental receptors.

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	from proposed in-pit tailings storage facilities (TSFs) in the Mulga Rock Uranium Project. This work was undertaken using the 1-d reactive transport capability of the geochemical model PHREEQc. In the current version of the PER for the project, the proponent has presented a new modelling study prepared by Rockwater that uses a different approach to simulate the transport of soluble contaminants in groundwater from the in-pit TSFs. A numerical modelling approach has been used to simulate three-dimensional, density-coupled groundwater-flow using the MODFLOW and SEAWAT modelling software, and solute transport has been simulated using MT3DMS. The principal advantage of the new modelling approach is that the simulation of groundwater flow within the palaeochannel aquifer can be undertaken in a much more realistic manner that considers flow in three-dimensions and the effects of varying salinity with depth in the aquifer. However, unlike the previous PHREEQc model, the new solute transport model does not consider geochemical processes other than hydrodynamic dispersion and sorption by aquifer minerals. Additionally, like the PHREEQc model, the limited amount of field data available to constrain aquifer parameters such as dispersion coefficients will limit the reliability of some of the conclusions that can be drawn from the model output. However, despite these limitations, the modelling has been carried out in a sound manner using conservative estimates of aquifer parameters and an approach that is generally consistent with the Australian groundwater modelling guidelines (NWC, 2012). The variations in solute concentrations with time and distance from the in-pit TSFs are considered to be plausible, but the level of uncertainly associated with these results has probably been under-estimated in the sensitivity analysis. This is largely because the sensitivity analysis that was carried out did not	

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	examine how varying spatial discretisation and the distribution of parameters in the model would affect the model output (refer to Guiding Principles 10.8 and 10.9 in Chapter 10 of the Australian groundwater modelling guidelines).	
DER	Insufficient geochemical testing has been undertaken to determine the rate at which metals and metalloids would be released into leachate from the oxidation of mine waste materials at the site. Kinetic testing of potential mine waste materials would need to be undertaken to provide this information. *Geochemical test-work* The potential for acidity and metals to be released on oxidation was determined using a static testing (acid-base accounting) approach that is normally used for assessing inorganic mine waste materials. This testing methodology does not take into account the fact that most of the metals in the lignites are associated with organic complexes rather than in discrete inorganic phases, and it is likely that the release of sulfuric acid on the oxidation of sulfide minerals will not be the only factor that will cause metals and metalloids to be released into leachate from these materials. Depending on a variety of factors including water content and the availability of oxygen, lignite can commence oxidation within hours of being excavated leading to large temperature increases within the material (Nalbandian, 2010). Under extreme conditions, the heating can lead to self-combustion of the organic matter, but otherwise the physical and chemical properties of the lignite can be greatly altered by the heating. This degradation of the organic matter could lead to the release of metals which are chemically bound to organic matter in the ore, and to the oxidation of sulphide minerals under high temperatures (>60°C) that could occur within stockpiled ore. The degradation of organic matter in oxidising	Vimy acknowledges that at the time of release of the PER document no kinetic test results were available and this was identified as a gap in understanding. Since that time, Vimy have commenced both laboratory (column leaching in accordance the AMIRA (2002) Guideline) and large field-scale (using 1000L intermediate bulk containers (IBCs) holding between 800 – 1000kg of material) kinetic test work for both the tailings and ore. Kinetic testing of the overburden materials is not deemed warranted as the oxidised overburden materials are geochemically benign (i.e. they have already undergone sulphide oxidation and stripping of all organics and metals / metalloids). The results of the kinetic testing will be used to update the “source terms” used in the existing geochemical modelling, where required, to improve the modelling predictions. Furthermore, the results from this kinetic test work will be included in the Mining Proposal and Mine Closure Plan. These results will further inform the environmental impact assessment for the Project and rehabilitation and closure planning of the post-mine landforms. Vimy consider that this deferral of matters, where there is ongoing test work or development that will give more information to better resolve the matters under consideration, is appropriate as the existing test work shows that no environmental impacts or impacts on receptors are expected, and that the results obtained to date are “plausible” (previous DER comment). The additional test work being undertaken will further refine the results of the initial tests and reduce the uncertainty in predicted impacts. In all cases the matters are subject to secondary approvals which give the opportunity to impose additional conditions if the new information suggests that there are unacceptable risks that merit such an approach.

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	lignite could also lead to the release of organic colloids containing metals and radionuclides into groundwater (McCarthy, 1998) beneath in-pit TSFs. The drying and oxidation of lignite can also lead to large volume reductions taking place in the material. This could be a significant problem for the disposal of organic rich tailings materials in both above ground and in-pit TSFs as the progressive drying of tailings could lead to shrinkage and differential settlement of these materials. This means that areas that have been backfilled with organic tailings materials could be prone to subsidence, which could lead to changes in the drainage pattern at the land surface beneath backfilled mined areas. The geochemical test-work that has been undertaken to date provides no information on the rate at which metals and metalloids could be released from mine-waste materials. This information could only be obtained by undertaking kinetic testing on representative mine-waste materials. Such testing would also provide an improved estimate of the "source term" for geochemical modelling of the movement of solutes in groundwater from the proposed in-pit TSFs.	This approach of deferring the resolution of matter was recognised by the DMP who stated that "It is expected that the outcomes of [the additional studies] and proposed management measures will be included and discussed in the Mining Proposal and Mine Closure Plan submission under the Mining Act 1978". Whilst it is accepted that the DER does not formally approve these documents it is envisaged that they will be supplied the relevant documentation for comment and assessment. To assess the potential for the organic-rich ore and tailings materials to generate excessive heat in response to oxidation, and potentially self-combust, Vimy are currently measuring the temperature and redox potential within both laboratory and field-scale kinetic programs to establish how the temperature of the materials fluctuates during oxidation and the potential for self-combustion to occur. In addition, volume loss in ore and tailings during oxidation is being measured to quantify potential shrinkage and the risk of subsidence occurring in the closure landforms. Whilst it is considered that the risks from self-combustion and subsidence are low, Vimy acknowledge that such processes may exacerbate the release of metals from the organic-rich materials and impact on closure of the site, and thus the results from this work will inform the management of these materials and will be reported in Mining Proposal and Mine Closure Plan for approval prior to project implementation.
DER	Concentrations of metals in groundwater from the palaeochannel aquifer (particularly levels of mercury and cadmium) are sufficiently high to cause environmentally harmful soil contamination if this water were to be used for dust suppression around the proposed mine site. *Mine water management* The elevated concentrations of many metals in groundwater in areas that will be mined will be of concern if the proponents plan to use this water for dust control on haul roads or other areas	The hypersaline groundwater within the paleodrainage channel will only be used for dust suppression on haul roads and site access roads, which will be constructed (or built-up) roads with a drainage system to prevent the release of this water or surface runoff from entering the surrounding environment. This utilisation of hypersaline groundwater or brine for dust suppression is consistent with the approach adopted at most mine sites in the Goldfields to compact the road base and reduce dust generation. Vimy will ensure that appropriate drainage management is implemented to prevent the release of applied

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	within the footprint of the proposed mining operation. Although the water is saline and unsuitable for supporting plant growth, it is likely that irrigation of soils for a prolonged period with groundwater would lead to metal contamination of soil that would persist long after soluble salts have been flushed from the soil profile and the soil is capable of again sustaining plant growth (Lin *et at.,* 2005; Chen *et al.,* 2008). Of particular concern are concentrations of mercury in groundwater which exceed the ANZECC 2000 short-term irrigation trigger value by a factor of up to 500, suggesting that mercury contamination of soil could become a significant environmental issue if groundwater were to be applied to soils for a prolonged period. Cadmium is also present in groundwater at concentrations that could accumulate in vegetation if groundwater from the palaeochannel aquifer were to be applied to soil (Lin et. al., 2005).	groundwater into the surrounding environment, and prevent impact on surrounding vegetation. Vimy also notes that DER is seeking to apply standards that are appropriate to water being used to irrigate crops for human consumption (ANZECC 2000) and applying them as if Vimy were using its water for that purpose – but as previously discussed the water will only be used for dust suppression purposes and the roads will be appropriately rehabilitated at the end of the mine life. At closure, all soil material contained in the haul roads and site access roads, and potentially contaminated by groundwater (either salinity, pH or metals), will be excavated to the original topographic surface and deposited into the pit void and then covered by a sufficient thickness of material so that it occurs below the rooting depth of the proposed revegetation. Following excavation, and prior to topsoil replacement, a soil survey of the *in situ* soils beneath the roads will be undertaken to determine whether any downward seepage and contamination occurs. Any identified contaminated soil will be excavated, if required, and deposited into a mine void for isolation. The closure aspects of the haul roads and site access road will be address explicitly in the Mine Closure Plan to be approved by the DMP. Following further review of the groundwater quality data presented in Table 11.1, which formed the basis for the DER comment on elevated Cd and Hg, it was identified that there was a transcription error in the Shogun and Emperor groundwater quality data presented in the PER. Consequently, all of the data for Shogun and Emperor should be moved down one row, such that the data for Cd, was actually for Cr, and the data for Hg was actually for Iodine (I). Given this error, the only data available for Cd and Hg is from the Ambassador Pit, which shows very low levels of Hg (0.0001 mg/L). This is supported by the static leach (ASLP) testing of the ore material which shows that Hg is relatively immobile in the solid phase, with negligible release into the water column. For Cd, the data in Table 11.1 vary from 0.001-0.319 mg/L, with an average of 0.037mg/L. On closer inspection, the maximum value of 0.319 mg/L is not likely to be representative of the aquifer system, in particular that portion that will be dewatered during mining (i.e. the top 2-5m of the aquifer), as the mode and

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		median of the Cd data are 0.001 and 0.0027 mg/L, respectively, which are below the short term (up to 20 years) irrigation trigger value of 0.05mg/L and also below the long-term trigger value in irrigation water of 0.01 mg/L as contained in ANZECC 2000. In other words, the cadmium concentration in dust suppression water is expected, on average, to be low enough that it could be used for irrigating crops.
DoE	*Inland Waters Environmental Quality* No specific issues – monitoring of groundwater quality down gradient of tailing storage and placement areas should be undertaken to calibrate/validate models regarding contaminant transport from tailing disposal areas. Information Required – Ongoing understanding of changes in groundwater quality downstream of tailings disposal areas.	Vimy will install fit-for-purpose groundwater monitoring bores at various locations downstream of the tailings disposal areas so that any changes in groundwater quality, in response to seepage, will be detected. The monitoring and analysis program to be implemented will be developed with the Department of Water (DoW) and Department of Environment Regulation (DER) and will be documented in an approved Groundwater Operating Strategy (GOS) or Works Approval for the tailings disposal facilities.
DoE	*Executive Summary- Residual Impacts and Offsets (p v and xi)* Lack of clarity. Information Required – It is unclear (with regards to which parameters) how surplus saline water from dewatering is of no worse quality than water from the same aquifer downstream – clarify 'no worse'.	This is an Executive Summary and the detail can be found in the relevant section of the PER. The quality of the groundwater is described in Section 11.3.2. The quality of the groundwater is spatially highly variable in terms of salinity, pH and contained metals but as a general rule the salinity and the pH both increase as the water in the palaeochannel moves very slowly in a southerly direction. Figures 11.2 and 11.3 show maps of the estimated distribution of salinity and pH profiles. As a general rule the salinity and pH increases as the water moves south. The reference to 'no worse' applies to all relevant water quality parameters.
DoE	*Section 9.6* Characterise wastes, including intermediate processing wastes, effluents and tailings according to contaminant and leachable concentrations including base metals present in the deposits to	Vimy acknowledges that whilst current leach testwork for the tailings has only been undertaken on non-neutralised (acidic) materials (hence does not reflect actual leach characteristics), the results obtained represent worst-case as neutralisation of the tailings will either precipitate out metals (particularly Co, Cu, Ni and Zn) or will reduce the mobility of cationic hydrolysis metals and metalloids given the potential change in surface charge. The results for the worst-case

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	allow for waste processing and tailings seepage issues to be addressed. Leach tests will include the use of on-site water. Information Required – Although radionuclide activity concentration data in waste and residues are given in Appendix C of Appendix D9 more discussion is needed with regards to the radium-226 residual activity concentrations. This is required to assess expected radionuclide distribution in process effluent, tailings seepage and extracted ground waters. This represents a worst-case scenario because it is likely that a neutralisation phase will be introduced to facilitate the removal of Cobalt, Copper, Nickel and Zinc by a precipitation process. So the tailings material considered by ANSTO was considerably more acidic and had higher levels of Cobalt, Copper, Nickel and Zinc than are likely to be present in what is ultimately produced. However, the test work performed by ANSTO was considered to provide an accurate reflection of the environmental risks associated with metalliferous drainage (SWC 2015a). Work undertaken to date does not reflect the actual leach characteristics of the processing to be undertaken. Indeed, work was undertaken using an acid leachate rather than neutralised tailings. Further explanation on the relevance of this acidic testwork and how all variations as a result of a neutralisation phase would assist in determining relevance.	scenario were used as “source-terms” in the solute fate and transport modelling (PER Appendix D10). As addressed in a separate response, due to similar chemical characteristics and in particular their crystal and hydrated ionic radii as well as electronegativity, Ra-226 is known to substitute with barium the most of all alkaline earths (IAEA, 2014). Precipitation of radiobarite (Ba, Ra) SO4 has been shown to be an important process in controlling the solubility in a range of natural waters, significantly decreasing its mobility. In the presence of moderate to elevated amounts of sulphates (such is the case at Mulga Rock), barium concentrations in groundwaters will be controlled by the precipitation of barite, as typical Ba concentrations are generally near saturation levels. This has been confirmed by modelling of the solubility index of barite at Mulga Rock by the CSIRO (Appendix D6), showing concentration near or at saturation. The effective density/salinity layering of groundwaters (with a tailings leachate the least saline) coupled with high sulphate and barium in groundwater and low transmissivity in the top portion of the saturated sediments will also see the effective capture of radium downstream from the source material. As such, modelling of uranium (as opposed to less mobile uranium sulphates compounds in tailings) is likely to represent a worst-case scenario, consistent with the conservative approach followed throughout the risk assessment. The significant lateral drop in transmissivity outside of the paleovalley sedimentary fill coupled with general inflow into the channel will prevent lateral excursions of tailings leachate. Vimy will undertake static and kinetic leach testing on neutralised tailings derived from piloting work. The results of this testwork will be used to update the “source terms” used in the existing geochemical modelling, where required, to improve the modelling predictions. Furthermore, the results from this testwork will be included in the Mining Proposal and Mine Closure Plan to be submitted to the Department of Mines and Petroleum (DMP) for approval. These results will

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		further inform the environmental impact assessment for the Project and rehabilitation and closure planning of the post-mine landforms.
DoE	*D7 Characteristics of Tailings and D10 Solute Transport modelling for in-pit Tailings Storage.* Radium identified at high levels in groundwater and leach process waters. No analysis of radium in ore/tailings/plume analysis. Baseline levels of radium not presented in data. (Radium is highly mobile under acidic or highly saline conditions and may be enriched in tailings). Monitoring network for surface water, groundwater and tailings leakage not yet identified - unable to determine their adequacy. Will need to identify locations/receptors to be monitored (further note, groundwater contamination from in ground and above ground tailings plume is likely to remain within the paleochannel). Information Required – Provide baseline values of Radium in groundwater and ore. Identify the monitoring network for groundwater, surface water and the tailings storage facilities.	Vimy will install fit-for-purpose groundwater monitoring bores at various locations downstream of the tailings disposal areas so that any changes in groundwater quality, in response to seepage, will be detected. The monitoring and analysis program to be implemented will be developed with the DoW and DER and will be documented in an approved GOS or Works Approval for the tailings disposal facilities. As mentioned in a separate response, a number of groundwater samples were collected from the ore zone and underlying aquifers in early 2016 during the excavation of the geotechnical investigation trenches and are in the course of being analysed for radon and radium (Ra226) concentrations in groundwaters. Similar tests will be carried out on the leachate component of bulk ore samples submitted to ambient conditions (temperatures and rainfall) on-site in order to identify potential radon and Radium-226 concentrations in leachates from stockpiled ore. Similarly, radon flux, radon and Ra-226 concentrations will also be measured on bulk tailings to be generated as a result of a pilot plant using bulk ore samples collected at the base of the geotechnical investigation trenches. Various waste streams (both solid and liquid) generated in the course of generating a final uranium oxide concentrate at the pilot plant stage will also be subjected to analyses for radionuclides at ANSTO Minerals, similar to initial sighter tests carried out on smaller waste streams samples in 2010 and 2015. Those results will be incorporated in the hydrogeological model update, through updated source terms. Given that no permanent or ephemeral surface water occurs with the Project area, except following major (1:100-year 72-hour) cyclonic events, no monitoring program will be considered for surface water. Surface waters within the tailings disposal facilities will be monitored for quality as required in the Tailings

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		Operation Strategy (TOS) which will be developed in collaboration with and approved by the DMP and DER.
DoE	*D7 Physiochemical characteristics of Tailing from the MRUP (Pg. 16)* Inadequate coverage. Information Required – Calculations of potential for acid rock drainage (ARD) are based on sulphur contents in ore from the Ambassador and Princess resources. Sulphur content for Shogun and Emperor resources has not been determined, and the average from Ambassador and Princess are assumed to be representative of all ROM ore on the basis that they have similar uranium concentrations. While both uranium and sulphide will be associated with reduced sediments, uranium is not sulphide hosted in this deposit and uranium content may not be the best indicator of sulphur content. This potential for heterogeneous sulphur concentrations may also affect the performance of the processing plant. Provide geochemical data relevant to the characterisation of the Shogun and Emperor deposits to demonstrate that the sulphur content used in ARD assessment is representative of the whole resource.	The average Total S content at the Emperor Deposit (based on over 500 analysis results) was 1.36%, with a range from 0.12 to 6.42%. The Total S content at Shogun was similar (based on over 600 results) with an average of 1.34% and a range of 0.09 to 5.23%. These values are consistent with those from the Ambassador and Princess Deposits, used in the PER, and reflect the macro-scale homogeneity of the orebody. Whilst local-scale heterogeneity does exist, resulting in the reported Total S maximum values, the corresponding median values are generally lower than the mean, indicating the prevalence of Total S contents around 1-1.2%.
DoE	*D7 Physiochemical characteristics of Tailing from the MRUP (Pg. 16)* Inadequate coverage. Information equired – A sulphide content of 1.64% is used to assess potential ARD of ore material. However, there is a wide range of sulphur contents observed, and some high grade ore is	The Total S contents were determined on actual vertical metre drillhole samples (i.e. same as the geological resource assessment). In total over 2000 Total S readings have been made at a NATA accredited laboratory, providing considerable confidence in the values reported in the physiochemical characteristics. There is little loss of these sulphides through the processing plant and thus the tailings are expected to have similar sulphide contents as the orebody.

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	reported to be up to 13% sulphur. It is not clear how representative 1.64% is. A more robust discussion of the variability of sulphur within the MRUP ore should be provided. Given the variability of sulphur concentration in the ore the average content may not be the most appropriate method to use in estimating ARD potential. Provide details on how the average sulphur content of ore was determined and the justification for selecting this method. If this represents a calculated mean, it may be instructive to compare it to a median or 90th percentile as well. If the sulphur content of a homogenised ore sample was used, provide evidence that the sample was large enough to be representative of the whole resource given the variability of sulphur in the area.	As described above, the median values for Total S are generally lower than the corresponding mean, indicating that whilst high maximum values occur, these tend to be isolated with the vast majority of the orebody, and subsequently tailings, expected to have a Total S content around 1-1.2%.
DoE	D7 Physiochemical characteristics of Tailing from the MRUP (pg.17) Unclear conclusion. Information Required – In reporting on determinations of tailings liquor concentrations of metals, the Australian standards leaching process (ASLP) is said to provide an unrealistic worst-case scenario, as it attempts to minimise common ion effects by having a high solid:liquid ratio in leach tests. However, eliminating the common ion effect is only unrealistic if the solid phase will be exposed to a single pulse of water and given a long time to reach equilibrium. Reducing the common-ion effect during dissolution is appropriate if attempting to simulate dissolution of minerals into groundwater which flows through the solid phase, as flow will provide 'fresh' water to equilibrate with solid material over time. The submitter suggests the proponent clarify how the tailings are expected to interact with local groundwater flow once in the TSF.	Vimy agree that if groundwater flows occur through the tailings materials, then this will reduce the common-ion effect and the results of the ASLP testwork will likely be a realistic estimate of the potential mobility of metals in the tailings material. However, the tailings materials, given its texture (around 60% silt+clay) and organic carbon content (typically 20-40%) will store appreciable moisture, with a resulting field capacity in the range of 35%. The total porosity of this material will be around 50% and thus the specific yield or drainage porosity is only 15%. This low macro and meso-porosity results in the tailings predicted to have a saturated permeability in the range of <0.1 m/day (<10cm/day). The vast majority of the water stored within this material (i.e. within the micro, ultra-micro and crypto-pores) will effectively be stagnant with long residence times in the marix; hence the common ion is expected to be an important factor limiting the release of metals, metalloids and radionuclides from the solid-phase. The expected permeability of the fine texture tailings will be lower than the surrounding Eocene sediments, albeit, the upper organic-rich portion of the orebody is expected to have a low permeability in the range of 0.02 – 0.7 m/day. The in-pit tailings will therefore act like a ‘plug’ with groundwater flows expected

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	Is it assumed that there will be no flow of water through the TSF once it is in place? If not, it may be more appropriate to state that the ASLP provides a realistic estimate of the potential mobility of metals in the tailings material.	to go around and beneath the tailings. As the initial subaqueous tailings consolidate seepage from the tailings will be released into groundwater slowly overtime as the macro- and meso-pores drain.
DoE	D7 Physiochemical characteristics of Tailing from the MRUP (pg. 17) Information gap. Information Required – The results of ASLP tests to determine metal mobility from tailings and ore are based on equilibration with solution of only 16 - 20 hours. This is not likely to be a realistic representation of the contact time between tailings and groundwater postclosure. Provide data, such as time-series results for the leach tests, showing that the solution has come to equilibrium with solid phase, or provide other evidence to suggest that 20 hours is long enough to establish mobility of cations over 10's to 100's of years.	Vimy acknowledge the deficiencies in the ASLP test in providing realistic estimates of metal release, particularly for tailings materials and scenarios. To overcome these deficiencies, Vimy are currently undertaking both small-scale column leaching (in accordance with the AMIRA (2002) Guidelines) and large-scale column leaching (utilising 1m tall, 0.4m diameter columns) to more accurately assess the potential mobility of metals, metalloids and radionuclides over time from the tailings. These column leaching tests will run for approximately one year and will assess release of solutes from the solid phase overtime. The results of this kinetic testing will be used to update the “source terms” used in the existing geochemical modelling, where required, to improve the modelling predictions. Furthermore, the results from this kinetic testwork will be included in the Mining Proposal and Mine Closure Plan for approval by the DMP and the DER. These results will further inform the environmental impact assessment for the Project and rehabilitation and closure planning of the post-mine landforms.
DoE	*D7 Physiochemical characteristics of Tailing from the MRUP (pg. 28)* Possible typographical error. Information Required – Mg mobility % in ASLP results reported 200%. Is this correct?	Vimy acknowledge that the percentage results provided for Mg, for both leaches (i.e. MilliQ and Site Water) are incorrect and should have been expressed as 100% implying complete removal of the solid phase Mg. A similar typographical error existed for Ca. For both base cations the leached concentrations exceeded the measured solid phase content – obviously this cannot occur. The issue was due to the method of measurement of the solid phase of the cations, which only extracted the readily soluble portion of the solids using a 1:5 soil/water extract. The greater solid/liquid ratio used in the ASLP test removed more Ca and Mg than did the 1:5 extract, resulting in the reported results. This issue was only applicable to the base cations as all other solid phase metals and metalloids

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		were determine using an *aqua regia* digest, and thus they represent total metal content.
DoE	D7 Physiochemical characteristics of Tailing from the MRUP (pg. 30) Inadequate coverage. Information Required – Tailings permeability is reported as 10^{-8} m/s after drying, one order of magnitude higher than DoW (2013) clay liner permeability (10^{-9} m/s). This appears to be used as justification not to include a clay liner in the TSF, however, an order of magnitude may represent a significant difference with respect to potential leakage volumes. Provide evidence that the leakage volumes from the TSF are low enough that they are unlikely to impact the local groundwater system and that a clay liner is not necessary.	The above-ground TSF will be clay lined on the floor, in accordance with the DoW (2013) *Liners for containing pollutants, using engineered soils (Water Quality protection Note 27)*, and will have a HDPE liner, in accordance with the DoW (2013) *Liners for containing pollutants, using synthetic membranes (Water Quality Protection Note 26)*, on the embankment walls to prevent lateral seepage. This contrasts with the in-pit TSF which will be unlined as vertical seepage into the underlining groundwater system is considered the best environmental outcome, due to its existing degraded properties and non-beneficial use of this water. The discussion around unsaturated permeability was specifically addressing the potential for lateral movement of tailings liquor into the side walls of the in-pit TSF and subsequent potential impact on the surrounding oxidised sediments. Based on the texture (particle size distribution) and expected bulk density and water retention characteristics, the Hydraulic Conductivity Function (HCF; PER Appendix D7) for the tailings shows that the inherent permeability of the material will decrease rapidly as it begins to drain below saturation and will likely have an unsaturated permeability in the order of 10^{-8} m/s at field capacity. This permeability represents a flow of around 32 cm/yr, compared to only 3.2 cm/yr for a 10^{-9} m/s clay liner. The potential lateral movement of tailings liquor will be further diminished by the very low unsaturated permeability of the surrounding oxidised sediments (sands) at field capacity, which is expected to be in the order of 10^{-9} m/s, and thus this permeability will be rate limited on the lateral movement of tailings seepage into the surrounding oxidised environment.
DoE	*D7 Physiochemical characteristics of Tailing from the MRUP (pg. 36)* Information gap.	No laboratory testwork was conducted for the PER to quantify the absorptive capacity of the carbonaceous material, and this was identified as a knowledge gap. However, the Mulga Rock orebody was formed by the lignitic carbonaceous material acting as a sink for uranium and base metals leaching from the adjacent

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	Information Required – Organic material in the ore body is listed as a permeable reactive barrier (PRB) which will have an attenuating influence on metal mobility. Were any leach tests performed to establish to what extent it will bind cations? Additionally, has it been established that all leakage from the TSF will pass through the PRB? Provide evidence that the carbonaceous material observed will act as a trap for solutes passing through it, and report on the known extent of this material in the subsurface with relation to potential TSF seepage pathways. Provide evidence that seepage from the TSF will not travel through pathways that bypass the PRB.	granite-greenstone terranes of the Yilgarn Craton and Albany-Fraser Province. The role of the carbonaceous material in immobilising uranium and metals is well established as their distribution in the paleodrainage channel is well correlated to the organic material. Mining of the deposit will only remove a small portion of the total volume of carbonaceous material within the paleodrainage channel, and subsequently a significant quantity of organic material will be located downstream of the Mulga Rock Project. It therefore stands to reason that any solutes (uranium, metals or radionuclides) released from the project (eg from the in-pit TSFs) will subsequently be recaptured by the downstream carbonaceous material; hence acting as a Passive Reactive Barrier (PRB). To quantify the adsorptive capacity of the carbonaceous material, Vimy are currently undertaking column breakthrough studies to confirm its adsorptive capacity and to obtain realistic adsorptive coefficients for the various target species that will be, if required, used to improve the solute concentration predictions of the solute fate and transport models. The Narnoo Paleodrainage channel, in the vicinity of the Mulga Rock Project, shows a marked vertical density stratification with depth, such that density increases with increasing depth in the aquifer. The expected salinity of the tailings seepage will resemble the salinity of the upper aquifer, where the carbonaceous material is located, and thus it is considered that the tailings seepage will be preferentially forced through the PRB due to this density stratification (i.e. it is unlikely to displace any of the deeper more saline groundwater). Whilst the solute fate and transport model undertaken by Rockwater (2015; PER Appendix D10) did not fully model geochemical interactions, it did simulate three-dimensional, density-coupled groundwater-flow using MODFLOW and SEAWAT/MT3DMS modelling programs. The results from this modelling show that even if tailings seepage bypasses the surficial carbonaceous (PRB) material, and enters the more permeable basal sands of the aquifer, it is expected to take 1,200 years to reach the southern boundary of

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		the Mining Lease (M39/1080) and reach approximately 50km from the in-pit TSFs after 10,000 years. It is important to reiterate that there are no downstream receptors within 300km of the Project and no beneficial uses of the groundwater. Consequently, any impacts on the environment, through a change in groundwater quality as a result of the Project will be negligible and reversible.
DoE	*D7 Physiochemical characteristics of Tailing from the MRUP (pg. 36)* Information gap. Information Required – Microbial activity is listed as a factor that will neutralise released acidity and prevent further oxidation of sulphide, yet there is no evidence presented of biological activity in the project area. Provide evidence that microbial activity in the project site will limit the potential of sulphide oxidation, and comment on the time it may take for the biological system to recover after mining has ceased.	Vimy considers that whilst microbial activity, or biogenic processes, were important in the formation of the orebody, the explicit role of microbes in neutralising released acidity is limited. For the tailings material, it is the oxidation and decomposition (possibly by microbes) of the organics that limits the oxidation of sulphides as the decomposition process consumes oxygen and thus minimises the availability of oxygen to support the sulphide oxidation reaction. Furthermore, the high water holding capacity of the tailings (i.e. with a field capacity around 35%) will significantly limit oxygen diffusion into the tailings and thus once oxygen levels are diminished following organic matter decomposition, the replenishment from the atmosphere will be rate limited. It is therefore considered that the extent of sulphide oxidation and acidification in the tailings will be limited by the low oxygen levels and the Eh of the system remaining below 600mV required for the oxidation of Fe^{2+} to Fe^{3+}.
DoE	*D8 MRUP Tailings Storage Facility Seepage Analysis (pg. 19)* Inadequate coverage. Information Required – Seepage from TSF is calculated as -0.5% of aquifer volume per year. This is said to be insignificant regarding potential to affect water quality. This is somewhat misleading, as 0.5% of a local aquifer represents a very large volume of water. If seepage continues at this rate for 10 years, 5% of the aquifer volume will consist of tailings liquor, which may have a significant impact on groundwater quality.	The seepage estimate of 0.5% of the aquifer volume per year is only applicable for the above-ground TSF, whereby a clay liner, constructed in accordance with the DoW (2013) *Liners for containing pollutants, using engineered soils (Water Quality Protection Note 27)*, will restrict seepage to around 3.2 cm/y (i.e. equivalent to its saturated permeability of 10^{-9} m/s). This volume of seepage will then be reduced as it moves through the thick (40-45m) oxidised sediment profile, which has a significant storage capacity. It is therefore considered that the volume of tailings seepage from the above ground TSF recharging the underlining regional paleodrainage channel aquifer is negligible and will unlikely impact on the quality of the groundwater.

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	Additionally, it is unclear if this value represents the cumulative effect of the three TSF, or the volume leaking only from the above ground TSF. Clarify whether the seepage volume represents all three TSF or only the above ground facility, and state the timeframe over which seepage is expected to occur. Provide information relating to whether there will there be a barrier to recharge at the top of the TSF to prevent flushing of meteoric water through the system.	The expected seepage volume from the above-ground TSF will be significantly less than the seepage volume from the in-pit TSFs which are in hydraulic connection with the groundwater system. Given the degraded quality of the paleodrainage channel aquifer (eg hypersaline, moderately to highly acidic, sulphate-rich and reducing), it is considered that the direct discharge of tailings seepage from the in-pit TSFs into the aquifer represents the best environmental outcome, as the composition of the seepage water resembles the groundwater quality and there are no downstream receptors to be impacted. The solute fate and transport model undertaken by Rockwater (2015; PER Appendix D10) using a three-dimensional, density-coupled groundwater-flow model (i.e. MODFLOW and SEAWAT/MT3DMS) showed that under a worst-case scenario, solutes from the in-pit tailings will take 1,200 years to reach the southern boundary of the Mining Lease (M39/1080) and reach only 50km from the in-pit TSFs after 10,000 years. Over these distances solute concentrations only slightly exceed background levels and all are below the DoH (2006) non-potable groundwater use criteria; hence the impacts on the groundwater environment are expected to be negligible and reversible. For the TSFs, including both the above and in-pit TSFs, no barrier will be used to prevent recharge at the top of the TSF and to prevent flushing of meteoric water through the system. Tailings deposition will occur subaqueously to prevent the generation of potentially radioactive dust from the tailings surface. This volume of water will far exceed the likely volume of rainfall landing on the surface of the TSFs and thus any meteoric water will simply be incorporated into this water cover and take on the properties of the process water. Negligible dilution of the water cover is expected from rainfall.
DoE	*D8 MRUP Tailings Storage Facility Seepage Analysis (pg. 23)* Information gap. Information Required – In seepage modelling, lateral seepage from the TSF is reported to occur preferentially along sand lenses in the Eocene and Miocene sediments. Have the distribution and	Vimy acknowledge the lateral movement of tailings seepage from the in-pit TSFs will preferentially access and flow along any sand lenses in the oxidised sediments. The unsaturated zone hydrological (using HYDRUS 2D/3D) modelling shows that the lateral extent of this seepage is likely to be a function

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	extent of these sand lenses been clearly defined? Could this be a pathway for tailings liquor to seep into the biologically active zone? Outline the data used to establish the presence and extent of sand lenses in the overburden, and comment on the potential of these to allow water from the TSF to enter the biologically active zone.	of depth, and subsequent pressure head, resulting in a greater volume of seepage being 'forced' into the sand lenses at depth. The extent to which lateral movement of seepage water is expected to occur in sand lenses in the Miocene sediments, which represents the biologically active zone (BAZ), is likely to be constrained by: • The pressure head in the tailings will be minimised in the near surface layers and thus the driving force is reduced, compared to deeper in the TSF, and • *In situ* moisture contents within the BAZ are expected to be at or close to permanent wilting point (PWP; 1,500kPa matric suction). In this 'dry' state the permeability of this material, particularly the sands, will be very low and accordingly to the Hydraulic Conductivity Function (HCF) graph presented in the tailings seepage report (PER Appendix D8), the permeability of these materials will be 10^{-11} m/s, which is two order of magnitudes lower than the DoW (2013) Clay Liner Guidelines (*Liners for containing pollutants, using engineered soils (Water Quality protection Note 27)*. Consequently, even though the presence and extent of sand lenses in the Miocene sediments are unknown, they are not likely to significantly increase the risk of lateral seepage flows interacting with the surrounding native vegetation, and thus any lateral seepage in the BAZ will be tightly constrained to around the in-pit TSF. Given the native vegetation does not access the deeper oxidised Eocene sediments, any lateral seepage from the in-pit TSFs will not impact on the native vegetation.
DoE	*D10 Results of Solute Transport Modelling for in-pit Tailings Storage (Pg. 5)* Information gap. Information Required – Elements included in transport modelling are U, Copper (Cu), Co, Zn. Stated in tailings characterisation report that Lead (Pb) and Ni are above level of class 3 waste for	Vimy acknowledge that the exclusion of Ni and Pb was an oversight, and based on their elevated solid-phase content and mobility, they should have been included in the Rockwater (2015; PER Appendix D10) solute fate and transport model. Although this was the case, both Ni and Pb are cationic-hydrolysis metals, similar to Co, Cu and Zn, and thus their behaviour in the aquifer system is expected to be similar to the other modelled parameters.

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	landfill. It is unclear why these are not included in transport modelling. Provide reasons for the exclusion of Pb and Ni from transport modelling despite the high concentrations of these observed in the results of leach experiments.	Furthermore, the original PHREEQC modelling did include both Ni and Pb, and showed that geochemical attenuation would likely occur such that elevated groundwater concentrations were expected in close proximity to the in-pit TSF (i.e. < 100m from the pit edge) and that beyond this, distance concentrations did not exceed background levels after 10,000 years. It is therefore considered that the aqueous behaviour of Ni and Pb are understood and the risks of environmental impact are low.
DoE	*D10 Results of Solute Transport Modelling for in-pit Tailings Storage (pg. 5)* Inconsistency. Information Required – The proponent states that TSF lining will prevent any seepage from the above ground TSF, yet the TSF seepage modelling report (App D8) predicts significant leakage volumes entering the water table. Clarify whether a clay lining will be included in the TSF or not (both above and below ground), and comment on the amount of leakage expected from each of these. Has the design of the TSF been revised during the preparation of the PER?	Vimy confirms that the above-ground TSF will have a clay liner on the floor, in accordance with the DoW (2013) *Liners for containing pollutants, using engineered soils (Water Quality protection Note 27)*, and will have a HDPE liner, in accordance with the DoW (2013) *Liners for containing pollutants, using synthetic membranes (Water Quality Protection Note 26)*, on the embankment walls to prevent lateral seepage. The reported seepage referred to in Appendix D8 equates to the saturated permeability of the clay liner, which is 1.0×10^{-9} m/s or 3.2 cm/year. The in-pit TSF will not be lined and it is considered that the best environmental outcome for these TSFs is for the seepage to drain into the underlying paleodrainage channel aquifer, as the composition of the tailings seepage will resemble those of the native groundwater. The design of the TSF has not changed during the preparation of the PER.
DoE	*D10 Results of Solute Transport Modelling for in-pit Tailings Storage (pg. 16)* Inconsistency. Information Required – The proponent indicates that the transport model indicates only 15% water remaining in tailings, and that seepage will continue for 300 years. Seepage modelling report	Vimy apologises for the discrepancies in water retention data used in multiple reports. The tailings material has a total porosity around 50% and a field capacity of around 35%, leaving a specific yield or drainable porosity of 15%. Based on this data, the tailings will initially drain relatively rapidly to achieve field capacity which is expected within 20 years after tailings deposition ceases. At field capacity the tailings will still hold a significant quantity of water and it is expected that gradient driven capillary seepage will occur for an extended time after the cessation of operations (i.e. for 300 years).

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	states that field capacity is closer to 50% and seepage will cease within 20 years. Clarify the expected field capacity of tailings, and the timescales associated with seepage from both above and below ground TSF.	
DoE	*General Comment, Sections 10 and 11* It is assumed that natural processes such as sequestration will prevent the transport of contaminants into and through the environment. Information Required – Given the very long lifetime of the wastes, these assumptions will need to be tested, both by means of monitoring programs and modelling.	It is important to reiterate that the Mulga Rock Project, and particularly the system to be mined and rehabilitated, occurs in an environment that has undergone appreciable oxidation of sulphides and leaching and mobilisation of uranium, metals and radionuclides since the Eocene (56-33.6 million years ago). The lacustrine conditions formed within the Narnoo paleodrainage channel resulted in a significant accumulation of organic and carbonaceous material which acted like a sink for uranium, metals and radionuclides leaching from the adjacent granite-greenstone terranes of the eastern Yilgarn Craton and Albany-Fraser Province. Uplift of this region throughout the remainder of the Paleogene and Neogene Periods resulted in the oxidation of pedogenic sulphides and the subsequent release, mobilisation and accumulation at the declining redox boundary (i.e. a typical acid sulphate soils process). The proposed Mulga Rock Project will simply replicate the above natural oxidation and leaching process, with the tailings expected to contain the oxidation by-products, similar to that generated by natural processes in the area. Given that the Mulga Rock Project will only remove a small portion of the total Eocene carbonaceous material, significant volumes of this material exist downstream of the deposit, which have the same adsorptive capacity that formed the original deposit that is planned to be mined. To quantify the potential seepage of reaction products from the tailings, and to determine the zone of influence of the Project, Vimy will install fit-for-purpose groundwater monitoring bores at various locations downstream of the tailings disposal areas so that any changes in groundwater quality, in response to seepage, will be detected. The monitoring and analysis program to be implemented will be developed with the DoW and DER and will be documented in an approved GOS or Works Approval for the tailings disposal facilities.

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DoE	*Section 1.8.3, paragraph on Benefication* Concentration via beneficiation reduces the volume of tailings but may not reduce the total activity in the tailings. Information Required – Since it is the activity concentration that is important in determining dose, and the effect of beneficiation may be to increase the activity concentration, this problem needs to be discussed further.	Vimy acknowledges that the total activity of tailings will not change as a result of the beneficiation process, as a smaller volume of material will have a higher activity. There is therefore no impact on the modelling results. With regards to the higher activity of the tailings, the impact on dose from radon and gamma shine is irrelevant as the tailings deposition will be subaqueous, depressing any radon flux by greater than 95% (see Section 15.9 of the PER). Once settled and dried, the corresponding activity (and potential dose) increase will only occur for a short period of time, until the tailings are trafficable and are covered with a suitable thickness of a capillary break and growth material to limit any further radon emanation. Given the conservative assumptions made in the PER regarding the radon emanation rates from tailings, actual radon flux is expected to match the rates specified in the modelling report for only a short period of time when the dried tailings surface is exposed; hence the levels assessed in the PER are unlikely to be exceeded. Once actual long-term radon emanation fluxes are determined from bulk tailings (currently being generated), those revised figures will be used in an updated air quality and radon modelling report.
DoE	*Section 11.2, Paragraph 1* The PER states, when referring to large cyclonic storm events, "Such events have only been recorded in 1976, 1995, and 2011". The radiological consequences of these events on the operation have not been considered. A case could be made for such important events occurring approximately every 15-20 years. Information Required – The probability that such an event will occur during the life of the mine needs to be established, and the radiological consequences assessed.	Vimy acknowledge that the region has experienced three 1:100-year 72-hour storm events associated with Cyclone Trixie (1975), Cyclone Bobby (1995) and Cyclone Carlos (2011), in the last 41 years. These three events, with rainfalls around 170mm in 72 hours, resulted in the only times that the regional surface drainage system has been reactivated, with no surface water existing in all other years. Given these events are 1:100-year storms their Annual Exceedance Probability (AEP) is 1%; hence there is a 1% chance that a rainfall event will exceed this rainfall amount in any given year. During operations cyclonic storm events are likely to have the greatest potential impact on any above-ground landforms, which includes the overburden stockpiles and the above-ground TSF. Below-ground operations, including in-pit

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		TSF and the mine-pit, are less likely to be impacted, resulting in radiological releases to the environment, as excess rainfall and any release is captured in the void. To protect the above-ground TSF from such cyclonic events, a freeboard of 1m will be maintained throughout the operation of this TSF. This ensures that there is adequate storage capacity to retain all rainfall landing on the active tailings surface without overtopping the embankment walls. The side walls of the above-ground TSF will be constructed in accordance with the DMP (1999) *Guidelines on the Safe Design and Operating Standards for Tailings Storage* and ANCOLD (2012) *Guidelines on Tailings Dams* to ensure they can withstand such events. In addition, the side walls of the above-ground TSF will be lined with a HDPE liner, in accordance with the DoW (2013) *Liners for containing pollutants, using synthetic membranes (Water Quality Protection Note 26)*, to prevent the release of tailings into the surrounding. These planning, design, construction, operation and closure guidelines are considered sufficient, and best practice, to protect the environment and limit any radiological consequences. The overburden stockpiles will contain only oxidised overburden and thus they are geochemically and radiologically benign. It is therefore considered that the potential radiological consequences from cyclonic events on this material is minor with a low likelihood.
DoE	*11.3.2.2 (pg. 238)* Term definition. Information Required – Mention of Kakarook - Kakarook North Aquifers - unclear if two water sources have been identified. Clarify if there is more than one aquifer or water resource near the extraction borefield.	There are two aquifers (Kakarook and Kakarook North) that appear to be separate, but given similarities in their water quality may be being supplied from the same area/source. They are conceptually illustrated in Figure 4 of Appendix D1.
DoE	*11.3.3 Identified Environmental Values (Pg. 241)*	The term GDE in the PER refers to Groundwater Dependent Ecosystems – where groundwater essentially means subsurface water located in the zone of saturation in pores, fractures in rocks and cavities; and dependent ecosystems

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	Term definition. Information Required – States that a lack of stygofauna encountered reinforces the assessment that the aquifer is not conducive to GDEs. Clarify definition of GDE use in PER. Note, GDE can refer to above-ground ecosystems (such as groundwater dependent vegetation).	means any ecosystem (including ecological processes) which are dependent upon that supply of water. Vimy acknowledges that GDE can refer to above ground ecosystems where those systems depend upon the subsurface water to supply some or all of their water requirements. Stygofauna have been known to exist in hypersaline conditions, but not at levels above 50,000mg/L TDS. The absence of stygofauna merely helps to corroborate the view that this body of water is too saline for any other GDEs.
DoE	*11.3.3 Identified Environmental Values (Pg. 241)* Term definition. Information Required – It is unclear whether reference to the habitat interpreted beyond the boundaries of the extraction borefield are applicable to all stygofauna and nematodes, or just the nematode. Clarify extent of total stygofauna habitat.	As was explained in Appendix C2 of the PER: • Nematodes were collected from one site at Kakarook North. The same Nematodes were also collected during troglofauna sampling at Ambassador and Emperor. This demonstrates that this species has a habitat that is spread over very large distances. However, this Nematode is not regarded as stygofauna and therefore will not be affected by any dewatering at Kakarook North. • In relation to the stygofauna (two species of Oligochaeta) found at Kakarook North, these were found at only two of the twelve sites sampled. Each of those sites is more than 1km from where it is proposed that the bores making up the borefield are expected to be located. o Enchytraeus sp.1 (PSS) is a species complex that has been recorded in other parts of Western Australia including the Pilbara, Kimberly and Northern Goldfields regions. Therefore, it is clear that the habitat for this particular species extends well beyond the boundaries of the proposed borefield. o Tubificidae sp. MR1 is a potentially new species and has only been recorded from the Kakarook North area. However similar species/complexes of Tubificidae have been recorded in the Pilbara and Kimberly and where they have been recorded they have distribution ranges at least ten times the size of the Kakarook North investigation area. There is therefore no reason to believe that this Tubificidae is not

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		widespread throughout the extent of this aquifer including outside the area affected by the borefield.
DoE	*11.4 Water Balance (pg. 246)* Internal inconsistency. Information Required – Unclear what 'quality of this water... will essentially be the same.' means. Inconsistent use of "same" and "better quality" and "essentially the same" are confusing. Clarify if this means of the same or of better quality in relation to reinjection borefield water quality and identify parameters used to make this assessment.	This is a sentence in a section discussing water balance and it reads as follows - "The quality of this water will depend upon the area being mined and will essentially be the same as the mine dewatering water..". The sentence is merely explaining that the quality of mine dewatering water varies by mining area and that the quality of surplus water being reinjected will be the same as the quality of the water being extracted as part of the mine dewatering process. The term 'essentially' was added because there may be a difference between the average quality of mine dewatering associated with a mining area (such as Ambassador and Emperor) and the quality of the water taken from that area in a particular year. There may be small annual variations but essentially the quality will be the same. None of this alters the fact that mine dewatering water that is reinjected into what is the same aquifer downstream (and which has the characteristic that the quality in terms of salinity and acidity appears to deteriorate as it moves south; noting that the reinjection borefield is located to the south of the mining areas) will be no worse in quality that the receiving environment into which it is being reinjected.
DoE	*Water Balance (pg. 246)* Water balance. Information Required – 2.6 GL/a is calculated as going to the TSF as reject process water (from extraction and dewatering). Given dewatering bores nearby, there is a potential for reject process water to enter dewatering bores before attenuation has occurred. This could lead to a closed system which may have implications for the current system flow and attenuation predictions.	There are three potential TSF areas – an above ground facility that may be used for the first 18 months and a couple of area (Princess and east-end of Ambassador East) where tailings will be disposed of into previously mined area. The above-ground facility, if utilised, will be fully lined and any seepage will not reach dewatering areas before mining in those area would have ceased. Similarly, although the tailings being deposited into the mined out Princess pit will drain into the underlying aquifer the slow rate of drainage and the low transmissivity of the top layer of the aquifer into which it drains mean that by the time it has migrated from Princess to the Ambassador East deposit, mining in that area would have ceased and moved to Ambassador West. Moreover, attenuation studies suggested that attenuation of metals would mostly occur

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		within a very limited distance from the tailings facilities, far less than the distance from Princess to Ambassador. Finally, it should be noted that water quality will be monitored and in the unlikely event that processing water that had been deposited in tailings were to make its way back sufficiently to be captured by dewatering bores, this would quickly be picked up by the monitoring and appropriate remedies undertaken.
DoE	*Site Water Balance Diagram (figure 11.6 at pg. 247 and 248)* Information gap. Information Required – Define how seepage rate and evaporation rate of tailings water accounts for being in-pit (lower evaporation rate) and overlaying low transmissivity tailings (low seepage). Examine contingency for overflow or increase in volumes of process water that exceed capacity of in-pit TSF.	Vimy acknowledge that evaporation rates and seepage rates within in-pit TSFs are appreciably lower than would be experienced in above-ground TSFs due to their lower surface area to volume ratio. As a result, the solid/liquid ratio of the tailings must be carefully managed to avoid higher than predicted fill rates, which diminishes the storage capacity of the TSFs. This is particularly important given subaqueous deposition will be utilised, to prevent dusting of an exposed dried tailings surface, as less than optimal solid densities will result in an excessive build-up of the water cover. The nature of the in-pit TSF at the Princess Deposit (which actually consists of three separate pits) will enable tailings deposition to be rotated between multiple pits and thus if excessive filling is identified then it will be possible to cease deposition in that pit and focus on the other pits. In addition, the Ambassador in-pit TSF can also be used for overflow if excessive filling in Princess is identified, and as a last resort the above-ground TSF could be used as a contingency. Based on the understanding that the tailings deposition process for the in-pit TSFs must be operated within a defined parameter range, given its rate-limiting processes, and the availability of several in-pit TSFs that can be utilised at any point in time, it is considered that there is sufficient contingency to protect against excessive filling of the TSF and to prevent the capacity of the in-pit TSFs being exceeded.
DoE	*Section 11.5, Paragraph 2*	As specified in Table 11.1 of the PER the background U and Th contents within the paleodrainage channel varies from less than detection (0.005 mg/L) to 0.068 mg/L (average 0.021 mg/L) for U, and less than detection (0.005 mg/L) to 10

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	The detection limit is provided without stating the background concentration. This is misleading. If the detection limit is greater than the background level, the measurements are less useful. Information Required – The average background concentrations of Uranium and Thorium in groundwater and surface water need to be presented, to establish whether or not the measurements are useful.	mg/L (average 1.574 mg/L), for Th. Analysis of groundwater was undertaken by ICPMS at a NATA Accredited Laboratory. The presented data is therefore considered meaningful and accurate. Given the paucity of surface water within the Project area (i.e. there is typically no permanent or ephemeral surface water features, with surface water only occur following 1:100yr 72hr cyclonic events), no surface water monitoring will be undertaken.
DoE	*Section 11.6* The characterisation of the wastes and tailings presented in this Section is reasonable, but the impact is qualitative rather than quantitative, largely based on events "likely to occur". Information Required – The impact needs to be better quantified, or the applicant needs to have a plan to deal with the possibility that the assumptions on which the current assessment is based turn out to be false.	The overburden materials to be mined and stockpiled are geochemically and radiologically benign given their oxidised and highly weathered nature. Consequently, no AMD or radiological impacts are expected to occur. The physical stability of these materials, in response to both wind and water erosion, was identified as a knowledge gap, and Vimy are currently undertaking both laboratory and field-scale trials to quantify actual wind and water erosion rates. This information will be used to inform the landform designs to ensure that the overburden stockpiles are safe, stable, non-polluting and sustainable (i.e. they meet all of the tenets of closure). The impact of the tailings materials on the surrounding environment have been assessed by modelling, with the predictions showing that no long-term, irreversible environmental impact will occur. This is primarily due to the tailings seepage having a composition similar to the groundwater within the paleodrainage channel, and no environmental receptors occur downstream. In addition, there are no beneficial uses of this groundwater. Several gaps were identified in knowledge leading to uncertainties in model estimates. These gaps are currently being addressed by laboratory and field-scale kinetic testwork and column breakthrough experimentation. The results of this testwork will be used to update the “source terms” used in the existing geochemical modelling, where required, to improve the modelling predictions. Furthermore, these results will be included in the Mining Proposal and Mine Closure Plan for approval by the DMP and the DER. These results will

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		further inform the environmental impact assessment for the Project and rehabilitation and closure planning of the post-mine landforms.
DoE	*Sections 11.7.2 and 11.7.3* The ion exchange processes discussed here are two-way (adsorption and desorption), and will lead to a local steadystate situation (equilibrium). However, each local region will not have infinite capacity to immobilise the contaminants, and there will always be a concentration gradient present. Therefore, the contaminants will continue to move through the medium. Information Required – The break-through times for the different soil and/or rock layers need to be examined, and the consequences discussed.	Vimy acknowledge that spatial and temporal heterogeneity in immobilisation processes will influence the fate and transport of solutes in the groundwater system. Vimy are currently undertaking large column (1m high, 0.4m diameter) breakthrough studies to improve the understanding of adsorption processes and to obtain site and material specific adsorption coefficients for a variety of target species. The results from this work will be used to update the solute fate and transport models in collaboration with the DER. It is important to reiterate that the solute fate and transport modelling undertaken by Rockwater (2015; PER Appendix D10) did not consider geochemical processes and simply relied on density-coupled flow and hydrodynamic dispersion. The results from this modelling showed that any seepage from the tailings will take 1,200 years to reach the Project Boundary and will only travel 50km after 10,000 years. At all times the concentration of the groundwater does not exceed background levels significantly and at no time were the Department of Health (2006) non-potable groundwater use criteria exceeded.
DoE	*Section 11.8, Page 258* The PER states "The modelling can be repeated when there is a more quantitative understanding of the hydraulic characteristics of the actual tailings". This is acceptable in principle, but is not convincing in demonstrating compliance to relevant legislations. Information Required – The proponent needs to demonstrate that there is a reasonable likelihood that the proposed operations will comply with current legislative and regulatory requirements at all stages of the project, including the post-closure stage. This requires more than conceptual understanding.	Vimy acknowledge that at the time the PER was submitted sufficient quantities of tailings material were not available to quantify its hydraulic characteristics. Although this is the case, realistic properties were derived based on its texture (particle size distribution) and water retention properties using the USDA Rosetta Model. Hydraulic testwork is currently underway on representative tailings material obtained by piloting and this data will be used to update the relevant model, including the seepage analysis and solute fate and transport. Furthermore, the results will be included in the Mining Proposal and Mine Closure Plan for approval by the DMP and the DER. These results will further inform the environmental impact assessment for the Project and rehabilitation and closure planning of the post-mine landforms.

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DoE	*11.9 Best Practice Containment (pg. 264)* Term definition. Information Required – "Estimated that after 2.5 years (appendix D8) 40m of tailings would have completely drained.' Clarify if this is in relation to the above-ground or in-pit TSF.	This is in relation to the in-pit TSF. The above-ground TSF, if utilised, will consist of a 'single-lift (maximum height 10m) TSF' (see s.15.2) which could never hold 40m of tailings.
DoE	*11.9 Best Practice Containment (pg. 264)* Conceptual design. Information Required – The proponent claims that the above ground TSF will drain to field capacity. Without a suitable sealing capping, rainfall can drain through TSF, further mobilising (pushing) seepage, while maintaining field capacity which would necessitate water pushing through and promoting further seepage. Clarify how the design of the above ground TSF would prevent further infiltration or drainage post-closure. The proponent states the TSF will be capped to prevent Radon emanation, it is unclear if this also relates to infiltration.	The above-ground TSF will be clay lined in accordance with the DoW (2013) *Liners for containing pollutants, using engineered soils (Water Quality protection Note 27)*. This guideline requires the constructed clay liner to have a saturated permeability of 10^{-9}m/s, and thus once saturated by seepage will have a permeability of 3.2 cm/yr, which will continue until all of the tailings has reached field capacity. Above the clay liner there will be an underdrainage system that will remove the excess (free) seepage water and further prevent seepage into and through the clay liner. Once tailings deposition has ceased, and the tailings drained sufficiently to support heavy machinery, it will first be covered by at least 1m of a capillary break to prevent the upward migration of tailings liquor and salts, and then with a 1-2m thick store-release cover that will sustainably support the revegetation. The species selected and the thickness of the store-release cover will minimise any infiltration and drainage into the tailings material. Once the cover is across the above-ground TSF and the excess tailings liquor has been removed by the underdrainage system, then the potential for continued long-term seepage through the clay liner and into the underlying vadose profile will be negligible and only driven by capillary gradients.
DoE	*Section 11.11* The PER states "The following Management Plans have been or will be developed." There are a number of plans that still need to be developed.	Vimy will ensure that any Management Plans that are required as part of any licence application will be developed prior to application and that they will be flexible enough to allow changes to be made as new information becomes available and experience is gained.

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	Information Required – These plans will need to be part of any licence application. They should be flexible enough to allow changes to be made as new information becomes available and experience is gained.	
DoE	*Section 9.5* Analysis of expected radionuclides distribution in both extracted ground waters and process effluent and flow path modelling of any water discharged both from reinjection and tails deposition. Information Required – Although uranium data are discussed in section 9.5 and Appendices D1 and D2, there is no data provided on radium-226 or other radionuclide activity concentrations in extracted ground waters. Inadequate. Section 11.5 still suggests little additional work has been undertaken on radium-226 in ground water or waste streams. Original comments do not appear to be addressed adequately. There appears to be a focus on best practice containment as opposed to characterisation and monitoring.	Vimy acknowledge that the availability of radium-226 data in groundwater was limited at the time the PER submitted. This was identified as a gap. To fill this knowledge gap, a number of groundwater samples were collected from the ore zone and underlying aquifers in early 2016 (post PER submission) during the excavation of the geotechnical investigation trenches, with these water samples currently being analysed for radon and radium (Ra^{226}) concentrations. Similar tests will be carried out on the leachate component of bulk ore samples submitted at ambient conditions (temperatures and rainfall) on-site in order to identify potential radon and Radium-226 concentrations in leachates from stockpiled ore. Similarly, radon flux, radon and Ra^{-226} concentrations will also be measured on bulk tailings to be generated as a result of a pilot plant using bulk ore samples collected at the base of the geotechnical investigation trenches. Various waste streams (both solid and liquid) generated in the course of generating a final uranium oxide concentrate at the pilot plant stage will also be subjected to analyses for radionuclides at ANSTO Minerals, similar to initial sighter tests carried out on smaller waste streams samples in 2010 and 2015. These results will be incorporated into the solute fate and transport model update once at hand, through updated source terms. Furthermore, these results will be included in the Mining Proposal and Mine Closure Plan for approval by the DMP, DER and Radiological Council. These results will further inform the environmental impact assessment for the Project and rehabilitation and closure planning of the post-mine landforms.

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DoE	*Section 9.7* Describe the long term containment of waste material and process water, designed to be consistent with best practice. Demonstrate A and B below through multiple lines of evidence: A. The effectiveness of the containment. B. That any release of waste material and process water to the environment does not lead to above background levels of radionuclides and other contaminants; or undertake suitable modelling of the long term movement (10,000 years) of waste material and process water or until background levels are reached. Information Required – Uranium is modelled but there are no results provided for radium-226, or other radionuclides in Section 9.7 or in Appendix D8. It appears only Uranium and Thorium are dealt with. Inadequate. Section 11.5 still suggests little additional work has been undertaken on radium-226 in waste streams. There appears to be a focus on best practice containment as opposed to characterisation and monitoring. Under Appendix H3 section 5, the proponent has committed to 'Further test work on radionuclide concentration and deportment into various process and waste stream will be carried out by the proponent prior to finalisation of the detailed design phase of the project.'	Due to similar chemical characteristics and in particular their crystal and hydrated ionic radii as well as electronegativity, Ra-226 is known to substitute with barium the most of all alkaline earths (IAEA, 2014). Precipitation of radiobarite (Ba, Ra) SO_4 has been shown to be an important process in controlling the solubility in a range of natural waters, significantly decreasing its mobility. In the presence of moderate to elevated amounts of sulphates (such is the case at Mulga Rock), barium concentrations in groundwaters will be controlled by the precipitation of barite, as typical Ba concentrations are generally near saturation levels. This has been confirmed by modelling of the solubility index of barite at Mulga Rock by the CSIRO (Appendix D6), showing concentration near or at saturation. The effective density/salinity layering of groundwaters (with a tailings leachate the least saline) coupled with high sulphate and barium in groundwater and low transmissivity in the top portion of the saturated sediments will also see the effective capture of radium downstream from the source material. As such, modelling of uranium (as opposed to less mobile uranium sulphates compounds in tailings) is likely to represent a worst-case scenario, consistent with the conservative approach followed throughout the risk assessment. The significant lateral drop in transmissivity outside of the paleovalley sedimentary fill coupled with general inflow into the channel will prevent lateral excursions of tailings leachate. Please see previous response for a discussion of further work on waste streams.
DoE	Discussion of residual impacts, including as appropriate monitoring programmes to measure residual impacts, and management programmes to further mitigate these residual impacts and to deal with circumstances where outcomes fall short of intended objectives.	Please see previous response for a discussion of further work on waste streams.

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	Information Required – Section 11.5 still suggests little additional work has been undertaken on radium-226 in waste streams. There appears to be a focus on best practice containment as opposed to characterisation and monitoring. Under Appendix H3 section 5, the proponent has committed to 'Further test work on radionuclide concentration and deportment into various process and waste stream will be carried out by the proponent prior to finalisation of the detailed design phase of the project.'	
Conservation Council WA	*Tailings Management* One of the EPAs objectives is to maintain the quality of groundwater and surface water, sediment and biota so that the environmental values, both ecological and social, are protected. *"The initial above-ground tailings storage facility will be lined and any seepage will move vertically downwards into the local aquifer."*- PER Pg. xi *"By the time tailings seepage or drainage reaches the mining lease boundary the composition of the plume of contaminants will be indistinguishable from natural variation within the existing ground water."* PER Pg. 388. In Appendix D2 it is stated that *"Tailings seepage is 28.6 kL/hr (686 kL/d)."* This volume of seepage seems quite high, it is not clear how that volume of tailings seepage will be retained or how quickly it will move and into which receiving environment. The statement: *'Tailings seepage will likely have a lower salinity than the receiving groundwater environment and therefore density stratification will ensure that any tailings seepage plume is forced through the carbonaceous PRB, likely removing the excessive solutes and equilibrating the tailings water to that of the*	Vimy's objective is to also maintain the quality of groundwater and surface water, sediment and biota so that the environmental values, both ecological and social are protected, and that the Mulga Rock Project will not impact on these environmental values. The predicted tailings seepage rate of 28.6 kL/hr or 686 kL/d is correct and Vimy are relying on tailings seepage directly into the groundwater system to consolidate the tailings and remove excess tailings liquor. The in-pit TSFs will be unlined so as to facilitate seepage into the groundwater system. Although this is contrary to the usual "isolate and contain" approach to tailings, it is considered the best environmental outcome given the degraded nature of the paleodrainage aquifer and the occurrence of extensive carbonaceous material downstream of the pits, which will remove the majority of solutes (uranium, metals and radionuclides) from the water column. This sequestration process mirrors the biogeochemical mechanisms that formed the deposit, and thus groundwater quality is not expected to exceed background concentrations at the project boundary. Surface water is extremely scarce within the Project area and no permanent or ephemeral surface water features exist. The only time that surface water accumulation occurs within defined topographic depressions is after large 1:100-year 72-hour cyclonic events. Surface water will therefore not impact on the Project and the Project will have no impact on surface water in the region.

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	surrounding groundwater' (pg. 9) is highly problematic. The density contrast between groundwater of different salinity does not provide sufficient driving force to 'push' groundwater into particular aquifers/lithologies as they are proposing. When two fluids of different density meet, they mix and tend to form complex patterns of fingering. The different density fluids may eventually stratify under conditions of minimal flow/disturbance over long time-scales, but this is unlikely to be able to constrain the downwards migration of a plume of contaminated water, and it certainly can't 'force through' water into a particular lithology. The 'PRB' they refer to is not an engineered barrier, as implied, but simply the carbonaceous sediments in the aquifer, which are probably highly heterogeneous, not like an engineered barrier at all. If the proponent's assessment that there is only a 'small' risk of impact from tailings seepage is based on this statement, the submitter would urge for the project to be rejected on the grounds that the safety of tailings is based on unproven assumptions. The risk of tailings leakage is significant, not just because of the radionuclide content but because of the fact that Cobalt (Co), Cu, Nickel (Ni), Manganese (Mn), Zinc (Zn) and Pb are mobile and leachable from the tailings (pg. 9). All of these metals are significant toxicants and pose a significant risk to the environment and public health. Unsaturated flow models are notoriously hard to calibrate and run, so predictions based on their seepage model (HYDRUS 2D and 3D) should be reviewed carefully. They have admitted that they don't have any hydraulic parameters for the tailings and some of the overburden material - this raises concerns about the unsaturated flow and seepage models.	Vimy agree that density stratification cannot “force” water through material or a particular lithology, and that under typical groundwater conditions mixing occurs. Direct measurements of salinity (TDS) vertically through the aquifer have clearly shown that strong density stratification exists and this is likely due to the very low flow rates occurring in the system, driven by a hydraulic gradient of <0.001, which results in groundwater travelling <3km in 1,000 years (Rockwater, 2015; PER Appendix D2). The lower salinity tailings seepage would therefore remain in the upper portion of the aquifer and would then preferentially flow through the surficial carbonaceous layer, resulting in the removal of excess solutes. The term ‘PRB’ for Passive Reactive Barrier, was never meant to infer a constructed or engineered system, it was used, as is similarly the case in wetland systems, to imply a highly carbonaceous layer that has a high adsorptive capacity to remove solutes from the water column. Irrespective of whether the carbonaceous or PRB is highly heterogeneous, conservative solute fate and transport modelling (Rockwater, 2015; PER Appendix D10), assuming no biogeochemical immobilisation, so that it will take 1,200 years for any tailings seepage to reach the Project Boundary and that it will only travel 50km after 10,000 years; hence biogeochemical reactions will significantly reduce this travel distance downstream. Vimy agree that the various base metals quoted are mobile in the tailings material, but as flow rates within the paleodrainage channel are negligible they do not impact downstream, and will be preferentially absorbed onto the surface of the carbonaceous material, similar to the fixation mechanisms that formed the deposit in the first place. There are no beneficial uses for the groundwater, except dust suppression, no downstream environmental receptors or groundwater dependant ecosystems (GDEs) and interaction with surface waters; hence the risk to the environment and public health is very low. Vimy agrees that calibration of unsaturated zone hydrological models is difficult and that at the time of release of the PER only estimates of the hydraulic parameters were available. The estimates used were derived from the known particle size distribution of the various sediments and their water retention characteristics, using the USDA Rosetta Model, which has been calibrated

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	The proponent relies heavily on the theory that the *"carbonaceous material that exists at the surface of and below the water table"* has acted as a barrier that captured the uranium in the geology in the first place. But no real evidence has been provided, instead there are unproven and dubious assumptions about the permeability of the carbonaceous material, the changed structure of the tailings compared to the un-mined uranium ore and how it would act under changed conditions with changed chemical and mineral content. For example, if there were exposure to above-ground elements (eg rain and oxygen) uranium may oxidise the organic matter and cause changes in redox state, which could render these elements more mobile. It is not clear how long or how rigorously they have tested exposure of this material to the elements this during their leaching assessment and it isn't clear from the report presented in Appendix D8. There is a lack of work done on sensitivity analysis of the model. There is no clear assessment of the risks - or worst/best case scenario in the event that there were variations to some of the key model parameters, or if the parameters had been underestimated or overestimated. Overall that leaves the model with a high level of uncertainty. Despite this, they still predict more than 20 ML of seepage from the above-ground storage facility, which is a significant amount, particularly if it is further contaminated with heavy metals. Given the uncertainty around the key model parameters this scenario could be worse. There is no identifiable assessment on the significance of the impact from higher levels of seepage of materials with higher levels of heavy metals or radionuclides. Based on the lack of modelling, the failure to consider a number of significant aspects of the proposal that could have a detrimental impact on the immediate environment and the downstream environment and springs at the Queen Victoria Spring A Class	world-wide. It is therefore considered that the estimates used are realistic and Vimy will undertake further work to obtain actual hydraulic parameters, and if required, will re-run the HYDRUS 2D/3D model. To obtain accurate measurements of seepage under the above-ground TSF, Vimy will consider installing soil moisture probes below the clay liner that will detect a wetting front and provide quantitative data on seepage rates. Although this is proposed, it is important to reiterate that the quantify of any tailings seepage below the above-ground TSF, and reaching the underlying groundwater, is negligible compared to the seepage rates from the in-pit TSFs. Modelling of the in-pit seepage has shown that no impacts are likely, and thus the risk of groundwater impacts from the above-ground TSF is very unlikely. The hydrogeological and solute fate and transport modelling that was undertaken for the Mulga Rock Project, including the sensitivity analysis, was in accordance with the *Australian Groundwater Modelling Guidelines (2012)*. In both studies, the key parameters influencing the flow and transport of solutes, including source terms, were varied by up to 100%, which is considered sufficient to capture the likely and reasonable variability that may occur in these values. Although sensitivity analysis was limited in the unsaturated zone modelling, the expected variation in seepage quality that may reach the underlying groundwater system is adequately captured by the sensitivity analysis in the solute fate and transport modeling. This modelling was undertaken on the tailings seepage quality from the in-pit TSFs, which is likely to be significantly greater than that in groundwater recharge from the above ground TSF. It is therefore considered that the modelling sensitivity analysis is sufficient to provide confidence in the model predictions. It is important to reiterate that assuming the worst-case scenario, whereby no biogeochemical reactions take place to sequester any released solutes from the tailings (which have been varied by 100%), the very low flow rates in the aquifer will restrict the downstream movement of seepage so that it takes 1,200 years to reach the Project Boundary and 10,000 years to travel 50km, with levels

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	nature reserve the submitter urges the EPA to recommend the project is not approved. We note that the proposal includes in pit tailings disposal at the Princess site and the northern part of the Ambassador East site. In Appendix D8 TSF Seepage Analysis there is no discussion or reference to any fault lines that run through this area. However, in Appendix C1 Stygofauna Pilot Study Figure 3 Pg. 13 there is the clear identification of the Cundeelee Fault line that appears to run right by the Princess deposit and intersects with the Turnback Fault. The Turnback Fault appears to have two branches the lower branch appears to go through the Shogun deposit and possibly through the bottom part of the Ambassador deposit. All four deposits appear to be nestled in between three fault lines. There is no mention of fault lines in the PER, the Tailings Seepage Analysis or the Mine Closure Plan. As far as the submitter can tell the only discussion or mention of fault lines is in the subterranean fauna pilot study. We are deeply concerned about this omission from other sections of the PER. This oversight undermines the validity of many of the geological studies and assumptions. Given that the proposal is to store radioactive materials in pits surrounded by three fault lines, this raises serious questions about the long term management and security of this material. This material is volatile in the environment for no less than 10,000 years, a time frame in which we can expect to see a number of geological shifts - made much more likely given the presence of fault lines. The submitter urges the EPA to recommend that this project is not approved on the grounds that the proponent has failed to identify significant geological factors and subsequent risks that pose an unacceptable risk to the environment.	remaining below or at background. Given the Queen Victoria Springs is around 55km from the southern boundary of the Ambassador in-pit TSF, it will take more than 10,000 years to reach, and even when it does, the actual Spring is an ephemeral perched surface water feature with no hydraulic connection to the underlying groundwater system; hence no impacts on this Class A Nature Reserve are expected to occur from the Mulga Rock Project. Vimy disputes that the geological formation model is “unproven and dubious” and cites the following work: CSIRO: The CSIRO study of the geochemistry, mineralogy and hydrogeochemistry and characterisation of organic matter at Mulga Rock (Appendix D6) showed a clear relationship between some macerals (organic matter components) and uranium accumulation at Ambassador. In particular, ^{13}C Nuclear Magnetic Resonance on a number of samples from the Ambassador deposits showed clear relationships between uranium concentration and aliphatic and aromatic peak positions. It also showed a clear association of high concentration of carboxylic and carbonyl functional groups in the organic matter with fixation of uranium. This is consistent with the literature review carried out ahead of that testwork, showing that at moderately acidic pH (ca. 4-7), free radionuclides and/or trace elements are complexed via carboxylate functional groups of organic macromolecules or colloidal organic complexes, with such complexation probably irreversible for actinides (i.e. U and Th), except in waters that have a high ionic strength and, in particular, are dominated by divalent cations such as calcium. This is also supported by work carried out by the proponent, showing a good correlation between the proportion of liptinite and exinite, rich in those functional groups, within the overall organic matters, up to grades of ca. 4,000ppm U_3O_8. Osaka University: Those results were confirmed in 2010 by some exploratory analysis of sandstone and lignite ore powders (with grades ranging from 224 to > 8,600ppm

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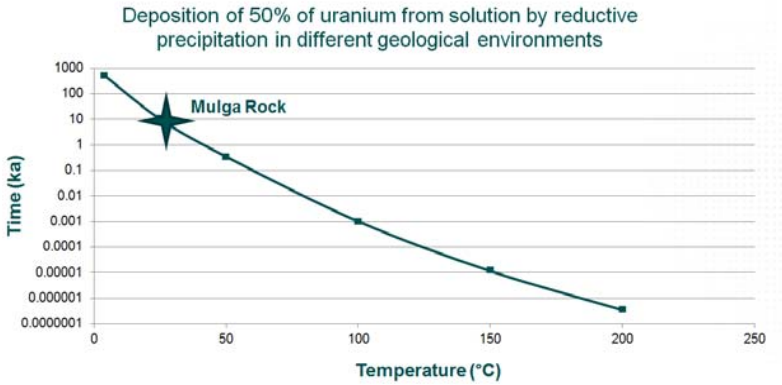
		U_3O_8) using Fourier Transform Infra Red (FTIR) analyses. FTIR spectrometers measure light absorbed by a sample in the infra-red region of the light spectrum. Those spectra showed the presence of an absorption band due to uranyl cation, as well as potential uranium oxides and mixed oxides. The adsorption feature associated with adsorbed uranyl species fixed without reduction showed a strong correlation with a decreasing peak height ratio corresponding to the COOH/COO^- ratio. This supported uranyl complexation by carboxylic functions of lignites as a primary fixation mechanism. A negative correlation of the peak height of the uranium mixed oxides with ratios associated with CH and OH functional groups, suggesting reduction of the uranyl by alcoholic functions. The fixation of uranium via biogenic processes is also supported by a compilation of material published by Dr Nakashima showing that fixation of uranium by reductive precipitation processes in low temperature environments is extraordinarily slow, when not mediated by bacterial or microbial activity (see diagram below).  <u>University of Melbourne</u>: Drs Cumberland and Moreau from the University of Melbourne have also characterised organic matter at Mulga and its potential for uranium reduction and immobilisation in the period 2013-2015. This work program was carried out

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		under the CSIRO Organic Geochemistry of Mineral System Cluster (*http://www.cet.edu.au/research-projects/special-projects/projects/csiro-organic-geochemistry-of-mineral-systems-cluster*). Results of that research were presented at various workshops and support the progressive fixation of uranium onto organic matter via sorption, followed by biomineralisation involving direct bacterial membranes concentration mechanisms (resulting in high uranium –and other metals - accumulation) or fixation via exchange sites controlled by extrapolymeric substances (biofilms). Sorption of hexavalent uranium is generally low at mildly acidic values and increases with increasing pH in the range 4 to 6. EPFL (Ecole Polytechnique de Lausanne): Dr Bernier-Latmani in recent years has shown conclusively that uranium in its mobile (hexavalent) form can undergo reduction through a range of microbially and/or bacterially mediated processes. Those fixation mechanisms are as follows: • Direct enzymatic reduction by microorganisms • Indirect reduction through microbial reduction of Fe^{3+} by Iron reducing bacteria (IRB) • Indirect reduction through microbial sulphate reduction by sulphate reducing bacteria (SRB); additionally, in the presence of iron, iron sulphide minerals form further reducing hexavalent uranium to its tetravalent form. Results presented at a CSIRO Cutting Edge Science Symposium in 2013 showed that the product of microbial reduction of hexavalent uranium exhibits more complex speciation than through reductive precipitation. In particular, microorganisms are able to produce nanoparticulate UO2 under certain chemical conditions. Unlike its mineral equivalent, that biogenic uranium oxide (also referred to as monomeric) is consistent with stoichiometric UO_2 and represents an interim fixation mechanism and is linked to the roduction of biofilms by the microorganisms (also referred to as extrapolymeric substances or EPS). The non-uraninite uranium is then available for final fixation through

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		one of the mechanisms listed above, in particular in the presence of sulphates and low iron levels (the case at MRUP). Curtin University: In a study of ore samples from MRP, Jaraula *et al.* (2015, included in Appendix) studied the potential impact of ionising radiation on organic matter. It found that up to grades in the range of 2,000-5,000ppm U_3O_8, samples contained long chain *n*-alkanes and alkanones (C_{27}-C_{31}) and an odd/even carbon preference indicative of extant lipids, compared to intermediate length *n*-alkanes and alkanones with no carbon number preference for higher grades samples. Such changes are consistent with radiolytic cracking (radiation damage) of polyaliphatic macromolecules (spores, pollen, cuticle or algal cysts) resulting the breaking of C-C bonds. This implies that radiation damage associated with high grade uranium ore only (not representative of as opposed to very low grades in tailings) is likely to see degradation of organic matter supporting bacterial activity. On that basis, assuming a decreased fixation potential of the organic matter and associated microorganisms in tailings at MRP due to radiation damage is not justified. It is important to reiterate that assuming the worst-case scenario, whereby no biogeochemical reactions take place to sequester any released solutes from the tailings, the very low flow rates in the aquifer will restrict the downstream movement of seepage so that it takes 1,200 years to reach the Project Boundary and 10,000 years to travel 50km, with levels remaining below or at background. Given the Queen Victoria Springs is around 55km from the southern boundary of the Ambassador in-pit TSF, it will take more than 10,000 years to reach, and even when it does, the actual Spring is an ephemeral perched surface water feature with no hydraulic connection to the underlying groundwater system; hence no impacts on this Class A Nature Reserve are expected to occur from the Mulga Rock Project. With regards to the faults, and in particular the Cundeelee and Turnback Faults and their potential to impact on the in-pit TSFs, this is highly unlikely as they

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		have not been active for over 100 million years and due to the thick Jurassic to Quaternary sedimentary sequences that overlie the geological contacts. Given the very low likelihood of occurrence and impact, the faults were not considered relevant and were not addressed in the PER, Tailings Seepage Analysis or the Mine Closure Plan. There is a higher risk that the Darling Fault, on the eastern margin of Perth, will be activated before these faults, yet dams and residential communities are built along the fault system. With regards to the volatility of the material, Vimy are proposing to simply replicate the oxidation processes that has been occurring for millions of years, resulting in the acidification of the material and groundwater, mobilisation of uranium, metals and radionuclides, and subsequent capturing of these solutes either at the redox boundary or further downstream. There is no surface signature of this natural process and with the rehabilitation efforts to be undertaken by Vimy, no post-mine surface signature will likely result; hence there is no post-mine change in environmental or public risk. Whilst a change in material properties does occur during processing, with the resulting tailings having a higher surface area to volume ratio and thus release of solutes, this 'finer' texture results in a significantly lower permeability and thus the residence time of the tailings liquor is increased substantially increasing the immobilisation of the released solutes. The net effect is that the taiings seepage is likely to have a concentration similar to the weathering products of the natural oxidation reaction that is still occurring today and will continue for millions of years to follow.
Proforma, P4, P5	Tailings from Mulga Rock will leak (have seepage) as described in the PER. Concerns raised about contamination of water resources are as follows: • Contamination of groundwater is inevitable. • Uranium mining permanently pollutes groundwater and the immediate surrounds of the mine site.	The in-pit tailings facilities are designed to drain into the aquifer that runs under the facility because the carbonaceous material that characterises the upper layer of the aquifer will sequestrate the potentially contaminating material. It is not correct to assert that contamination of groundwater is inevitable: Sufficient heavy metals are expected to be captured by the carbonaceous material (including any residual uranium that may be mobile) so as to leave the

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	• The downstream reserve would bear the brunt of any leakage. • Toxic leaks from tailings sites and contamination of local water resources are well documented. • Interference with underground water will always have a long term effect. • Contamination has happened all too frequently at other mines. • All previous uranium mines have left a mess, particularly in water systems. • The risk to deadly pollution of the ground water in the area renders the project untenable. • Uranium is already contaminating drinking water in the Goldfields.	local ground water no different in quality to what naturally prevails within what is an aquifer that is toxic due to highly levels of salinity and acidity. It is not correct to assert that uranium mining at Mulga Rock will permanently pollute the groundwater and the immediate surrounds of the mine-site: The groundwater is not expected to be of any worse quality that variations in quality that naturally exist within this aquifer. There is not expected to be anything more than negligible surface expression of uranium in the area as a result of dust dispersion and all tailings material will be sufficiently isolated from the environment to avoid the possibility of any pollution of the surrounding area. It is not correct to assert that the downstream reserve (Queen Victoria Spring Nature Reserve) will bear the brunt of any leakage from tailings. In the unlikely event that the tailings plume was to migrate to the area of the Queen Victoria Spring Reserve (which would be expected to take more than 10,000 years) it would be around 60m below ground level in that area and isolated from having any impact upon any sensitive environmental receptor. Whatever toxic leaks from tailings sites and contamination of local water resources that have been documented, they are of no relevance to the Mulga Rock Project where most of the tailings will be disposed of in-pit within the unique environment of being surrounded by carbonaceous material that is very efficient at sequestrating heavy metals. Vimy does not accept that interference with underground water will always have a long-term effect. Vimy's management of the local groundwater is not expected to result in any long-term effects on any sensitive environmental receptors. Vimy does not accept that contamination at other uranium mines or any impacts they may have had on local water systems is of any relevance in assessing the

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		likely impacts of Vimy's proposal unless the circumstances were in some relevant way similar. Vimy does not accept that there will be any deadly pollution of the groundwater and therefore that the project is untenable. Vimy acknowledges that uranium can be found at low levels in water in the Goldfields area; this is not the result of uranium mining but the existence of naturally occurring uranium.

7. Air Quality and Atmospheric Gases

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Department of Health (DoH)	*Dust Management Plan* The proponent appears to have addressed DoH concerns providing the level of radionuclides in dust emissions present no radiological risk then dust around the campsite will only need to be managed for amenity and to reduce the potential for acute health effects to occur.	The proponent agrees with the DoH comments and will ensure that effective management of dust levels is achieved by implementing the Dust Management Plan (Environmental Management Plan MRUP-EMP-024), covering all activities on-site. This management plan will undergo regular revisions as operational experience and monitoring data becomes available.
Departmen of Environment Regulation (DER)	*General Guidance and Ambient Air Quality Criteria* The closest sensitive receptor, Accommodation Village, is 6 km away. The closest anthropogenic source, for cumulative impact assessment of air emissions, is the Tropicana Gold Mine, 110 km away. It is noted that two different locations are cited for the Accommodation Village in the PER (6 km away from mine-site) and in the Dispersion Modelling Report (10 km away from mine-site). This matter needs clarification.	Noted. The ambiguity in the distance between the closest sensitive receptor (the accommodation village) and a mine site arose from two different locations being assessed. The final location of the mining village presented in the PER (and modelled in Appendix E1) is located 5-6km from the closest proposed mine site at Shogun and up to 15-16km from the easternmost section of the proposed Ambassador operation.

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Air Quality Modelling

The major source of particulate matter (PM) emitted from the project is from ground-based sources, consequently the maximum ground level concentrations will occur close to the mine-site. The modelling of fugitive particulate emissions is complex and there are a number of factors which result in uncertainty in the modelled concentrations, particularly for this assessment that ground impacts were modelled for distances more than 110 km. However, in this case, the ground impacts of PM from the project would not be significant at larger distances. The modelling provided indicates the risk of adverse impact of PM, from the project, to public health and the environment is low as summarised below:

<table>
<tr><td colspan="3">Closest sensitive receptors (6 km) and beyond</td></tr>
<tr><td>Likelihood</td><td>Consequence</td><td>Risk</td></tr>
<tr><td>Unlikely</td><td>Minor</td><td>LOW</td></tr>
</table>

Cumulative impacts of other industrial sites and developments in the region have not been assessed. However, it is unlikely that cumulative impacts from other anthropogenic sources will be a significant issue due to the large distances involved (more than 110 km). The modelling indicates the risk of adverse cumulative impacts from other anthropogenic sources to public health and the environment is low as summarised below:

<table>
<tr><td colspan="3">Closest industrial site (110km) and beyond</td></tr>
<tr><td>Likelihood</td><td>Consequence</td><td>Risk</td></tr>
<tr><td>Rare</td><td>Insignificant</td><td>LOW</td></tr>
</table>

Background concentrations of air contaminants were not included in the air dispersion modelling assessment. Consideration of
</td>
<td>
The proponent agrees with the DER risk assessment process and low ranking with regards to adverse impact of PM from the Project to human health and the environment.

As argued in the air dispersion model, the cumulative impact associated with the proposed Project and the closest mining operation (Tropicana Gold Mine, 110km to the northeast) is so low that it does not warrant further investigation.

This is particularly the case given the west northwest to east southeast dominant winds in the area and highly variable natural rates of dust generation and emissions.
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<tr><td></td><td>background concentrations is normally part of an air quality assessment:

However, the modelling results indicate that the maximum 24-hour average PM10 concentrations at all sensitive receptors are low. The predicted peak contribution to PM10 concentration from the proposal at the nearest sensitive receptor (accommodation village) is 27% of the National Environment Protection Measure criteria. The provided modelling indicates the risk of adverse impact of PM from the project to public health and the environment (excluding background concentrations) is low as summarised below:

<table><tr><td colspan="3">Closest sensitive receptors (6km)</td></tr><tr><td>Likelihood</td><td>Consequence</td><td>Risk</td></tr><tr><td>Unlikely</td><td>Minor</td><td>LOW</td></tr></table></td><td></td></tr>
<tr><td>DER</td><td>Emissions from Power Generators

The air dispersion model, CALPUFF, used for modelling of emissions from the power generators, is an appropriate model to use in this case. The configuration of the air dispersion modelling appears reasonable. The predicted pollutant concentrations from power generators at sensitive receptors are low, but significant ground level concentrations were predicted at the processing plant.

The risk of adverse impact of controlled power generators from the project to public health and the environment is summarised below:

<table><tr><td colspan="3">Closest sensitive receptors (6km)</td></tr><tr><td>Likelihood</td><td>Consequence</td><td>Risk</td></tr><tr><td>Unlikely</td><td>Minor</td><td>LOW</td></tr></table></td><td>The proponent agrees with the DER risk assessment process and low ranking with regards to adverse impact of power generators from the Project to human health and the environment.

As discussed in the PER, the proponent anticipates that power sourced primarily from natural gas or LNG will be selected, delivering significant benefits in terms of pollutant concentrations compared to conventional diesel engines.

Updated source terms assumptions will be used for a revised air quality modelling once available.</td></tr>
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Submitter	Submission and/or issue	Response to comment
	In the air quality assessment and in the emission estimates of the power generators, it was not stated if all generators will use controlled diesel engines and no specific controls were mentioned. Using an uncontrolled diesel generator would, in this case, result in a "moderate" risk. Emissions from power generators have been estimated using a generic formula from the National Pollutant Inventory (NPI) emissions estimation manual. NPI estimates are provided to indicate the total annual emissions from industries, not reflecting day-to-day and hour-to-hour changes, and commonly include a large margin of conservatism.	
DER	*Radon Modelling Assessment* The ground level concentrations of radon were modelled for all sensitive receptors using the CALPUFF dispersion model. As mentioned above, there are a number of factors which result in uncertainty in the modelled concentrations of ground-based sources (i.e. radon) for long distances (over 110 km). Further comments are outlined below: Most field radon monitoring devices record continuous measurements of radon gas over a short interval of time (a series of minutes and report the results in hourly increments). In addition, adverse health effects of radon can be caused by high short-term exposure and the radon standards are set for short-term exposure. The radon modelling results in the PER are based on annual averages. In order to compare radon modelling results with field monitoring data (as part of the Management Plan of MRUP-EMP-028) and relevant standards, it would have been more appropriate to provide	There are a number of incorrect observations in this comment, addressed below. Management Plan (MRUP-EMP-028) This Radiation Management Plan (RMP) does not currently exist for the full operation and no RMP was submitted as part of the PER. A condensed version of an RMP was developed and approved by the Department of Mines and Petroleum (Resources Safety) for the geotechnical investigation trenches. <u>Modelling over long distances</u> The aim of the air quality modelling is to provide an assessment of the magnitude of the potential risk as a result of operational emissions from the project. The work conducted by Vimy Resources has shown that even at relatively close distances, the impacts of radon emissions and therefore operationally contributed radon concentrations in the environment are negligible. The results of the modelling show that on the approximate project boundary, project originated radon adds less than 1% to the overall natural background concentrations of radon which vary between 20 and 30 Bq/m^3 (see section 13.7.6 pf the PER and section 2.8.2 of appendix B of appendix F1).

Submitter	Submission and/or issue	Response to comment
	modelling results in shorter averaging periods (e.g. 1-hour, 24-hour). It is noted that the radon emanation rate, which is used in the dispersion modelling, was measured from only two low-to-medium grade ore samples. As stated in the PER (Radiation Report), airborne radon concentration is extraordinarily variable with concentrations varying well over a factor of 10 in a typical 24-hour period. Also, ground-level concentrations have a noticeable temporal and locational variability. Given significant variabilities in the radon emanation rate, there is not enough data to determine if the selected emission rate is representative. The proponent, however, has stated that further radon data will be collected during geotechnical investigations in the future. It would be appropriate to use these monitoring data to update the emissions model.	Therefore, at further distances, the operationally contributed radon is extremely negligible. <u>Monitoring of radon</u> It is correct to say that modern monitoring equipment is able to monitor radon concentrations over user defined sampling periods. For example, it is possible to measure short term concentrations or longer term concentrations. However, it is important to note that longer term concentrations are in fact averages of shorter term concentrations. Vimy's preference is to employ long-term data to assess the potential health impacts related to radon as occupational limits imposed for health purposes are based upon annual dose limits (see below Standards for Radon). Although it is accepted that short-term 'spikes' in radon exposure may occur, it is not considered that short-term monitoring, and comparing against short-term averages, is common practice and that longer-term averages provide a more meaningful assessment of overall exposure and risk. However, in-pit radon monitoring will be continuous and appropriate measures will be implemented if observed levels rise above regulatory limits. During operations, Vimy Resources will monitor radon and its decay products for the purposes of dose assessment, rather than for comparing to predicted modelling results. As noted previously, the air quality modelling is used to determine if the potential impacts are acceptable and the modelling has shown that the impacts will be negligible. Although this is the case, the results of radon monitoring will be used to validate the model predictions and confirm their long-term accuracy and reliability. Regular checks of ambient radon levels associated with ore exposure within recently dug large-scale geotechnical investigation trenches show consistently low levels of radon concentrations in air a few meters away from the ore, typically averaging less than 200Bq/m^3 (or a fifth of the threshold for active management in a workplace) for a high grade ore. This figure is consistent with rates reported in the PER.

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		Additional long-term radon emanation rates are now being carried out on an increased range of ore types, as well as different overburden material (which were assigned low grade emanation rates in the course of modelling due to the lack of data). Accordingly, emanation rates from overburden landforms are expected to decrease by close to an order of magnitude and the air model updated accordingly. <u>Health effects of radon</u> There are no adverse health effects from radon. Evidence for this is that radon does not appear in the ICRP Publication 119, Compendium of Dose Coefficients based on ICRP Publication 60. The risk comes from exposure to the decay products of radon and there are standard and recognised methods for assessing the impacts. The health effects of exposure to elevated concentrations of radon decay products are well understood and incorporated into relevant exposure and dose standards. The statement that “There are no adverse health effects from Radon” is therefore technically accurate based upon the fact that the gas radon is itself harmless, and that it is the actual decay products that cause adverse health effects. <u>Standards for radon</u> There are generally no short-term exposure standards for exposure to radon that are applicable for uranium mining situations; this can be technically validated by the Radiological Council. The standards are based on either radon decay product concentrations or dose. ARPANSA recommends a reference level of 1,000Bq/m^3 for radon, recognising that this measure is a surrogate for the exposure that would be received from the decay products that grow into air when radon decays. This level is generally adopted in jurisdictions around Australia. Exposure to this concentration of radon, with radon decay products in approximate equilibrium, for a full working year, would result in a dose of approximately 10mSv per year. This is compared to the annual worker dose limit of 20mSv/y. During exposure and handling of high grade ore samples (U

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		concentration >2,000ppm) radon measurement did not exceed 100Bq/m^3 for the entire 4 month mining exercise, with the majority of values <10 Bq/m^3. It is important to note that the primary and most important radiation related limits and standards are annual exposure and dose limits. Therefore, monitoring results are used as the basis for the exposure and dose estimates. When predicting potential doses from the project, it is proper to calculate the annual averages as the basis of predicting annual potential doses. Air quality modelling can provide outputs for different periods (for example, 24 hour averages, or annual averages), however, radiation limits are based on annual dose limits. It is not appropriate to utilise 1 hour or 24-hour modelling results for dose assessment because the aim is to produce annual average levels for comparison with annual limits. 1 hour real-time concentrations might be used for operational/management purposes. <u>Radon emanation</u> Radon emanation rates act as the basis for the source terms in the air quality modelling. Where there is a lack of any local emanation rate data, a figure of 50Bq/m^2/s per %U is generally used (Olympic Dam EIS, 2009). However, where actual data is used, then it is appropriate to take this into account. Radon emanation test work was conducted on the ore and is presented in appendix F3 of the PER. This work has been peer reviewed and is in press. The test work showed that for the Mulga Rock ore, a radon emanation rate of approximately 30Bq/m^2/s per %U was applicable and accounts for a high grade uranium material (1,000ppm). This is in relatively good agreement with the standard figure used when data is unavailable and illustrates that a high degree of conservatism was applied in estimating dose rates (i.e. the average ore is only 600ppm, but it was modelled at 1,000ppm). The radon concentration variability outlined in the PER and referred to by the reviewer is for naturally occurring concentrations. In general, the air concentration variations are independent of the emanation rates with the variability in air concentrations depending predominantly on atmospheric conditions. Very stable atmospheric conditions lead to a build-up of radon in air

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		and higher concentrations, while turbulent conditions result in high levels of dilution. Table 4.6 of Appendix F1 shows the results of passive radon monitoring (which provides an average radon concentration over a three-month period). It is well recognised that there is seasonal variation in radon concentrations, with levels higher during the more stable months of the year and the monitoring data reflects this. Spatial variation also occurs, and this can be due to local geology. However, these are naturally occurring variations. Vimy Resources notes that there is adequate data to draw the conclusion that impacts of radon decay products for workers and the public will be very low and well below any statutory standards or limits. Further analysis is not justified given the assessed impacts. Radon measurements obtained during the excavation of the geotechnical investigation trenches and subsequent exposure and handling of high grade ore material, using a Doseman Monitor, did not exceeded 100Bq/m^3 for the ore mining exercise, with the majority of values <10 Bq/m^3 (note the ARPANSA trigger value is 1,000 Bq/m^3). Similarly, gamma measurements using a RAD7 meter with exposed high grade ore did not exceed an equivalent of 2.5 mSv/yr. These results highlight the low dose exposures likely to be experienced by the workforce in contact with the ore material. During operations, actual data will be used to assess impacts rather than through the use of modelling.
DER	*Dust Management and Monitoring.* The proposed dust management plans (MRUP-EMP-019, MRUP-EMP-024 and MRUP-EMP-030) appear reasonable and have properly addressed minimisation of dust generation. The modelling assessment of dust deposition indicated that incremental deposited dust contribution from the proposal is very low at the closest sensitive receptor, at a maximum of 0.022 grams	Noted. As addressed in a separate response, the modelling of incremental dust deposition associated with project will be supplemented with data gathered from large-scale excavations recently completed and resulting landforms, to be captured in a revised air quality model.

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	per square metre per month (g/m^2/month) (about 1% of the standard of $2g/m^2$/month).	
Department of the Environment (DoE)	*Assessment of radon Exposure* The impact that the new ICRP changes for estimating radiation dose from exposure to radon-222 and its progeny will have on commitments to radiation protection, dose estimations and monitoring programmes should be discussed. Information Required – The ICRP conversion factors for assessing inhalation doses from radon progeny exposure will be higher than current values. The dose coefficients applied and a discussion on the potential impacts of the future changes to these values needs to be included.	Noted. The proponent also notes that at the time of completing the impact assessment, ARPANSA (the regulatory authority) had not reviewed those recommendations for adoption into a future review of RPS No.9 nor advised the suitability of those dose conversion factors to an environmental risk assessment. Once reviewed, and if deemed valid by ARPANSA for the purpose of a risk assessment, the proponent will derive an alternative assessment of radon exposure to reflect new dose conversion factors. However, it is not yet clear as to what the final recommendations for uranium mines might be in a revised ARPANSA RPS No.9 Code of Practice and aside from the conversion factors, the Radon Daughter (RnD) dose pathway is in any case very readily controlled via cabin air filtration.
DoE	*Table 12.1* The numbers given in the last column have more significant figures than are justified by the data. Information Required – The number of significant figures needs to be checked.	Noted. The numbers quoted in Table 12.1 refer to standards published in the National Environment Protection (Ambient Air Quality) Measure (Air NEPM) developed for benchmarking purposes, as discussed in Appendix E1. The proponent did not see fit to discuss how appropriate the significant figures of those national standards are in the course of the assessment.
DoE	*Table 12.12* The dust concentrations (mass loadings) quoted in this table of the PER seem low. Values in the range 10-100 ($\mu g/m^3$ might be expected – see EUR 15760 or HPA-RPD-058. Information Required – These concentrations need to be checked.	There is no reason to doubt the results of the air quality modelling given that the consultant is an expert in the area. The mass loadings quote in Table 12.12 relate to incremental dust related to activities associated with the Project, and are additive to the background values, which averaged 20 $\mu g/m^3$ over the May 2012 to February 2016 period.

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		The maximum annualised value of 3.16 µg/m^3 (against a maximum of 14 µg/m^3 on a 24hr average) hence represent a maximum of 15.8% of the long-term average stated above, and are consistent with the statement in GHD2015a of the Project contributing up to 25% of the overall ambient dust. These dust concentration values are considered accurate and are congruent with those reported in EUR15760 for non-urban areas, being in the range of 5 to 50ug/m^3. EUR15760 also states that "*Considerably higher dust-loadings are likely in localised areas due to man-made disturbances, particularly arid, dusty environments. Recent studies concerning the Maralinga and Emu nuclear test sites in Australia gave dust-loadings in the range 50 to 1,300µg/m^3 for digging*". Vimy notes that the dust concentration in the pit was assumed to be 2,500µg/m^3 (see Appendix F1, page 38) which represented a conservative assumption. EUR15760 goes on to state that "*these values are for an extremely arid and dusty environment and so are likely to represent the higher end of the possible values of dust-loading*". In other words, Vimy has used conservative estimates that are higher than what were regarded as the 'higher end of possible values' as contained in EUR15760. DoE appears to be confusing likely dust loading assumptions at source with likely dust loading estimates at the receptors which are located at distances up to 110 kilometres from the source. The reason the dust concentrations in Table 12.12 appear so low is that they are the modelled increase in dust concentrations located at least 6km (mostly much more) from the source of the dust. Vimy notes that HPA-RPD-058 which DoE used as a reference supporting its assumption that dust should be in the range 10-100 µg/m^3 contains no such guidance. HPA-RPD-058 describes the methodology that has been implemented in the software PC-CREAM 08 to assess the radiological impact of routine discharges of radioactive material into the environment. In relation to 'Man-made resuspension' (section 3.3.2.2 (b)) it specifically states "*Currently PC-CREAM 08 does not include this exposure pathway…*" It is not possible for Vimy to check these values until Vimy has commenced mining and is able to measure increases in dust concentrations associated with

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		its activities at these key locations. Vimy also notes that it will be monitoring dust emissions as a matter of course once operations have commenced.
DoE	*Table 12.15* The PER states “No exceedance of ambient dust… at monitoring locations”. This may not be sufficient to conclude that this is generally true at all locations. Information Required – Clarification needed in radiation management plan.	Vimy Resources note that Table 12.15 refers to management targets and potential measures in the event of failures. The statement “No exceedance of ambient dust… at monitoring locations” is therefore a management goal with a set of actions in the event that the target is not achieved. The Radiation Management Plan that will be provided to the local statutory authority prior to construction, as part of the permitting process, will contain further detail in regards to monitoring, trigger levels and actions.
DoE	*Appendix B of F1 and Section 12.4.5* The references list GHDb or GHDe – Tracer dispersion modelling, as the basis for the radon assessment to the public and environment. This report is not provided as part of the submission, it is required to check the radon modelling used in the assessment. Information Required – Please provide this document as referenced.	Noted. This report has been provided as Appendix to this document. However, it is noted that the assessment has been conducted by a reputable air quality consultant and has been verified by radiation protection consultants. Model grid files supporting the concentrations reported were also checked in-house using a GIS package. Once all data relating to radon flux from various source term materials (including ore, overburden landforms, tailings and groundwater) gathered from the geotechnical investigation trenches (and associated work programs) becomes available, the revised source terms will form the basis of an updated dispersion modelling, to be reported to the relevant decision making authorities.
DoE	*Appendix E1 - 1.2* The PER states "the processing area is expected to have a sufficient moisture content to prevent significant emissions..." It is not clear where the moisture content mentioned in the third paragraph will come from. If it results from spraying during	The ore from the initial beneficiation plant to the back-end of the base metal plant and the uranium product plant will remain in slurry form preventing the release of any dust or other emissions. The only dust to be generated from the processing plant is when a spill occurs and the liquor dries allowing the sediment to form a crust on the ground. Hygiene measures will be implemented

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	processing, then, as soon as this stops (e.g. post-closure) one would expect dust release to increase. Information Required – Additional detail is needed, particularly with respect to post-closure dust levels.	around to plant to ensure that any spills are cleaned up to prevent them from forming dust. The only time during the processing of the ore where dust may form is in the packaging rooms for the uranium oxide and base metal concentrates. Both of these facilities will have sufficient ventilation (with dust collection) to maintain a safe working environment for all personnel and reduce the potential for the release of dust. During closure, all plant and equipment will be decontaminated, with any residue collected and deposited in a remaining void to be covered with a suitable thickness of material to prevent interaction with the surface. The only time that dust may potentially be an issue is during the drying and crusting of the tailings surface to allow heavy machinery onto it to cover with the capillary break and cover system. Dust levels will be assessed during these operations and if excessive dust is generated then closure operations of the TSFs will be ceased. It is important to note that the final post-mine landform will be covered with a suitable thickness of physically and geochemically stable material to ensure no post-mine surface signature of the operation; thus resembling the pre-mine environment.
DoE	*Appendix E1 - 2.2.1, Final Paragraph* The PER states "Undeveloped and rehabilitated capped pits (five years post capping and seeding) are taken as background dust sources and will therefore not be included in the modelling process". The assumption that emissions from undeveloped and rehabilitated capped pits can be neglected implies that the radionuclide concentrations in the dust from these sources will be the same as it was before operations commenced.	Noted. Dust generation associated with uncapped overburden landforms is currently being studied following the excavation of two large geotechnical investigation trenches. The air quality model update will use data derived from this monitoring program in parallel with ongoing weather data collection to more accurately assess dust emission from landforms post-closure.

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	Information Required – The dust emission from undeveloped and rehabilitated capped pits should be included in the impact assessment, because these emissions result from human action.	Ongoing germination trials on the same landforms and its impact on dust generation will also be used to assess the potential for early seedling species to minimise wind erosion and shear at ground level.
DoE	*Appendix E1 - 8.5.3* The PER reports measured dust deposition values that are 3-7 orders of magnitude higher than predicted values. This warrants further discussion. Information Required – The discussion (the final sentence of the section) needs to be developed further, as it is not clear whether the observed discrepancy between predicted and measured values are because the points where the model results are calculated are not the same as the points where the receptors are located, or because there are inadequacies in the model or the modelling procedure.	The text in Section 8.5.3 clearly states that the modelled incremental dust deposition rates at the receptor locations concentrations are far less than the naturally occurring dust deposition rates. The measured results are intended to provide an indication of the existing naturally occurring deposition rates and the modelled results refer specifically to the deposition that could occur as a result of operations. The relatively low operational originated deposition is as expected since the sensitive receptor locations are at a significant distance from the sources of dust production.
DoE	*Appendix E1 - 9.1.2, Final Paragraph* The conclusion (final paragraph) reflects a tendency throughout all the documents to assume that because the predicted values are low, the actual future values will be low. Models are only as good as the information put into them (data, assumptions, etc.) Information Required – The conclusion should be that there is a reasonable likelihood that concentrations will be low. This leaves open the possibility that the models may be in error, and justifies the use of monitoring (during operations) to check the model predictions and take action if the predictions are found to be in error.	Vimy acknowledge that models are only as good as the input data and assumptions used, and that the model results are only estimates with a reasonable likelihood. Fit-for-purpose monitoring of the various contaminant pathways (e.g. groundwater, dust, and radioactivity) will be undertaken throughout the operations to establish whether actual levels are similar to those predicted. This process forms an important part of Vimy's adaptive management approach, with the results fed back into the models to validate them and improve future predictions. Deviations between predicted and actual values will be investigated, where required.

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United Church WA	Greenhouse gas emissions estimated at 3,596,636 tonnes CO_2-e over the life of the proposed operation. Given the urgent need to reduce carbon emissions to prevent catastrophic changes in climate occurring, greenhouse gas emissions are a significant environmental impact that must be accompanied by effective and equivalent offsets.	Vimy acknowledges that the greenhouse gas emissions associated with the proposal over its expected life were estimated to be the equivalent to 3.6 million tonnes of carbon dioxide. Vimy also estimated that the uranium produced as a result of the development of the proposal, if used in nuclear power plants to displace the equivalent amount of coal-fired electricity generation would result in a global reduction in greenhouse gas emissions equivalent to more than 800 million tonnes of carbon dioxide, and as such Vimy does not believe it necessary or appropriate to offset the relatively small amount of carbon dioxide produced locally.
Conservation Council WA (CCWA)	Greenhouse Gas Emissions: *"Overall the development of the Proposal is expected to result in the equivalent of the generation of an additional CO_2-e of ~224kt per year."* Pg. xiii. CO_2 will be released from transport, power generation, processing ore and neutralising acids. The submitter welcomes this data from the proponent that clearly acknowledges that the nuclear fuel cycle is not carbon neutral. There would be significant carbon emissions released during the mining and transport of uranium mining over the life of any mine. The consultants and Vimy make the assertion that there are no sensitive receptors close to the proposed mine. The Queen Victoria Springs A Class reserve is just 14 km away from the mine, as an ecologically significant area we would class this as a sensitive receptor given its recreational utility. We suggest that there should be monitoring at Queen Victoria Springs. The potential source of dust includes the pits, waste rock dump, overburden landforms, roads, tailings and ore stockpiles. Some of these sources would have a significant heavy metal or radionuclide content that poses a threat to the flora and fauna in the region and can easily bio accumulate.	Vimy has never claimed that the nuclear fuel cycle is carbon neutral; Vimy maintains that nuclear power has a very low level of carbon emissions in relation to the amount of electricity produced. To give some perspective to this issue, Vimy expects to produce 1,360 tonnes of uranium concentrate per year and this amount would be expected to fuel nuclear capacity of around 6.8GW which in turn would be expected to produce around 54TWh of electricity. Based upon Vimy's estimate of the associated carbon emissions this would equate to a contribution of approximately 4g CO2e/KWh. Vimy does not accept the assertion that the Queen Victoria Spring Nature Reserve is just 14km away from the mine. The southernmost extremity of any area where mining will take place is over 20km from the northern boundary of the Queen Victoria Spring Nature Reserve. The spring itself is much further away. Vimy acknowledges that potential sources of dust include the pits, overburden landforms, roads, tailings and ore stockpiles. Only the ore, the small layer of material directly above the ore (which may contain mineralisation and therefore will be distributed directly to the base of the backfilled material), any stockpiles and tailings will contain any heavy metals or radionuclides. Notably the overburden landforms and the roads will not contain these materials. The dust

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	In addition to the dust having heavy metal and radionuclide content it is possible that the water used for dust suppression may also have heavy metal and radionuclide content as well as higher concentrations of salt. For example, we note that in Appendix F1 - 5.1.4 it states that *"Waterborne radionuclides will be present in groundwater which seeps into any pit exposure below the water table. This water is captured and used, for dust-suppression purposes, and in the ore beneficiation concentrator. Any excess will report to the project water handling system, noting that ultimate disposal after recycle of excess will be via disposal wells as approved. There will be no releases to watercourses, and thus no surface water radiation delivery pathways."* When this water evaporates leaving behind salts, heavy metals and radionuclides this could increase the concentration build up in the environment. In Appendix E1 GHD have charted dust deposition in the region, showing a high level of variability. They identify that from October through to April is a "typical dust season". This presents a number of hurdles for the safe management of dust that contains heavy metals and radionuclides posing a threat to the environment and workers health. During October to April there is lower rainfall (lower than already low rainfall). Temperatures at this time are also very high - regularly 40 degrees. This also means that evaporation levels are going to be much higher. This means that they are likely to increase the water used for dust suppression. It is also conceivable during these hotter months that workers will be more inclined to not wear Personal Protective Equipment as the short term relief of not wearing a mask during 40 degree days may seem more desirable that the risk of ingesting dust particles that may or may not have radionuclides attached.	modelling demonstrated that dust from these sources did not pose any threat to either the flora or the fauna of the region. Vimy does not accept the assertion by the CCWA that "*there is evidence of uranium mine-workers in Australia not wearing Personal Protective Equipment because of heat*". Peter Karamoskos (Medical Association for the Prevention of War; International Campaign for the Abolition of Nuclear weapons) has stated that "*It is estimated that up to 50 per cent of underground uranium miners in Australia do not use their masks*" but he has not provided any evidence to back up this assertion. The CCWA has presented the statements of an anti-nuclear campaigner as if they were evidence – which they are not. Vimy does not accept the assertion that its workers will not utilise their Personal Protective Equipment (PPE) due to heat. It will be a condition of employment at the Mulga Rock Project that all required PPE are worn as directed, and failure to do so will result in termination of employment. In contrast to underground operations, the Project will involve open pit mining which both significantly reduces the health issues, but also increases the visibility of all employees, so that the likelihood of personnel not wearing PPE is reduced.

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	The submitter notes that there is evidence of uranium mine-workers in Australia not wearing Personal Protective Equipment because of heat *"Miners are now given personal protective equipment (PPE) including masks to filter out the radioactive particulate matter. Yet many underground miners find the masks extremely uncomfortable, especially in the hot underground environment they must contend with. It is estimated that up to 50 per cent of underground uranium miners in Australia do not use their masks, and thus drastically increase their risk of lung cancer while underestimating their actual radiation dose (since this is calculated assuming PPEs are used)."* Peter Karamoskos Nuclear Radiologist. While this refers to underground miners the cause of not wearing the PPEs is based on heat - the temperature at Mulga Rock over those months is likely to be similar to those temperatures felt underground. While the document above refers to radon exposure risk, the submitter suggests that there is a different risk of alpha emitters in dust being ingested. The issue here is the presence of dust in an environment where dust is hard to manage in an industry where there is a culture of dismissing the risks of radiation exposure and undermining the risks and accumulative risk of exposure to low doses of radiation. Some of the elements mentioned above may deeply compromise any attempts to make mining safer. The submitter has not identified anywhere in the PER where these risks are clearly identified and addressed. The submitter is not confident that the proponent has identified these risk and articulated an action plan to mitigate occupational exposure during the hotter, drier, dustier months. The submitter urges the EPA to recommend that this project is not approved on the grounds that the environmental conditions are prohibitive for workers to operate safely during hot, dry, dusty	

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	months where there is a clear increase in the risk of occupational exposure to radionuclides.	
P3	Where will electricity come from for this proposal, how will it be generated and how much Co_2 will be produced?	The electricity required for operations will be generated on-site using either diesel fired or gas fired generators. On the assumption that diesel fired electricity generators will be utilised, the amount of CO_2e emissions generated over the life of the mine (16 years) will be approximately 2.6 million tonnes (see Table 12.10 of PER). Vimy expects to be able to procure a suitable supply of gas and therefore this number would be expected to fall by around 25% (assuming similar efficiency between fuels). It is important to note that the above figure of 2.6 million tonnes of CO_2e emissions only relates to electricity generation whilst the the value of 3.6 million tonnes of CO_2e emissions, reported above, relates to the total CO_2e emissions, factoring in mining emissions (~0.54 million tonnes) and processing (in particular neutralising acidity with carbonate; ~0.44 million tonnes). This breakdown of emissions is clearly shown in Table 12.10 of the PER.
Proforma	Radioactive dust from mining activity and waste dumps has potential to blow hundreds of kilometres and contaminate landscapes and impact on flora and fauna.	The overburden material is essentially un-mineralised and contains no more radioactive materials than can be found in normal sand. The mineralised layer that contains radioactive materials in concentrations that might give rise to concern is located just above and below the water table. The material is essentially moist and will not create much dust when mined. The issue of radiation related impacts to non-human biota is dealt with in Section 12 and Appendix F1 and in particular within Appendix B (*Human Health, Bushtucker and Non-Human Biota Radiological Assessment Technical Report*) of Appendix F1. There is not expected to be any significant impact upon flora and fauna.

8. Human Health

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Department of the Environment (DoE)	There is no clear commitment to the application of dose constraints. The purpose of “trigger levels” in relation to dose constraints is also not clear. Information Required – Operational dose constraints for both workers and the public should be included in the radiation management plan and waste management plan.	Dose constraints are levels on time-integrated doses which will be mutually set in discussion with the regulator at the time of preparation of the operational Radiation Management Plan (RMP) for approval. A sensible dose constraint might for example be set at 50% of the pro-rata limit (e.g. 2.5 mSv per calendar quarter). Given the open pit mining scenario and low grade of the ore involved, modelling and practical experience suggests that such doses are very unlikely to be exceeded. Any breach of an agreed constraint will trigger an investigation and if justified might result in engineering modifications. 'Trigger levels' in this context are intended to be short-term response prompts, such as an early-morning high RnDP PAEC level in the pit prohibiting access by on-foot pit workers such as surveyors, etc., until conditions abate; or a succession of higher than normal daily dust levels prompting an investigation into spill clean-up or dust collection system maintenance etc. This set of considerations will be captured in the operation RMP, and will evolve in collaboration or consultation with the regulator. So, 'trigger levels' require immediate management measures whilst 'constraints' focus on longer term trends and associated management measures. Effective trigger levels should ensure there is no need to respond through constraints.
DoE	*Section 13.1.1* The PER gives a list of Plans which does not include decommissioning – it may be necessary to develop a decommissioning plan. Information Required – A decommissioning plan can be developed as operations proceed.	The decommissioning of the site will be addressed in the Mine Closure Plan to be submitted to the Department of Mines and Petroleum and Environmental Protection Authority for approval prior to implementation of the Project.

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DoE	*Section 13.2.2* The terms radon emanation rate and radon exhalation rate are not used consistently throughout the document. Information Required – Terminology should be 'tightened'. Exhalation rate refers to the radon flux at the ground surface. Emanation coefficient is the fraction of radon atoms that escape from the soil grains into the pore space (in the porous medium containing the Ra-226) that decays to produce radon.	Noted. The rates quoted in the PER refer to the release of radon over a specific area, or exhalation flux density (IAEA, 2013), expressed in $Bq.m^{-2}.s^{-1}$. The total release rate of radon used for modelling purposes was obtained by multiplying the area averaged exhalation flux density by the total surface area of the landform modelled. The main variables affecting that flux are: • Radium activity concentration in the landform modelled • Bulk density of the matrix • Emanation coefficient • Diffusion Coefficient Given the inherent variability and uncertainty in determining those four variables (accurately determining diffusion coefficient in particular is problematic), actual readings from various source terms provide a better indication of expected radon flux than theoretical calculations.
DoE	*Section 13.5.1* The calculations cannot be checked from the information provided. Information Required – Details of the calculations or an indication of the location of these should be provided, to enable the reader to check the estimates.	The information provided in Section 13.5.1 is derived directly from the calculations and corresponding assumptions discussed in section 6.1 in Appendix F1. The assumptions are as follows: • Average grade across the pit floor of 600ppm U_3O_8; using a widely accepted figure of 3.5 µSv/hr per 1,000ppm U_3O_8, the expected dose rate over bare ore, without shielding, stands at 2.1 µSv/hr (3.5 µSv/hr*600/1,000). • The shielding of 50% of gamma radiation by steel in the grinding circuit and leach tanks, resulting in an exposure of 1.8 µSv/hr (3.5 µSv/hr*0.5, rounded upwards); similar values are assumed for the tanks and pipes around the hydrometallurgical plant.

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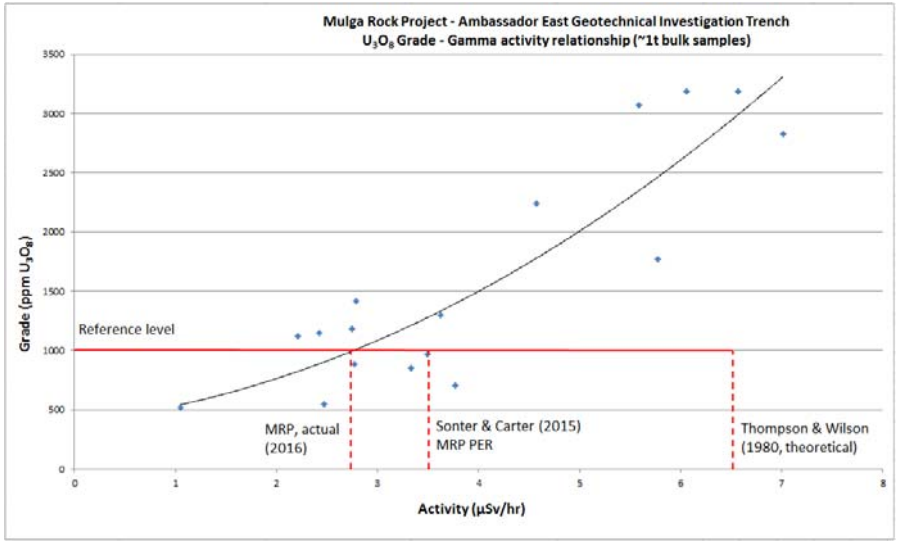
DoE	*Section 13.5.1 and Appendix F1 – 6.1 and Appendix F3* The PER quotes "In-pit gamma dose rate assessment were carried out using, as guidance from the literature, a figure of 3.5 millisieverts per hour (μSv/h) 1000 parts per million (ppm) U308". This value is not properly referenced. It mentions Saito and Jacob, UNSCEAR as justification for this value, but these references are not included in the reference list. It is also not evident how their measurement of ore drums in Appendix F3 supports using this value. Typically, a figure of 6.5 μSv/h per 1000ppm U308 is used from Thompson and Wilson (1980) – Calculation of Gamma Ray Exposure Rates from Uranium Ore Bodies Using this gamma dose rate value, the doses shown will increase by a factor of almost 2. Information Required – Proper use of references to justify this value. It should also be listed which value is contained within each of these references.	In-pit dose rates assessments relied on a peer-reviewed compilation of actual gamma dose (Sonter and Carter, 2015), as opposed to theoretical calculation referred to by the submitter. Work since completed by the proponent on greater than 18tonnes of ore confirms that the figure of 3.5 μSv/hr for 1,000ppm U_3O_8 ore used in the PER is a conservative assumption. Measurements collected on those bulk samples imply an activity factor of 2.75 μSv/hr for 1,000ppm U_3O_8 ore. This suggests an overestimation of doses discussed in Section 13.5.1 by a factor of 25-30% for equivalent grades. 

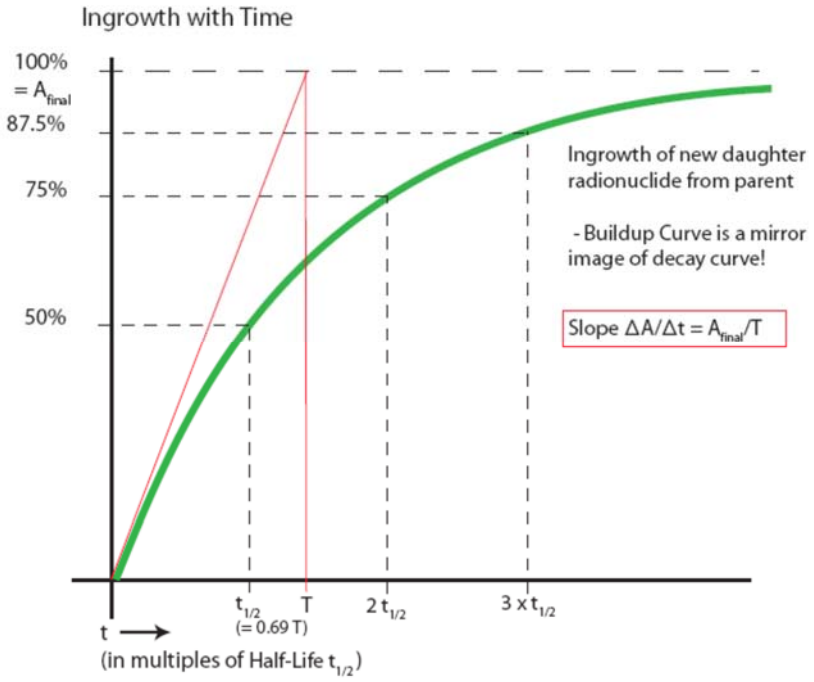
Submitter	Submission and/or issue	Response to comment
DoE	*Section 13.5.1* The PER states “Workers seated in cabs of mobile equipment would be partially shielded….reduce the gamma….by factor of 50%”. No justification for this value is provided. Information Required – This value (50%) needs to be justified. Have measurements been made, or literature sourced to use this shielding factor?	Measurements were made by Radiation Advice Solutions at the Yeelirrie uranium project during its first clean-up phase in the mid-1990s, indicating about a ~70% reduction of gamma shine on heavy equipment (bulldozer, Sonter, pers. com.). Similar measurements have also been made at the Ranger uranium open pit operation, and underground in the decline of the nearby Jabiluka uranium project when it intersected ore, showing an approximate reduction of 50% for a haul truck operator (in the cabin). Both sets of results were only reported internally and not put in the public domain.
DoE	*Table 13.5* The radon release rates are exhalation rates (not the indicated “emanation” rates) – see the comment on Section 13.2.2 (above) which discusses the difference. Information Required – The background exhalation rate would provide a useful reference point.	Noted. The historical literature uses both terms, but the term of 'flux' as discussed above is preferable. Background flux from soils (worldwide) is quoted by Wilkening (1972) as 0.016 $Bq/m^2/s$ (equivalent to 0.43 $pCi/m^2.s$) and documented in Sonter *et al.*, (Radiation Protection in Australia, 2002), in their review of radon flux from rehabilitated and un-rehabilitated uranium mill tailings deposits.
DoE	*Section 13.5.3* The radon increase rate calculated is actually the instantaneous increase. Information Required – If there is a temperature inversion, so that the dispersion of radon from the top of the pit is reduced, the total or average radon increase over the period of the inversion needs to be calculated.	Noted. Given the large amount of variables involved in assessing the total or average radon increase over the period of the inversion, those figures will best be derived using actual radon flux measurements measured on a range of bulk ore samples excavated in the geotechnical investigation trenches completed in early 2016.
DoE	*Section 13.5.3-4, Section 13.6.1 and Appendix F1 – 6.3* The PER does not include details for estimating Potential Alpha Energy Concentration (PAEC) and the inhalation dose based on the Radon concentration becquerels per cubic metre (Bq/m^3). The	The following details regarding the calculation of in-pit concentrations of radon and decay products are listed in section 6.3 of Appendix F1 and are as follows: • Dimensions of exposed ore of 20 ha, • 2 $Bq/m^2/s$ radon flux,

Submitter	Submission and/or issue	Response to comment
	equilibrium factors and the dose conversion factors used are not provided. Information Required – Please list, with references, the equilibrium factors and dose conversion factors used. These are required to check the adequacy of calculations.	• Overall pit dimensions of 500 m by up to 1,200 m, depth 50 m, • Corresponding volume of air capped by atmospheric inversion at surface, and • Low airspeeds, of 1 m/s (3.6 km/hr); giving air transit times of 500 seconds in contact with ore, and total in-pit air age up to 1200 seconds. Calculating for instantaneous radon injection rate into 'pit box' then (2 $Bq/m^2/s$ x 20 ha) = 4 x 105 Bq/s; Volume into which Rn is injected = (20 ha x 50m) = 1 x 107 m^3. So concentration increase rate $\Delta C/\Delta t$ = 0.04 $Bq/m^3/s$. Maximum concentration occurs at maximum air transit time across ore, which is 500 seconds, which equates to 20 Bq/m3. The potential alpha energy intake can be determined from measurements of the potential alpha energy concentration in the air (PAEC) and the volume of air inhaled, with PAE exposures due to radon progeny determined by integrating the PAEC over the exposure time. The Equilibrium factor can be derived using the following formula: $F = (0.106\ c_{Po-218} + 0.514\ c_{Pb-214} + 0.380\ c_{Bi-214}) / c_{Rn-222}$ where cx stands fort eh activity concentration of the nuclide x *(http://www.wise-uranium.org/rdcrnh.html*). For an air age of about 1,200 seconds, this equates to an equilibrium factor of approximately 0.3 (compared to typical values of 0.4 for outdoor settings), so the PAEC (Potential Alpha Energy Concentration) of the ingrown radon decay products will be in this worst-case approximately 0.03 $\mu J/m^3$. This resultant RnDP concentration is less than 0.5% of the allowed derived air concentration (DAC), which is 7 $\mu J/m^3$.
DoE	*Sections 13.5.4 and 13.6.2* The PER shows a dose rate calculation of 0.7μSv/h, however the value applied in the dose assessment is 0.1μSv/h. As noted above	The initial dose calculation in the PER from which the figure of 0.7μSv/h was derived was based upon the assumption that no radon was released from mined ore until such time as it was processed in the processing plant. However, radon will be released from the ore as a result of advanced

Submitter	Submission and/or issue	Response to comment
	proper references should be used to show how the value of 0.7µSv/h has been derived. Information Required – Justification for the dose rate applied from radon exposure. The proponent cannot simply apply the case of another mine, particularly when the value calculated is several times higher than that applied.	dewatering of the mine; radon will be released from the exposed face of the mine; radon will be released as result of the fact that about 85% of the mined ore will be processed by beneficiating it whilst it is still at the mine pit. In addition the 85% of the ore that is beneficiated at the mine site will, from then onwards, be contained in an aqueous solution – the radon emissions from ore that had been dewatered in advance and then subjected to extensive physical processing (the beneficiation) and then remains in an aqueous solution are expected to be very low in practice. The ore that is not beneficiated will be mined and then stockpiled at the mine site before being trucked to the main processing plant during which time the contained radon will be emanating. For these reasons the assumption that no radon will be released until the ore is processed at the main processing plant was considered unrealistic. There is no obvious way to calculate exactly how much of the radon will have been released from the ore by the time it reaches the main processing plant. However, another uranium operation that has an existing processing plant that handles greater volumes of higher grade ore in its processing plants reports radon emanation figures associated with its plant of approximately 0.08µSv/hr – rounded to 0.1µSv/hr. Since this figure is likely to be higher than that expected to be experience at Vimy's processing plant (due the lower grade and lower volumes associated with Vimy operations) adopting a figure of 0.1µSv/hr for exposure associated with radon progeny was believed to be a realistic but conservative assumption. Note that if Vimy had adopted a figure of 0.7µSv/hr instead of 0.1µSv/hr the annual dose projection shown in Table 13.9 of the PER would show that impact from Radon Decay Products (RnDP) would increase from 0.2 mSv/yr to 1.75mSv/yr and the potential total dose would increase from 2.8mSv/yr to 4.3mSv/yr which would still be a long way below the worker dose limit of 20mSv/yr.

Submitter	Submission and/or issue	Response to comment
DoE	*Section 13.5.4* The radon increase rate calculated is actually the instantaneous increase. Information Required – To estimate the average increase in radon concentration due to processing of the ore, the rate at which radon is put into the 'box' and the rate at which radon is lost from the 'box' both need to be known. A detailed calculation should be presented.	The radon increase rate calculated is indeed a representation of the instantaneous increase. Please see response to submission regarding Section 13.6.1 and Appendix F1-6-3 for details of calculation.
DoE	*Section 13.5.5 and Appendix F1 – 6.4* Some calculations in this Section of the PER appear to be incorrect. Uranium activity in dust is listed as 6.4 becquerels per gram (Bq/g), however for uranium ore of 600ppm, this should be 7.4 Bq/g. The dose calculation which lists 8 alpha emitters, should be 8.32 based on the Naturally Occurring Radioactive Material (NORM) guidelines. In this case, the calculated dust dose for a pit worker would increase from 600µSv/y to 800 µSv/y. Information Required – The calculations made in this section should be checked. If the value given (6.4 Bq/g) is because the Ore is not in equilibrium, then the dose conversion factor from NORM guideline cannot be applied directly and must be recalculated.	The uranium activity for a 600ppm uranium ore relates to a concentration expressed in U_3O_8, hence the discrepancy. Radiometric equilibrium has been assumed for the purposes of dose calculations.
DoE	*Section 13.6.1 and Appendix F1 – 6.1* A simple assessment of potential dose from Thoron is provided in Appendix F1. There is, however, no mention of potential dose from Thoron in the main text (in Section 13.6), and this dose is not included in projected worker doses.	The gaseous decay product of the Th^{232} decay chain is Rn^{220}, also called Thoron. Thoron ('Tn') decays with a 55 second half-life to produce a suite of decay products also called 'thoron daughters'. Thoron daughters (TnDP) are like radon daughters (RnDP) inasmuch as they can deliver a radiation dose to

Submitter	Submission and/or issue	Response to comment
	Information Required – Inclusion of Thoron in the dose calculations for workers or justification as to why Thoron has been excluded.	the lungs and thus may require active control in mine and plant, depending on concentration in workplace air. Thorium will release Tn continually into the air as it is being generated, and upon those ores being ground and leached. The fraction of Tn released, compared with that generated, per second, is the 'thoron emanation coefficient', analogous to the 'radon emanation coefficient'. Modelling of Tn needs to consider the release rate of Tn from the thorium in the ore in-process in plant. The total amount of thorium in plant at any time will equal the input rate x residence time. Thorium arrival rate is, for worst-case, (25 ppm Th x 1.7 mtpa) = 5.375 kBq/s, being the arrival rate into the hydrometallurgical plant. These figures are based on assay and flow of the beneficiated concentrate, assuming a 50% rejection of thorium through the beneficiation. A thorium leach fraction of 25% was used, compared to with current results suggesting a leach rate of 7 to 10% only. The resulting 1.344kBq/s represents the release from leaching. There is also release of Tn from the beneficiated ore resident in-plant, being generated by decay of the contained thorium, dependent on the total amount of thorium in the plant. The amount of thorium in the plant at any time is (for a conservative 24 hours residence time) = 1.344 x 86,400 = 116.1 MBq. This thorium is finely disseminated or in solution and assumed to release all Tn it generates as it progresses through the plant. The resulting Tn generation rate is: Parent activity / Tn mean lifetime = (116.1/(55 x 1.45)) = 1.46 MBq/s where mean lifetime = half-life x 1.45 From a potential dose impact on a plant worker, two scenarios were considered: • Perfectly still conditions with nor airflow during low level inversions • Low wind conditions with wind speeds of 1m/s

Submitter	Submission and/or issue	Response to comment
		In both cases, the dimensions of the box modelled are 500m x 500m x 10m for a total of 2.5 x $10^6 m^3$. Still air and low level inversion scenario: The Tn concentration will build up in this box at an initial rate of (1.46/2.5) = 0.58 $Bq/m^3/s$. This concentration build-up will flatten off over several Tn lifetimes, e.g. a few minutes, as rate of Tn atoms decaying in the air volume rises to equal rate of new Tn atoms being injected into the air (see diagram below).  The equilibrium air concentration will be: Build-up rate x T mean lifetime = 0.58 x 1.45 x 55 = 46 Bq/m^3

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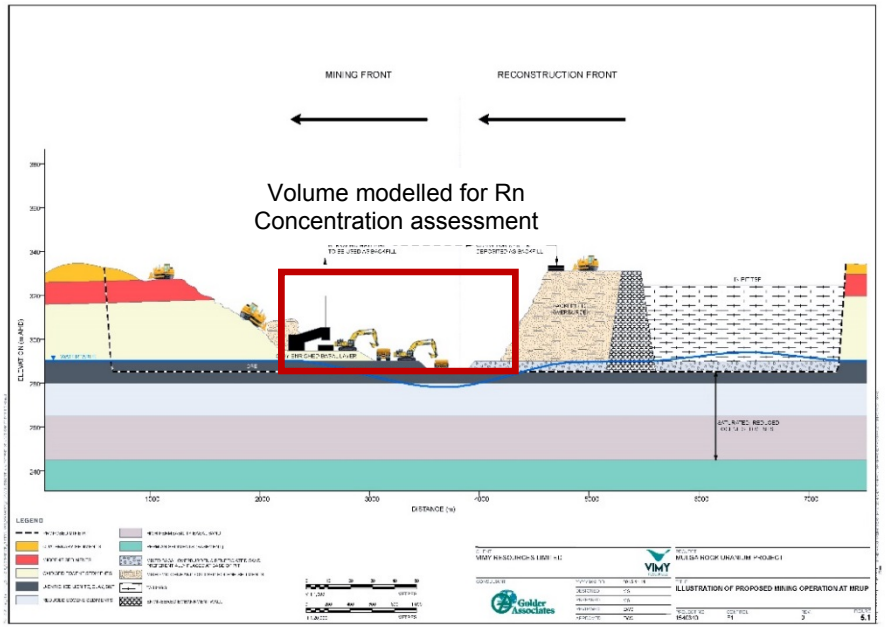
		Using the dose conversion factor of 7mSv per 100 Bq/m^3 for 2,000 hours in RPS #9.1 (or 0.035 µSv/Bq.hr/m^3), one hour of exposure to that air will deliver a notional dose of 1.6 µSv /hr from Tn. Assuming those conditions prevail for three hours every early morning for a full two months for a night shift worker on a 2 and 1 roster, this would result in a notional cumulative dose of 40 x 3 x1.6 = 196 µSv or 0.2 mSv. <u>1m/s wind conditions scenario:</u> Under those conditions, the effective half-life combining both physical decay and dilution and removal by turbulence (eddy diffusivity) is about 8 seconds. This reduces the equilibrium concentration from 46 to 6.7Bq/m^3 for a notional dose rate of 0.23 µSv/hr. Assuming those conditions prevail for the remainder of the year for a worker on a 2 and 1 roster, this would result in a notional cumulative dose of 240 x 10 x1.6 = 3,840 µSv or 3.84 mSv or a notional combined dose of 4.04mSv. RPS No.9.1 dose conversions assume equilibrium factors of 1, with known TnDP/Tn Equilibrium Factors in atmosphere in the literature ranging between 0.01 to 0.001. This is consistent with in-field observations at Mulga Rock and another Australian project involving NORM (Sonter *et al.*, in press). For the purposes of modelling potential doses, the proponent used a conservative disequilibrium factor of 0.02, delivering a maximum annual effective dose from Thoron of 80.8 µSv or 0.08mSv.
DoE	*Section 13.6.1 and Appendix F1-6-3* Using an alternative method to calculate the radon levels in the pit (Thompson, RS 1994, 'Residence Time of Contaminants Released in Surface Coal Mines – A wind tunnel study) yields results from predicted radon of: • 72 Bq/m^3 for 1 metre per second (m/s) wind • 30 Bq/m^3 for 2.4 m/s wind (a typical average value for the site)	The concentrations derived for figures of 1 and 2.4m/s based on the Thompson (1994) are incorrect, as shown below. The radon concentrations in the pit depend on the rate of increase related to the flux from the pit floor and the ventilation rate of the pit (under normal conditions, the number of air changes that occur per hour). This figure can be calculated using Thompson (1994) formula of: T=33.8 x (V/UrLW) x (0.7 cos(x) + 0.3) where;

Submitter	Submission and/or issue	Response to comment
	These values are higher than the 20 Bq/m^3 listed. Information Required – Dose values may be higher than those listed in the assessment. Further clarification required. Conversion to PAEC using equilibrium factor listed in 6.3: • 72 Bq/m^3-> 0.12µJ/m3 • 30 Bq/m^3-> 0.05uJ/m3 Dose conversion for pit workers using RPS9 factor of 1.4 mSv per mJ h m^{-3}: • 0.12µJ/m^3 -> 0.4mSv • 0.05µJ/m^3 -> 0.18mSv Dose conversion for pit workers using ICRP 2015 recommendation of 3.4 mSv per mJ h m^{-3}: • 0.12µJ/m3 -> 1 mSv • 0.05µJ/m3 -> 0.4 mSv	T is the rate of change (h), V is the pit volume, calculated to be 30.0 x 10^9m^3 for a 50m deep pit Ur is the wind velocity in meters per hour L is the length of the pit (500m), and W is the width of the pit (1,200m) X is the angle of the wind to the long axis of the pit (30°) Rates of changes derived for wind speeds of 1 and 2.4m/s are 0.43 and 0.18, or 2.35 and 5.64 air changes per hour. The equilibrium radon concentration is the steady state concentration that is reached when the generation rate is balanced by the ventilation rate. For radioactive gases, the half-life is an important constant, since decay of the gas will also occur; this is critical in assessing conceptual concentrations of thoron with a half-life of 55s but less so for radon with a half-life of 3.8 days. For modelling purposes, the decay of radon has been ignored. The equilibrium concentration of radon in the mine can then be derived using the following formula: Rn (Bq/m^3) = Radon generation rate (Bq/hr) / (Mine volume x number of air changes per hour) The radon generation rate is dependent upon: Area of pit floor exposed: 20ha or 200,000m^2 Radon flux rate: 2Bq Rn/m^2/s, resulting in a radon release of 0.4MBq/s. The resulting steady state concentrations are as follow: 1.0m/s: 20.4Bq/m^3 2.4m/s wind (typical conditions): 8.5Bq/m^3

Submitter	Submission and/or issue	Response to comment
		The value of 20Bq/m^3 for the 1.0m/s wind speed modelled in in good agreement with that alternative approach and demonstrates once again the conservative attitude of this assessment and supports the resulting figure of 0.11 mSv based on the current RPS9 dose conversion factor. Assuming the ICRP 2015 recommended conversion factor of 3.4mSv/mJ.h.m^3, the resulting dose conversion for pit workers increases from 0.11mSv to 0.27mSv. For the purpose of modelling, a conservative approach was taken, assuming the pit volume to be limited to a vertical projection of the floor extents to the original surface, ignoring the extra volume of air provided due to pit walls angles and the nature of overburden stripping and backfilling in the mining and reconstruction fronts (see below). 

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<tr><th>Submitter</th><th>Submission and/or issue</th><th>Response to comment</th></tr>
<tr><td>DoE</td><td>Section 13.6

When considering the methods of assessment discussed in the comments above and comparing the alternative assessment (and Thoron dose) with the PER dose assessment presented in Table 13.7, the following doses are obtained;

<table><tr><td></td><td>Gamma</td><td>Dust</td><td>Radon</td></tr><tr><td>Table 13.7</td><td>2.6</td><td>0.6</td><td>0.1</td></tr><tr><td>Alternative assessment</td><td>4.8</td><td>0.8</td><td>0.4</td></tr></table>
Information Required – Dose calculations need to be shown in their completeness, with all assumptions justified.</td><td>Please see response to previous submission for the assessment of potential dose assessment ranges. The proponent also notes that at the time of completing the impact assessment, ARPANSA (the regulatory authority) had not reviewed those recommendations for adoption into a future review of RPS No.9 nor advised the suitability of those dose conversion factors to an environmental risk assessment.

Once reviewed and if deemed valid by ARPANSA for the purpose of a risk assessment, the proponent will derive an alternate dose assessment to reflect new dose conversion factors. However, based on the data gained from gamma rates from 2016 bulk samples, and using potential revisions on dose conversion factors argued for in the submission, the total exposure is likely to very closely approximate the original value total dose exposure.

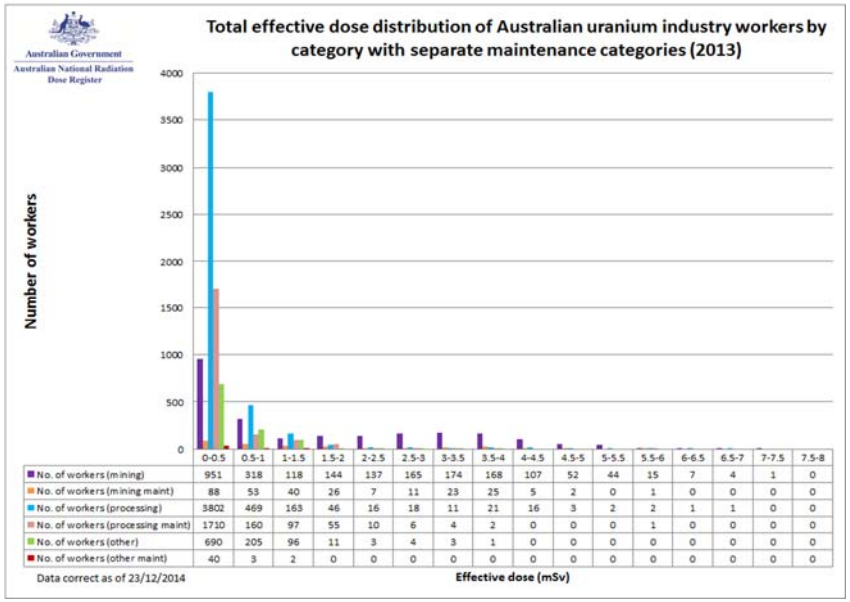
<table><tr><td></td><td>Gamma</td><td>Dust</td><td>Radon</td><td>Thoron</td><td>Total (mSv)</td></tr><tr><td>Table 13.7</td><td>2.6</td><td>0.6</td><td>0.11</td><td>-</td><td>3.3</td></tr><tr><td>Alternative assessment</td><td>2.0</td><td>0.6</td><td>0.11-0.27*</td><td><0.1</td><td><2.8-3.0</td></tr></table>
* 0.11 if using steady state concentration for a typical wind speed of 2.4m/s and the ICRP 2015 recommended conversion factor of 3.4mSv/mJ.h.m^3 (0.27*8.5/20.4).</td></tr>
<tr><td>DoE</td><td>Section 13.6.1

The PER states “…filtration systems for the cabs of mobile equipment remove all airborne dust”.

Information Required – Justification is required for this statement. Additionally, the radiation management plan should include</td><td>The filtration systems for the cabs of mobile equipment referred to in Section 13.6.1. As discussed above, filters to HEPA specifications need to remove at least 99.97% of particles sizes of 0.3 µm (and likely much greater efficiency for particles sizes more typical of AMAD in open pit mining (somewhere between 2 and 5 µm). Some of the best rated HEPA masks have an efficiency rating of</td></tr>
</table>

Submitter	Submission and/or issue	Response to comment
	provision for regular replacement of filters and monitoring of the effectiveness of these filters.	99.995% for particles sizes of 1 µm, increasing to greater than 99.999% for particles greater than 2 µm.
DoE	*Section 13.7.3* The PER references previous work from ANSTO (1989). It is not indicated if the measurements made on ore and waste by ANSTO were from Mulga Rock. Information Required – This needs to be clarified.	All samples used for that survey were derived from exploration holes drilled at Mulga Rock, from the Ambassador deposit. Those samples were collected 100m away from the bulk ore samples collected at the base of the East Ambassador geotechnical trench. This allowed for effective comparison of radon emanation coefficient with actual radon flux measured at the base of the trench in early 2016.
DoE	*Section 13.7.7* The PER refers to "The model…", but does not specify which model was used. Information Required – Clarification is needed.	The model discussed in the PER referred to the hypothetical model assuming extremely conservative consumption of local food sources, with intakes of 155kg/yr of plant material and 125kg/yr of animal material. This hypothetical model also assumed that people ingesting this food live permanently close to site (despite the lack of amenities) and only consume locally sourced food.
DoE	*13.7.9 Human Health- Product Transportation Routine trucking of the final uranium product to Port Adelaide (pg. 325)* Inadequate coverage: Transport options Information Required – The transport of uranium is of interest and concern to regulatory authorities and the public. Best practice experience shows projects are well served by minimising risk from the transportation component of the production cycle. Logistical and permitting circumstances at WA ports, which are much closer than Adelaide, currently preclude these ports as an option. The relatively lengthy mileage to Adelaide (more than double the distance to WA ports), increases the risk of road incidents and accidents and could potentially result in public concerns and objections regarding transportation of the product.	As DoE correctly observes Vimy is currently precluded from exporting uranium from WA ports. Vimy acknowledges that exporting from such ports would be preferable in terms of reducing the distance the product needed to be transported by road with the attendant risk of road incidents and accidents. Vimy does not agree with the implied assertion that in light of the 16-year mine life Vimy should consider including WA ports in its options. Vimy needs to transport its uranium via a port that deals with shipping containers, is capable of handling Class 7 goods, and that has a regular throughput of vessels capable of and prepared to ship Class 7 goods. The only port in WA that has sufficient container traffic to meet Vimy's requirements is Fremantle. Vimy does not believe that there is a realistic prospect of Fremantle being prepared to accept uranium shipments transiting through the port within the 16-year lifetime of the Project. Even raising it as an option is likely to provoke a hostile response and unnecessarily raise fears about Vimy's intentions.

Submitter	Submission and/or issue	Response to comment
	The proponent will also be required to undertake separate environmental and approvals processes for the South Australian segments of the proposed transport route. Discussion around the flexibility of Vimy Resources' transport route options should include the future potential for export from a WA port, particularly in light of the lengthy time for which the proposed project could operate.	
DoE	*Section 13.8.1* The PER discusses components of 'As Low As Reasonably Achievable' (ALARA). One important component of ALARA that is missing is avoiding or minimising unnecessary exposures. Information Required – An indication of how this will be done needs to be provided.	The ALARA principle for limiting radiation exposure will be used as a part of the company's Safety Management System, encompassing site activities from a design to operation to closure phase. As part of that system and through ongoing job safety analyses, avoiding or minimising unnecessary exposures will be achieved through the judicious use of resources potentially exposed to radiation as a result of design, planning and corrective actions.
DoE	*Section 13.8.2* The PER states that "Hazards and risks, including radiation, are most effectively controlled through good design decisions at an early stage". Control by design is only a plan, based on assumptions, and cannot guarantee control of hazards and risks. Information Required – The management plans need to include provision for checking whether the design assumptions remain valid, and that the plan is working as expected.	Noted. The Western Australian NORM Guidelines # 3.2 specifically covers operational monitoring requirements, specifically the various elements to be considered in the program design. The operation Radiation Management Plan (to be developed in consultation with the relevant regulatory agencies and in accordance with NORM Guideline # 2.2) will clearly identify potential pathways, supervised and controlled areas and employees or employee groups to be monitored. Annual statutory reporting and ongoing engagement with various regulatory agencies will ensure effective reporting and management of risks. Equipment and facilities for controlling radiation sources, institutional controls and training of personnel, as well as records managements will also be detailed in the operation Radiation Management Plan.

Submitter	Submission and/or issue	Response to comment
DoE	*Section 13.8.3, ParagraphR2.* The PER quotes gamma radiation exposures of "up to 5 millisieverts per annum (mSv/a)". This appears to be low for ore at 600 ppm. See previous comment on alternative dose assessment. Information Required – Details of the calculations need to be provided.	This level of prediction is borne out by experience in operations characterised by grades much greater than those anticipated at the Project (e.g. Ranger, NT, where doses only rarely got above about 1 mSv).  0-0.5 0.5-1 1-1.5 1.5-2 2-2.5 2.5-3 3-3.5 3.5-4 4-4.5 4.5-5 5-5.5 5.5-6 6-6.5 6.5-7 7-7.5 7.5-8 No. of workers (mining) 951 318 118 144 137 165 174 168 107 52 44 15 7 4 1 0 No. of workers (mining maint) 88 53 40 26 7 11 23 25 5 2 0 1 0 0 0 0 No. of workers (processing) 3802 469 163 46 16 18 11 21 16 3 2 2 1 1 0 0 No. of workers (processing maint) 1710 160 97 55 10 6 4 2 0 0 0 1 0 0 0 0 No. of workers (other) 690 205 96 11 3 4 3 1 0 0 0 0 0 0 0 0 No. of workers (other maint) 40 3 2 0 0 0 0 0 0 0 0 0 0 0 0 0 Figure 6.1 (from ANRDR, B. Paritsky, ARPANSA) and Table 6.4 (from Olympic Dam EIS 2009) in Section 6.5.1 of Appendix F1 (reproduced here) clearly support these empirical observations, with almost no exposure of Australian uranium industry workers to effective doses in excess of 5mSv/a, including gamma radiation, dust, and radon decay products.

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<tr><th>Submitter</th><th>Submission and/or issue</th><th>Response to comment</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><th rowspan="2">Mine and type of worker</th><th rowspan="2">Ore grade (%U_3O_8)</th><th colspan="2">Total dose</th><th colspan="2">Gamma</th><th colspan="2">Radon</th><th colspan="2">Dust</th></tr>
<tr><th>Avg</th><th>Max</th><th>Avg</th><th>Max</th><th>Avg</th><th>Max</th><th>Avg</th><th>Max</th></tr>
<tr><td>Ranger Mine Worker</td><td>0.29</td><td>1.0</td><td>4.8</td><td>0.5</td><td>4.3</td><td>0.1</td><td>0.4</td><td>0.3</td><td>0.9</td></tr>
<tr><td>Rössing pit equipment operator</td><td>0.035</td><td>2.1</td><td>n.a.</td><td>0.6</td><td>n.a.</td><td>1.2</td><td>n.a.</td><td>0.4</td><td>n.a.</td></tr>
<tr><td>Rössing pit field staff</td><td>0.035</td><td>2.5</td><td>n.a.</td><td>1.0</td><td>n.a.</td><td>1.1</td><td>n.a.</td><td>0.4</td><td>n.a.</td></tr>
<tr><td>McLean Lake open pit workers</td><td>1.6</td><td><1</td><td>n.a.</td><td>n.a.</td><td>n.a.</td><td>n.a.</td><td>n.a.</td><td>n.a.</td><td>n.a.</td></tr>
<tr><td>Canadian surface miners 2004</td><td>Various</td><td>1.1</td><td>< 5</td><td>n.a.</td><td>n.a.</td><td>0.3</td><td>n.a.</td><td>n.a.</td><td>n.a.</td></tr>
<tr><td>Nabarlek open pit worker</td><td>2</td><td>6.6</td><td>n.a.</td><td>2.3</td><td>10</td><td>0.3</td><td>n.a.</td><td>4</td><td>n.a.</td></tr>
<tr><td>Olympic Dam underground mine worker</td><td>0.07</td><td>3.8</td><td>10</td><td>1.8</td><td>4.8</td><td>1.8</td><td>4.7</td><td>0.2</td><td>0.5</td></tr>
<tr><td>Estimated (maximum probable) Olympic Dam Expansion open pit worker</td><td>0.05</td><td>3.5</td><td>8</td><td>1.4</td><td>4</td><td>-</td><td>2.3</td><td>0.1</td><td>1.7</td></tr>
</table>
By comparison, the average individual effective dose at Canadian underground uranium mines in 2011 (dealing with much higher grades than at Mulga Rock) was below 1.4mSv. (https://www.cameco.com/uranium_101/mining-milling/more-topics/safety/)
</td></tr>
<tr><td>DoE</td><td>Section 13.8.3

The PER states “active radon (and radon progeny) control is unlikely to be necessary during mining operations”. This statement may not be justified.</td><td>Measures relating to active management of radon concentrations during mining operations will be addressed in the operation Radiation Management Plan, and will require approval from the relevant statutory agencies.</td></tr>
</table>

Submitter	Submission and/or issue	Response to comment
	Information Required – It is a good idea for the proponent to maintain active monitoring, at least during commencement of mining to ensure radon levels are low. This would be part of their RMP.	The proponent has been actively involved in ongoing monitoring of environmental and environmental types of radiation present at the Project, as detailed below: • Passive Radon Monitors: continuously since October 2012 • Environmental Thermoluminescent Dosimeters (TLDs issued by ARPANSA) on a quarterly basis since October 2008 • High Volume Sampler (for airborne dust concentration, and radionuclides concentrations in dust) since May 2012 • Continuous radon daughter monitoring (using an ERDM from Radiation Detection System) since May 2012 • Dust Deposition Gauges (DDG), for passive dust measurements, recorded at 10 sites (recently expanded to 14) across the project since July 2013 • Weather data (for solar radiation): Continuous records have been collected since late 2009 across three stations using Mark4 automated weather stations • Continuous environmental radon monitoring in December 2014-January 2015 (using Durridge RAD7 units on loan from Cameco Australia) • Charcoal canister (Countess Method) radon emanation measurements on ore and cover material in February 2015. • Measurements of radon and thoron emanation from dry and wet ore and potential clay liner, as well as bulk barren overburden material using Durridge RAD 7 units (ongoing).
DoE	*Section 13.8.8* The PER states “The above ground tailings will be capped, covered…manner that prevents radon….no alpha dust or gas emanations”. An assumption is made that all radon and dust will be prevented.	Vimy acknowledge that over long-time scales biotic processes, including deep-rooted vegetation and burrowing fauna, can result in a hydraulic and atmospheric connection with the surface. Furthermore, all above-ground post-mine landforms will experience some degree of peneplanation potentially exposing encapsulated radioactive material over a 10,000-year period. Although this is the case, it is important to recognise that the tailings pH (around 4.5) and atmospheric conditions will limit the mobility of uranium in exposed tailings. Similarly, at an assumed uranium content of <100ppm for tailings, the

Submitter	Submission and/or issue	Response to comment
	Information Required – The proponent should consider the effects of erosion and degradation of capping overtime, including factors such as water, wind, deep-rooted flora and burrowing fauna.	corresponding gamma activity is expected to be <0.5uSv/hr, which equates to 4.4mSv/yr – slightly above the typical background value of 2mSv/yr and well below the acceptable occupational level of 20mSv/yr. It is still Vimy's preference to store all tailings within the in-pit TSFs, with the above-ground TSF only to be used as a contingency, as this will remove the risk of peneplanation (wind and water erosion) exposing the tailings. Over the TSFs only shallow-rooted revegetation species will be used, with the cover system of sufficient thickness to support the transpiration requirements of the vegetation species; hence preventing the need to root deeper into the profile to extract soil moisture and potentially penetrating through the capillary break and into the tailings. It is envisaged over the medium to long-term the adverse physical and chemical properties of the tailings (i.e. acidic and hypersaline) will limit the extent to which biotic processes interact with the tailings. Field-scale measurements using detailed ground-based LiDAR are currently being undertaken to quantify wind and water erosion processes on-site. The results from this work will be used to update the landform evolution modelling for the TSFs to establish an optimal cover system that is stable over the long-term and provides the necessary level of environmental and community protection. This will provide the required quantitative assessment. The results of the updated landform evolution modelling will be reported in the Mining Proposal and Mine Closure Plan for approval by the Department of Mines and Petroleum, Department of Environment Regulation and Radiological Council prior to implementation of the Project.
DoE	Human Health, Tailings 13.8.8 Post Closure (pg. 332) Rehabilitation and Closure, 15.8.2 Ore and Tailings Materials, Tailings (pg. 364) Inadequate coverage: Best practice is to store tailings in the mining void, leaving the land surface much like it was pre-mining.	Vimy acknowledges the increased risk associated with the above-ground TSF, and reiterate that this landform will only be used as a contingency if the in-pit TSFs cannot be used for some reason. The above-ground TSF will be constructed, operated and closed according to best practice, as outlined in the DMP (1999) *Guidelines on the Safe Design and Operating Standards for Tailings Storage* and ANCOLD (2012) *Guidelines on Tailings Dams*.

Submitter	Submission and/or issue	Response to comment
	Information Required – The tailings management strategy for the proposal has been developed by benchmarking against industry accepted leading tailings management practices. The strategy selected, to return the majority of tailings to mined-out pit voids to ensure their isolation and to prevent any adverse impacts to the environment and human health and safety, represents best practice tailings management. Once sufficient voids have been created tailings will be deposited back into the unlined pit below the biologically active zone and subsequently capped. The report notes pg. 15 that *"TSFs and any other facilities are always preferably located in depressions or low points rather than elevated areas".* However, one of the three tailings facilities is planned as an above ground feature. The above ground tailings facility will be capped, covered and rehabilitated in a manner that prevents radon emanation. The ore material is classified as potentially acid forming and may release acidity under appropriate conditions. The submitter suggests that the Proponent provide greater reasoning of why above ground storage of tailings is proposed and suitably address the differing risk profile of an above ground TSF.	The specific details on closure of the above-ground TSF, including cover system thickness to support the growth requirements of revegetation and provide safeguards against peneplanation processes (i.e. wind and water erosion), will be outlined in the Mining Proposal and Mine Closure Plan to be submitted to the Department of Mines and Petroleum and the Environmental Protection Authority for approval prior to implementation of the project.
DoE	*13.8.8 Human Health, Tailings- Post Closure (Pg. 332) Rehabilitation and Closure, 15.8.2 Ore and Tailings Materials, Tailings (pg. 364)* Inadequate coverage: Risk of lateral transmission of tailings Information Required – Previous work in the area has identified local fault scarps *http://www.ga.gov.au/darwin-view/hazards.xhtml.* These features have not been adequately identified and incorporated into risk assessments in the PER relating to: tailings and overburden facilities, as well as landform modelling over 10,000 years.	The local fault scarps have not shown any significant activity within the last 100 million years. The above ground tailings facility will be constructed to standards appropriate for the level of seismic activity associated with the area and there is no risk that earthquakes will lead to cracks in the sides of the above-ground tailings facility which will be double lined (which includes a polyurethane liner). Any cracks in the base of the facility would simply enable liquid to seep through faster than expected from where it would migrate down to the underlying aquifer and be collected by the carbonaceous material located there.

Submitter	Submission and/or issue	Response to comment
	An above-ground TSF faces additional risks in comparison to in-pit TSF, due to the potential for earthquakes to cause minor cracking and increased permeability of seal material. This creates the potential for lateral flow from the TSF to sandstone rather than to the carbonaceous material below. While noting the existence of carbonaceous material in the project area which could be an eventual receiver, elements exposed to the oxidising low carbon environment in the sandstone will be highly mobile compared to those remaining in a carbon rich, reducing environment. This risk, while possibly low, needs to be examined and incorporated into the PER.	Vimy acknowledges that there is evidence consistent with the Queen Victoria Scarp having been active in the last 2.4 million years. However, there is no evidence that this structure extends into the Mulga Rock Project area. An analysis of exposed sediments from past and recent test pit activity shows no evidence of post-Miocene faulting which suggests that there has been no significant activity within the local area within the last 5 million years. Vimy estimates that the large regional fault scarps have not been active for more than 100 million years notwithstanding the fact that there have been small movements in scarps within the region which do not extend into Vimy's Project area.
DoE	*Appendix F1 - 3, final dot-point* The PER gives a description of "Ingestion and absorption of radioactive material." It should be noted that ingested radionuclides can also deliver a radiation dose to the walls of the various parts of the gastro-alimentary tract. This dose can be higher than the dose delivered to other internal organs after dissolution in the stomach. Information Required – These doses need to be included in any estimate of committed effective dose resulting from ingestion.	Noted. For all internal dose calculation, the relevant dose conversion factors determined by the ICRP will be used, for alpha, beta and gamma radiation (expressed in μGy/hr/Bq/m^3), for the relevant isotopes (most likely Ra^{226} and Po^{210}). Those doses will then be used to derive total committed doses from ingestion.
DoE	*Appendix F1 - 4.4, Page 27, first paragraph* The PER states that "there is a pronounced diurnal cycle". The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) (ARL) measurements over an extended orebody have shown that near surface radon concentrations under nocturnal inversion conditions can be three orders of magnitude higher than average daytime levels. This possibility is noted in the following paragraph.	Noted. Various relevant aspects of the project will be addressed in the operation Radiation Management Plan (RMP), and developed through consultation with the relevant statutory authorities. Depending on the risk assessment underpinning the RMP, this might imply real-time monitoring of RnDP and operational responses and planning around that potential issue, with limits placed or a permit system used to allow entry into the pit by peripatetic workers, until inversion conditions have abated.

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	Information Required – The RMP will need to discuss appropriate measures to deal with this potential problem.	
DoE	*Appendix F1 -4.4, Page 30.* The PER states that "These large natural variations will swamp any Project-increment RnDP". This assumes that modelled values will be consistent with mining operations. Information Required – Modelled outputs need to be checked against monitoring once mining/processing commences.	Agreed. Dust monitoring since 2012 and ongoing weather data collection suggests that large natural variations will dominate the RnDP concentrations in the region of the Project, largely swamping any incremental concentrations associated with dust emissions from the project.
DoE	*Appendix F1 - 5.1.4* The PER does not consider the possibility that radon could be released from groundwater when it is brought to the surface (outgassing) (also see Appendix F1 - 6.2.5). Discussion should be included. Information Required – This discussion should be part of the RMP.	This matter was specifically discussed in Section 5.1.2 and assessed in Section 6.2.5 of Appendix F1. The following assumptions were made for the purposes of the assessment: • A daily radon released as a result of pit dewatering using a rate of 4,000 m^3 groundwater/day. • The radon content of the groundwater is modelled to be approximately 5 MBq/m^3. This is derived on the basis of a porosity of 50%; grade of 8 BqRa/g; and 50% partitioning of Rn between solids and water. On this basis, the radon released from pit dewatering will be 200 kBq/s. However, this compares with measured peak concentrations of 500-600kBq/m^3 (or about 10% of the rates assumed) derived from actual high-flow pump test-work associated with dewatering the ore zone in the Ambassador east geotechnical investigation trench in early 2016. This suggests that the assessment of radon release from groundwater dewatering is likely to prove very conservative. These measurements will be used in preparing the operation Radiation Management Plan.
DoE	*Appendix F1 - 6.3*	Noted.

Submitter	Submission and/or issue	Response to comment
	Nocturnal inversions tend to develop from the ground upwards, because the ground cools faster (at night) than the overlying air. Information Required – The calculations in this section may need to be checked.	The calculations in Section 6.3 of Appendix F1 will be updated once long-term radon fluxes are measured on bulk ore samples.
DoE	*Appendix F1 - 6.4* The PER indicates that the "global average" U238 concentration is used for calculations. It would be clearer to refer to this as 'site average', as seems intended. Information Required – Clarify and apply to site calculations where appropriate.	Noted. The global average referred to in Appendix F1 – 6.4 referred indeed to the site average, and not intended to refer to worldwide concentrations.
DoE	*Appendix F1 -10.2* The PER states "Action levels will be defined in consultation...at the time of development of RMP". Information Required – The draft of the RMP should be developed, with the prospective action levels. Although there are some action levels listed in Section 13.8.6, Table 13.20, it would be easier to assess these as part of a draft plan.	This is indeed a component of the operation Radiation Management Plan, to be developed in consultation with regulatory authorities, as required under the Western Australian Department of Mines and Petroleum's NORM Guideline 2.2.
DoE	*Bush tucker assessment is summarised in section 11.7; with technical details in Appendix F1.* Assessment of risks to human health from bush tucker consumption in the region from radiological sources and other contaminants, based on local diet. Where a local community is not present a hypothetical model should be used, taking into account a worst-case scenario. Information Required – Ingestion dose assessment is provided in Appendix B of Appendix F1. Table 9 provides the Concentration	The impact assessment conducted for the PER, summarised in Table 11 of the PER shows that the estimated potential ingestion dose for the closest sensitive receptor (apart from the mining village location) is 0.1mSv/y. This assessment assumed that all food consumed over the course of one year would be sourced from that particular location. In practice, this is highly unlikely and therefore is conservative. Typically, whole body concentrations provide a weighted average of radionuclides in various organs of a species, for example for animals, it factors in radionuclides in flesh, internal organs and bones. Various radionuclides are

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	Ratio's (CRs) used, however these are for whole organism rather than tissue specific. Unless whole organisms are consumed this assessment is Inadequate. Suggest to use whole-body/tissue conversion factors in Yankovich et al 2010 (Yankovich, T.L., Beresford, N.A., Wood, M.D., Aono, T., Andersson, P., Barnett, C.L.,Bennett, P., Brown, J.E., Fesenko, S., Fesenko, J., Hosseini, A., Howard, B.J.,Johansen, M.P., Phaneuf, M.M., Tagami, K., Takata, H., Twining, J.R., Uchida, S., 2010. Wholebody to tissue concentration ratios for use in biota dose assessments for animals. Radiat. Environ. Biophys. 49, 549-565.) Whole body /tissue conversion factors do not appear to have been applied. It is acknowledged the bush tucker ingestion pathway doses that have been calculated using whole body CR's are extremely low. It is recommended that the bush tucker used in the PER ingestion dose assessment be reviewed to identify those organisms where only specific tissue is consumed rather than the whole organism. Whole body/tissue conversion factors should be applied for these organisms to more accurately reflect the potential ingestion dose from bush tucker.	known to exist at higher concentrations in different organs and this information has been summarised at the following web address: *https://wiki.ceh.ac.uk/display/rpemain/Tissue+to+Wholebody+Conversion* The information indicates that the whole body-to-tissue ratios for uranium, radium and lead for muscle, liver and kidney are greater than 1. This means that whole body radionuclide concentrations will overestimate the concentrations of radionuclides in flesh, liver and kidney for these elements. For bone, the ratios are less than 1, but bone is generally not consumed. For polonium, the ratios are less than 1 for liver and kidney, meaning that polonium concentrations are higher in the organs that the whole body concentrations. However, this is will not make any change to the conclusion that potential impacts are minimal because the quantity of liver and kidney from animals consumed would be a very small part of a diet. Since bones and the internal organs are not generally consumed, it was considered appropriate to conservatively use whole body concentrations rather than just flesh concentrations when assessing internal doses. This was not made clear in the PER or in Appendix F1. Additional work is not considered to be necessary given that the conservative modelling and assessment has shown that the potential ingestion doses will be very low.
Radiological Council	The proponent has addressed the key requirements for radiation under the *Radiation Safety Act 1975* and relevant codes of practice. The risks associated with radiation are to be addressed in the RMP and can be adequately monitored and managed under this plan. It is expected that this will be submitted directly to the Radiological Council under the *Radiation Safety Act 1975* and DMP under the *Mines Safety and Inspection Act 1994* for approval prior to the commencement of each stage of the project.	Noted. The proponent agrees with the Radiological Council assessment that the risks associated with radiation are to be addressed in the Radiation Management Plan and will be adequately monitored and managed under this plan. The proponent will engage early with relevant stakeholders in developing this Radiation Management Plan.

Submitter	Submission and/or issue	Response to comment
United Church WA	*The dangerous nature of uranium throughout its full life cycle* The risks involved with extracting, storing, transporting and processing the ore and its by-products are much too high to be approved as a safe activity. Given that the waste material retains its radioactivity for thousands of years, rehabilitation of the area is unrealistic as there will be ongoing risks of contamination from the pit which is proposed to be backfilled with the mine's waste material and tailings.	Vimy does not accept the assertion made by the United Church WA that the risks involved with extracting, storing, transporting and processing the ore and its by-products are much too high to be approved as a safe activity. Vimy acknowledges that the waste material (tailings) retains its radioactivity for thousands of years, but does not accept that this in any way implies that rehabilitation of the area is unrealistic. The tailings will be permanently isolated from any sensitive environment receptors. It is not correct to assert that there will be any significant ongoing risks of contamination from the pit because the tailings will be buried under sufficient quantity and quality of material to ensure that there is no real risk of contamination and that any contaminants will migrate into the local aquifer where they will be permanently sequestrated by carbonaceous material. In the unlikely event that the sequestration is not effective the contaminants will remain in the aquifer which itself remains permanently isolated from any sensitive environmental receptors.
PND (WA)	According to the World Health Organisation (WHO), Radon 222 gas is the second leading cause of lung cancer globally. Why should workers at the mine have to compromise their health to earn a living? Who is to be held liable when human health is damaged and when the environment is harmed by the activities of this mine? Will it be the mining company that might have profited by its activities? Or will it be the taxpayers – many of whom might have opposed uranium mining in the first place?	Vimy acknowledges that, according to the World Health Organisation, "Radon is the second cause of lung cancer in the general population, after smoking". However, the WHO also noted that it is a "radioactive gas that emanates from rocks and soils and tends to concentrate in enclosed spaces like underground mines or houses". The issue of radon gas will be managed to ensure that workers are not exposed to levels of radon gas that could compromise their health. Vimy does not accept the premise that human health will be damaged or that the environment will be harmed by its activities and therefore it does not accept that there will be an entity that needs to be held liable.
P3, Proforma	*Occupational health and safety* Uranium mining put workers at additional risk to regular mining including cancer. Uranium mine workers are often told that the radiation doses they receive are below or close to background	Vimy acknowledges that the protection afforded to uranium miners in the past was not sufficient to prevent adverse health consequences. Vimy has calculated the likely additional exposure for workers at the mine-site and has calculated that the most exposed workers will be subject to an

Submitter	Submission and/or issue	Response to comment
	levels and below permissible limits - the implication being that the radiation doses are 'safe'. However, the doses received at the mine site are additional to background radiation so workers are at additional risk of fatal cancers. International cancer incidence and mortality data demonstrate statistically significant links between radiation and all solid tumors as a group, as well as for cancers of the stomach, colon, liver, lung, breast, ovary, bladder, thyroid, and for non-melanoma skin cancers and most types of leukemia. Over the years the permitted levels of radiation exposure for workers and the public have dropped dramatically as research, particularly from radiation biologists, indicates harmful effects still exist at much lower exposure levels. For workers, the permitted dose was set at 500 mS/a in 1934, 150 mSv in 1950, 50 mSv in 1956, and 20 mSv (averaged over five years) in 1991. The limit for members of the public is just 1 mSv. The submitter considers that there is no safe dose. Any suggestion that it is not dangerous particularly to foetus and under 40 years old is false. There is ample evidence in scientific literature that one-fifth to one-half of uranium miners in North America have suffered from lung cancer. Uranium miners are also exposed to carcinogenic whole body gamma radiation as well as the ingestion of radium – the element that induced leukemia in Madame Marie Curie. Uranium mining can destroy the genetic integrity of life and lead to mutations and deformities – a legacy which could ultimate cause untold misery and the extinction of all life as we know it. Radioactive waste poses a threat to all life by damaging the DNA that has taken millions of years to evolve to the great diversity of lifeforms on earth today. Mining uranium shows disrespect to all species and their hard fought adaptations.	additional amount less than 3mSv/yr against the accepted limit for workers of 20mSv/yr. Vimy acknowledges that some people genuinely believe that there is no safe dose. However, the regulations designed to protect workers do not accept that assertion and Vimy accepts that the limits required by the regulations are sufficient to ensure that workers are properly protected. Vimy acknowledges that in earlier periods there was inadequate protection afforded to uranium miners particularly in circumstances where miners were mining underground and therefore at risk to exposure from elevated concentrations of radon gas. Vimy notes that it will be operating an open-cut mine where the issue of a build-up of radon gas is unlikely to eventuate (other than during brief atmospheric inversions which will be dealt with by monitoring radon levels in the pits and preventing access to areas if and when such builds-ups occur). Vimy does not accept that uranium mining undertaken as part of its proposal will destroy the genetic integrity of life or lead to any mutations or deformities; Vimy does not accept that there is any possibility that it will lead to a legacy that could ultimately cause untold misery let alone the extinction of all life as we know it. The radioactive waste (tailings) generated during Vimy's operations will be isolated from any sensitive environmental receptors and will not pose a threat to any life forms or lead to any damage to any DNA.

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Proforma, P3	Submitters raised the following concerns regarding human health: • Radioactive dust from mining activity and waste dumps has potential to blow hundreds of kilometres and contaminate food chains. • Food and drink from the Fukushima disaster was probably contaminated from the radioactivity. • Uranium mining is a health hazard to those working in it. • The impacts of uranium on human health (see Dr Helen Caldicott's publications) are well known. • Radioactive waste is a risk to public health. • Uranium mining itself kills 3-4 people a year through the radioactive gas radium. Imagine the cost in Australian lives from mining, extraction and tailings from this mine alone. • Exposure to radiation in the nuclear industry can cause cancers. • Uranium takes away society's freedom of choice for a healthy future. • My family and I deserve and want the right to healthy living. • Would like there to be a healthy environment for descendants. • The UK government constantly refused to acknowledge the abnormally high incidence of child Leukaemia in the general vicinity of its nuclear power generating facilities. • A submitter moved to WA to enjoy the benefit of a clean environment and the health benefits that is likely to bring. • There are already enough half-lives around this place. • I am horrified that Australia is following uranium mining. I have nursed many with cancer associated with Maralinga. • I have a cousin who lived near 3-mile island in Pennsylvania, her kids have thyroid gland issues, this reactor suffered a partial meltdown.	The overburden material is essentially un-mineralised and contains no more radioactive materials than can be found in normal sand. The mineralised layer that contains radioactive materials in concentrations that might give rise to concern is located just above and below the water table. The material is essentially moist and will not create much dust when mined. The issue of radiation related impacts to non-human biota is dealt with in Section 12 and Appendix F1 and in particular within Appendix B (Human Health, Bushtucker and Non-Human Biota Radiological Assessment Technical Report) of Appendix F1. There is not expected to be any significant impact upon flora and fauna or upon food chains. Vimy acknowledges that the Fukushima disaster may have led to low levels of contamination in local food and drink; but Vimy does not believe that what happened at Fukushima is relevant to an assessment of the environmental impact of its proposal. Vimy does not accept the assertion that uranium mining is a health hazard to those working in it; nor does it accept that the views of Dr Helen Caldicott on the impacts of uranium on human health are relevant to this assessment. Vimy accepts that radioactive waste could be a risk to public health if it were not properly treated – but Vimy does not accept that the radioactive waste (tailings) that it will produce will not be properly treated. Vimy does not accept the assertion that uranium mining causes the death of 3-4 people per year due to the radioactive gas radium. Leaving aside the problem that radium is not a gas (and assuming that the submitter is referring to radon gas) it should be noted that radon gas concentrating inside confined spaces (such as people's homes) is estimated to be responsible for over 20,000 lung cancer deaths per year in the USA alone. However, since Vimy will be operating open-cut mines there will be no build-up of radon concentrations that is likely to affect worker health or cause any associated fatalities. Vimy can

Submitter	Submission and/or issue	Response to comment
	• Concerns relating to the health impacts of lead and polonium-210.	assure the submitter that there will be no deaths associated with Vimy's mining operations that will be properly attributable to radon gas emanations. Vimy acknowledges that exposure to high levels of radiation can cause cancer and therefore that if people were to be exposed to high levels of radiation that it could cause cancer. However, no workers at Vimy's operations will be exposed to levels of radiation that would properly warrant any concern about causing cancer. Vimy's operations will have no impacts upon any significant environmental receptors and neither the uranium that is mined nor any of the associated activities will prevent anybody from exercising their freedom to choose a healthy future; nobody's right to a healthy living will be adversely impacted; and nobody's descendants will be deprived of a health environment as a result of this proposal. There is no properly documented evidence that suggests that there is a correlation between the location of nuclear power generating facilities in the UK and high incidents of childhood leukaemia. There is nothing in Vimy's proposal that would prevent a submitter from enjoying the clean environment in WA or enjoying the health benefits that may or may not flow from this. A submitter seems to be suggesting that the development of Vimy's proposal will result in additional radioactivity (i.e. more half-lives will be generated). The concern is based upon a misunderstanding. Vimy's proposal will not create any additional radioactive material. That will only happen when the uranium has been made into nuclear fuel and is put into a reactor. That will not be happening in Australia. There won't be any additional "half-lives around this place". A submitter who has nursed cancer patients associated with Maralinga has suggested that this is a reason to be concerned about uranium mining in Australia. However, Maralinga related to the testing of nuclear weapons by the British between 1956 and 1963 at the Maralinga site in South Australia. The

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		uranium produced by Vimy will only be used for peaceful purposes and the submitter should not be concerned about the potential for uranium mining to cause cancer in the same way as it is alleged happened with Maralinga. Vimy acknowledges that the Three Mile Island nuclear reactor suffered a partial meltdown in March 1979. However, there was no significant release of radioactive material and the average dose attributed to the 2 million people living near that facility was estimated at 14µSv which would be highly unlikely to be the cause of her children suffering thyroid gland issues. There is no sensible pathway by which the very small amounts of Lead and Polonium-210 produced as a result of radon gas emanations could affect the health of the general public.

9. Heritage

Submitter	Submission and/or issue	Response to comment
Department of Aboriginal Affairs (DAA)	The DAA is aware of two previously reported Aboriginal heritage sites that intersect the proposed footprint area of the Project. The Registered sites are DAA 1985 (Minigwal 2) and DAA 1986 (Minigwal 3) and are both recorded as artefact scatters. It is understood the Proponent has undertaken Aboriginal heritage surveys for the Project area and has recent Aboriginal heritage information for this area. The proponent states on pg. 340 of the PER that the objective concerning Aboriginal heritage is to avoid or minimise disturbance to any heritage place during the course of the development of the Project. It is understood a heritage management plan is being developed for this purpose. It is noted on pg. 341 of the PER that the proponent states that if an Aboriginal site is identified and cannot be avoided, permission to disturb the site will be sought	Vimy agrees with the view expressed by Department of Aboriginal Affairs that any potential impacts to Aboriginal heritage from the Proposal can be addressed by the provisions of the *Aboriginal Heritage Act* 1972.

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	through the appropriate DAA approvals process and in consultation with Traditional Owners. Based on the records available to the DAA, and the information presented in the PER, DAA is of the opinion that any potential impacts to Aboriginal heritage from the Proposal can be addressed by the provisions of the *Aboriginal Heritage Act* 1972.	
Department of the Environment (DoE)	*Appendix G – Heritage* Requirement Heritage Impact Avoidance • Heritage impact process to be identified within the various management plans Information Required – The following plans to be finalised in consultation with any relevant Traditional Owners to avoid or minimise disturbance to any heritage sites as required post PER consultation phase, prior to commencement of on-site work: • Ground Disturbance Management Plan • Heritage Management Plan • Document and Data Control • Environmental Induction and Training Management Plan	Vimy does not accept the assertion being made by DoE that the Ground Disturbance Management Plan; the Heritage Management Plan; the Document and Data Control Management Plan; and the Environmental Induction and Training Management Plan all require consultation with relevant Traditional Owners in order to avoid or minimise disturbance to any heritage sites. Given that the areas proposed to be disturbed have all already been surveyed by relevant Traditional Owners and no sites were located, Vimy does not accept that any further consultation is required. In the event that further sites are located they will be dealt with as required under the *Aboriginal Heritage Act 1972* including any required consultation. Vimy's Heritage Management Plan includes consultation with relevant Traditional Owners where it is appropriate. However, for the avoidance of any doubt, Vimy's position is that it does not need to consult with any Traditional Owners in order to finalise any management plans even where those plans contain management measures designed to ensure that heritage sites are avoided or impacts are minimised; that is not the same thing as saying that Vimy would not consult with relevant Traditional Owners in the event that sites are located. As the management plans themselves make clear – in the unlikely event that heritage sites are located during on-ground activities Vimy will of course consult with relevant Traditional Owners and all other stakeholders concerning the appropriate course of action. In relation to the observation made by DoE that "It appears that the management plans have been finalised however this has not been confirmed in the proponent's response", Vimy notes that the Ground Disturbance

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		Management Plan (MRUP-EMP-019) and the Heritage Management Plan (MRUP-EMP-034) are contained in Appendix K1 of the PER. The Document and Data Control Management Plan (which will be MRUP-EMP-038) and the Environmental Induction and Training Management Plan (which will be MRUP-EMP-039) have not yet been completed. The DoE has suggested that it "considers that if further Aboriginal sites are located during ground disturbance, consultation with Traditional Owners must occur". Vimy's position is that if further sites are located during ground disturbance it will consult with relevant Traditional Owners if it is appropriate. For example, were operators, undertaking ground disturbing activity, to locate an archaeological site (comprising an insignificant artefact scatter) that was outside the area that it was proposed to disturb, the location would be recorded on the Vimy database (so that disturbance could be subsequently avoided) and the Department of Aboriginal Affairs would be informed. But if the site is not significant and not proposed to be disturbed there would be no reason to engage in consultation with any traditional owners. DoE has suggested that Vimy's statements to the effect that because surveys have been undertaken and no sites have been located in the proposed Disturbance Footprint therefore no further consultation is required is inconsistent with Vimy's statements to the effect that if further sites are located then consultation with the relevant stakeholders will occur. Vimy does not accept the assertion that these positions are inconsistent. The proposed Disturbance Footprint has been surveyed for ethnographic sites and it has been determined that there are no sites in the area. The archaeological surveying work undertaken so far suggests that it is highly unlikely that there will be any archaeological sites located when clearing and ground disturbing activities commence. In the unlikely event that on-ground activities results in archaeological sites that were thought not to be present actually being located, Vimy will comply with the requirements of the *Aboriginal Heritage Act 1972*, including any requirement to consult with Traditional Owners. For the avoidance of any doubt – Vimy does not believe that any consultation with traditional owners is required before finalising its various management

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		plans, it does not believe that any further consultation is required about potential heritage sites prior to commencing activities on the ground, but in the event that any sites are located (even though none are thought to be present) then of course Vimy would immediately protect the potential sites from any further disturbance and consult with relevant stakeholders, including traditional owners, about its proposed course of action to deal with the issue. Vimy notes that it has an ongoing program of consulting with all stakeholders about project related issues and that includes relevant traditional owners and this is not merely confined to heritage issues but includes all environmental impacts and it also includes Aboriginal Empowerment through employment and other contracting and service arrangements.
DoE	*Appendix G – Heritage* Requirement Mitigation/Offset Mitigation, including salvaging and storage, would be adopted in situations where disturbance cannot be avoided or minimised. Information Required – The following plans to be finalised in consultation with any relevant Traditional Owners to avoid or minimise disturbance to any heritage sites as required post PER consultation phase, prior to commencement of on-site work: • Ground Disturbance Management Plan • Heritage Management Plan • Document and Data Control • Environmental Induction and Training Management Plan	See comments above. Note: MRUP-EMP-019 and MRUP-EMP-034 are contained within Appendix K1; the other management plans are yet to be finalised. There appears to be a misunderstanding – Vimy refutes the need to consult with Traditional Owners before finalising its own management plans but those management plans contain requirements to consult with traditional owners in the event that further sites are located; Vimy does not in any way refute the need to consult with traditional owners were such an outcome to eventuate.
DoE	*Appendix G – Heritage* Requirement	The Heritage Management Plan (MRUP-EMP-034) is contained within Appendix K1.

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	Heritage Management Plan Information Required – Implementation of the management rules, including buffer zones, signage or other measures agreed by the respective Liaison Committees in relation to protecting known heritage.	There are currently no known heritage sites within the proposed Disturbance Footprint. Vimy will ensure that if any heritage sites are found during activities they will be appropriately protected or if necessary the appropriate permission to disturb the sites is obtained before any disturbance takes place.
Conservation Council WA	While the proponent has outlined actions where there is unauthorised disturbance of an artefact, there is little detail about the authorised disturbance of artefacts. What will happen to artefacts that the proponent moves? Will the proponent seek permission to destroy artefacts? Will the proponent consult with surrounding communities about applications to disturb and destroy artefacts? In the unfortunate and unlikely event that this project proceeds, the Aboriginal Heritage Management Plan should at the very least describe protocols around "authorised" disturbance or destruction as well as existing plans for managing "unauthorised" disturbance or destruction. We would also like to note that existing policies and planned changes to the Aboriginal Heritage Act fall far short of meeting objectives of protecting Aboriginal Heritage. We find it very disturbing that there are laws that give permission to companies to permanently destroy artefacts that are remaining relics of one of the oldest living cultures in the world.	Vimy has surveyed the proposed mining area with two different teams of Wongatha people (a men's team and a women's team) and no new sites were located. The only known sites in the area lie outside the proposed Disturbance Footprint and will not be impacted. In the unlikely event that Vimy comes across any artefacts or any other Aboriginal sites and they are located in an area where disturbance cannot be avoided then Vimy will comply with the requirements of the Aboriginal Heritage Act 1972. This process requires a s.18 approval and this includes appropriate consultation with relevant traditional owners. The Heritage Management Plan (MRUP-EMP-034) does not describe protocols around authorised disturbances – since any authorised disturbance will be undertaken with s.18 approval and the protocols will be whatever requirements or conditions are necessary as a part of obtaining that approval. Vimy understands that some people are not happy with the proposed changes to the *Aboriginal Heritage Act 1972* as contained in the draft Aboriginal Heritage Amendment Bill 2014 because they believe that it weakens the protection afforded threatened heritage sites and hands too much power to the Department of Aboriginal Affairs. Without passing judgement on the validity or otherwise of these fears, Vimy would nevertheless like to point out that the identified sites in the region of its project are not expected to be disturbed and the legislation is not expected to alter the status of any of them in a manner that would reduce the accorded protection.
PND(WA)	Vimy Resources denies that there are any Traditional Owners of the area or even that the area is inhabitable, coming to this	Vimy notes that there is currently no Native Title Claim over any part of the Project area. The previous Wongatha claim that was rejected by the Federal

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	conclusion through reliance on outdated and dubious anthropological reports. Hence the company has not sought an Indigenous Land Use Agreement Status for Mulga Rock. The closest indigenous community to the mine site would be Coonana 50km away. The Coonana community had its services cut by the State government, so the community could not be sustained there. Of course this circumstance is very convenient to Vimy Resources. Many people who had lived at Coonana had been pushed off their lands around Maralinga because of contamination from the British atomic bomb tests in the 1950s and '60s. After the supposed clean-up of radioactive material, ex-serviceman Avon Hudson explained that some of the land was still contaminated. He said at that time, "They should've took proper measures to prevent further contamination of the Aborigines – they suffered enough during the actual bomb tests and years later." One member of the Coonana community has refused to leave – and remains there to this day as far as PND(WA) is aware. Conservation Council WA people have met others from the community who claim that land and they have quietly said that they do not want uranium mining there. Having been ousted from their familiar community, we can guess that their confidence has been undermined and that the formal processes of objecting to their treatment just seems too difficult. There is a second community at Mt Margaret, and Vimy has also not consulted them. Because the Coonana community has been almost completely displaced and the company has not consulted with its people or with those from Mt Margaret, Vimy claims that there are no Native Title issues attached to their proposal.	Court in 2007 did not extend down as far as the mining area proposed by Vimy but it did extend down into the overall Project area north of where mining is expected to occur. Vimy does not deny that the Wongatha people have asserted a claim over the land north of where mining will occur in the past or that Wongatha people still assert a form of traditional ownership separate from Native Title over this same area. Vimy refutes any assertion that the surveys undertaken by Robert McKeich in the 1980s were in any way dubious or that the findings have not stood the test of time or become less relevant with its passing. The two survey findings are in Appendix G2 and G3. However, Vimy undertook further survey work involving two separate teams of Wongatha people (a men's survey team and a women's survey team) which confirmed the earlier finding of McKeich and is supplied as Appendix G1. The location of what was the Coonana community is more than 100km from the Project area – see Figure 4.1 PER document. Vimy strongly disagrees with any assertion that the cutting of services to this remote community was in any way related to the development of Vimy's project. Vimy's activities will have no impact upon any community located more than 100km away. PND (WA) appears to be asserting that CCWA people have met with people from the Coonana community who claim 'that land' (without being specific about exactly what 'that land' is) and have expressed a view contrary to uranium mining. It is not clear who these people are or where they are currently located, since PND (WA) has asserted that there is only one member of the Coonana community left at Coonana. It isn't even clear whether 'that land' is actually located within the area where Vimy proposes to mine. Moreover, CCWA did not raise this issue with Vimy in recent discussions about the Mulga Rock Project.

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	PND(WA) does not respect that view, and notes that during the scoping phase of the proposal, the Department of Aboriginal Affairs advised Vimy to consult with indigenous people affected.	The Mt Margaret community is around 200km from the Mulga Rock Project and there will be absolutely no impact upon that community from the development of this project. Vimy stands by the evidence of McKeich's work and the subsequent survey work undertaken by local Wongatha people that confirmed that there are no ethnographic sites within the project area. Vimy also notes that there has never been a Native Title Claim over the area where it is proposed that mining will take place.
Kalgoorlie-Boulder Chamber of Commerce and Industry (KBCCI)	Aboriginal Engagement – Macro and micro engagement with Aboriginal people to identify practical employment opportunities is encouraged. At the micro level the Goldfields Aboriginal Workforce Development Centre is a very capable agency.	Vimy supports the concept of maximising the opportunities for local and regionally based Aboriginal people to be employed or to provide services as a result of the development of the Project. Vimy considers maximising Aboriginal engagement to be a key part of establishing a strong social licence to operate. Vimy will be liaising with the Goldfields Aboriginal Workforce Development Centre as part of that process once Vimy is closer to the actual implementation phase. However, it does not consider this matter to fall within the remit of an environmental impact assessment.
P5, Proforma	I am opposed to uranium mining at Mulga Rock for many reasons. One of those reasons is because of the effects this Uranium mine will have on the Indigenous people of the region. The Indigenous people who live in Coonana close to Mulga Rock are a refugee community known as the Spinifex people who were forced to come across the border from South Australia after the nuclear weapons tests at Maralinga and Emu Field in the 1950s. These people have been moved from community to community over generations by the government. Now with the government's closures of Aboriginal communities in Western Australia these people are now being conveniently displaced and dispossessed again for the benefit of the mining companies. Have these people not suffered enough? You cannot just dispossess people, then give them land to live on and then dispossess and displace them	There are no Indigenous people living in the region within the distance where there could be any impact upon them from the development of this Proposal. There is currently no community at Coonana and the location of what was the Coonana community is more than 100km from the Project area – see Figure 4.1 PER document. Vimy strongly disagrees with any assertion that the 'government's closure of Aboriginal communities in Western Australia' is in any way related to the development of Vimy's project. Vimy's activities will have no impact upon any community located more than 100km away.

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	again as soon as minerals are found that mining companies want to dig up. This is morally wrong.	
Proforma	Submitters raised the following concerns regarding heritage: • Show respect for Traditional Owners. • Listen to the elders on this important issue. • As an archaeologist and anthropologist I see Mulga Rock as a sacred place. • Mulga Rock and surrounding areas is ancient to my people and our song lines are still practiced today. • As an Aboriginal Elder said, "This stuff is bad; it should stay in the ground". The Aborigines had it right when they called this country "sick country". We must respect sacred sites, acknowledge the background stories, of why these dangerous minerals and rocks must remain in the ground. • Aboriginal People – not just one community but tribes, clan, me and women across Australia – recognised country which contains uranium as 'evil' country and chose and were prohibited from entering land. Aboriginal people healed and fed themselves off this land. We don't know what experiences led them to come to the conclusion that uranium country was not healthy but I think we would be well advised to respect tens of thousands of years of experience. • Aboriginal people have a unique and fundamental connection to Country. This is largely espoused by an underpinning spirituality, ways of knowing, and world view identifiable within Aboriginal "Law". Aboriginal people exhibit and carry forward this knowledge by criss-crossing Dreaming Stories across Country that utilise animals and wildlife within this knowledge dynamic. Aboriginal people are responsible for their Country (through Aboriginal "Law") and the animals and wildlife are key	There are currently no traditional owners claiming Native Title rights over the area where Vimy proposes to mine. Vimy does not agree with the implied assertion that it has failed to show respect for traditional owners. Robert McKeich undertook surveys in the 1980s (Appendices G2 and G3) and established that at that time no local Aboriginal people claimed any ancestral or traditional rights over the area concerned. There were no ethnographic sites in the area – which means there were no sacred sites and no song lines either. Since then Vimy has undertaken further surveys (Appendix G1) utilising Wongatha people which confirmed the absence of any ethnographic sites. Vimy listened to Wongatha elders in relation to heritage matters. It is not clear when submitters talk about Mulga Rock being a sacred place whether they are actually talking about the location of the Mulga Rock Project or whether they are referring to Mulga Rockhole which is located more than 60 kilometres to the west. It is simply not correct to assert as a relevant generalisation applicable to the Mulga Rock Project area that Aboriginal people recognise country which contains uranium as 'evil' or that there was any prohibition on entering the land or that uranium mining would be an antithesis of local Aboriginal "Law". No such opinions have been expressed by the Wongatha people who undertook the surveys. The development of Vimy's proposal will have no adverse impact upon any Aboriginal communities and will therefore not result in any abuse. Vimy has not and will not be purchasing any land from Aboriginal people; Vimy has granted Mining Leases on Unallocated Crown Land over which there has never been any Native Title Claims made.

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	representatives and fundamental in maintaining and carrying-forward spirituality and identity. Uranium mining is antithesis to these aforementioned elements. • Appalled by the devastation mining has on the indigenous people. The Aboriginal community has suffered as a result of previous mistakes, please do not abuse them anymore. • Concerned about the way companies have persuaded Aboriginal leaders such as Jigalong to sell off their people's land for uranium mining. These uninformed groups of desert people have been sold on the premise that their people will have a bright future and lose little, but they have no idea how this will affect them forever. • In the Northern Territory, the Traditional Owners of the Rum Jungle uranium call it 'Dead Place'. They do not fog here. They did not use rocket science to come to that conclusion. So now the Minister is happy to allow Mulga Rock to become a death place. • This proposal is an affront to the aboriginal custodians of the land. • As an Anangu woman from this area there has been less than basic consultation with Traditional Owners in the late 1980's/early 1990's. Where is this mining company that has the exploration lease? They have not consulted with appropriate TO's and seem to steadfastly refuse to do so. If they say they have I can categorically say they are lying.	Since there are no traditional owners of the land where mining will take place, the area will not become a 'death place' and nor will the proposal to mine be an affront to anyone. Vimy has utilised the services of Wongatha people to undertake surveys in the area, but the original Wongatha claim did not extend as far south as the area in question and the Wongatha people involved in the surveys did not claim the land in question. Without there being any traditional owners that claim the land, it is not possible to undertake consultation.

10. Rehabilitation and Decommissioning

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Department of Mines and Petroleum (DMP)	The Conceptual Mine Closure Plan (CMCP) is generally acceptable. Some additional work would be expected by DMP for the Mining Proposal and Mine Closure Plan submission in the following areas: • Further refinement of the completion criteria to ensure they include environmental indicators suitable for demonstrating achievement of the desired closure objectives. • Mine Closure Plan would be expected to include a Stakeholder Engagement Strategy.	Vimy acknowledge that the existing Conceptual Mine Closure Plan (CMCP) will need to be updated, and submitted with the Mining Proposal, for DMP/EPA approval and implementation of the Project. The updated Mine Closure Plan (MCP) will include specific completion criteria that can be used to assess rehabilitation performance and to establish when closure has been met. In addition, the updated MCP will include a detailed Stakeholder Engagement Strategy.
Department of the Environment (DoE)	*Section 15.2* The proponent's objective of constructing safe, stable, non-polluting landforms is extremely limited over long timescales. Information Required – Given the long timescales involved, which make monitoring irrelevant after a few years, one closure criterion that might be applied is to leave the site in such a condition that it is likely to remain in compliance with current legislative and regulatory requirements under all reasonably foreseeable circumstances. Ways of doing this should be discussed.	The concepts of safe, stable, non-polluting and sustainable form the four tenets of closure, as specified in the DMP (2015) *Guidelines for Preparing Mine Closure Plans.* Vimy consider that under current climatic conditions a safe, stable, non-polluting and sustainable post-mine landform will be achievable and that over the long-term (i.e. 10,000 years) it will evolve similarly to the surrounding native areas (e.g. the post-mine landforms will experience similar rates of peneplanation as the surrounding native landsurface). The backfilled mine-pit, with overburden material, will be safe and stable given the sandy nature of the overburden profile and as there are no physical or chemical limitations to revegetation growth, the backfilled profiles will remain sustainable over the long-term. These profiles will be non-polluting as the backfilled overburden material is geochemically and radiologically benign. The in-pit TSFs will also be safe and stable given they are below-ground, and their propensity for subsidence will be quantified by additional laboratory and field trials that are currently underway. Furthermore, the stability of the tailings will be required in order to install the capillary break and store-release cover system. Although the in-pit tailings will continue to seep into the underlying groundwater system over the long-term, the quality of the seepage is not

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		considered too dissimilar from the existing paleodrainage aquifer and thus it is not deemed to be polluting as solute concentrations will not exceed background levels beyond the project area – there are also no downstream environmental receptors that will be impacted on within a 10,000 year period, as determined by the conservative solute fate and transport modelling undertaken by Rockwater (2015; PER Appendix D10). Both the above-ground TSF and overburden stockpiles represent the greatest risk to the safety and stability of the site. The above-ground TSF will be constructed in accordance with the Department of Mines and Petroleum (1999) *Guidelines on the Safe Design and Operating Standards for Tailings Storage* and ANCOLD (2012) *Guidelines on Tailings Dams* to ensure that the risk of tailings release is minimised. For both the above-ground TSF and overburden stockpiles the design of the cover system will be based on laboratory and field-scale erosion results that will quantify the rates of wind and water erosion. This information will then be used to create a landform design that will accommodate these erosion rates, which having a detrimental impact on the safety or stability of these landforms over the long-term. Through implementation of this process, it is expected that the above-ground TSF and overburden stockpiles will experience similar rates of peneplanation as the existing environment. Similar to the below-ground TSF, the above-ground TSF will be considered as non-polluting as the volume of seepage that reaches the underlying groundwater system will be negligible and will have geochemical and radiological properties similar to the aquifer; hence no impact on the quality of the groundwater system is expected. Similar to the backfilled mine-pits, the overburden stockpiles will also be non-polluting as the overburden material is geochemically and radiologically benign. As the overburden material exhibits no physical or chemical limitations to growth, revegetation of the stockpiles will be sustainable over the long-term, particularly with a stable landsurface, whilst for the above-ground TSF only revegetation species that can be supported by the relatively thing cover system

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		will be used in rehabilitation. It is therefore considered that the above-ground landforms will be sustainable over the long-term. Based on the above discussion it is therefore considered that the post-mine landform will be safe, stable, non-polluting and sustainable over the long-term and will function similarly to the surrounding environment.
DoE	*15.2 Conceptual Characterisation of MRUP at Closure (pg. 346)* Conceptual design Information Required – "No significant long term impact on baseline surface water or groundwater flow patterns and quality will occur as a result of operations" and "No unsafe areas will remain after closure..." Pit voids and geometry of overburden landforms may be unsafe, and may result in changed hydrogeological and surface water flow patterns. This needs to be addressed by the proponent.	DoE suggests that pit voids and the geometry of Overburden Landforms (OL) may be unsafe. DoE does not give any reasons why it believes that the voids and the OLs may be unsafe. Section 15.2 of the PER is a conceptual characterisation of the Project at closure and it makes clear that Vimy will construct safe, stable, non-polluting landforms (this includes all OLs and all pit voids) that are geomorphically and functionally consistent with the surrounding landforms. Given that there is an objective of creating safe landforms and rehabilitation will not be considered complete unless and until such safe landforms have been established it is unclear why DoE consider that such landforms may still be unsafe. DoE also suggest that pit voids and overburden landforms may result in changed hydrogeological and surface water flow patterns: • Given that there are no surface water flows in the area it is not clear what the issue of concern actually is. In the unlikely event that so much rain was to fall that there was some surface water flow – the water flow is not expected to travel far before it is reduced to nothing by pooling in local inundations and by infiltration. The PER suggests that there will be no significant long term impact on surface water flows and since there are no ecosystems dependent upon surface water flows, in the highly unlikely event that there are surface flows and that they are impacted by changed landforms as a result of Vimy's activities, no dependent ecosystems will be affected and so there will be no significant impacts. • The groundwater that exists in the aquifer under the mining area is not connected to surface water flows. The overburden landforms will have no impact upon the groundwater in the aquifer below. Pit voids will be

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		constructed so that at a minimum the ground surface at the lowest point is at least 10m above the underlying aquifer. It is possible that a high rainfall event may result in water temporarily accumulating in the base of a pit void and subsequently infiltrating down to the underlying aquifer but the small volume of water involved would not be expected to have a significant impact upon hydrogeological water flow patterns. The OLs will be composed predominately of free-draining material and no phreatic surface or mounding will occur in them. Infiltrating rainfall will drain to field capacity, which from the Soil Characterisation work (PER Appendix H2), is typically <10-15%. This moisture content is well below the likely Plastic or Liquid Limits for this material, and thus infiltrating rainfall will not impact in the geotechnical stability of the OLs, as moisture conditions above field capacity will not develop. In addition, the texture contrast between the OLs material and the *in situ* profile is not sufficiently different to cause permanent ponding and any temporary ponding will likely create a small hydraulic head that will facilitate further infiltration into the underlying profile. Moisture conditions within the OLs will therefore not exceed the field capacity of the materials, for any length of time, and thus the geotechnical stability of the OLs will not be compromised. Furthermore, the OLs are not sufficiently large enough to cause the groundwater level to rise and 'mimic' the changed topographic surface (i.e. groundwater levels often parallel the topographic surface resulting in a rise in groundwater level under hills or positive landform features). The groundwater will therefore remain at 40-50m below the surface and the mounding will not impact on the carry or load capacity of the soils directly below the OLs – this is very different from a 'leaky' above TSF whereby groundwater mounding often develops below the embankment foundation potentially impacting on its stability. Given that there is negligible surface water across the site, and the topographic depressions generally accumulate any surface water, the placement of the OL will ensure that if a major cyclonic event does occur in the future then the

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		basement of the OLs will not became saturated and exceed the Atterberg Limits of the materials. The OLs will therefore not become unstable and will not impact on any surface water or groundwater in the Project area
DoE	*Section 15.3* The material that is used for backfilling and that left above-ground (including barriers and capping) will not have the same properties as the original material because of the processing that it has undergone (e.g. crushing, fracturing, etc.). Information Required – The potential effects of these changes need to be considered, particularly in terms of erosion.	The overburden material that is backfilled into the mine-pits to reconstruct the soil profile will have similar properties to the pre-mine materials given its sandy nature. During mining of the overburden, there will be no requirement for blasting, crushing or fracturing of the overburden material. Furthermore, the predominately sandy overburden materials are classified as apedal or structureless, and given the relatively uniform particle size, they are not easily compacted and experience very little swell; hence their bulk density, hydraulic and water retention characteristics will be similar to their pre-mine equivalents. The similarity in physical properties between the pre and post-disturbance overburden materials has been clearly seen in deep trenches excavated in the 1995 Shogun Rehabilitation, whereby roots of the Eucalypt overstorey was exploring the entire soil profile to depths >6m. Furthermore, the density of stockpiled overburden materials in recently excavated Geotechnical Investigative Trenches was equivalent to the pre-mine material, with only 3% swell. It is therefore considered that the properties of any cover system used to rehabilitate the post-mine landforms will be similar to the pre-mine properties and these have been thoroughly characterised and their ability to support rehabilitation is known.
DoE	*Section 15.5* The PER gives an outline of the Preliminary Radioactive Waste Management Plan (RWMP). Mention is made of managing impacts, but there is no information about assessing potential impacts.	Prior to the implementation of the Mulga Rock Project, a detailed Radiation Management Plan (RMP) will be submitted as part of the Mining Proposal, and this Plan must be approved by the Department of Mines and Petroleum in collaboration with the Radiological Council. The RMP will include specific information on potential impacts, exposure controls and monitoring requirements to capture any potential impacts on

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	Information Required – The plan should also make provision for periodic assessment of the potential impact of the wastes to allow for possible changes in waste characteristics, new information, etc.	personnel, the community and the environment. The results from this monitoring will be fed back into the RMP, and used to validate existing models, to help inform future decisions about radiological safety and ensure that possibly changes in material properties and processes are considered - this feedback loop forms part of Vimy's Adaptive Management Process to Environment, Health and Safety
DoE	*Section 15.8.1, 15.8.2,15.10, 15.13 & 15.14* The PER sections here suggest that there may be considerable uncertainty about the long term (post-closure) impact of the proposed mining and waste management operations. Information Required – The uncertainties that may result from extrapolating the results of controlled (laboratory) experiments to the natural environment need to be considered. A long term assessment considering degradation of barriers (i.e. with barriers removed) should be considered.	It is important to recognise that all landforms, whether pre- or post-mining will experience peneplanation over time scales of 10,000 years. The post-mine landforms will be designed so that they achieve the four tenets of closure being safe, stable, non-polluting and sustainable. Field-scale trials are currently being undertaken to quantify the impacts of wind and water erosion on stockpiled overburden materials, and the results of this work will be used to inform post-mine landform designs so that the impacts of these processes do not have a detrimental effect on the long-term closure of the proposed landforms. These trials are employing ground-based LiDAR to capture changes in landsurface overtime of actual overburden landforms at millimetre-scale accuracies. The results will establish the erosion rate for each overburden material expressed in t/ha/yr.
DoE	*Figures 15.8, 15.9 and 15.10* Information presentation Information Required – It is unclear what the vertical extent of OL or aboveground TSF during operations and after 10,000 years due to compressed vertical scale. Clarify vertical scale or vertical exaggeration in figures to allow for comparison.	All overburden landforms (OL) will be constructed to a maximum height of 30m (see Table 15.4 of PER). The above ground TSF will be constructed to a maximum height of 10m (see section 15.2 of PER). • The vertical extent of the OL will therefore be 30m; and after 10,000 years of weathering it will still be 30m high as a large part of the top surface is not eroded at all. Note the modelling work was based upon no vegetation being present and represents a worst-case scenario since rehabilitation will include establishing vegetation consistent with vegetation communities that exist in the area and this will inhibit erosion. • The vertical extent of the above ground TSF will be 10m; and after 10,000 years of weathering it will still be above 9m in height. Again note that this

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		is a worst-case outcome and that proper rehabilitation will inhibit most of the modelled erosion.
DoE	*Appendix H1, Figure 1.1* The PER provides a conceptual outline for the mine closure plan development. There is no provision in the plan for meeting the legislative and regulatory requirements. Information Required – The plan needs to include provision for checks against the relevant legislative and regulatory requirements and the actions to be taken if these requirements are not met (iterative improvement).	Prior to the implementation of the Project, a Mining Proposal and Mine Closure Plan (MCP) will be submitted for approval by the Department of Mines and Petroleum and Environmental Protection Authority. The MCP must be updated every three years, and Section 3 of the Plan (*Identification of closure obligations and commitments*) requires that all legal and relevant legislative obligations are identified and considered in the development of completion or closure criteria to ensure that they are met and that the project stays current. The legal obligations are documented in a legal obligations register. A closure task register is also required to ensure that appropriate work is undertaken to stay up-to-date with relevant legislative and regulatory requirements.
DoE	*Appendix H1 - 2.3.2, Table 2.2 and Table 9.4* Tables 2.2 and 9.4 of the PER give proposed volumes of overburden landforms. Leaving a total of 215 million cubic metres of overburden on the surface implies that there will be very little backfilling, and that the final geomorphology of the site after closure will be significantly different from that before operations commence. Information Required – This seems to be inconsistent with statements made elsewhere in the PER, that the final impact will be minimal. Clarification is needed.	For the Princess Deposit effectively all of the overburden (around 25,000,000m^3) will be stockpiled out of pit, with only a small proportion returned to cover the in-pit TSF back to the previous topographic landsurface. For the Ambassador Deposit all of the overburden excavated for the in-pit TSF will remain stockpiled out of pit (around 23,000,000m^3). The approximate 48,000,000m^3 void at Princess and Ambassador will therefore be replaced with the tailings so that no change in pre-mine topography will result. Of the remaining 235,625,000m^3 to be mined from Ambassador only 25,000,000m^3 (only 11% of the total) will be stockpiled out of pit in the Ambassador South and West stockpiles. Consequently, the post-mine landsurface at Ambassador will be resemble the pre-mine surface as the vast majority of the overburden is backfilled into the pit. The volume deficit will result in a small topographic depression in the southern end of the Ambassador pit. The existing size of the Shogun Deposit is not conducive to in-pit conveying and backfilling of the overburden into the mine pit, and thus traditional truck and shovel will be used. The majority of the overburden (35,000,000m^3) will therefore remain in stockpiles out of pit, with only a relatively small portion returned to the mine-pit to cover the groundwater and orebody and prevent a

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		pit lake from developing. The resulting void will be reshaped by pushing down the sides of the pit walls, thus preventing the need for abandonment bunds, with the resulting landform likely to resemble the pre-mine topographic depression overlying the paleodrainage channel. For the Emperor Deposit, mining will consist of a combination of tradition truck and shovel, resulting in off-path stockpiled overburden landforms, and in-pit conveying and backfilling resulting in no out of pit landforms. Of the total 270,000,000m^3 to be mined at the Emperor Pit, approximately 38% (103,906,000m^3) will be stockpiled out of pit with the remaining 62% to be used to backfill the profile. The resulting post-mine landform will therefore resemble the topographic depression over the paleodrainage channel. During the continued development of the Project, every effort will be made to minimise the use of truck and shovel, and thus the creation of overburden stockpiles, as this represents a significant cost to the Project. The use of mechanised in-pit processing, conveying and backfilling of the mine voids therefore has economic and environmental advantages and is the preferred mining technique.
DoE	*Appendix H1 - 7.6* The post-closure radiological impact on groundwater will be determined by factors such as the physico-chemical characteristics of the materials (tailings), and the depth of the top of the water table below the bottom of the tailings. Information Required – The long-term implications of groundwater contamination need to be considered in the closure plan (and the general impact assessment).	The long-term impacts of tailings seepage on groundwater quality have been identified, with modelling showing that no discernible change in groundwater quality, from background levels, is expected at the project boundary. There are no downstream environmental receptors and no beneficial users of the paleodrainage aquifer. Although this is the case, Vimy will install fit-for-purpose groundwater monitoring bores at various locations downstream of the tailings disposal areas so that any changes in groundwater quality, in response to seepage, will be detected. The monitoring and analysis program to be implemented will be developed with the Department of Water and Department of Environment Regulation and will be documented in an approved groundwater operating strategy or works approval for the tailings disposal facilities.

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		The results from this groundwater monitoring will validate the existing groundwater model and will inform the Mine Closure Plan for the site, with adaptive management ensuring that the results are continually used to update the prediction of environmental impacts.
DoE	*H1 MRUP Conceptual Mine Closure Plan (Table 8.2 at pg. 57)* Information gap Information Required – Section marked "Identification and Management of Closure Issues" fails to identify pit voids as separate to backfilled mine pits and overburden landforms. Given that only 50-75% of overburden material will be placed back into pits, these partially filled and unfilled voids pose separate risks to backfilled mine pits and overburden landforms.	All areas that have been mined for ore will have at least some backfilling as mining of ore will take place around the level of the water table and below and Vimy is committed to ensuring that mining voids are backfilled to at least 10m above the underlying water table. The section marked 'Identification and Management of Closure Issues" in Appendix H1 treated all backfilled areas, whether backfilled to surface or backfilled to at least 10m above the underlying water table under the same heading. It is correct to assert that in Table 8.2 in Appendix H1 Vimy did not identify pit voids as separate to backfilled mine pits but that is because in this Table, areas that had previously been mined were treated the same whether they were backfilled to surface or backfilled to at least 10m above the water table. Overburden landforms (OLs) were deal with separately and there is no reason to treat partially backfilled mine pits under the same heading as overburden landforms. DoE suggests that because only 50-75% of overburden material will be placed back into pits that there might be unfilled voids that pose a separate risk to backfilled mine pits and overburden landforms. However, it is incorrect to assert that there will be any unfilled mining voids because as previously explained all mining pits will be at least partially backfilled to a level at least 10m above the underlying water table. All mining pits will be at least partially backfilled and the risks associated with these partially filled mining pits were dealt with under the same heading of 'Backfilled Mine Pits'. The use of the word 'void' has been avoided as it generally implies non-rehabilitated, near-vertical pit walls. Instead any partially backfilled voids, following mining, will have their pit walls knocked down to a stable angle that will allow ingress for both people and animals and avoid the need for an abandonment bund. These slopes will be revegetated with an appropriate native (local provenance) seed mix to ultimately resemble an E1-E3 vegetation

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		community. The rehabilitated voids will be designed so that they resemble and function similar to the natural topographic depressions that were present prior to mining. Vimy acknowledge that partially backfilled mine pits can become geotechnically unstable, particularly at the contacts between the *in situ* profile and the backfilled material, resulting in large crevices forming over time. Using a cut and fill approach to reduce the batter angle of the *in situ* profile or pit walls, whilst further filling of the central portion of the void, will prevent the backfilled or cut material from dislodging away from the *in situ* material. Furthermore, as the cut or backfilled material has a texture similar to that of the *in situ* materials there is not a sufficient texture-contrast boundary to facility perching and sub-surface lateral flows which could impact on the stability of the surface materials. Consequently, infiltrating rainfall is expected to move through the cut or backfilled material and into the underlying *in situ* profile without ponding and no lateral flows are expected. All slopes will be rehabilitated which will further stabilise them.
DoE	*Appendix H1 - 8.3* The PER simulates landscape evolution over 10,000 years. As in some previous comments, there appears to be a marked reliance on modelling and control by design. Degradation of engineered barriers over time should be considered. Information Required – The recent tailings dam accident in Brazil should provide a clear warning that control by design may not be viable over the lifetime of the radionuclides in the TSF (hundreds of thousands of years). The implications of this should be considered.	It is important to recognise that all landforms, whether pre or post-mining will experience peneplanation over time scales of 10,000 years. The post-mine landforms will be designed so that they achieve the four tenets of closure being safe, stable, non-polluting and sustainable. Field-scale trials are currently being undertaken to quantify the impacts of wind and water erosion on stockpiled overburden materials, and the results of this work will be used to inform post-mine landform designs so that the impacts of these processes do not have a detrimental effect on the long-term closure of the proposed landforms. These trials are employing ground-based LiDAR to capture changes in landsurface overtime of actual overburden landforms at millimetre-scale accuracies. The results will establish the erosion rate for each overburden material expressed in t/ha/yr. With respect to tailings dam failures, Vimy understand the increased risk of above-ground TSFs, and thus the in-pit TSFs (which cannot fail structurally)

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		are the preferred option, with the above-ground facility likely to be used as a contingency.
DoE	*Appendix H1, Figure 9.6* This figure shows the material in the overburden landform (OL) to be "Mixed Miocene/Oxidised Eocene Sediments"). The mechanism of processing means that the material has lost its original structural integrity and cannot be considered as sediments. The same comment applies to the "reconstructed quaternary sand". Information Required – These changes in structural integrity should be considered in the post-closure impact assessment.	The majority of all overburden material to be mined is classified as apedal (structureless) sand, with a relatively uniform particle size distribution. Consequently, excavation of these materials and subsequent backfilling or stockpiling will not alter their structure or appreciably change their physical or hydraulic properties. It is important to reiterate that none of the oxidised overburden material will be processed and it will simply be excavated and used to reconstruct the backfill profile or stockpiles. There is therefore no change in the texture of the material, and as the bulk density remains the same (only a 3% swell) the hydraulic and water retention properties of the disturbed material are equivalent to the pre-mine properties.
DoE	*Appendix H1 - 9.4.1* This section of the PER considers the TSF. It is implicitly assumed that the structural integrity of the above ground TSF will be maintained long enough for the activity of the radionuclides in the tailings to have decayed to levels similar to background. This is likely to take hundreds of thousands of years. There is no evidence that any man-made structure has maintained its integrity for more that about 10-15,000 years. Information Required – This loss of structural integrity needs to be taken into account in the post-closure impact assessment.	Vimy acknowledge that all landforms will experience peneplanation over time periods of tens to hundreds of thousands of years. It is therefore the preferred option to discharge all tailings into the in-pit TSFs and only use the above-ground TSF as a contingency. Although this is the case, it is important to recognise that the tailings pH (around 4.5) and atmospheric conditions will limit the mobility of uranium in exposed tailings. Similarly, at an assumed uranium content of <100ppm for tailings, the corresponding gamma activity is expected to be <0.5uSv/hr, which equates to 4.4mSv/yr – slightly above the typical background value of 2mSv/yr and well below the acceptable occupational level of 20mSv/yr. It is important to clarify the use of the word ‘substantial’ when describing erosion of the cover system on the above-ground TSF. The referred erosion is relative to yearly erosion rates which typically equate to <5t/ha/yr or <0.3mm lost from the surface. If this rate is maintained, then over 10,000 years 3m of material will be removed from the surface of the above-ground TSF. Erosion rates are expected to decrease as vegetation growth occurs, by decreasing raindrop impact on the soil surface and the root system of the vegetation

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		stabilising and anchoring the surface soils. It is therefore expected that <3m of erosion will occur from the above-ground TSF over the 10,000-year period. The above-ground TSF will be constructed in accordance with ANCOLD (1998) *Guideline for Design of Dams for Earthquakes*, ANCOLD (2012) *Guidelines on Tailings Dams: Planning, Design Construction, Operation and Closure* which covers the design considerations necessary for earthquakes and AS 1170.4-1993. The embankment walls will therefore be geotechnically stable over the long-term and sufficient to contain the tailings material, which will continue to drain and consolidate over time reducing their risk to the environment. The store-release cover system to be employed, which will also have a capillary break to prevent upward migration of salinity, will have sufficient thickness to minimise infiltrating rainfall seeping into the tailings material, further facilitating the drying and consolidation of the tailings. To assist in designing the cover system for the above-ground TSF, if required, Vimy are currently undertaking field-scale trials to quantify the impacts of wind and water erosion on stockpiled overburden landforms, and the results of this work will be used to inform post-mine landform designs so that the impacts of these processes do not have a detrimental effect on the long-term closure of the proposed landforms. These trials are employing ground-based LiDAR to capture changes in landsurface overtime of actual overburden landforms at millimetre-scale accuracies. The results will establish the erosion rate for each overburden material expressed in t/ha/yr. Any design that is developed for the above-ground TSF will be included in the Mining Proposal and Mine Closure Plan to be approved by the Department of Mines and Petroleum in collaboration with the Radiological Council, and the Department of Environment Regulation.
DoE	*Appendix H1 - 9.5 Figures 9.8 and 9.11* The figures show the level of the water table in relation to in pit TSF. It is not regarded as good practice to design a waste disposal system in which the water table can penetrate the waste. Best	For the Mulga Rock Project, the tailings will be discharged directly into the aquifer system as this is considered the best environmental outcome. The quality of the tailings seepage or liquor resembles the quality of the paleodrainage aquifer which is degraded due to contemporaneous Acid

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	practice is regarded as requiring that the bottom of the waste should be at least 5 metres above the water table. This design is not consistent with the basic principle of "isolate and contain" when disposing of radioactive waste. Information Required – An alternative design for the in-pit TSF should be considered, where additional 'clean' fill material is added prior to tailings to minimise the possibility that the water table will rise into the waste.	Sulphate Soil (ASS) processes leading to a highly acidic, hypersaline, sulphate-rich and reducing groundwater environment. There are no environmental receptors in the region and no beneficial users of the groundwater. The radiological impacts from seepage from the TSFs are considered to be similar to the addressed geochemical impacts, in that the seepage from the TSF will be discharged into a groundwater system that currently has elevated radionuclide levels in equilibrium with the natural system. As discussed, the paleodrainage channel, that hosts the Mulga Rock Deposit, represents a contemporaneous ASS system, whereby uranium ore is being continually exposed (at depth) by continental uplift along the eastern margin of the Yilgarn and oxidized, facilitating the release of Acid and Metalliferous Drainage (AMD) including radionuclides into the groundwater system. These solutes are then effectively resorbed in the underlying reducing redox conditions, with any excess remaining in the water-column. The process whereby seepage from the TSFs enters the palaeodrainage channel is not considered any different from the natural redox reactions and any solutes, including radionuclides, will be effectively immobilised within the carbonaceous material within the palaeochannel. It is also important to reiterate that tailings deposition will be subaqueous to prevent possible dust generation from a dried tailings surface. Consequently, the physical process of discharging the tailings into the water table will be no different to subaqueous deposition. The highest outcome for the in-pit tailings is for them to seep directly into the aquifer as this will facilitate draining and consolidation, with the surrounding carbonaceous materials capturing any released solutes (uranium, metals or radionuclides), similar to the processes undertaken to form the orebody. This adsorption process will effectively immobilise all potential contaminants preventing any environmental impact. It is therefore considered that the impacts from the tailings will be isolated and contained by utilising the natural sequestration capacity of the carbonaceous material downstream of the TSFs.

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		Vimy understand that this is contrary to the existing best practice, but given the nature of the deposit the current proposed tailings approach is preferred and from a previous discussion with the Department of Environment Regulation (DER) they are comfortable that not adverse impacts from in-pit tailings will result given the nature of the paleodrainage system (this was verbally conveyed at a meeting with the DER, OEPA and Vimy on the 14 September 2015).
DoE	*Appendix H1 - 9.5* Assuming a Uranium concentration of 600ppm (in the ore), and given that the specific activity of U-238 is 12440 Bq/g, the activity concentration of U-238 in the ore will be approximately 7.5 Bq/g. If the uranium chain radionuclides in the ore are approximately in secular equilibrium, then each radionuclide will have a similar activity concentration. This means that after the uranium isotopes are extracted from the ore, the remaining radionuclides will still have the same activity concentration (assuming the radionuclides are uniformly mixed throughout the tailings. Information Required – It is unclear what assumptions have been applied. Clarification of assumptions made in calculating the impact of resuspended dust.	That is correct as outlined in section 13.7.3 of the PER. As noted in the PER, the mine tailings are expected to essentially contain the same radionuclide concentrations as for the ore, apart from uranium, 90% of which has been leached to final product. The tailings are to be deposited into the mined out pits and allowed to dry before being progressively covered. For the air quality assessment, dust emissions and radon emissions form the tailings have been factored in to the overall impact assessment. (See Section 1.2 of appendix E1). For assessing the impacts of remnant radionuclides in tailings dust on exposures to the public from emissions of dust, the assumptions are outlined in table 13.12 of the PER. As described in Section 13.17.5, a conservative approach was taken for estimating the radiological impacts of dust. It was assumed that all dust emitted from the project (including tailings dust) would contain all radionuclides (including uranium) in the same concentration as they would be in ore. This is conservative because the tailings do not contain the majority of the uranium isotopes.
DoE	*Appendix H1 — 10* This section of the PER includes information on monitoring post-decommissioning. The radionuclides in the waste, tailings etc., are the same as those in the natural environment. The monitoring period will be very much less than the lifetimes of the radionuclides in the waste and tailings. This means that it may not be easy to	For the above-ground TSF a fit-for-purpose seepage monitoring system will be implemented directly below the clay liner to detect the presence and rate of tailings seepage. If seepage is detected above the saturated permeability of the clay liner then this will be investigated to establish the potential impact of released solutes (uranium, metals and radionuclides) on the environment.

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	determine the source of any changes in environmental levels, unless the changes are so large that they indicate a serious problem, such as the overflow of a TSF or the collapse of a containment barrier. Information Required – The purpose of the (radionuclide) monitoring program needs to be clarified. Is the program to determine long term impacts, problems with containment barriers, or both?	Similarly, a leak detection system will be incorporated into the HDPE liner so that any potential leaks through the side walls will be identified. For the in-pit TSFs, fit-for-purpose groundwater monitoring bores will be installed downstream in the paleodrainage channel. These bores will assess any changes in groundwater quality and effectively establish the direction and rate of movement of the tailings plume. This information will be used to characterise the long-term spread of tailings seepage and the ultimate area of influence of the Project.
Conservation Council WA	*Mine Closure* In the CMCP Vimy state that through the implementation of closure objectives that • *"no significant long term physical offsite impacts will occur as the result of the operations"* • *no significant long term impact on baseline surface or groundwater flow patterns and quality will occur as a result of operations"* There is no clear articulation of what is considered significant. It is clear from this and other parts of the PER and Appendix that there will be impacts offsite and to waters. There is however no description about how significant these impacts will be. Without clear criteria and thresholds these impacts could be very hard to regulate. We are concerned about the low bar set by declaring criteria should be achievable as the basis for deciding criteria. We are of the view that criteria should be based on best environmental outcomes and if those criteria are not achievable the project should not proceed. The real costs of closure should be	The Mulga Rock Project will have no impact on surface waters as no permanent or ephemeral systems occur in the Project area. The impacts on groundwater will be limited to water quality, and no change in background groundwater quality will occur outside of the Project Boundary. Changes in water quality above background levels will occur in the immediate vicinity of the operation (i.e. in-pit TSFs), but these levels quickly decrease as solutes are taken up by the carbonaceous material). It is important to reiterate that fit-for-purpose monitoring bores will be installed downstream of the operations to detect any changes in water quality, and clear and specific trigger levels will be set and reported in the Mining Proposal and Mine Closure Plan, which need Department of Mines and Petroleum (DMP) and Environmental Protection Authority (EPA) (and likely Department of Environment Regulation and Department of Water) approval prior to implementation of this Project. The modelling work undertaken for the PER, however, shows the risk of impact on the surrounding environment, particularly beyond the Project Boundary, to be very low. The use of the word “achievable” primarily relates to completion criteria to be applied to revegetation or rehabilitation performance. For example, all too often a species richness of 70% of the pre-mine vegetation is used as a closure goal, but this is set without any knowledge of the percentage of recalcitrant species, the seed ecology of the species or the availability of seed. The result is that

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	understood early and built into pre-feasibility studies. The environment is too often compromised and this often begins at early stages of mine proposals. There are a number of different aspects that the submitter is concerned about, including: • There is no clear identification of what the closure costs for this proposal would be. Further there is no indication of whether the project would be feasible given the costs of rehabilitation and no discussion on any requirements for a 100% annually reviewed and adjusted bond. This is discussed in more detail in following sections on rehabilitation, bonds and the Mining Rehabilitation Fund (MRF). • Too much of the language in the draft closure criteria Table 6.1 - Appendix H1 CMCP, have phrases like 'reduce risk', 'acceptable levels', 'significant', 'appropriately', 'appropriately managed'. Many of these phrases are ambiguous and open ended. Defining what is 'acceptable' what 'appropriately' means, what is 'significant' for each particular risk area is essential. What is appropriate, acceptable and significance are often played off against other factors like economics. It is dangerously deficient to leave the creation of these frameworks up to the discretion of the company. Further parameters and guidelines should be imposed on critical aspects of mine closure. There should be clearer commitments by the company to do what is best for the environment upon closure. • The proponent refers to baseline environmental data in the CMCP but does not provide references. It is important that the data referred to in the CMCP are easily identifiable and understood across departments, the public and the proponent. • There are significant omissions - in particular there is no clear identification of the Aboriginal heritage and artefacts that may	typically only around 30% of the species richness is returned, and thus it is not possible to meet the closure criteria of 70%. Similarly, setting a stability criteria of 5 t/ha/y, which is often enforced by regulators, equates to around 0.3mm eroded from the surface per year. This is less than occurs on natural landforms and is beyond what can be measured. A more realistic erosion (wind/water) rate will be developed that better reflects the surface processes operating within the Mulga Rock Project. Vimy will ensure that all completion criteria developed are scientifically valid, justifiable and agreed to by the stakeholders. With regards to the closure costs, these will be reported in the Mine Closure Plan to be developed and submitted for approval by the DMP/EPA for implementation of the project. Costs of closure and the environmental liability on a yearly basis will be kept to a minimum given that the proposed mining technique which will involve continual backfilling of the mine void as the mining front progresses. There are both environmental, as well as economic benefits, to the rehabilitation process. The actual costs of rehabilitation will be determined based on the Rehabilitation Liability Categories and Unit Rates outlined in the DMP (2013) *Mining Rehabilitation Fund – Guidance*. Detailed, clear and scientifically valid completion criteria will be developed and documented in the Mining Proposal and Mine Closure Plan (MCP) to be submitted for approval by the DMP and EPA. These criteria will set clear triggers or benchmarks to assess environmental impact and rehabilitation performance. Vimy apologise for any references referred to in the Conceptual Mine Closure Plan (CMCP), but not included in the references. This will be amended for the MCP to be submitted to the DMP/EPA to ensure transparency and allow all work to be easily sourced. Vimy disagree that there has been an omission of Aboriginal heritage, with the surveys being undertaken to date clearly showing that no heritage sites will be impacted by this project. Known artefact sites that occur outside of the

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	be of significance. There should be clear intended outcomes presented as to whether they will be permanently destroyed or displaced or whether their location will be GPSd and artefacts will be replaced on closure. • There is no mention of the Yellow Sandplain Priority Ecological Community status of the region that the MRUP would operate and any specific criteria for remediating the site to be reinstated as a PEC. • There is no clear description of how long it will take for the groundwater to recover. • The submitter re-iterate issues and concerns about the limitations of desktop studies, and the limited study during non-peak periods for SREs. With inferior and limited base line studies the proponent is able to sidestep accountability for remediating the environment. See above sections and comments on Short Range Endemic species and fauna species. • In the CMCP the proponent has failed to identify that the mine site is in the Yellow Sandplain PEC and make no commitment to remediate to a standard that could see the area re-claimed as a PEC. .	Disturbance Footprint has been accurately located to ensure that they will not be impacted on. Groundwater rebound within the paleodrainage channel will occur rapidly given the minimal amount of dewatering that will occur as the orebody is typically only 2-5m below the surface. Deeper sections of the orebody will require additional dewatering, however, hydraulic gradients within the paleodrainage channel will not be impacted on and flows will continue to the south. For the Kakarook North Borefield, rebound of the cone-of depression is expected to occur in 10 – 20 years, however, under the worst-case scenario whereby recharge only occurs via rainfall infiltration (assumed to be 1% of rainfall), complete replenishment of the extract water will take 145 years. It is important to reiterate that there are no environmental receptors associated with both aquifer systems and no other beneficial users in the region; hence impacts are considered to be negligible. The comment on the applicability of the Short Range Endemic (SRE) survey has been addressed in the Terrestrial Fauna section of these responses, and Vimy highlight that the SRE surveys and reports undertaken for the Project satisfy all of the objectives of the EPA in regard to SREs, as stated within the EPA Guidance Statement No. 20 (EPA 2009). The comment regarding the Mulga Rock Project occurring within the Yellow Sandplain PEC has been addressed in the Flora and Vegetation Section of these responses. As discussed the MRUP PER does give due consideration to the location of the proposed project within the Yellow Sandplain Boundary and the fact that <1% of the YSP will be disturbed and effectively rehabilitated, with the proportion of the S6 vegetation community (which shows the greatest affinity to the PEC) to be disturbed to be significantly less.
Conservation Council WA, proforma	*Tailings Closure and Seepage* Mentions about the ASLP testing with the conclusion that only Cadmium (Cd), Co, Iron (Fe), Selenium (Se), Zn materials will leach from the ore - inferring that acids are unlikely to leach - are	Vimy expects both metals and acidity to leach, but the pH of the neutralised tailings will be equivalent to the pH of the groundwater; hence, it is not considered an issue and was not assessed further.

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	not supported with any references to a study or the methodology, or to the assumptions made in the ASLP testing. Without providing the ASLP test methodology and assumptions we do not accept these assertions and remain concerned about the risk of AMD at the site. The submitter has raised concerns about the proponent's assumptions about the permeability and mobility of metals in tailings, the proponent presents the view that metals will be "stripped-out" and contained but provides no detailed studies or methodology or indeed any plausible evidence used to make this claim. If Vimy's assumptions about the seepage rate and interaction in groundwater are wrong, there could be serious and detrimental long term impacts on downstream environments and importantly on the springs at the Queen Victoria Spring A Class nature reserve. This worst-case scenario has not been explored as it should have been and the submitter urges the EPA to address this pivotal omission. In the CMCP - Pg. 60 - the proponent identifies a range of risks with the above ground tailings facility. We had previously understood that tailings would be relocated to the mined out pit at Princess and the northern part of Ambassador. In Figure 8.3 there is some modelling for remediation but it is unclear if the tailings pit will contain tailings or not. In section 9.4.1 and 9.4.2 of the CMCP there is no further clarity or explicit statement made about returning the above ground tailings into either Princess or Ambassador. In Figure 9.10 it shows more clearly that there will be tailings in the above ground tailings facility. Absolute clarity about the remediation and long-term management of tailings is essential. The submitter notes that industry best practice is to dispose of tailings in mined out pits. There should be	Solutes (uranium, metals and redionuclides) in the tailings seepage will be removed from the liquid-phase of the aquifer through the same biogeochemical processes that formed the orebody in the first place. It is important to reiterate that contemporaneous acid sulfate soils processes, which resulted in the accumulation of solutes at the redox front, are continuing today and will continue into the future, whether or not the Mulga Rock Project occurs. The byproducts of this oxidation process are similar to the composition of the tailings seepage and thus the geochemical characteristics and likely behaviour of the seepage will mimic the natural processes. Vimy will install fit-for-purpose monitoring bores downstream of the in-pit TSFs, so that the tailings seepage can be identified and tracked, and the long-term predictions made using the various models can be validated, and if deviations occur in actual versus predicted then these discrepancies can be investigated. Vimy would like to assure the submitter that the above-ground TSF will only be used as a contingency, and that the preferred economic and environmental option is to dispose of all tailings into the in-pit TSFs. The above-ground TSF will be constructed, operated and closed in accordance with the DMP (1999) *Guidelines on the Safe Design and Operating Standards for Tailings Storage* and ANCOLD (2012) *Guidelines on Tailings Dams* so that best-practice is implemented. With the tailings to be preferentially deposited into the in-pit TSF, and then covered by a suitable thickness of capillary break and growth medium, and given the degraded nature of the existing aquifer system and absence of downstream receptors, they are likely to represent a low risk to the public or the environment over the 10,000-year period.

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	some comparison or explanation as to the environmental merits of storing some tailings above ground and some buried in pits. There is no detailed discussion on the options and the impacts or risks from the various options. If the proposal is to keep tailings in the above ground pit permanently there would be a myriad of issues that have not been explained by the proponent. The greatest risk in this environment is erosion and dust, and the bioavailability of radionuclides, heavy metals and AMD. In plate 8.3 and 8.4 of the CMCP the proponent identifies some trial rehabilitation over three years. In these images it is clear that there are some significant barriers to revegetating the landscape. With low rainfall, high rates of evaporation and dry windy conditions revegetation will be difficult and the impact of erosion is likely to be significant. There is general concern that tailings are unsafe: • Tailings have a life of about 10,000 years and pose significant public and environmental risks. • Nuclear waste will remain dangerous for thousands of years. • Uranium tailings present a long term environmental risk. • Uranium mining leaves behind millions of tonnes of radioactive mine tailings.	
Conservation Council WA	*Backfilling and Overburden Landforms* In section 9.2 – Pg. 74 - the proponent states that it is not economically feasible to back fill the pits with overburden. They have not described the environmental merits of backfilling or not backfilling. They have not described the impacts on increased infiltration rates from not backfilling or the build-up of water in half filled pits, or surface expressions of radiation from exposed areas. They have not discussed the chemical, heavy metal or radionuclide content in the overburden landforms and not	It is Vimy's preference to backfill the mine pits as it is acknowledged that this is the most economic and environmentally sound rehabilitation technique. The chosen mining technique involving in-pit conveyors and spreaders will facilitate this backfilling process. Given the nature and size of this equipment it does have space requirements, and thus it is not suited to mining of the Shogun Deposit or a portion of the Emperor Deposit. In these cases, traditional truck and shovel will be used, resulting in the formatting of out-of-pit overburden stockpiles. It is also important to recognise that through the use of in-pit TSFs, a large volume of potential overburden space is taken-up and thus the

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	discussed the seepage issues, erosion issue and contamination issues with retaining overburden landforms on the surface. They have however indicated in total there would be over 214 million tonnes of overburden at 8 OLs. They indicate that one of those would be completely removed, two will be reduced and the other 5 would remain. This would dramatically change the post mining landscape, in an arid, dry and dusty environment these landforms would pose a significant long term risk to the environment, as would the numerous unfilled pits. The submitter notes in the earlier and separate Kintyre uranium proposal by Cameco where the proposal was to only half backfill the pit, turning the pit into a permanent lake they conceded that uranium concentration would be high for the first ten years. While we oppose the Kintyre proposal and this particular aspect of the proposal we would like to draw a comparison to identify that Vimy has not clearly articulated or understood the risk of only half filling the pit as Cameco did with the Kintyre proposal. Rather than considering the environmental implications, Vimy have identified economic considerations. As mentioned earlier the EPA is not able to consider economic factors when making their assessment and recommendation about a project. If they were to consider economic factors it should only be in relation to whether the proponent has capacity to fulfil environmental obligations. Given this statement about the feasibility of backfilling, we would suggest that the proposal as a whole has tenuous economic merits and a high level of economic uncertainty and should not be approved.	overburden excavated for the in-pit TSFs will remain in the overburden landforms. A detailed account of the overburden movements is provided below: • For the Princess Deposit effectively all of the overburden (around 25,000,000m^3) will be stockpiled out of pit, with only a small proportion returned to cover the in-pit TSF back to the previous topographic landsurface. • For the Ambassador Deposit all of the overburden excavated for the in-pit TSF will remain stockpiled out of pit (around 23,000,000m^3). The approximate 48,000,000m^3 void at Princess and Ambassador will therefore be replaced with the tailings so that no change in pre-mine topography will result. • Of the remaining 235,625,000m^3 to be mined from Ambassador only 25,000,000m^3 (only 11% of the total) will be stockpiled out of pit in the Ambassador South and West stockpiles. Consequently, the post-mine landsurface at Ambassador will be resemble the pre-mine surface as the vast majority of the overburden is backfilled into the pit. The volume deficit will result in a small topographic depression in the southern end of the Ambassador Pit. • The existing size of the Shogun Deposit is not conducive to in-pit conveying and backfilling of the overburden into the mine pit, and thus traditional truck and shovel will be used. The majority of the overburden (35,000,000m^3) will therefore remain in stockpiles out of pit, with only a relatively small portion returned to the mine-pit to cover the groundwater and orebody and prevent a pit lake from developing. The resulting void will be reshaped by pushing down the sides of the pit walls, thus preventing the need for abandonment bunds, with the resulting landform likely to resemble the pre-mine topographic depression overlying the paleodrainage channel. • For the Emperor Deposit, mining will consist of a combination of tradition truck and shovel, resulting in off-path stockpiled overburden landforms, and in-pit conveying and backfilling resulting in no out of pit landforms. Of the

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		total 270,000,000m^3 to be mined at the Emperor Pit, approximately 38% (103,906,000m^3) will be stockpiled out of pit with the remaining 62% to be used to backfill the profile. The resulting post-mine landform will therefore resemble the topographic depression over the paleodrainage channel. During the continued development of the Project, every effort will be made to minimise the use of truck and shovel, and thus the creation of overburden stockpiles, as this represents a significant cost to the Project. The use of mechanised in-pit processing, conveying and backfilling of the mine voids therefore has economic and environmental advantages and is the preferred mining technique.
Conservation Council WA	*Further Studies* The proponent has identified a number of studies that they intend to complete to better inform mine closure. At this stage the submitter makes the comment that if the results of these studies indicate there are major problems with rehabilitation it will be too late. We have previously lodged submissions with the EPA and the DMP on the assessment process and make the observation that without key studies and information it is impossible for the regulators to make an informed decision or recommendation about the environmental risks or merits of a proposal. This appears to be the case with the Mulga Rock project where the proponent has been unable to submit definitive studies on: • Groundwater monitoring • Seepage monitoring • Flora response to fire • Seed ecology • Burial effects • Soil water dynamics • Plant water use	Vimy acknowledge that there were several knowledge gaps in the PER assessment; however, where uncertainties existed worst-case scenarios/parameters were used to predict impacts. Vimy are currently undertaking the required work to resolve the identified gaps and the results from this work will be reported in the Mining Proposal and Mine Closure Plan to be submitted to the Department of Mines and Petroleum and Department of Environment Regulation for approval prior to project implementation. The results will not change the overall environmental impact, but they will reduce the uncertainty. With regards to the faults, and in particular the Cundeelee and Turnback Faults and their potential to impact on the project, this is highly unlikely as they have not been active for over 100 million years and due to the thick Jurassic to Quaternary sedimentary sequences that overlie the geological contacts. Given the very low likelihood of occurrence and impact, the faults were not considered relevant and were not addressed in the PER, Tailings Seepage Analysis or the Mine Closure Plan. There is a higher risk that the Darling Fault, on the eastern margin of Perth, will be activated before these faults, yet dams and residential communities are built along the fault system.

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	• Overburden physical and hydraulic characterisation • Slow and material stability • Wind erosion • Geochemical characterisation • Column leaching • Tailings rheology • Seepage analysis • Solute fate and transport The submitter is most concerned about the omission of any studies, description or acknowledgment of the Cundeelee Fault or the Turnback Fault and worst-case scenarios. The above studies should be included in any future mine plans, tailings management plan, mine closure plans. Without the above studies and seismic studies of the Cundeelee and Turnback fault lines and worst-case scenarios studies - particularly into tailings seepage and AMD, the submitter maintains that this application lacks the detail and evidential basis required and the EPA should not approve the proposal.	
Conservation Council WA	*Unplanned Closure* The submitter welcomes the proponent's consideration of unplanned closure and believes that the risk of this occurring is significant while the commitments made by the proponent are deficient. As described in previous sections the global uranium market does not warrant the development of new uranium mines. If the proponent proceeded with this mine at this time there would be a high risk of premature closure. There is so much uncertainty	A detailed closure task register for unplanned closure, as outlined in DMP/EPA (2015) *Guidelines for preparing Mine Closure Plans*, will be submitted with the Mining Proposal and Mine Closure Plan to be approved prior to implementation of the project. The basic premise of the unplanned closure strategy for the site will be to encapsulate any radioactivity material and to create a safe, stable, non-polluting and sustainable post-mine landform. The risks to rehabilitation and closure of the site are reduced as progressive backfilling of the mine void is the preferred rehabilitation option, as it has both environmental and economic advantages. The entire mining technique for the operation has been developed to facilitate backfilling and progressive

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	around the future of the nuclear industry that the future demand for uranium is highly uncertain. The environment movement and all the organisations represented through this submission would certainly not accept an un-remediated uranium mine in WA. The proponent makes no commitment to rehabilitate the mine in the event of premature closure or suspension of any future mine operations. This aspect of mining regulations allows for companies such as Vimy to walk away from rehabilitation commitments, blaming market conditions. Progressive rehabilitation would alleviate some of the risks, but the long-term problems would remain. It is precisely for this reason that we advocate that mines, and particularly any uranium mines, should be required to have 100% of the expected cost of closure held in bonds, and that this value should be annually or biannually reviewed and adjusted to reflect the most current risk and liability. This is discussed in more detail in following sections on rehabilitation and bonds.	rehabilitation of the void, and thus the costs to rehabilitate in the event of unplanned closure will reduced. Vimy will contribute the required legislative Rehabilitation Levy, based on the Rehabilitation Liability Categories and Unit Rates, so that sufficient funds are available to rehabilitate the site in the unlikely event that it is left with the State Government. Vimy understand that it has a moral and ethical obligation to the community and the environment, and this will ensure that the site is adequately rehabilitated to the required standards.
P1, Proforma	Only very generic information was provided on rehabilitation methods and expected outcomes. The submitter thinks this is a real concern as there is an extremely poor track record of mine rehabilitation in Australia, in fact it is the submitters belief that no mines have been successfully rehabilitated to the standards set out in Section 15.2, that is, no significant long-term physical off-site impacts, no significant long-term changes to surface or groundwater quality or flows, safe for access by humans and other animals, a landform consistent with the surrounding visual amenity and supporting a self-sustaining native ecosystem of regional relevance. In Section 15.3, the PER notes that “backfilling of the mine voids and reconstruction of the soil profile …. Will likely restore the pre-	Vimy acknowledge that rehabilitation efforts throughout Australia, and in particular Western Australia, have been substandard and that there are very few sites that have been relinquished to the State. The Mulga Rock Project best resembles a mineral sands minesite and these are considered to have one of the lowest environmental footprints in the mining sector; significantly lower than a hard rock mine which results in a large void and associated waste rock dump. At the Mulga Rock Project all mine voids will be backfilled, thus allowing the restoration of groundwater processes and preventing the formation of a pit void. The backfilled mines pit will be rehabilitated to an acceptable, stakeholder-agreed standard and the overburden stockpiles contain materials that have no physical or chemical limitations to root growth. It is therefore considered that a safe, stable, non-polluting and sustainable landform will be produced for closure.

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	mine hydrology… and pedagogic function of the landform". Just how likely is this? Are there examples of other mines anywhere in Australia where this has been achieved? Given what I believe to be a very low level of achievement of these sorts of outcomes that other mines, what it is this proponent planning to do differently to achieve these outcomes? Submitters suggest that it is not possible to rehabilitate the site and it will remain permanently contaminated.	Unlike the operations at Yeelirrie and Wiluna, the Mulga Rock Project has significant overburden material that is geochemically and radiologically benign. This provides sufficient material to cover all tailings and ore, and thus no surface radiological signature will result after rehabilitation. The tailings seepage has a composition similar to the existing paleodrainage aquifer, and this is due to the processing of the ore simply replicating the acid sulphate soil process that has been occurring natural for millions of years. Consequently, in-pit tailings deposition, directly into the paleodrainage aquifer is considered the best environmental outcome. Based on the above discussion, and the knowledge and work submitted in the PER, it is considered that rehabilitation of the Mulga Rock Project will be achievable.
P1, PND(WA)	In relation to the TSF and OLs, Section 15.3 states that "the surfaces of these posts mine landforms have been designed to be stable and resistant to both wind and water erosion, while the surficial soil profile has been designed to ensure that sustainable revegetation is achieved". Again, what is the likelihood of success in achieving this outcome? Are the available topsoil resources suitable for placement on these types of sloped landforms? Appendix H2 indicates that the soils on-site have a number of limitations; however, the limitations are only briefly addressed in the rehabilitation section (15.8). It is not clear how the limitations of the soils will be overcome in order to achieve the outcomes associated with a stable, non-polluting landform that will support native vegetation. Also, it is not clear what quantities of each soil type will be encountered and how this relates to how the different soil types will be placed on the final	Vimy would like to focus the attention onto the successful and sustainable rehabilitation that currently exists on the Shogun trial mine area, which was undertaken back in 1995. Detailed characterisation of the overburden materials shows that they exhibit no physical or chemical limitations to growth, and that the key driver for rehabilitation success was water availability. Vimy have taken this into account and have developed specific revegetation seed mixes that match the ability of the various reconstructed soils profiles to meet the growth requirements of the revegetation. This ensures that the revegetation will be successful. Further work on seed ecology of the keystone species is currently underway to ensure that the correct method of seed collection (e.g. whether through soil stripping, seed collection or mulching) is selected and further germination trials will identify recalcitrant species that may require further work. With this knowledge of the seed ecology and the capability of the materials to support sustainable growth, successful rehabilitation is expected. It is important to recognise that in the various studies undertaken to determine landform design, where uncertainties existed, and which are currently being resolved, worst-case scenarios/parameters were used to identify impacts and confirm their likelihood and consequences. This is the primary role of the PER process, which after all is an impact assessment. The additional work will not

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	landform (some of the soil types for example are not suitable for exposure at surface). It is really critical that this is thought through prior to commencing mining because this is perhaps the single most important factor in achieving the stated rehabilitation outcomes. It would be unfortunate if the project was approved and mining commenced, and then the detailed studies proposed found that this was a fatal flaw in terms of rehabilitation. Indicative plans for progressive rehabilitation are provided however it is noted that mine planning is at a very early stage. A problem that has prevented progressive rehabilitation in many other mine sites is variability of ore quality across the site. In many minds, this has meant that mining does not occur in a progressive, linear type fashion but rather selectively so that different all qualities can be blended. This in turn means that errors are not progressively rehabilitated as it is not desirable to sterilise any particular part of the pit in case later access is wanted. Of course this does not become apparent until more detailed testing of ore body is carried out. What is the risk of this occurring for this mine? How likely is it that mining will indeed progress in the linear fashion suggestion in the PER, thus allowing the straightforward progressive rehabilitation proposed? A total of 32 million tonnes of toxic radioactive mine tailings would be left behind after the mine's closure. As no uranium mine site anywhere in Australia has ever been rehabilitated adequately, what assurance can we have that the aftermath of the Mulga Rock uranium mine would be any better? Uranium mines occur in remote places and that is perhaps not conducive to better rehabilitation efforts.	change the identified impacts, but it will refine them and allow specific management strategies to be developed. It is considered that sufficient information exists, and that the Shogun rehabilitation provides sufficient confidence, that rehabilitation will be successful and that a safe, stable, non-polluting and sustainable post-mine landform will occur at closure. All results from additional work being undertaken to refine the uncertainties, will be reported in the Mining Proposal and Mine Closure Plan to be submitted to the Department of Mines and Petroleum and Department of Environment Regulation for review and approval prior to the implementation of this Project.

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	The proponent should be required to address the uncertainty associated with achieving these outcomes, particularly in relation to the likelihood of being able to achieve these outcomes. Examples should be provided where these outcomes have been successfully achieved in similar climatic and bio-regional contexts or in fact in any context in Australia. Otherwise, it cannot be concluded with any confidence that the long term (i.e. post mining) impact of this proposed mine are negligible. This has considerable bearing on any decision made regarding this project as the proposed mine will add further to the already significant burden carried by the people of Australia in relation to rehabilitated mine sites. Thus while the proposed mine may result in short-term economic gains and employment opportunities, there is likely to be long-term economic and environmental loss associated with dealing with post closure impacts. In summary, it is impossible to see how the conclusions drawn in Section 15.15 can be made on the basis of the information presented. This has significant bearing on any decision to proceed with this project.	
PND(WA)	There is the obvious matter of funds to complete rehabilitation and the final securing of the site to isolate the radioactivity it will still contain for 10,000 years. Will signage warning people to be wary of this site last for that time? Will any people around the site in a few thousand years' time be able to correctly interpret these signs – if they have remained at site? The decline of nuclear power will diminish the profits to be made from uranium mining. Even if the company was willing to act responsibly in rehabilitating the mine site (supposing that was physically possible), would its wealth be up to this task when its mine's operational life is over? Or will this burden fall to WA's tax payers and be delivered through government-managed intervention? Or will the company and/or	The mining and waste disposal methodologies discussed in the PER will provide effective containment of the NORM and NORM residues from the biologically active zone. Based on modelling detailed in Appendix H1 and actual experience of backfilled landforms (including at the historical Shogun trial pit), the proponent anticipates that upon closure, landforms will stabilise to a final mine closure has been and will be an integral of operations development planning at the Mulga Rocks Project. With operational experience, the Mine Closure Plan will be refined progressively in consultation with regulatory agencies and in accordance with the 2015 Department of Mines and Petroleum's *Guidelines for preparing Mine Closure Plans*. This will ensure environmental objectives and completion

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	the government attend to its maintenance/ monitoring role for 10,000 years? Not likely! According to the PER, there will be seepage from the tailings from Mulga Rock. This would not be a good start to stewardship of this mine for the next ten millennia.	criteria relating to closure are met by cessation of activities on-site. Appropriate signage will be used as deemed appropriate by the regulatory agencies at the time.
Proforma	There following concerns were raised regarding dealing with waste: • What are we going to do with the uranium when it returns to Australia as waste? • We will no doubt bury it on Indigenous people's land, which we have no right to do. • Increased terrorism and rapidly changing temperatures increase the associated risks and make appropriate stewardship of waste more difficult. • How do you explain to future generations why we thought it was acceptable to leave them this problem? • Our planet nor our country will sustain toxic waste. • There is no realistic means of containment of tailings waste, which would contaminate the Australian continent and enter foodchains and water catchments. • Australia's record is particularly poor – there is no uranium mine that has been successfully rehabilitated in this country. Claims to the contrary are spurious and cynical attempts to justify intensely destructive and dangerous practices. • Australia is having difficulties finding a storage location for its existing nuclear waste (e.g. Lucas Heights), quite apart from the technical difficulties still being experienced worldwide ensuring long term, safe storage of such highly toxic material. It will be unable to store waste from what we mine. • Long term implications for storage of spent nuclear materials are ludicrous, inefficient and pointless.	Vimy expects to export all of its uranium production and will not be under any obligation or expectation to take back the uranium after it has been through the nuclear fuel cycle. Indeed, the legislation of Western Australian [*Nuclear Waste Storage and Transportation (Prohibition) Act 1999*] currently prohibits the establishment of a nuclear waste storage facility in this State, or the use of any place in this State for the storage or disposal of nuclear waste and the transportation in this State of nuclear waste. Therefore, there will, for the foreseeable future, be no waste returning to Western Australia that will need to be dealt with and no burying of such material on Indigenous People's land. The only waste produced by Vimy will be the tailings that will be disposed of into Tailings Storage Facilities (TSFs). Vimy does not accept the assertion that terrorism poses a threat to the stewardship of such tailings facilities or that climate change increases the risks either. The tailings will contain relatively low levels of uranium and they will be isolated from the environment and immune to climate change impacts. Vimy does not accept the premise that the development of this proposal will result in a problem that it would be unacceptable to leave for future generations. Vimy notes that the development of the proposal is not expected to result in any significant residual impacts upon the environment. Vimy does not accept the premise that the development of this proposal will result in toxic waste that either Australia or the planet is unable to sustain. Vimy notes that the tailings associated with this proposal will be permanently isolated from the environment and that there are not expected to be any significant residual impacts. Vimy does not accept the premise that there is "no realistic means of containment of tailings waste" or the implied assertion that the waste would

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	• No known method as to the safe storage or disposal of all nuclear waste. • Safe short term and long term storage of nuclear waste has not been solved. • No one wants to accept radioactive waste. • Learn from what is happening with the waste from the mines in the NT. • Australia has a dismal record of containing pollution due to uranium mining. • Given the half-life of uranium, how can you justify radioactive waste from the decomposition of uranium when used?	therefore contaminate the Australian continent and would enter food chains and water catchments. Vimy notes that its tailings will be permanently isolated from any sensitive environmental receptors and never enters any food chains or any water catchments that have any associated GDEs. Vimy does not accept the assertion that no uranium mine has been successfully rehabilitated in Australia. Vimy notes that the Nabarlek uranium mine and associated mill, which were located in the Northern Territory (and produced about 11,000 tonnes of U_3O_8 between 1979 and 1988) was deemed fully rehabilitated in 1995. Vimy also notes that the development of its proposal it not expected to have any significant residual impact upon the environment. Vimy acknowledges that there is currently no established long term solution for the storage of nuclear waste produced by the Lucas Heights nuclear reactor. Vimy notes that this waste mostly consists of low level waste (LLW; about 87%) which can easily be disposed of and that WA already has a LLW repository (the Mt Walton East Intractable Waste Disposal Facility); but this facility is solely for WA's LLW. The remaining waste is intermediate level waste (ILW; about 13%) and is also classified as category S waste because of its long-lived nature. However, there are no technical barriers to a safe long-term solution, namely a geological repository capable of isolating and containing the material for the requisite time. Vimy notes that the only waste located in Australia that will result from the development of its proposal will be the tailings material that will be safely isolated and contained and there will be no residual impacts upon any sensitive environmental receptors. Vimy does not accept the assertion that the long term implications for the storage of spent nuclear materials can be characterised as either ludicrous or pointless. Vimy acknowledges that currently the methods used to store spent nuclear materials are not efficient and that it would be far more efficient if spent nuclear fuels that are not going to be reprocessed were deposited in suitable deep geologic deposits as soon as the materials have sufficiently cooled.

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		However, Vimy does not believe that this issue is relevant to the assessment of its proposal. Vimy does not accept the assertion that there is “no known method” of safely dealing with spent nuclear fuel. Vimy notes that both the reprocessing of spent nuclear fuel and deep geological disposal represent safe disposal methods for dealing with this material. Vimy does not accept the assertion that there is no solution to the safe storage of spent nuclear fuel over the short term or the long term. Most spent nuclear fuel is stored in storage ponds that are located at the reactor sites which used the fuel in the first place. This is a short term solution which is entirely safe and is the most appropriate storage method given the high radioactivity and high heat of spent nuclear fuel immediately after use in a reactor. The water in the storage ponds absorbs the radioactivity and acts as a cooling medium. After cooling sufficiently, the spent nuclear fuel can be transferred to dry casks (made from concrete and steel) which are a safe storage option over the short and medium term. Deep geologic disposal represents a safe long-term storage option. Vimy acknowledges that many people are reluctant to accept the disposal of nuclear waste in a location near where they live, but does not accept the assertion that no one wants to accept radioactive waste. Vimy notes that the municipality of Euajoki on the west coast of Finland was happy to accept the building of the Onkalo spent nuclear fuel repository within its area. Vimy also notes the ‘Tentative Findings’ of the ‘Nuclear Fuel Cycle Royal Commission’ were that the storage and disposal of spent nuclear fuel in South Australia was likely to deliver substantial economic benefits to the South Australian community. Vimy does not accept that any mines located in the Northern Territory are relevant to an assessment of Vimy’s proposal. Vimy notes that the only uranium mine currently operating in the Northern Territory is Ranger which involved relatively deep hard rock mining where both the waste rock and tailings are disposed of away from the open-cut mine; this should be contrasted

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		to Vimy proposal which involves far shallower mining in essentially sand, where the sand is mostly backfilled into the same pit and tailings are also mostly disposed of into in-pit tailings facilities. Vimy also notes that there are not expected to be any significant residual impacts upon the environment and that this includes impacts from tailings. Vimy does not accept the assertion that Australia has a dismal record of containing pollution from uranium mining. Vimy notes that all potentially polluting materials produced at the site of its proposal will be sufficiently contained enough to ensure that there will be no significant residual impacts to the environment. The uranium that Vimy will be mining will consist of about 99.3% ^{238}U which has a half-life of approximately 4.468 billion years, and about 0.7% ^{235}U which has a half-life of approximately 704 million years. The waste material that Vimy will dispose of into tailings facilities will contain this same proportion of different isotopes of uranium and will be no different from the naturally occurring uranium that exists in the area in terms of the associated half-lives. All tailings will be permanently isolated from any sensitive environmental receptors. Vimy does not believe that there is a problem with the "decomposition of uranium" associated with its proposal that requires any justification.
Proforma	Submitters were concerned that Australia would have to take back uranium waste: • There is an expectation that if we export uranium then Australia should be responsible for taking back and storing the uranium waste. • We don't want it back as nuclear waste when whoever buys it wants to dump its products. • Australia should not be housing "spent" uranium from other countries.	Vimy expects to export all of its uranium production and will not be under any obligation or expectation to take back the uranium after it has been through the nuclear fuel cycle. Indeed, the legislation of Western Australian [*Nuclear Waste Storage and Transportation (Prohibition) Act 1999*] currently prohibits the establishment of a nuclear waste storage facility in this State, or the use of any place in this State for the storage or disposal of nuclear waste and the transportation in this State of nuclear waste. Therefore, there will, for the foreseeable future, be no waste returning to Western Australia either from the Vimy Project or any other uranium mining in WA.

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	• Overseas corporations and some Australian governments are casting greedy eyes on WA as the potential dumping ground for the toxic byproducts of a dangerous industry. • By entering the global nuclear fuel cycle, WA will have increasing pressure to "do the right thing" and accept waste that no one else wants. • The government is desperately trying to get communities to accept radioactive waste because of various offers they are trying to bribe their way in. • Any country buying uranium from Australia might just want to send the waste back to where it came from adding to the waste already here, making it an environmental disaster.	
Proforma	Big trouble is taken to concentrate the uranium, but only the uranium which is sufficiently concentrated to yield a profit is transported away, while in the tailings the element (and the radiation) is still much higher than in the natural ore.	Vimy acknowledges that it will concentrate the uranium before extracting the uranium through acid leach and resin extraction and that not all uranium will be extracted and therefore some will remain in the tailings. However, Vimy does not accept the assertion that the amount of the element of uranium that remains in the tailings will be higher than would be found in the natural ore. Vimy notes that the average grade of the ore within its Ore Reserve is around 660ppm U_3O_8 and that the concentration in the tailings after processing this material is not expected to exceed 200ppm which is considerably lower.

11. Offsets

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Department for the Environment (DoE)	*16.2 Background- Subterranean Fauna (Pg. 387)* Internal inconsistency and inadequate coverage. Information Required – Clarify resulting extent of likely stygofauna habitat due to drawdown and high salinity zones in extraction	The exact actual distribution of the small number of stygofauna that were observed to be present in the Kakarook North aquifer is unknown. The salinity within the aquifer varies from 2,400 mg/L TDS recorded at a centrally located bore (NGW 49) up to 8,790 mg/L TDS at a bore located on the western edge of the aquifer (NGW 21). However, these observations were outliers and the

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	borefield and express this as a percentage reduction in likely habitat.	vast majority (26 out of 30) of the samples taken were in the range 3,000-6,000 mg/L TDS. It is therefore probably not correct to assert that there are high salinity zones within the aquifer at Kakarook North that might represent a constraint on the distribution of the recorded species of *Oliochaeta*. If the potential habitat of these species were congruent with the available water within the aquifer (on the basis that variations in salinity will not inhibit their distribution) then given that only about 17% of the water currently present will be extracted over the life of the mine, the water extracted will reduce available habitat by at most 17%. In practice, recharge is not likely to be insignificant, as attested to by the relatively low levels of salinity and the reduction in habitat caused by extraction over the life of the mine is expected to be less than this.
DoE	*16.2 Background - Subterranean Fauna (Pg. 387)* Internal inconsistency. Information Required – Stygofauna are identified in 2 locations within the borefield area. It is subsequently claimed that "stygofauna are located...away from proposed borefield location." Clarify inconsistency.	There were two locations where stygofauna were identified in samples of water taken from bores. The samples were taken from within the overall area of the Kakarook North aquifer. The proposed borefield will be located centrally within the overall aquifer at a location where the aquifer is at its deepest. Two bores that yielded water samples containing stygofauna are located outside this central area where the borefield will be located (borefield location); each one is just over 1km from where production bores are expected to be established. The two bores that yielded the stygofauna are outside the area where the borefield bores will be located (borefield location) but are in the wider area around where the borefield will be located, generally referred to as the 'borefield area'.
DoE	*16.2 Offsets - Air Quality and Atmospheric Gases (pg. 388)* Information gap. Information Required – While consideration is given to the use of gas as a fuel for electricity generation at the MRUP, renewable energy does not appear to have been considered in detail as part of the potential energy supply mix. Renewable energy sources have the potential to deliver enhanced financial and environmental	Renewable energy sources have the potential to deliver enhanced financial and environmental outcomes only under circumstances where intermittency of supply is not a problem. Vimy's processing plant will operate on a 24 hours a day, seven days a week basis and requires continuous baseload supply. Existing financially competitive renewable energy options are simply unable to meet this requirement. Vimy has sought approval for diesel powered electricity generation as the worst-case outcome (in terms of greenhouse gas emissions). Vimy has

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	project outcomes, as well as benefits with regards to public relations. Detail demonstrating the consideration of renewable energy resources would fill this information gap in the MRUP PER. The use of gas for fuel as an alternative to diesel is mentioned in the PER, however, further detail on these considerations are would benefit the document.	continued to progress the option of the supply of gas for the generation of electricity and is confident that it will secure such an option. Vimy continues to explore fuel options for the generation of electricity. Those options include both a gas pipeline to supply gas and the transport of liquid gas to site utilising trucks.
DoE	*16.3 Mitigation Hierarchy- Minimisation (pg. 390)* Term definition. Information Required – The proponent states that "The mine plan and mining method will result in approximately 50-75% of the waste overburden and over 90% of the tailings being placed back within mined out pits". This represents a wide range of waste overburden material. Clarify the amount of waste overburden used in subsequent calculations, or identify which part of this range was used, to allow suitable assessment of overburden landforms and pit voids.	Vimy has every incentive to maximise the amount of backfill undertaken as it is very much cheaper to effectively move overburden horizontally and simply deposit in in areas within the same pit that have already been mined. However, this method of strip mining requires an initial slot to be dug and the material from that slot to be deposited elsewhere (in adjacent overburden landforms). Depending on the eventual size of the pits being developed (this will vary depending upon the economics of mining at the time the mining takes place; the higher the price of uranium the lower the cut-off grade and the bigger and deeper the pits) the proportion of material that forms the initial mining slot will vary as compared to the total amount being mined from the pit. Under a range of differing cost and pricing scenarios this ratio is expected to vary between 50% and 75%. For the purposes of obtaining PER approval the overburden landform footprint is based upon the largest likely footprint with the expectation that not all this area will be required. In all cases the overburden landforms will be limited to 30m in height and will be suitably rehabilitated; similarly, all pit voids will at a minimum be backfilled to at least 10m above the underlying aquifer and suitably rehabilitated.

12. Consultation

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Department of the Environment (DoE)	*Public Consultation* Evidence has been provided of ongoing consultation and agreement with Traditional Owners. Information Required – Evidence of ongoing consultation with Traditional Owners.	Aboriginal consultation is the process by which Aboriginal people can become involved in a decision-making process on issues that affect them. Although there are currently no claims by Native Title Claimant Groups over any part of the Project area, Vimy acknowledges and respects that the Wongatha people identify themselves as Traditional Owners of land directly north of the area where mining will take place. In recognition of asserted Traditional Ownership, Vimy has utilised Wongatha people for all heritage survey work and has consulted with and informed Wongatha representatives about the progress of the Project and provided them with the information contained in the PER. Vimy will continue to consult with Wongatha people as appropriate but is much more focussed on engagement.
Proforma	Submitters raised concerns about consultation with Traditional Owners: • The consultation and views of the Traditional Owners of the land are not clear. There needs to be less silence and secrecy about this and more information and publicity about these types of decisions so the general population are informed as this is certainly a matter of public interest. • There has been no consultation with Traditional Owners.	There are no identifiable Traditional Owners of the land where Vimy's granted mining leases are; it has therefore not been possible to consult with or obtain the views of such people. There is no silence or secrecy about this. However, Vimy respects the assertion of Traditional Ownership made by Wongatha people over land to the north of Vimy's mining area. Vimy has consulted with representatives of the Wongatha people and has utilised Wongatha people in all its heritage survey work.

13. Other

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P2, P3, Proforma, P4, P5	Submitters raised general concerns about the natural environment: • Uranium mining is unnecessary, unsafe and unwanted. Home to the unique marsupial mole, sandhill dunnart and brush tailed mulgara Mulga Rock is an ancient and fragile landscape in the heart of our outback country. Plans to clear 3,709 ha of native vegetation replacing it with 14 waste rock piles and 9 open pits, taking up to 15 million litres of groundwater and leaving behind 32 million tonnes of radioactive mine tailings is a toxic trade I do not support. • Australia is known for its wide open spaces, fresh air and clean waters. Australia makes a valid profit from tourism in respect to its untouched natural areas. Mining the earth has only one worth and that is the gain of rich resources taken to produce financial profit for big business. • Emissions and pollution caused from uranium cannot be safely measured for long term environmental impact once it has left the ground. Mining is an unsustainable venture when faced with what's left of the location after its resources are taken. Australians will be left with great big holes, lifeless, worthless and homeless for the wild animals that, though small, are dying out at a rapid rate due to disturbed habitat. Money and greed of resources will not be understood later on when all that is left is an eye sore. Our beautiful country has no voice only money is talking. See the beauty of our natural landscape in its purest form and treasure it, for we are the custodians. If we don't put a stop to mining in all guises our land and sea will become a waste dump. • Please stop this uranium mine at Mulga Rock to preserve our natural heritage. • I would ask the Members of the EPA to please appreciate that a great many of the foreseeable consequences will not affect them or even members of their generation. Instead the greatest risks will be borne	All areas that have been cleared of Native Vegetation will be rehabilitated once the area is no longer required. There will not be any 'waste rock piles' – there will be eight overburden landforms (which will comprise of un-mineralised overburden material; essentially sand) which will resemble the dunes that exist in the area and will be rehabilitated with appropriate vegetation once fully formed. The number of open pits expected to be dug is likely to be less than nine pits and is expected to encompass an area of not more than 2,374ha (Table E-2 PER document). All open pits will be partially (at least 10m above underlying water table) or fully backfilled and rehabilitated to resemble appropriate vegetation communities that exist in the area. Although the gross rate of extraction being applied for is up to 5.5GL/a (~ 15 ML/d) the average gross rate of extraction is estimated to be only 2.3GL/a (~ 6.2 ML/d), some of which will be reinjected into the same aquifer downstream from where it was extracted. In all cases, water is being extracted from groundwater that is not connected to the biosphere that characterises the surface environment. There will about 48 million tonnes of tailings created over the life of the mine of which about 60% will be water and so the dry weight of the tailings will be approximately 19.4 million tonnes. The tailings will be deposited in Tailings Storage Facilities that will ensure that their contents are permanently isolated from all sensitive environmental receptors. Vimy's proposal will have no impact upon tourism in WA; it is not located at a site visited by tourists and mining activity will be around 50km from the Queen Victoria Spring.

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	by your children under 30 and grand children and their descendants who you may not even know. If risks would be unacceptable for your children then so they should be for your great, great grandchildren. • "We do not inherit the earth from our ancestors; we borrow it from our children." • Uranium mining, export and use are not localised issues. They concern/affect us all around Australia and worldwide.	The emissions associated with mining and processing the ore were dealt with in Section 12 of the PER; Vimy does not agree that emissions cannot be safely measured. The submitter asserts that mining is unsustainable because after mining there will be great big holes that will not support the local fauna. This is not a correct characterisation of what will be left once Vimy has finished mining an area. All mining areas will be backfilled (at least partially) and profiled to resemble existing landforms. All areas will be rehabilitated. Vimy does not accept the assertion made by this submitter that the development of this proposal represents any threat to future generations. There will be no significant residual impacts in relation to any of the environmental factors that were assessed. The uranium that Vimy produces and exports will only be used for peaceful purposes and Vimy does not accept the assertion that uranium used as nuclear fuel to generate electricity has a harmful overall effect upon the environment.
Proforma, P3, P4, P5	Submitters raised general concerns about the dangers and risks from uranium: • Uranium is inherently dangerous and will only harm people and our planet. • There is no safe way to mine, dispose of, or use radioactive materials. • The nuclear industry is a threat to humanity and a scourge on the planet. • Radioactive material is dangerous and should be left alone. • There are too many risks and threats associated, it will leave this area uninhabitable. • Serious environmental and safety concerns with all parts of the nuclear fuel industry, from mining to transport, nuclear reactor accidents and storage of waste for 10,000 years.	The uranium that Vimy produces and exports will only be used for peaceful purposes and Vimy does not accept the assertion that uranium used as nuclear fuel to generate electricity has a harmful overall effect upon the environment, or that it poses any threat to either humanity or to the planet generally. Vimy does not accept the assertion that mining of uranium cannot be undertaken safely or that uranium cannot be handled securely. The only radioactive waste produced locally will be deposited in Tailings Storage Facilities (TSF) that will ensure that their contents are permanently isolated from all sensitive environmental receptors and therefore will be disposed of safely. Vimy does not accept the assertion that the development of this proposal would leave the area any more uninhabitable than it already is (due to lack of water).

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	• Not ethical and complete disregard for happiness and safety of other sentient beings. • Concern uranium cannot be handled securely. • Even with precautions, horrible disasters can happen. • It will cause immediate damage and long term hazard. • Uranium mining has huge environmental and pollution consequences - It is an unsustainable option. • The price is too high. It is not worth the risk it poses. • Insurers of domestic clients invariably exclude any damage or illness caused by nuclear related phenomena. • Concern raised about the time it would take for uranium to decay. • Concern that Australia would become a radioactive wasteland like many parts of Europe and North America. • Concern about the long term impacts of storing radioactive waste. • Even with the best designs, nature is unpredictable and can and does damage and render unsafe even the best designed tailings dams and control systems and barrier dams. Eventually they will fail. Whether in a thousand years or in three years. It is not worth knowing with certainty that these containment systems for nuclear waste will leach radiation into the environment. It is not worth the risk. • Until a permanent solution to encase the tailings underground is found, the current stockpile should not be moved and dissipated into further risky surface proposals. • Until uranium waste can be rendered not harmful, it should definitely not be mined nor reburied after use. • No reactor has produced more power than it consumes during its entire lifetime, and intractable waste products are lethal for 10s of 1000s of years. Beyond that, its only other purpose is to produce nuclear weapons. Australia should have no part in this death industry.	The risks associated with radioactivity are dealt with in Sections 12, 13 and 15 of the PER. The environmental and safety concerns that relate to the nuclear industry in general are beyond the remit of this Environmental Impact Assessment. However, Vimy believes that these matters are adequately dealt with by the IAEA and other regulatory agencies. Vimy does not accept the assertion that the development of its proposal would be unethical or that it shows any disregard for the happiness and safety of other sentient beings. Vimy acknowledges that even with precautions, horrible disasters can happen but does not believe this matter is relevant to an assessment of its proposal. Vimy does not accept the assertion that the development of its proposal will cause immediate damage and long-term hazard. Vimy's PER sets out all of the environmental consequences of the development of its proposal. There is nothing that suggests that there will be even a risk of huge environmental and pollution consequences or that the project represents an unsustainable option. There is nothing that suggests that the "price is too high" or that "it is not worth the risks that it poses". Vimy does not accept the implied assertion that insurance against the consequences of issues related to uranium mining would be excluded from domestic policies. Vimy respectfully suggests that the submitter is confusing the issue of the difficulty of insuring against the consequences of nuclear accidents with the entirely different risks associated with the mining of uranium. Uranium takes different lengths of time to decay depending upon the particular isotope of uranium being considered. Natural uranium is typically composed of around 99.3% uranium-238 and about 0.7% uranium-235. The half-life of uranium-238 is about 4.5 billion years and the half-life of uranium-235 is about 700 million years. So for all intent and purposes the rate of decay is very slow and the uranium will remain radioactive. However, all the uranium mined is

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	• Stop geoengineering, GMOs, uranium and coal mining, fracking and everything nuclear. I do not believe that you people realise the seriousness of our precarious position. • Mistakes in this industry are forever. • I am surprised that any human being would even consider this. It shows absolutely no respect for the God-given creation which civilised human beings have long treasured. • Mining uranium creates radioactive waste here, and overseas, posing a public health risk and liability. • Irresponsible mining companies walk away 'broke' and do not repair their damage. • Comments were made about the long term tailings management and radioactivity issues and Olympic Dam was given as an example.	either safely exported or returned to TSFs that will permanently isolate the uranium from sensitive environmental receptors. There should be no concern about the storage of the tailings (radioactive waste) – it will not cause any part of Australia to become a radioactive wasteland and there will be no significant residual impacts over either the short-term or the long-term. The submitters have suggested that even the very best tailings dams will eventually fail and therefore that nuclear waste will leach into the environment. However, the majority of Vimy's tailings will be deposited back into in-pit tailings facilities which do not rely upon dam structures as they are deposited well below the surface level of the ground in the area. Vimy may utilise an above-ground tailings facility for the first 18 months of production, but once in-pit facilities become available this above-ground facility would be drained and allowed to consolidate then capped and rehabilitated. Any leakage from this facility would migrate down to the underlying aquifer where contaminants would be sequestrated by the carbonaceous material that was responsible for creating the deposit in the first place. This waste has been characterised by the submitter as "nuclear waste"; that is not an appropriate characterisation. It is naturally occurring uranium that will have been mined, and from which most of the uranium will have been removed. Most of the radioactivity will come from daughter products of uranium (which are also naturally occurring) and which are not removed during the processing process. Most of the tailings (and possibly all of the tailings if Vimy does not use the above-ground TSF) will be encapsulated below ground precisely as the submitters are suggesting. Vimy does not accept the assertion that uranium should not be mined nor reburied after use until it can be rendered not harmful. Uranium cannot be rendered inherently harmful but burying waste material in an appropriate manner does render it un-harmful.

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		Vimy does not accept the assertion that "No reactor has produced more power than it consumes during its entire lifetime". Vimy does acknowledge that waste products (spent nuclear fuel) can be harmful for thousands of years and must be appropriately dealt with, but does not accept that the only other use for such waste is the production of nuclear weapons. Spent nuclear fuel is of no use for the creation of nuclear weapons and since Vimy's exports will be used entirely for peaceful purposes it does not accept the assertion that its uranium exports will in any way be part of any "death industry". Vimy does not accept the appropriateness of putting 'geoengineering, genetically modified organisms, coal mining and fracking' into the same category as 'uranium mining and the nuclear industry'; nor does it accept the implied assertion that the development of a proposal that involves uranium mining necessarily contributes to the precariousness of any matter related to the environment. The submitters assert that "Mistakes in this industry are forever" – it is not clear which industry is being referred to; to the extent that it refers to the nuclear industry rather than the uranium mining industry it is beyond the scope of this environmental impact assessment. There are not expected to be any significant residual impacts as a result of the development of this proposal. Vimy does not accept the assertion that the development of this proposal is in any way disrespectful to the concept of "creation". To the extent that the development of Vimy's proposal "creates radioactive waste here" that radioactive waste is tailings that will be disposed of in a manner that ensures that they remain permanently isolated from any sensitive environmental receptors; it will not pose a public health risk or liability. To the extent that the development of Vimy's proposal creates radioactive waste overseas – the asserted risks and liabilities are beyond the remit of this assessment which is concerned with environmental impacts within WA.

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		The submitters suggest that "Irresponsible mining companies walk away 'broke' and do not repair their damage". Vimy does not accept the implied assertions that it might be an irresponsible mining company or that it might become insolvent during operations. Vimy will undertake rehabilitation on a progressive basis and will ensure that it fully rehabilitates all areas once they are no longer required for operations. There are not expected to be any significant residual impacts and Vimy does not accept the assertion that it might not repair any damage. Comparisons were made to Olympic Dam only where there were relevant similarities and it was therefore appropriate to make such comparisons. Both the mining method and the method for the disposal of tailings are different and no generalisations should be made between two very different operations.
United Church WA	The hazardous waste from the nuclear energy industry to which the uranium will be supplied. There is no accounting for the hazardous waste produced from the full nuclear cycle of which uranium mining is the beginning process. The storage of nuclear waste from the nuclear energy industry is unresolved. It is an inevitable result of the decision to mine uranium that will burden the earth and future generations for thousands of years and a problem from which the uranium industry cannot be absolved.	Vimy acknowledges that uranium produced as a result of the development of its proposal will ultimately be used in nuclear reactors for the purpose of generating electricity. Vimy also acknowledges that after being used in a nuclear reactor the uranium will become spent nuclear fuel which is a hazardous product. However, whilst Vimy also acknowledges that this hazardous waste product is not accounted for in the Environmental Impact Assessment (EIA), Vimy does not accept the assertion that it should be. Vimy also does not accept the assertion that the storage of nuclear waste from the nuclear energy industry is unresolved, or that there follows an inevitable consequence that will burden the earth and future generations for thousands of years. Spent nuclear fuel can be reprocessed, or can safely be disposed of in deep geologic disposal facilities. However, this issue is beyond the remit of this EIA.
Wildflower Society/ Conservatio	The question needs to be asked, whether organisations that treat the EIA process with a lack of respect as this one has done in places, be trusted to manage what may be quite substantial environmental impacts at this site?	Vimy does not accept the premise that it has treated the EIA process with any lack of respect; nor does it accept the premise that there are substantial environmental impacts that it should not be trusted to manage.Vimy believes that it can be trusted with the handling of uranium ore and uranium concentrate, including transporting it to an export terminal and that it can also be trusted with

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n Council WA	Extending to the responsibility of handling, transporting and storing toxic materials? It is a remote site and will operate with little oversight. Fledgling companies like Vimy are particularly vulnerable to external economic factors in this economic climate and in this particular industry. This has most recently been highlighted in the draft findings of the SA Nuclear Fuel Cycle Royal Commission which states that "*Increases in the uranium price in the short term are unlikely given existing inventories. While the low price has restrained greenfield exploration, recent commercial decisions in Australia do not give a clear indication of the future prospects of the uranium industry."* The benefits of the uranium sector are marginal and often overstated, the long term costs of regulating, monitoring and managing the legacy left by small companies like Vimy is a burden on our environment, our Government and our tax payers.	disposing of the tailings in an appropriate manner. Vimy acknowledges that the site is remote, but does not accept the implied assertion that there will therefore be little oversight.Vimy acknowledges that the price of uranium as recorded in the uranium spot market remains depressed and that this has had an adverse impact on sentiment generally. However, this focus upon the uranium spot market is misplaced in the sense that the vast majority of uranium sales made by producers are not transacted through the spot market and occur directly as contractual sales between the producers and the nuclear utilities that require uranium as fuel. Long term prices are more stable than spot prices and typically would be expected to command a premium of around 20-25% in a stable market Fledgling companies like Vimy are aware of the vagaries of the market and their potential vulnerability to price fluctuations and so too are investors that fund companies like Vimy. The solution is to underpin financing with sufficient long term contracts to ensure the debts incurred in financing the required investment in mining and processing infrastructure can be met from revenues associated with long term contracts regardless of fluctuating economic conditions. Vimy will be endeavouring to achieve this outcome of underpinning the sustainability of its operations through the natural hedging that exists within long term contracts. Vimy does not agree with the assertion that the benefits of the uranium sector are marginal and often overstated. The uranium mining industry is estimated by the Minerals Council of Australia (MCA) to currently sustain around 3,000 jobs and to contribute $600m worth of exports. That figure is expected to increase as new uranium mines such as Vimy's enter into production. Vimy does not accept the premise that there will be long term costs associated with regulating, monitoring and managing the legacy left as a result of its Project being developed that will have to be paid from government funds. Vimy's project involves permanent isolation of radioactive waste material (tailings) from any sensitive environmental receptors and full rehabilitation of all disturbance areas once no longer required. All the costs associated with

Submitter	Submission and/or issue	Response to comment
		rehabilitation and all monitoring and management activities will be borne by Vimy.
P2, P4, P5, Proforma	Submitters consider there are safer and more reliable alternatives: • Within a few short years, uranium will be made completely obsolete for renewable energy. • Australia has the means to have a thriving renewable and non-fossil fuel industry and this is where the government should be focusing on. • Australia and the rest of the world should be developing renewable energy sources. • Renewable energy is better for the environment, the economy, the people and it doesn't come with the risk of a nuclear meltdown. • We should only consider projects which will increase our use of renewable energy and severely limit dangerous radioactives and fossil fuels. • Our future is renewable, not radioactive. • If not an alternative technology, perhaps a simple tax shift. Infringe polluters, provide incentive for sustainable alternatives. • Investment and supporting a cleaner system of using resources for obtaining energy is the new paradigm. • Technology has advanced to a point where safe and reliable solar and wind energy is now available. We are now scientifically geared to produce and promote alternative energy sources with less harmful outcomes. • As an alternative to fossil fuels, nuclear power will come online too late and be the most expensive option available. • Uranium has no place in a sustainable future. There are ample alternative energies available that will not leave behind a legacy of destruction. • There are safe and renewable energy sources that should be explored, and would also generate jobs.	Vimy does not accept the implied premise in this submission suggesting that renewable energy is a safer and more reliable alternative to nuclear power; Vimy believes that both renewable energy and nuclear power need to be developed in order to address the potential threats posed by climate change. Vimy does not accept the assertion that uranium (nuclear power) will be rendered obsolete by renewable energy within a few years. Vimy believes that both sources of power will need to be developed as much as possible over the next couple of decades. This submission suggests that Australia should be focussing on renewable and non-fossil fuel industries. Vimy notes that uranium is part of a non-fossil fuel industry. Vimy also notes that the uranium that is mined will all be exported, and that the issue of whether the government should focus on promoting renewable and non-fossil fuel industry development is not relevant to an environmental assessment of this proposal. Vimy does not accept the assertion that renewable energy is better for the environment, the economy and for the people – nuclear power is as safe and non-polluting as renewable energy when considered on a full life-cycle basis. A proper risk assessment of the risks associated with nuclear power taking into account probabilities and consequences does not support the assertion that the risks associated with nuclear meltdowns are too high. Vimy does not accept the assertion that only renewable energy projects should be considered and that fossil fuels and nuclear energy should be severely limited. Whatever may happen within Australia, there will be demand for nuclear fuel for the foreseeable future and the need for Australia to assist countries with nuclear industries (including the USA, Europe, South Korea, Japan and China) by providing the required fuel.

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	• Australia is one of the sunniest countries in the world, why not harness this and set an example to the world? • We don't want energy derived from fossil fuels either. • In Germany, nuclear power stations are being phased out and their focus is on renewable energy. • Revolution in battery technology means we can run majority of Australia on solar, wind and some geothermal. Improvement in technologies such as solar panel design has also improved efficiency. • We need to promote the reduction of power usage – less is best. • While renewable energy cannot be exported, Australian technology can. • Opportunity to develop state of the art solar power – photoelectric and high efficiency heat engines. • Mining industry cannot make money from natural resources like solar and water power. • In a world of renewable energy, Australia's natural advantage is probably in the order of 30% over the rest of the world, as the quality of our resources is impressive. • What about hydro electricity from the Kimberley? • We are losing the chance to become world leaders in renewable technology.	Vimy does not accept the implied assertion that renewable energy and nuclear energy are alternatives; Vimy believes that both are an essential part of the global energy mix required to meet the challenge of climate change. Vimy acknowledges that the taxation of carbon emissions can provide incentives for "sustainable alternatives", but notes that given the low carbon emissions associated with nuclear energy such a proposal would encourage nuclear energy as well as renewables. Vimy acknowledges the implied assertion of the need for investment in, and support of, using resources to obtain energy as cleanly as possible; Vimy notes that it proposal supports 'clean energy'. Vimy does not accept the assertion that technology has advanced to the point where reliable solar and wind energy is available – intermittency remain a problem and battery technology has not evolved to the point where it is capable of economically resolving that issue. Vimy does not accept the assertion that nuclear capacity cannot be increased rapidly enough (will come on line too late) or that it will be the most expensive option. Nuclear power is the only non-fossil fuel source of power capable of being increased sufficiently quickly to deal with China's growing electricity demand in an environment where fossil fuel (in particular coal) growth is being constrained for health and environmental reasons. Moreover, the cost of nuclear power when calculated on a levelised cost of electricity basis is fully competitive with the renewable alternatives. Vimy does not accept the premise that uranium will leave behind a "legacy of destruction" or the assertion that it has "no place in a sustainable future". Vimy acknowledges that there are safe and renewable energy sources that could also be used to generate electricity and that such projects would create jobs, but Vimy believes that both renewables and nuclear energy are required to deal with the potential threats posed by climate change and does not regard renewables as an alternative that could substitute for nuclear.

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		Vimy acknowledges that Australia is one of the sunniest places in the world, but does not believe that this fact is relevant to an assessment of a uranium mine that will export uranium concentrate to fuel nuclear reactors in other countries. Vimy notes that nuclear energy is not a fossil fuel. Vimy acknowledges that Germany has announced an intention to phase out nuclear energy; Vimy also notes that despite a focus on renewable energy the result of the phasing out of the nuclear reactors that have been closed so far has been to increase Germany's greenhouse gas emissions. Vimy acknowledges that there have been improvements in battery technology but does not accept the assertion that this means that the 'majority of Australia' can be run on solar, wind and geothermal. Whatever mix Australia determines is optimal is unlikely to alter the global demand for uranium for use in nuclear reactors and will not be relevant to an assessment of the environmental impact of Vimy's proposal. Vimy acknowledges that efficiency measures (that reduce overall power usage) are also part of an appropriate response to reducing greenhouse gas emissions, but does not believe that this is a relevant factor in the Environmental Impact Assessment of its Project. The essence of part of these submissions is that Australian renewable technology could be exported, that there is an opportunity to develop state of the art solar power, photo-electrics, and high efficiency heat engines, that money could be made from natural resources, that Australia has a natural advantage in the world of renewable energy and yet that Australia is losing an opportunity to become a world leader in renewable technology – and all of this is being asserted as if somehow the development of Vimy's project would inhibit this in some way. This is simply not the case. Vimy's project is in no way in competition with any initiatives that may or may not exist to promote renewable energy and the associated technology in an Australian context. Nor

Submitter	Submission and/or issue	Response to comment
		is Vimy's project likely to have any impact upon the export potential for the services and technologies that might be developed. Whatever the benefits of otherwise of hydroelectricity in the Kimberley it has no relevance to a uranium mining project located in the Goldfields region. Vimy does not believe that the development of its proposal will have any impact upon whether or not Australia can become a world leader in renewable technology; or that this issue has any relevance to an impact assessment of its proposal.
PND (WA)	The public submitter urges the EPA to include the global implications of climate change in its assessment of whether the Mulga Rock project should go ahead.	In terms of the global risks associated with climate change it should be noted that the Total Greenhouse Gas Emissions associated with the development of the project have been estimated at 3.6Mt CO_2e over its 16-year modelled life in Appendix E1. The amount of uranium expected to be produced if converted into nuclear fuel which then displaced coal fired capacity was estimated at around 50Mt CO_2e per year (s.16.2 PER document), which would amount to more than 800Mt CO_2e over the life of the mine. The impact on climate resulting from the development of this Project should therefore be regarded as positive.
P3, United Church WA	Who will pay sickness benefits and carer's costs of those that get cancer, leukemia and other genetic diseases? Is it the tax payer? What about compensation to the families who lose a loved one? What right does the nuclear industry have to administer doses of carcinogenic radioactive material to all life forms and future generations without their consent? The Uniting Church in Australia, Synod of Western Australia considers the proposal to mine uranium at the Mulga Rock Uranium Project as a serious issue of concern for the health of the local environment and people, and the health and safety of the broader community and planet.	Vimy does not accept the premise that there will be any sort of requirement for anybody to pay sickness benefits and carers' costs or that there will be cancer, leukaemia and other generic diseases as a result of the development of its proposal, or that taxpayer will be required to pay anything or that any compensation will be required as a result of families losing a loved one. Vimy does not accept the premise that there will be any administering of doses or carcinogenic material to all forms of life and future generations that would require any consent. Vimy acknowledges that the Uniting Church of Australia, Synod of Western Australia, considers that the mining of uranium at Mulga Rock is a serious issue of concern for the health of the local environment and people, and the health and safety of the broader community and plant. These concerns appear to be

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		misplaced in that they don't appear to be based upon an assessment of the impact from the development of the proposal as outlined within the PER. The Uniting Church does not seem to have appreciated that there are no local communities and that the assessment of the impacts upon human health did not raise any areas of proper concern. For each and every environmental factor assessed the conclusion after consideration of appropriate measures to avoid, minimise and rectify impacts was that there would be no significant residual impacts. It is therefore not clear on what basis the Uniting Church is asserting that it has a valid concern about the health and safety of the broader community and planet.
Proforma	Opposition to nuclear energy: • Nuclear energy has no place in a safe, clean, sustainable future. • It is not only expensive but dangerous. This so called "clean" energy carries huge financial and environmental costs. • Concerns about misuse of nuclear power. • Nuclear industry has proven to be unsafe time and time again. • Nuclear power is a moral issue. It is unacceptable to take advantage of nuclear power now and leave future generations for tens of thousands of years to deal with radioactive waste security and pollution. • We don't want "dirty" energy ruining our country or our planet. • Many other nations are shelving nuclear for both cost and safety reasons. • Uranium fuels nuclear power, which is itself an environmental disaster (e.g. Fukushima, Chernobyl) • Nuclear power is not green in terms of climate change or anything else. Processing of uranium required vast amounts of fossil fuel. Uranium is not going to give us emissions free electricity. • The nuclear industry is not as safe or clean as they claim.	Vimy does not accept the assertion that nuclear energy has no place in a safe, clean, sustainable future; Vimy believes that nuclear energy is a key component in any such future and that it offers the only real prospect of displacing sufficient coal-fired electricity generation to have any hope of bringing the carbon emissions from the generation of electricity globally under control. Vimy does not accept the assertion that nuclear energy is expensive and dangerous – or that it carries huge financial costs when compared to the amount of electricity that it is capable of producing. Vimy is not aware of any valid reason why there should be concern about the misuse of nuclear power in relation to an assessment of a uranium mining project in Australia. If the 'nuclear power' being referred to has anything to do with nuclear weapons – it should be noted that Australia's exports of uranium are regulated by ASNO and will ensure that any uranium that is exported can only be used for peaceful purposes. Vimy does not accept the assertion that the nuclear industry has repeatedly proved to be unsafe. Vimy acknowledges some submitters believe that nuclear power is a moral issue and that they do so on the basis that they regard it as morally unacceptable for the current generation of human beings to enjoy the benefits

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	• No one ever sets out the greenhouse gas emissions which occur; the building stage of a nuclear power station with so much concrete involved, and the emissions and waste in the decommissioning of nuclear power plants. • This industry can only be sustained by tax payer subsidies and compliance of the nuclear arms industry where the only monetary gains are. • The refuse from nuclear power generation continues to mount around the globe. • Uranium is used in an outdated power plant. • It is not economic and an unnecessary source of power. • The cost will continue to rise due to increased insurance fees and dawning recognition that old power plants and also old mines must at some point be cleaned up at a huge expense. • Australia should not be engaging in high risk and morally questionable energy industries. • Radioactive liability on the world's taxpayers long after the companies that have built the plants have gone. • Many accidents at power plants, tailings dam leaks at Australian mines and cancers in uranium miners have convinced me that we must move from fossil fuels to truly clean renewables. • Why is this still a question? 100 years after Marie Curie died of radiation poisoning, 60 yrs after 100,000's of people died from atomic bombs, not to mention Maralinga, Chernobyl, Fukishima. • I once read that if everyone in the world changed their light bulbs for energy efficient ones it would negate the need for the 600+ nuclear power plants around the world. • The nuclear cycle will be remembered as only a catastrophic moment in history symbolic of the human desire of dominance over nature and commitment to pollute as we please.	of electricity produced from nuclear reactors, whilst simultaneously leaving future generations over a period of tens of thousands of years to deal with the problem of ensuring that radioactive waste remains secure and unable to pollute the environment. However, Vimy does not accept the premise that nuclear power stations currently being utilised to produce electricity impose on future generations a burden sufficiently large that it constitutes a moral issue. Nuclear waste can be disposed of into deep geological repositories that would pose no significant burden on future generations in terms of either providing security or posing any environmental threat. Vimy does not accept the premise that it is appropriate to characterise nuclear energy as "dirty" or the assertion that the nuclear industry is ruining either Australia or the planet. Vimy notes that the development of its proposal is not expected to result in any significant residual impacts to the environment and that issues associated with the nuclear industry outside Australia are beyond the remit of this Environmental Impact Assessment (EIA). Vimy does not accept the assertion there are many nations which are shelving their nuclear industry for both cost and safety reasons. There are 31 countries with operating nuclear power stations; three of these countries are committed in varying degrees to phasing out nuclear power (Belgium, Germany and Switzerland) at some point in the future and none of these countries is doing so for cost reasons. Vimy acknowledges that uranium fuels nuclear power but does not accept the assertion that nuclear power is an environmental disaster or any implied assertion that the accidents at Fukushima and Chernobyl demonstrate the inevitability of environmental disasters associated with nuclear power. Vimy does not believe that accidents involving previous generation nuclear reactors in jurisdictions where regulations were not being adequately supervised and enforced has any relevance to its EIA. Vimy does not accept the assertion that nuclear power is not "green" in terms of climate change. Vimy believes that nuclear power will substitute for coal-fired electrical generation in China (in terms of new capacity being built) and as

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	• To continue with an industry that destroys the environment is suicidal. We need an economy, a society and a culture that repairs and creates fairness, not the present depletion economy and mindset we currently have. • Although nuclear energy can be deemed as 'new technology' and the lesser of two evils (i.e. coal fired stations and global warming), there are already viable alternatives available, not to mention the options in the near future that will put nuclear energy into the dark ages.	such will be a significant contributor to reducing China's greenhouse gas emissions compared to what would have happened without nuclear power. Vimy does not accept the assertion that processing of uranium requires vast amounts of fossil fuel. Vimy notes that the CO_2 equivalent emissions associated with the mining and processing of its uranium ore through to a concentrate is calculated to be the equivalent of 4g CO_2e/KWh from electricity generated by a normal nuclear power station. Vimy believes that the calculations that there are large amounts of fossil fuels associated with the processing of uranium relates to outdated studies that utilised an element of gas diffusion technology when considering the processing stage (this technology is now obsolete and all enrichment takes place utilising gas centrifuges; these use about $1/50^{th}$ of the power required for gas diffusion). This then compounded the error by assuming that the electricity used to run the gas diffusion plants was supplied from a source that had carbon emissions consistent with the overall grid of the country concerned. Vimy acknowledges that uranium does not result in emissions free electricity when considered on a 'life cycle basis' (as opposed to emissions from the plant when operating), but notes that such life cycle basis comparisons do suggest that nuclear energy has low carbon dioxide equivalent emissions on a par with the better of the renewables (on-shore wind). Vimy does not accept the implied assertion that the nuclear industry is unsafe or unclean. Vimy notes that the development of its proposal is not expected to result in any significant residual impacts to the environment and that issues associated with the nuclear industry outside Australia are beyond the remit of this EIA. Vimy does not accept the assertion that when considering nuclear power on a 'life cycle basis' the concrete and other materials involved in constructing the nuclear plant are not taken into account or that the emissions associated with disposing of spent nuclear fuel and ultimately decommissioning the nuclear

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		plant at the end of its life are ignored. All these factors are included in proper 'life cycle basis' calculations. There are no taxpayer subsidies to uranium mining in Australia. Any uranium exported by Vimy will only be used for peaceful purposes and therefore there is no aspect of the nuclear arms industry that has any relevance to its proposal. Vimy acknowledges that spent nuclear fuel continues to mount around the globe, but does not accept the implied assertion that this represents a serious problem or that it has any relevance to the development of this proposal. Vimy is confident that any uranium that it exports will only be used in nuclear power plants that comply with the required regulations that prevail within the country where the nuclear power plants are located and that these plants will not be outdated in a manner that might render them unsafe. Vimy does not accept the implied assertion that nuclear power is either uneconomic or unnecessary. Vimy does not believe that this is an issue relevant to an EIA. Vimy does not accept the assertion that insurance fees associated with nuclear power will continue to increase in a manner that has any relevance to this EIA. Vimy acknowledges that old nuclear power plants must at some point be cleaned up (decommissioned) and that the expenses involved may be large, but does not accept that this has any relevance to an assessment of its proposal. Vimy also acknowledges that old mines must be closed and rehabilitated and would refer the submitter to Section 15 of the PER where this issue as it relates to Vimy's proposal is discussed. Vimy does not accept the characterisation of the nuclear energy industry as being either 'high risk' or 'morally questionable'. Vimy notes that Australia does not have a nuclear energy industry other than the aspect of the mining and processing of uranium. Vimy also notes that there was nothing in the impact

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		assessment of its proposal that suggested that anything that would be undertaken was either 'high risk' or 'morally questionable'. Vimy notes that its proposal does not involve any radioactive liability being subjected upon any taxpayers even after its plant has closed and the area rehabilitated. Vimy also notes that its proposal is not expected to result in any significant residual impacts upon the environment. Vimy does not accept the implied assertion that there have been any significant tailings dam leaks at any Australian uranium mines that would warrant the avoidance of nuclear power as a consequence; or that there have been any increased incidences of cancer in Australian uranium miners in recent years that would be relevant to this assessment. Vimy does not accept any assertion that the bombing of Hiroshima and Nagasaki, which occurred over 70 years ago has any relevance to an impact assessment of a proposed uranium mine in Australia. Nor does Vimy accept the implied assertion that the nuclear accidents that occurred at Chernobyl and Fukushima have relevance to the environmental impact associated with a uranium mine in Australia. Vimy notes that Maralinga involved nuclear weapons being tested by the British, but does not believe that there have been any proven deaths associated with radiation that resulted from those tests (as opposed to deaths associated with the trauma of the associated temporary dispossession and relocation and the impact of a belief that there would be harmful effects). Vimy also notes that Marie Curie died approximately 82 years ago and that her death was believed to be associated with constant exposure to high levels of radiation, principally from test tubes of radium that she carried in her pockets, which probably caused the acute aplastic anaemia that was considered to be the cause of her death. There is no risk of similar exposure amongst any of Vimy's workforce. Vimy does not believe that the material that the submitter was relying upon is accurate. If all the incandescent light bulbs in the world were replaced with low energy bulbs, it would probably save the equivalent of around 80GW of nuclear capacity. Vimy notes that there is around 384GW of operable nuclear capacity

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		in the world, provided by only 440 nuclear reactors. Vimy believes that any reduction in energy requirements brought about by energy efficiency measures would be better utilised to reduce carbon emissions from coal-fired plant than targeting nuclear energy. Vimy does not believe that the nuclear cycle can reasonably be characterised as being "symbolic of the human desire of dominance over nature", unless that means a human desire for clean affordable energy to support heating, cooking and other matters that utilise such energy to give comfort to human beings. Vimy does not accept the implied assertion that the nuclear cycle represents the manifestation of unrestricted pollution. Vimy does not accept the implied assertion that the industry destroys the environment, or that it somehow undermines fairness in society or depletes the economy or is associated with any mindset that would be relevant to an environmental impact assessment of this proposal. Vimy does not accept the assertion that, in relation to dealing with global warming, there are viable alternatives to nuclear power. There is as yet no alternative capable of cost efficiently supplying reliable power capable of meeting the needs of baseload power requirements throughout a full year. Vimy does not believe that there are options within any 'near future' short enough to have any effect on current plans to increase nuclear capacity throughout the world as part of addressing global warming.
Proforma, P4, P5	Submitters were concerned about past accidents related to the nuclear industry: • Have we not learnt from the horrific accidents at Chernobyl, Fukushima, Kyshtym, Sellafield, Three Mile Island and Goiania, just to name a few? • The fallout of Chernobyl and Fukushima will continue for many years. • We saw what happened at Fukushima, they are still paying the price. Uranium mining only encourages these tragedies in our country and others. Do you want that kind of responsibility in your hands?	Vimy rejects anything that might imply that uranium exported from Australia could be used for anything other than peaceful purposes. In particular, Vimy utterly rejects any assertion that 'matters that relate to nuclear weapons testing' and the consequences that flowed from them are in any way relevant to an impact assessment of Vimy's proposal. Chernobyl should not be considered as representative of the sort of accident that could possibly occur in which Australian uranium exports might be involved. Chernobyl was a reactor built without any containment building and

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	• It could take 40 years to decommission Fukushima. There are so many million litres of contaminated water they have to be constantly constructing new tanks. Tens of thousands of tonnes of contaminated soil is piled into bags around the site. The latest plan to build an ice wall to keep the radioactivity from leaking into the Pacific Ocean may or may not work. • Fukishima is still spewing forth radiation at maximum levels. There is no clear estimate of how much radioactivity has leaked from the site. • Experience with the UK bomb tests which resulted in radioactive islands is warning enough. • Enough has gone wrong with the nuclear industry to convince me that uranium mining should not occur. Learn before it is too late. • Australian uranium has polluted Australian land and water, and also a large and now uninhabitable area around Fukushima. • Look what has happened to countries that have got involved in uranium / uranium mining. They cannot turn back the clock, although they wish they could. • Submitter raised the issue that the radiation fallout of Chernobyl had impacted the soils of their farm. Relocation was to avoid nuclear activity.	there are no such reactors in operation anywhere in the world and none are ever likely to be produced in future. Fukushima was a horrific accident caused predominantly by an earthquake and a tsunami that followed it. Many people were killed as a result of the earthquake and the tsunami; but there have been no deaths attributed to exposure to radiation that resulted from this disaster. The Japanese have now instituted a raft of additional safety measures to ensure that similar conditions would not result in a similar accident. Kyshtym was an accident that occurred at a site that produced plutonium for nuclear weapons. It is of no relevance to uranium that will only be used for peaceful purposes. The accident at Sellafield (formerly known as Windscale when the accident occurred) was a fire that started in a facility being utilised as part of the British atomic bomb project and as such it is of no relevance to Vimy's proposal which involves the export of uranium for peaceful purposes only. Three Mile Island did not involve the release of significant amounts of radioactive material and posed no threat to the surrounding environment. The Goiana accident involved the theft of radioactive material that had been used as a source for radiotherapy treatments, but had been left within the abandoned site of what had formerly been a hospital. While the accident was regrettable and Brazilian regulations have subsequently been tightened, Vimy does not believe an accident such as this represents a reason to abandon the huge benefits that nuclear medicine has brought, and in its own right cannot bolster any case against nuclear power generation. Vimy does not accept the assertion that 'the fallout' of Chernobyl and Fukushima will continue for many years. The term 'fallout' usually means the material that falls out of the sky in the immediate aftermath of a nuclear explosion and consists of the residual radioactive material that was pushed into the upper atmosphere by the blast and usually takes a few days to a few weeks to come back down. The fire associated with Chernobyl was responsible for

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		pushing some radioactive material up into the atmosphere and spreading it over a large area but there is no longer any continuing fallout from that accident. The Fukushima accident resulted in the release of both radioactive gas and radioactively contaminated water. Although the containment of contaminated water is an ongoing issue there is no associated fallout. There have been no further releases of gas since the original incidents. Vimy therefore believes that there is no longer any ongoing fallout from either of these accidents. Vimy does not accept the implied assertion that the development of its proposal would somehow encourage nuclear accidents. Vimy acknowledges that uranium is required as fuel for nuclear reactors and that without fuel the reactors would not run and so there could not be any accidents, but does not believe that supplying uranium to be used as nuclear fuel can be characterised as encouraging accidents. Vimy acknowledges that the decommissioning of Fukushima is likely to last for at least 30-40 years and that the problems include contaminated water and contaminated soil and the fact that containment of water using barriers created by freezing may prove to be ineffective. However, Vimy does not believe that the problems that TEPCO has in dealing with this clean up are relevant to an impact assessment of Vimy's proposal. Vimy does not believe that it is correct to assert that Fukushima is "still spewing forth radiation at maximum levels". Vimy acknowledges that there has been no clear indication of the total amount of radiation released into the environment as a result of the accident. TEPCO estimated that the release of radioactive gases amounted to about 1020PBq over the period 12-31 March, but more than half of this (~550PBq) was iodine-131 which has a half-life of eight days; this means that more than 200 half-lives have passed since the last of the significant releases and therefore there would be no remaining radioactivity left from Iodine-131. The radioactivity contained in water that has leaked into the ocean is an order of magnitude lower.

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		Vimy's proposal has no connection to any nuclear weapons programmes and no experience with UK bomb tests is relevant to the assessment of its proposal. Vimy acknowledges that there have been accidents in the nuclear industry, but it is not entirely clear why those accidents (assuming that they relate to nuclear reactor accidents) should be considered a convincing reason for rejecting the development of an Australian uranium mining proposal that is not expected to have any significant residual impacts upon the environment. Vimy does not accept the implied assertion that the learning that should be gained from an examination of these accidents would lead to the rejection of this proposal and Vimy would respectfully suggest that the learning that was achieved has contributed to increased safety associated with nuclear reactors currently operating. Vimy is not aware of any incidents at any currently operating uranium mines in Australia where there has been any significant release of radioactive material that could be characterised as pollution of Australian land or pollution of any water in manner that would have a significant impact on sensitive environmental receptors. Accordingly, Vimy does not accept the assertion that Australian uranium has polluted Australian land and water. Vimy does not accept the implied assertion that because Australian uranium was present in the fuel that was being used in the nuclear reactors operating at Fukushima, that therefore Australian uranium is somehow responsible for the pollution around Fukushima. Vimy also rejects any assertion that this constitutes a reason for rejecting Vimy's proposal. Australia has very high levels of environmental regulation that apply to uranium mining projects. There is no instance of uranium being mined in countries that have similar levels of supervision where commercial mining of uranium has resulted in an outcome that those countries have subsequently regretted. Vimy acknowledges that if a submitter had previously relocated to Australia from an area that had been contaminated as a result of fallout from Chernobyl and that soil had been contaminated at their farm - that might reasonably give

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		rise to concerns about subsequent contamination from any activity that might have the potential to contaminate the area where they are now living/working/farming. However, Vimy's proposal is not such an activity and there is simply no risk that the development could inflict any contamination on an area that is located more than 100km from where the mining activity will take place.
Proforma	Concern raised about existing contamination at mines: • Australia has had enough accidents and issues with mining exploration lately, the worst being the contamination of groundwater aquifers through the practice of 'fracking' for CSG. Coal mines that have been shut down for years are ignored, yet new mines are proposed. • Existing contamination in the outback from other mines.	Vimy does not believe that contamination at any other minesites in Australia is relevant to an assessment of the impact of its proposal unless those other minesites involve similar activities and processes likely to have similar impacts. Vimy notes that there are simply no similarities between fracking for coal seam gas and open cut mining of sandy material that contains uranium rich carbonaceous matter as well. There are no mines located in the same area as Vimy's proposal and there has been no contamination of the outback in that area from any other mines.
United Church WA	The Uniting Church holds specific concerns over the mining of uranium due to its potentially significant and long-lasting impacts on the environment, nearby communities, and the workforce involved its extraction, transportation and processing. The unavoidable contribution of uranium mining to the nuclear fuel cycle, including the proliferation of nuclear weapons, is an issue of great concern to the Uniting Church. In its Nuclear Fuel Cycle Policy from 2000, the Uniting Church in Australia stated its clear commitment to, "…the development of environmentally benign, renewable energy sources and the cessation of uranium mining. Recognising the complexity of the issues we call on individuals, churches, industry and governments to work together to end involvement in the nuclear fuel cycle." In 2014, the Uniting Church in Australia, Synod of Western Australia committed to campaign for the reintroduction of a ban on uranium mining in Western Australia due to ongoing concerns about the potential	Vimy acknowledges that the Uniting Church has concerns about uranium mining due its potential impacts upon the environment, nearby communities and the workforce involved in all aspects of the process. All these matters are dealt with in the PER which concluded that there would be no significant residual impacts upon the environment, which included nearby communities (which there are not any) and the workforce. Vimy does not accept the implied premise underlying part of the Uniting Church's submission that because uranium mining is used in the nuclear fuel cycle that it could be part of the proliferation of nuclear weapons. Vimy notes that all uranium exports from Australia are regulated in a manner that ensures that the uranium can only be used for peaceful purposes. Vimy acknowledges that on 1st March 2000 the Uniting Church in Australia (UCA) issued a key statement describing its commitment to the cessation of uranium mining. Vimy respectfully suggest that this statement was based upon a false premise that "greater energy efficiency and research" and the

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	impacts of the industry. These concerns have not abated and the proposal from Vimy Resources to mine uranium at the proposed Mulga Rock site is a worrying development.	"development and implementation of environmentally benign, renewable alternatives" could somehow substitute for the service provided by nuclear power in providing clean, affordable reliable energy. Vimy acknowledges that the Western Australian Synod of the UCA is committed to a campaign for uranium mining to be banned ostensibly on the basis that uranium is not required because renewables can perform the function of providing the required energy, but also on the underlying basis that the nuclear industry is not competitive, that spent nuclear fuel cannot be safely disposed of, and that there is a risk that uranium may end up in nuclear weapons. Vimy does not accept the assertion that there is a meaningful nexus between nuclear energy and nuclear weapons, or that spent nuclear fuel cannot be safely disposed of, or that the nuclear industry is not cost competitive or that renewables can perform the role required of nuclear energy in providing clean affordable reliable energy.
PND (WA), Conservation Council WA, United Church WA	Once uranium is mined, it is possible it could contribute to the availability of uranium for weapons purposes among our trading partners in our increasingly destabilising world. The blurred distinction between civilian and military uses of uranium in India is an example of the risks of exporting to that country which remains outside the Nuclear Non-proliferation Treaty (NPT), but has continuing difficulties in its relationships with its nuclear-armed neighbours China and Pakistan. India for instance refuses random International Atomic Energy Agency (IAEA) inspections of certain nuclear installations. All the "stringent conditions" applied to Australian uranium exports are hard to ensure once our uranium leaves our shores. Australian Obligated Nuclear Materials (AONM) terms are supposed to confine its use to civilian purposes. However, states importing AONM could use it to free up their own domestic supplies of uranium for their weapons programmes. Should we assume that they will all be innocent of nuclear	Vimy is confident that Australian safeguards to ensure that uranium exported from Australia can only be used for peaceful purposes are robust and more than adequate for the task. Vimy notes that uranium concentrate will not be transported through the Northern Territory as the product will be exported via Adelaide. Vimy does not accept the premise that there will be any significant environmental or social impacts associated with transporting uranium concentrate through South Australia. Vimy does not accept the assertion that for civilian use of uranium "there is as yet no satisfactorily safe solution to dealing with their inevitable long-lived toxic waste". Deep geological disposal should be considered a satisfactory safe solution. Vimy does not accept the assertion that there is "increasing global pressure for uranium producing countries to also become waste dumps". Vimy notes that

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	weapons involvement? We say NO. Australia has signed a Nuclear Cooperation Agreement with India, a country that might or might not be a destination for uranium from Mulga Rock – but the principle remains the same. We really have little control over exported Australian-flagged uranium. There can be no greater environmental disaster than nuclear warfare – except for massive catastrophic out-of-control global warming. The submitter firmly believes that it is irresponsible not to assess the international dangers associated with Australian uranium exports. We appeal to the EPA to take these into account – along with its assessment of the environmental and social impacts here in WA (and in South Australia and the Northern Territory if mined ore is to be transported through them to Adelaide or Darwin ports.) Not only will there be radioactive waste created at the mine, waste will also be created from using nuclear fuel in reactors overseas. Despite the military and civilian uses of uranium over 70 years, there is as yet no satisfactorily safe solution to dealing with their inevitable long-lived toxic waste. Why should we continue to create this waste when managing it safely remains unresolved? This waste is a public health risk when it contaminates land, and enters the air and water. As the conversation about nuclear in Australia turns from a discussion about uranium mining and nuclear power to a conversation about taking back international radioactive waste. WA must consider the implications of exporting uranium and the increasing global pressure for uranium producing countries to also become waste dumps. The proliferation of nuclear weapons has been a long held concern for the Uniting Church, as seen in our 1988 statement that the "production, possession, threatened use or use of nuclear weapons is a sin." In 2014 the Moderator of the Uniting Church of Australia, Synod of Western Australia, Rev Steve Francis, said that, "Uranium mining can lead to the	the legislation of Western Australia currently prohibits the importation, transportation or storage of such waste. Vimy considers the issue of whether nuclear waste could or should be brought back to Australia to be a subject beyond the scope of this Environmental Impact Assessment. Vimy acknowledges that the Uniting Church and other submitters may have long held concerns about the proliferation of nuclear weapons but is confident that Australian safeguards to ensure that uranium exported from Australia can only be used for peaceful purposes are robust and more than adequate for the task.

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	growth of nuclear weapons, thus making the world a more dangerous place and a less peaceful world to live in." While the use of uranium for nuclear weapons may not be the intended purpose of the Mulga Rock Uranium Project, it is an outcome that must be considered in the evaluation of the proponent's proposal.	
PND(WA), Proforma	Mines Minister Bill Marmion has revealed that the state has spent $300,000,000 of taxpayers' money subsidising and promoting uranium exploration and development in WA. This is unconscionable. What of the urgent need for more spending on climate change mitigation? On our education, health and public transport systems? How good if the government had directed a goodly part of that $300 million on developing the solar goldfields vision. Such renewable energy projects are the real job generators that we need at this time. Propping up uranium mining in WA has been an unworthy purpose indeed. Submitters were concerned about tax payer's money being spent on an unnecessary and unsafe industry/project: • Spend money for more important matters. • Not the best way to spend our tax dollars. • Take a long term view in managing the use of tax payer funds. Concern was also raised about the Government having spent $300 million of tax payer's money subsidising and promoting uranium exploration and development in WA, while being in so much debt and requiring the underfunded State public services to make substantial reductions in expenditure and ordinary people are having benefits cut because of the budget deficit. This is a waste of money; the money is better spent on homeless, poverty, sick or dying people, and also researching clean, safe and environmentally friendly power sources and options.	Vimy does not believe that it is correct to assert that Mines Minister Bill Marmion revealed that the State had spent more than $300 million subsidising and promoting uranium exploration and development in WA. On 24 April 2015, Minister Bill Marmion issued a media statement which contained the following attributed quote "More than $300 million has been invested in WA uranium exploration since the Liberal National Government lifted the mining ban in 2008." This did not convey any assertion about the amount of taxpayer money that had been spent on uranium exploration, it related to the amount of private money invested in uranium exploration. It is simply incorrect to assert that this amount of money is any form of subsidy.

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Proforma	Submitters are concerned about rehabilitation costs: • It has been shown time and time again that insufficient funds are available to complete mine site repair and this cost is always underestimated. In many instances the cost of rehabilitation is so high that the mine would not be viable in the first place if an accurate assessment of costs was carried out. • None of these mines are properly rehabilitated and leave behind a cost to the community. • It would be tremendously expensive to clean up once it has polluted environments, particularly water bodies. • Once the profit is gone, the companies go too, leaving their environmental trail of destruction behind for the Australian taxpayer to clean up. • When corporations are willing to pay the full cost to environmental restoration perhaps. • Why is it the WA tax payer's responsibility and not the mining companies?	Vimy does not accept the premise that if there have been previous instances where costs of rehabilitation have been underestimated and therefore insufficient funds were available to complete the task that it can be implied that the same thing might happen with Vimy's Project. Vimy's proposal includes progressive backfilling and rehabilitation. Those activities are part of the cost estimates of undertaking the mining and not some lump sum sitting at the end of the mine life that may or may not be sufficient to undertake the task. In the unlikely event that Vimy has underestimated rehabilitation costs that will merely result in higher operating costs (because the rehabilitation is an integral part of operations) rather than any failure to undertake rehabilitation. Vimy does not accept, in the context of its proposal, that the cost of rehabilitation could be so high as to render the proposal to mine uneconomic. Nor does Vimy accept any suggestion that there could be a cost to the community if proper rehabilitation is not undertaken. Vimy's proposal involves mining an ore body containing commercial grades of uranium from more than 35m below the surface and then depositing the majority of the material that used to contain uranium, but will have had most of it removed in the processing plant, back into in-pit tailings facilities that will subsequently be capped and buried with sufficient material so as to ensure that nothing can escape to the surface. Any mobile-heavy metals including radioactive materials will drain to the base of the tailings facility and into the local groundwater which is about 40m below the surface. The upper layers of this aquifer are characterised by being a highly reducing environment and containing large amounts of carbonaceous material that will act to sequestrate any mobile-heavy metals. There will not be any polluted water bodies that require cleaning up. These aquifers remain permanently isolated from any sensitive environmental receptors so even in the highly unlikely event that proper sequestration does not occur all heavy metals including the radioactive materials will remain in this aquifer permanently isolated from the environment.

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		Vimy does not accept the assertion that its proposal might result in an environmental trail of destruction for the Australian taxpayer to clean up or that anybody other than Vimy will be paying for the costs of rehabilitation.
Proforma	Submitters were concerned that the State Government were subsidising the uranium mining industry with $300 million taxpayer dollars: • It is not ok to spend tax payer's money to support an unwanted, unsafe and unnecessary industry like uranium mining. • The people of WA do not want this, and to spend our tax dollars on this venture is nothing but corporate pandering, the Barnett Government is a sell out. • Sick of the out of sight out of mind attitude of Australian Governments supporting big mining to the detriment of the environment.	The premise that the uranium mining industry has been subsidised by the State Government with $300m of taxpayer's money is incorrect (see above).
PND(WA), Conservation Council of WA, P3, P4, P5, Proforma	Many submitters objected to the Mulga Rock proposal. Submitters recommend that the application be rejected on the grounds that there are numerous unacceptable risks to the environment. Opposition / concerns raised about uranium and uranium mining at Mulga Rock: • Opposed to the plan to develop a uranium mine at Mulga Rock. • Leave it in the ground – the only safe place for uranium, where its radioactivity will not become bioavailable and used in power stations and weapons. • Stop it now before it's too late. • There is no argument that can justify the nuclear industry. • Opposed to mining, processing or storage of uranium and subsequent nuclear products. • Worst thing devised by mankind. It is foolish, unethical and perilous.	Vimy acknowledges that the submitters are opposed to the development of a uranium mine at Mulga Rock, but notes that this is an assessment of the environmental impact of a proposal and its acceptability, and that a statement of opposition not founded any environmental impact is of no relevance to such an assessment. Vimy does not accept the implied assertion that mining uranium will result in its radioactivity becoming "bioavailable" through use in power stations and weapons. There is sufficient regulatory control in place to ensure that any uranium exported from Australia can only be used for peaceful purposes. Notwithstanding previous nuclear accidents at Chernobyl and Fukushima, the nuclear power industry has an extremely good safety record. Vimy does not accept the assertion that there is no argument that can justify the nuclear power industry, as it genuinely believes that nuclear power is a required part of the energy mix if carbon dioxide equivalent emissions from the generation of electricity are going to be brought sufficiently under control to prevent the more serious consequences associated with potential climate change.

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	• The go ahead for uranium was given in the context of a minority State Government and does not represent a true mandate from the people of WA to support uranium. • Objections are well known throughout the world. How can you force something that is unwanted? • Not in my country. The uranium/land does not belong to you. • Do not fast track this mine. • Humanity has not reached a level of intelligence to be dealing with uranium in any way and will only end up killing the future. Human beings' track record towards the environment is not good. • The proposal does not represent a responsible approach to addressing the needs of the community, and to the present and future people of Australia. • Uranium mining is in a completely different category from any other mining due to its radioactive component at source, contamination of country with the leftovers, and dubious uses of the product. • Uranium mining should be 99% discontinued permanently leaving only 1% for medicine and research until replacement technologies are found. • Technological advances in both diagnostic tools and treatment regimes for cancers will ultimately replace Uranium based methods and there are already more than enough functioning Uranium mines in Australia alone to cater for the present requirements thus making it totally unnecessary to be opening any new mines. • We don't like watching our country being dug up, trashed and exported overseas.	Vimy acknowledges that there are submitters who are genuinely concerned about the mining, processing and storage of uranium and also about the subsequent nuclear products that can be generated. Vimy's PER details the environmental implications of its proposal on a range of environmental factors in a local context. After the application of appropriate measures to avoid, minimise and rectify any impacts, Vimy ascertained that there would be no significant residual impacts upon any of the environmental factors considered. It is not clear what the basis of the concerns in relation to the mining, processing and storage of uranium are in the context of Vimy's proposal. As to the issue of the subsequent nuclear products – those are beyond the remit of the PER since any further processing will take place outside of Australia. However, Vimy completely rejects any assertion that uranium produced as a result of its proposal will be used for anything other than peaceful purposes, or that uranium utilised for the generation of electricity is a valid reason for objecting to the development of this project. Vimy does not accept the assertion that because the Liberal party did not obtain an outright majority in the 2008 State election that the subsequent Liberal-National Government (supported by a number of independents) did not have a true mandate to affect government policy and therefore that the decision to formally lift the ban on uranium mining in Western Australia on 17 November 2008 is in any way invalid or unsupported by the people of Western Australia. Whilst Vimy acknowledges that many people around the world have an in-principle objection to uranium mining, that in itself does not represent a valid reason not to approve a proposal that has demonstrated that it will have no significant residual impacts upon any of the environmental factors considered within the PER. Vimy does not accept the assertion that approving this proposal would constitute "forcing something that is unwanted". Vimy does not accept the assertion that it will be mining on land that is claimed by any Traditional Owners. Vimy does not accept the implied assertion that it claims either the land or the uranium. Vimy has Mining Leases granted by the State and accepts that the State owns the uranium.

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		Vimy does not accept the assertion that the mine is being fast-tracked in a manner that would constitute grounds for an objection. Vimy does not accept the assertion that human intelligence has not evolved to the point where it is capable of dealing with uranium or that the result of approving this proposal would be somehow "killing the future". Vimy does not accept the assertion that its proposal does "not represent a responsible approach to addressing the needs of the community, and to the present and future people of Australia". There is no local community and there are not expected to be any significant residual environmental impacts. Vimy acknowledges that uranium mining is treated slightly differently from most other minerals due to its radioactivity, its potential to contaminate and the need to control its end-use. Vimy has demonstrated that this resource can be mined without harm to the environment and since its exports will be controlled by ASNO, "dubious" end uses will also be avoided. Vimy is pleased to acknowledge that the submitters recognise that uranium mining is an essential part of modern approaches to medicine. Vimy does not accept the assertion that uranium mining should only be allowed sufficient to sustain nuclear medicine and that countries that require uranium to support their nuclear industries in generating baseload power with low carbon dioxide equivalent emissions should be denied the right to acquire such a fuel from reliable suppliers such as Australia. Vimy does not accept the assertion that its proposal would result in "our country being dug up, trashed and exported overseas". All areas will be fully rehabilitated rather than being left in a "trashed" state and the only thing being exported will be a relatively small amount of uranium concentrate.
Proforma, Wildlife Society	Submitters consider that the risks of uranium mining outweigh the economic benefits, and were concerned about impacting the environment for money:	Vimy acknowledges that there are risks associated with uranium mining but does not accept the assertion that they might outweigh the economic benefits; Vimy utterly rejects the implied premise that approving its proposal would be tantamount to impacting the environment for money.

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	• Tax payers' money is wasted and the health of us all endangered for profits of a few. • This project only has a life of 16 years, are the returns substantial enough to justify the extensive impacts to what is an important natural state asset? • Destruction and profits should not come first. We cannot keep destroying our country for some human gain. • Stop passing on the costs of business to the future people of this country. Our children will be paying a high price for any short term profits. • This energy source is just a quick way to gain profits. • The world appears to be moving forward on 'the Paris agreement' and here greedy corporates are trying to dive in before the door is slammed. • As climate change does impact WA sources of clean artesian water, it may provide us with greater food and water security than a short term budget boost. • Digging up toxic materials that are safely stored below ground for short term gain does not make sense. • Government should not resort to uranium development to fund the budget. Minister advisors should have the foresight to consider the financial figures of new uranium mines and factor in the future costs/benefits to WA people and its environment. • Environment and its inhabitants must take preference over commercial exploitation. • This is short term gain ahead of intelligent long term planning for our future generations and planet. • Australia has no nuclear power plants so all of these resources are going overseas – a short-term quick return outlook. • Uranium mines have little economic credibility as they do not bolster employment – they mostly use visa holders who send their money	Vimy does not accept the assertion that taxpayers' money will be wasted, or that the health of any individuals will be endangered. Section 13 of the PER covered the issue of Human Health. Vimy does not accept the premise that there will be extensive impacts to an important natural state asset if the proposal is approved. The project has an estimated life of around 16 years and during that period it will involve the permanent employment of almost 500 people and a contribution to the State through the payment of royalties and payroll tax that is expected to amount to over $300 million. Given that there are not expected to be any significant residual impacts to the environment, Vimy believes that the proposal is justified. Vimy does not accept the implied assertion that the approval of this proposal will result in any "destroying our country", given that there are not expected to be any significant residual impacts. Vimy does not accept the premise that approval of this proposal will pass costs on to the future people of Australia or that in some way future generations (our children) will be paying any high price, given that there are not expected to be any significant residual impacts. Vimy does not accept the assertion that uranium as an energy source is just a quick way to gain profits; Vimy regards uranium as an energy source that makes an essential contribution to the lowering of the emissions associated with generating electricity, particularly where there is a requirement for baseload power. The 'Paris Agreement' deals with greenhouse gas emissions mitigation and adaptation, and their financing from 2020. The contribution that each individual country was prepared to make in order to contribute to achieving the aims of the United Nations Framework Convention on Climate Change (UNFCC) were volunteered in the form of Intended Nationally Determined Contributions (INDCs). For some countries submitting INDCs, nuclear energy was a key part of moving away from heavy reliance upon fossil fuels. It is therefore incorrect to assert that the development of a uranium mine somehow represents "greedy

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	overseas, profits go overseas, no corporate taxes are paid, and only a small amount in Royalties go to Australia. • Why subject Australia to this, for a flawed, dead end economy? • To consider mining as the only way WA can earn money is both short sighted and in the long term detrimental to other industries. • It is not possible for a nuclear power station to generate enough energy to replace the energy it took to build and commission it. It is economic madness to mine uranium for the purpose of generating electricity. • See the error of viewing the land as an opportunity to dig it up and make money. This has been the model of the WA government since it began. • Do not destroy and poison our great land for the sake of a few dollars. • People and the environment before greed. • The proposal is not in our interests, only your short term financial gain. • Too many of our special places are being destroyed in the name of progress and profit. Please do not let this be another. • All this to suit a few money hungry corporations who have no regard for uranium safety, the environment or the people of this country. • We cannot afford to destroy any more of our beautiful country for short term profits, which in no way benefits future generations. • This is a rash knee-jerk response to the popped balloon of the boom. It is a radical polony manifested in the wake of fiscal profligacy and lax economic goverance, which has seen profits of good years wasted, taken off shore. • Any company engaged in this activity should never be permitted to undertake mining unless they deposit a billion-dollar security against the inevitable accidents and toxic contamination that regularly occurs at such sites, and to ensure full decontamination and rehabilitation of the site into the long term future, and for ongoing public health	corporates are trying to dive in before the door is slammed" since an increase in the supply of uranium will be essential in ensuring that some elements of the submitted INDCs can be successfully achieved. Vimy acknowledges that climate change may have an impact upon both rainfall and rates of evaporation and that ultimately it may lead to less water being available in WA. However, since this proposal will not impact any sources of water that might be available for use in supporting agriculture or in supplying water to the public there is no reason not to approve this proposal on the basis of any concerns about water supplies. Vimy does not accept the premise that if it were to dig up uranium (toxic material) that is currently located below ground (safely stored) that it would be doing so for short term gain, nor does it accept the accompanying assertion that therefore it does not make any sense. Vimy does not accept the premise that the government is allowing uranium development in order to fund its budget – however Vimy does acknowledge that in allowing the perfectly legal development of a uranium mine that will not result in any significant residual impacts to the environment, the State government will increase its revenues associated with royalties and payroll tax. Vimy agrees with the assertion that advisors to the Minister should consider the financial aspects of the proposal and factor in a cost/benefit analysis including the impact upon the people of WA and the environment, and Vimy is confident that any such analysis when properly undertaken would support the development of this proposal. Vimy does not accept the premise that commercial exploitation would be taking preference over the environment and its inhabitants if the proposal were to be approved. Vimy notes that there are not expected to be any significant residual environmental impacts. Vimy does not accept the premise that long-term planning for future generations and the planet would be over-ridden for short-term gain were this

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	safeguards from the extractive, storage, transportation and remediation stages. • Australia has started moving away from being a quarry economy to creating employment and driving the economy in a way that does damage to our landscapes and biodiversity.	proposal to be approved. Vimy notes that there are not expected to be any significant residual environmental impacts. Vimy acknowledges that Australia has no nuclear power plants and that any uranium produced is likely to be exported. Vimy does not accept the implied assertion that exporting uranium constitutes a short-term quick return outlook; Vimy believes that the proposal represents an opportunity to 'add value' to the Australian economy over an extended period. Vimy does not accept the generalised assertion that uranium mines have little economic credibility or that they do not bolster employment. Vimy will be attempting to maximise the use of locally and regionally based labour and does not accept the implied assertion that it will use overseas labour employed on visas in Australia or that the money paid in wages will therefore be remitted back overseas. Vimy expects to pay corporation tax in Australia and it also expects that most of its shareholders will be based in Australia and therefore that profits paid via dividends will remain in this country as well. Vimy also rejects the assertion that the only payments that will end up in Australia will be royalties or that these royalty payments will be a small amount – royalty payments are currently set at 5% of the value of the product exported. Vimy does not accept the premise that Australia will be subjected anything detrimental as a result of the development of this proposal or the assertion that uranium mining could be characterised as a "flawed, dead-end economy". Vimy does not accept the premise that those involved in considering this proposal regard mining as the only way that WA can earn money or the assertion that support for mining is detrimental to other industries. Vimy does not accept the premise that nuclear power stations do not generate enough energy to replace what was required to build and commission them or the assertion that it is, therefore, economic madness to mine uranium for the purposes of generating electricity. Vimy does not accept the premise that land is seen merely as an opportunity to dig it up and make money, or that this has been the model of the WA

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		government since it began and therefore it does not accept the assertion that there is an error of perspective involved. Vimy does not accept the premise that any land will be destroyed or poisoned or the assertion that this is being done for the sake of a few dollars. Vimy notes that there will be no significant residual impacts upon the environment and that over the life of the project it is expected to contribute more than $300 million in revenue to the State. Vimy does not accept the implied assertion that the development of its proposal would result in greed being put before people and the environment. There will be no adverse impact upon people or the environment. Vimy does not accept the premise that the development of the project is for short-term financial gain or the assertion that the proposal is against any valid interests. Vimy acknowledges that the submitters may define their interests as being opposed to uranium mining but does not accept that such interests are valid in the absence of any significant adverse impacts to the environment. Vimy does not accept the premise that any special place will be destroyed as a result of the development of this proposal or the assertion that it is being done in the name of progress and profit. However, Vimy does acknowledge that if the proposal is developed it will result in profitable activity but does not believe that this constitutes any reason not to approve it. Vimy does not accept the premise that it does not have regard for “uranium safety, the environment or the people of this country” or the assertion that the development of this proposal would suit “a few money hungry corporations”. Vimy notes that there are not expected to be any significant residual impacts on the environment; the development is expected to create almost 500 full time jobs and to remit more than $300 million to the State; and the Project is 100% owned by Vimy Resources Ltd. Vimy does not accept the premise that the development of this proposal would involve the destruction of beautiful country or the implied assertion that it is being done for short term profits and offers no benefits to future generations.

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		Vimy notes that there are not expected to be any significant residual impacts upon the environment and that the creation of long term employment and the payment of royalties and taxes contributes to growing the economy and to improving living standards. The submitters appear to be suggesting that the development/approval of this proposal has been done hurriedly (rash knee jerk) in response to the end of the mining boom and that there is something radical being suggested (radical polony manifested) as a result of the budget deficit (in the wake of fiscal profligacy and lax economic governance, which has seen the profits of good years wasted, taken offshore). Vimy rejects all these assertions. This proposal has been developed over many years and the process of gaining approvals was initially commenced in July 2013 – it is therefore incorrect to assert that it has been hurried in a way that might be regarded as inappropriate. Vimy does not accept that anything that should be regarded as radical in a bad way has been suggested. There are radical (in the sense of departure from normal) elements involved – such as the use of cameras as part of the fauna surveying; but Vimy would respectfully suggest that this should be regarded as an 'unreservedly good' initiative. Finally, there does not appear to be anything that supports the assertion that the government's deficit has had any influence over the way Vimy's proposal has been treated. Vimy does not accept the premise that there will inevitably be accidents or regular toxic contamination or the assertion that Vimy should therefore be required to deposit a billion dollars to ensure that the site can be fully decontaminated and rehabilitated. Vimy does not accept the implied assertion that: • its proposal involves a "quarry economy" -since the proposal involves the processing of uranium ore through to uranium concentrate (or "yellowcake") which will include both physical (beneficiation) and chemical processing (acid leach, resin extraction, etc.) in addition to mining; or that

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		• its proposal will in any way damage the landscape or biodiversity – given the expectation that there will be no significant residual impacts.
Proforma	Australia's ecosystems are fragile and deserve protection. Mulga Rock is home to a number of rare species and contains many delicate ecosystems. Submitters were concerned about the proposal impacting on the environment and destroying this beautiful country, in particular, impact on native wildlife: • Do not destroy the last vestiges of our wilderness. • It is incredibly beautiful and untouched. The beautiful nature, culture and history is what makes Australia a special place to live and visit. Mulga Rock in WA is an amazing and rare spot to visit. • Concern about the destruction of biowealth. • Opposed to the destruction of fragile natural bushland that is home to native species already under threat from predation and previous irresponsible government decisions. • It will destroy uniquely beautiful country with rare species of flora and fauna such as the sandhill dunnart. • We are constantly facing environmental problems, let's not make this any worse. • The land will be degraded forever. • This would be an ecological blight on our landscape. • The planet is already immensely burdened by pollution. • When will we finally make this planet uninhabitable. • Deserts are not a barren landscape; they are part of a whole earth balance. • We have wrought enough damage on this country's fragile environment. We have the disgraceful honour of achieving the world's highest extinction rate of fauna and flora of any other nation. Is it not	Vimy acknowledges that Australia's ecosystems warrant suitable protection and that the area defined by the proposal contains habitat that may support rare species and that rare species may exist in the area. However, Vimy does not accept the implied assertion that there are local ecosystems that are so fragile that they might be upset by the very limited impacts that Vimy's proposal will have upon them. Vimy notes that its proposal is not expected to have any significant residual impacts upon the environment. Vimy does not accept the premise that the development of the proposal would destroy the last vestiges of our wilderness. Vimy notes that the entire disturbance footprint of the project constitutes less than 0.2% of the Priority Ecologcal Community that characterises the area (Yellow Sandplain Communities of the Great Victoria Desert) and that there are not expected to be any significant residual impacts upon the environment. Vimy acknowledges that the submitter has concerns based upon the fact that Australia has areas that are beautiful and untouched and that nature and culture and history are part of what makes Australia a special place to live and visit. However, it is not clear why these concerns extend to Mulga Rock – an area that is essentially devoid of history and culture, in that there is nothing of ethnographic significance that has been identified in the area and there are no significant archaeological sites either. Moreover, although this area is undoubted beautiful to some people when in pristine condition, more or less the entire development footprint was burnt in a bushfire in November 2014 and most of the area that did not burn was as a result of it having been burnt severely in an earlier fire in 2007. The condition of the vegetation would best be described as currently 'degraded' and whilst Vimy acknowledges that it will fully recover in time, Vimy also notes that it is committed to rehabilitating all areas that it disturbs and that there are not expected to be any significant residual impacts. Vimy also notes that Mulga Rock does not normally receive any visitors (not involved in activities related to its project) and it is misleading

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	about time we showed some respect for this unique country and leave this dangerous uranium in the ground. • Appalled by the devastation mining has on the country, fauna and flora and environment. Kalgoorlie and Coober Pedy are points in case. • We are already feeling the ill effects of past actions. • Opposition to any new projects which endanger our lands, people, and flora/fauna – this proposal would create risks to all of these. • Impacts on the environment and its creatures is serious and should not be explored or expanded in Australia. • I am constantly appalled by the poorly regulated destruction of our unique flora and fauna for short term economic goals. • Why despoil WA's environment? • Uranium mining is environmentally irresponsible and has a destructive impact on the environment. • Concern raised about irresponsible miners after the uranium in Australia to "finish off the Earth". • Earth is home to human beings that have value, not Commonwealth governments and companies that are long gone after they leave such a bad scar on the ground. • If uranium mining is too big a risk at Mindaroo then it's too big a risk in the fragile desert ecosystem around Mulga Rock. • We care for the welfare, well-being and survival of the Australian indigenous animals that inhabit the area that the proposed mine would rape, pillage and plunder and steal the habitat from the indigenous animals that have lived there since their inception. • I do not agree with this proposal to reduce this prized habitat area for the threatened species mentioned. We should be protecting these areas as the last remaining sanctuaries for these species. • Please consider the long term detrimental effects that mining uranium will have on the unique wildlife.	to suggest that it is a spot that might be visited by people interested in Australia's nature, culture or history. Vimy acknowledges that the submitter has concerns about the destruction of 'biowealth' (assumed to be another term for biodiversity) but believes that these concerns are misplaced in light of the fact that the development of this proposal does not constitute a threat to any species of flora or fauna. It is not clear which native species is thought to be under threat from predation and 'previous irresponsible government decisions' when the submitter expresses concerns about disturbance to their natural habitat. Vimy notes that it is considered highly unlikely that the development of the project will have a significant impact upon the Southern Marsupial Mole and it is considered that the impact on the Sandhill Dunnart will be at worst minimal as set out in Table 9.8 of the PER. Both these species show a preference for locations in the upper part of sand dunes and Vimy's proposal has been designed to avoid these areas as much as is practicable. Vimy does not accept the assertion that the development of its proposal will destroy any rare species of flora or constitute a threat to the Sandhill Dunnart or any other fauna. Vimy notes that any areas disturbed will ultimately be rehabilitated and that development of its proposal is not expected to result in any significant residual impacts to the environment. Vimy does not accept the assertion that the development of this proposal will make any current environmental problems worse or that the land will be degraded forever. Vimy notes that there are not expected to be any significant residual impacts. Vimy does not accept the assertion that the development of this proposal would be an ecological blight on our landscape, or that it will in any way increase the level of pollution that the submitter regards as being an immense burden on our planet or that it will in any way contribute to making the planet uninhabitable. Vimy notes that the development of the proposal is expected to result in a reduction in greenhouse gas emissions when considered globally

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	• Australia has a poor record of not looking after its endangered species. Our precious fauna heritage is important for our future generations that they know and protect our indigenous creatures. • We have wrought enough damage on this country's fragile environment. We have the disgraceful honour of achieving the world's highest extinction rate of fauna and flora of any other nation. Is it not about time we showed some respect for this unique country and leave this dangerous uranium in the ground. • I urge the EPA to consider impact on native flora and fauna. • Please look at the short and long term benefits to the environment. There is no way this is good for the flora and fauna. • I fear the effects of toxic residues and excessive groundwater use in a beautiful but fragile landscape, which is currently home to unique and endangered animal species. • The Earth is already under such stress and serious threat; the idea of approved new uranium mines is ridiculous. • Too much mining is going on in the world, sooner or later the world is going to become one big sink hole. • Please show some common sense in this issue. Our land is very precious and you can't go back and restore it after such destruction. • This is wanton destruction of an area that is important if our World is to survive with so few unspoilt areas left. • Healthy land, air and water are fundamental for the continuation of life on this planet. We demand a stop to practices that contaminate our environment and consequently ourselves. • When are we going to stop treating nature as a backdrop for humans, and understand that we are part of nature. • It concerns me greatly that the government would even consider the destruction of our unique and wonderful part of the world. Once it is destroyed and you've spent all the insignificant amount of money you have gained – what then?	and that it is not expected to have any significant residual impact upon the environment. Vimy acknowledges that deserts are not barren landscapes and that they contain ecosystems requiring protection, but notes that the development of its project is not expected to have an adverse impact upon the desert ecosystems that characterise the surface in the area. Vimy does not accept the premise that Australia has the disgraceful honour of achieving the world's highest extinction rate of flora and fauna compared to any other nation. An analysis of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List would show that number of species that are believed to have become extinct is greatest in the USA. Nor does Vimy accept the implied assertion that digging up the uranium would further damage Australia's fragile environment and would constitute a failure to show respect for the unique country. Vimy believes that its management measures to avoid, minimise and rectify any impacts attest to its respect for the unique country and that the fact that there are not expected to be any significant residual impacts on the environment negates the assertion that Vimy will be further damaging the environment. Vimy does not believe it is appropriate to compare mining activity at either Kalgoorlie or Coober Pedy with what Vimy is proposing to undertake, since Vimy will be backfilling and rehabilitating on a progressive basis. Whatever devastation may or may not have been inflicted upon country, fauna and flora and the environment that has appalled the submitter, is not something that is expected to occur as a result of the development of Vimy's proposal, given that there are not expected to be any significant residual impacts upon the environment. The submitter suggests that we are in some way feeling the ill effects of past actions. Vimy notes that an analysis of the impact of its proposal on human health (see Section 13 of PER) did not suggest that there were likely to be any ill effects.

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	• Too much of our planet is being slowly destroyed by those who put fast profit against preserving Earth – and its inhabitants – for a livable environment in which our children and their children can safely live. • I have seen the devastating results to land, water and environment caused by mining and fracking; and the terrible havoc that they cause to people, whole neighbourhoods and towns, along with the victims of wildlife. Your country is such a magnificent place. • Just because it is a remote area does not mean out of sight, out of mind. • In a time of likely mass extinctions as a result of climate change and significant contamination of water resources across the globe, there needs to be a conservative approach to any activity which degrades biodiversity or the environment and water resources. • We seem to have a culture of destruction here that always privilege's mining or development over concerns for the environment and the ongoing loss of species and habitat. • Native animals will lose their habitat and become regionally endangered and possibly extinct. Once these native animals are gone they will not come back. • It is extremely ignorant to continue destroying habitats of native species when their survival is so tenuous in the face of a changing climate. • Australian wildlife has enough threats to survival, many caused by people including introduced species and toxic mining, habitat destruction. • Risk to threatened/endangered species at a time when Australia is leading the field in extinctions is too great. • This proposal will have a profound impact on fauna and flora. • Effects on the wildlife in this area will not be reversible. • WA has the highest mammal extinction rate in the world.	Vimy acknowledges that if there were to be any significant impacts on the environment or its creatures that this would be serious and could be regarded as grounds for not accepting this proposal. However, since there are not expected to be any significant residual impacts there is no reason for opposing this proposal on the basis of it endangering any lands, people or flora/fauna. Vimy does not accept that the implied assertion that approval would equate to poor regulations or that it would result in the destruction of unique flora and fauna, or that it would be based upon short-term economic goals. Vimy does not accept the implied assertion that this proposal might result in the despoilment of WA's environment and notes that its proposal is not expected to result in any significant residual impact on the environment. Vimy does not accept the assertion that "uranium mining is environmentally irresponsible and has a destructive impact on the environment" and notes that its proposal is not expected to result in any significant residual impact on the environment. Vimy does not accept the assertion that uranium miners are irresponsible or any implication that the development of its proposal could in any way "finish off the earth". Vimy notes that its proposal is not expected to result in any significant residual impact on the environment. Vimy acknowledges that the earth is home to human beings and that human beings have value, however Vimy does not accept the implied assertion that Vimy's project will leave a bad scar on the ground or more generally that Vimy will leave the Project area without properly rehabilitating all the areas that it has disturbed (unless they are associated with infrastructure that is expected to remain in place because of continuing use – such as roads and the airstrip). Vimy does not accept the premise that uranium mining is too big a risk for Minderoo or the accompanying assertion that it is therefore too big a risk in the desert ecosystem around Mulga Rock. Vimy notes that Minderoo is the location of pastoral activity and that although the type of *in-situ* leach process that would likely to be used to extract uranium in that area would be regulated

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		in a manner that ought to prevent any contamination of the groundwater that is accessed in support of local pastoral activity, there would inevitably be some taint by association. None of those conditions are present at Mulga Rock which will not involve an *in-situ* leach process and does not have any pastoral activity located anywhere near the project area. Vimy utterly rejects the assertion that its proposal can be said to "rape, pillage and plunder and steal the habitat". Vimy acknowledges that there are Australian indigenous animals that inhabit the area and that the proposal will disturb some of their habitat and that there is a small chance that some animals may be killed during clearing activities and by ongoing operations. Vimy acknowledges that submitters have concerns about the disturbance to habitat that supports threatened species, however it is not correct to suggest that the habitat that will be cleared represents that last remaining sanctuaries for these species or that the proposed clearance represents any threat to the continued existence of these species. Vimy does not accept the implied assertion that the development of its proposal will have long term detrimental effects on the unique wildlife and notes that Vimy's proposal is not expected to have any significant residual impact upon the environment. Vimy acknowledges that precious fauna and its habitat is important and requires a degree of protection but it does not accept the assertion that Australia has a poor record in terms of looking after its endangered species or the implied assertion that Vimy's proposal might threaten these endangered species. Vimy does not accept the assertion that Australia has the highest rate of extinction of flora and fauna (as already explained - the USA has the highest rate). Nor does Vimy accept the implied assertion that digging up the uranium would further damage Australia's fragile environment and would constitute a failure to show respect for the unique country. Vimy believes that its management measures to avoid, minimise and rectify any impacts attest to its

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		respect for the unique country and that the fact that there are not expected to be any significant residual impacts on the environment negates the assertion that Vimy will be further damaging the environment. The PER considers the impact upon native flora and fauna – see Sections 6, 7, 8 and 9. The PER does consider short-term and long-term impacts to the environment and whilst the proposal cannot be described as good for the flora and fauna there are not expected to be any significant adverse impacts. Vimy does not accept the premise that there will be excessive use of groundwater or that there will be effects from toxic residues or the implied assertion that either of these will harm the landscape or the animal species that reside within it. Vimy notes that there are not expected to be any significant residual impacts on the environment. Vimy does not accept the assertion that the earth is under stress and serious threat (other than from potential climate change) or the assertion that this makes the approval of new uranium mines ridiculous. Vimy notes that the nuclear power industry represents an important part of the energy mix in any practicable solution to the problem of climate change and that uranium mining is essential in supporting that industry. Vimy does not accept the premise that too much mining is going on in the world or the assertion that sooner or later the world is going to become one big sink hole. Vimy also notes that it will be backfilling all the areas where it has mined and therefore that there is no possibility that its activities will end up causing large scale subsidence. Vimy does not accept the implied premise that the development of its proposal will result in destruction or that there might be a requirement to go back and restore any areas or the implied assertion that approval would show a lack of common sense. Vimy notes that it will undertake progressive backfilling and

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		rehabilitation and that there are not expected to be any significant residual impacts. Vimy does not accept the assertion that the development of this proposal would result in any wanton destruction, indeed Vimy utterly rejects the implication of any malevolence. Vimy recognises that the area where clearance is expected to take place is a largely unspoilt area but does not accept the assertion that it is important not to clear this particular area if “our world is to survive”. Vimy acknowledges that healthy land, air and water help to sustain life on this planet, but does not accept the implied assertion that the development of this proposal would contaminate our environment and consequently ourselves. Vimy notes that development of this proposal is not expected to result in any significant residual impacts upon the environment. Vimy acknowledges that we humans are part of nature but does not accept the premise that the development of this proposal would be in some way treating nature as a backdrop for humans. Vimy notes that development of this proposal is not expected to result in any significant residual impacts upon the environment. Vimy does not accept the assertion that the development of this proposal will result in “the destruction of our unique and wonderful part of the world” or the implied assertion that the revenue that will be generated for the State Government will be insignificant. Vimy notes that the development of this proposal is estimated to produce more than $300 million in revenue for the State Government (via royalties and payroll taxes), that all areas cleared will be properly rehabilitated and that there are not expected to be any significant residual impacts upon the environment. Vimy acknowledges that the submitter has concerns about the destruction of our planet in circumstances where short-term profits are being put ahead of long-term sustainability. Vimy does not believe that this view accurately reflects what is happening in Australia and does not accept the implied assertion that the development of this project might adversely impact the

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		liveability of our environment or in any way the safety of our children and their children. Vimy notes that the development of its proposal is not expected to result in any significant residual impacts upon the environment. Vimy acknowledges that there may be jurisdictions in the world where mining and fracking have had adverse consequences for the environment but does not believe that the regulatory environment in Western Australia would allow such consequences in any approved proposal. Vimy acknowledges that Australia is regarded by many as a magnificent place, but does not accept the implied assertion that approval of this proposal might in any way lead to terrible havoc being inflicted on people, or whole neighbourhoods and towns or on any wildlife. Vimy notes that there are no communities within 100km of the proposed development and that it is not expected to result in any significant residual impacts to the environment. Vimy acknowledges that the project is located in a remote area, but does not accept the implied assertion that its location will lead to a lack of regulatory supervision ("out of sight out of mind"). Vimy does not accept the premise that climate change and significant contamination of water resources across the globe is likely to lead to mass extinctions, or the implied premise that the development of this proposal will degrade biodiversity or the environment and water resources or the assertion that the approach taken to approving this proposal should be any more conservative than is normal for such projects as a result. Vimy notes the absence of Groundwater Dependent Ecosystems associated with the water resources being utilised and that there are not expected to be any significant residual impacts upon the environment. Vimy does not accept the premise that there is any "culture of destruction" involved here or the implied assertion that the approval of this proposal would be privileging mining/development over concerns for the environment or that there will be any ongoing loss of species and habitat. Vimy acknowledges that the development of this proposal will result in almost 4000 ha of native vegetation and potential fauna habitat being cleared over a period of 16 years

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		but notes that it will be progressively rehabilitated and that there will not be any loss of species or any ongoing significant loss fauna habitat or any significant residual impacts upon the environment. Vimy does not accept the implied assertion that the amount of clearance proposed could result in sufficient loss of habitat such that native animals would become regionally endangered and possibly extinct. Vimy acknowledges that the development of this proposal will result in almost 4000 ha of native vegetation and potential fauna habitat being cleared over a period of 16 years but notes that it will be progressively rehabilitated and that there will not be any loss of species or any ongoing significant loss fauna habitat or any significant residual impacts upon the environment. Vimy does not accept the assertion that the survival of native species in the Mulga Rock area is tenuous due 'a changing climate' or the implied assertion that allowing clearance would be 'extremely ignorant'. Vimy acknowledges that the development of this proposal will result in almost 4000 ha of native vegetation and potential fauna habitat being cleared over a period of 16 years but notes that it will be progressively rehabilitated and that there will not be any loss of species or any ongoing significant loss fauna habitat or any significant residual impacts upon the environment. Vimy acknowledges that the threats to endangered species of wildlife can include such factors as introduced species, mining and habitat destruction. However, Vimy's proposal will not threaten any endangered species and will not therefore increase the level of those threats. Vimy does not accept the assertion that the development of this proposal will risk threatened/endangered and would refer the submitter to Table 9.8 of the PER where it is made clear that there will not be any significant impacts upon threatened/endangered species. Vimy does not accept the assertion that the development of this proposal will have a profound impact on fauna and flora and would refer the submitter to

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		Sections 6, 7, 8 and 9 which deal with impacts to all fauna and flora. Vimy note that there are not expected to be any significant residual impacts. Vimy does not accept the premise that there will be any significant adverse effects on the wildlife of the area covered by the development or the assertion that any effects, should there be effects, would not be reversible. To the extent that habitat clearance has effects on the wildlife the areas cleared will subsequently be rehabilitated and the effects upon the wildlife thereby rectified. Vimy does not accept the premise that Western Australian has the highest rate of mammal extinction in the world or the implied assertion that the development of Vimy's proposal might contribute to mammal extinctions. The submitter is referred to Table 9.8 which shows that there will not be any significant impacts upon threatened/endangered species.
Proforma	The Precautionary Principle should be invoked when it comes to uranium mining.	It is not clear which particular definition of 'The precautionary principle' the submitter is invoking in relation to uranium mining. Vimy will assume that it is 'The precautionary principle' as set out in s.4A of the *Environmental Protection Act 1986* (EP Act). This suggests that where there are threats of serious or irreversible damage that a lack of scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. The EP Act goes on to state that in the application of the precautionary principle, decisions should be guided by a careful evaluation to avoid where practicable, serious or irreversible damage to the environment; and that when making an assessment of the risk decisions should be guided by weighted consequences of the various options. Vimy has not identified any threats of serious or irreversible damage to the environment that would result from the development of its proposal; and Vimy is not relying in any sense on a lack of scientific certainty to justify avoiding or postponing any measures designed to prevent such environmental degradation.

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		Vimy has endeavoured to avoid, wherever practicable, serious or irreversible damage to the environment and where relevant has weighted the consequences of various options when assessing the risk associated with those options. Vimy therefore believes that the precautionary principle has been respected when undertaking this PER and that the application of the precautionary principle will be applied when decisions are being made.
Proforma	Concern raised about environmental regulation. The submitter opposed the Ranger uranium at the time of approval but the government claimed to have the strongest environmental regulations ever in place. Unfortunately, these regulations are not enforced and there have been repeated environmental destruction. While the EPA puts restrictions and guidelines into approvals for projects, many projects fail to adhere to these. Mining uranium is something that I don't think can afford a lack of adherence to environmental protective policies and guidelines. I am worried about the effects non-adherence would have on the local area – not only in the short term but the long term.	Vimy acknowledges that the submitter has concerns about environmental regulation and that the submitter has previously opposed the approval of the Ranger uranium mine. Vimy notes that Ranger is located within the Northern Territory and therefore whatever regulations were put in place were not the responsibility of the Western Australian Environmental Protection Authority. Vimy also acknowledges that there have been a number of environmental incidences at Ranger but does not accept the assertion that this resulted in any environmental destruction or that it has any implication for the manner in which regulations concerning Vimy's project will be enforced. Vimy acknowledges that adherence to policies and guidelines designed to protect the environment is important and that failure to adhere to them can have short-term and long-term effects; but Vimy does not accept that the failure to adhere to the restrictions and guidelines associated with the approval of other projects is any reason to suppose that Vimy will not adhere to its restrictions and guidelines, or that it constitutes grounds for not approving this development.
Proforma, P4, P5	Australia has no example of a successfully rehabilitated uranium mine – all uranium mining leaves behind a toxic legacy on country.	Vimy does not accept the assertion that Australia has no example of a successfully rehabilitated uranium mine or that all mining leaves behind a toxic legacy. Vimy notes that the Nabarlek uranium mine and associated mill, which were located in the Northern Territory (and produced about 11,000 tonnes of U_3O_8 between 1979 and 1988) was deemed fully rehabilitated in 1995. Vimy

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		also notes that the development of its proposal it not expected to have any significant residual impact upon the environment.
Proforma	The increased probability of earthquakes could result in a potential disaster.	Vimy does not accept the premise that there will be any 'increased probability of earthquakes' or the assertion that any local earthquake might result in a potential disaster. Vimy notes that if the surface tailings facility is utilised it will be built to standards appropriate to the level of seismic activity that prevails in the area. Vimy also note that the vast majority of (if not all) tailings will be deposited in-pit below surface levels and would not be likely to be affected by even the strongest of the likely earthquakes in the area.
Proforma	Submitters were concerned about the impacts on tourism: • Submitter considers the resources, agriculture, unique landscape and wildlife to be a strong draw for tourism. • At a time when tourism, especially ecotourism is so incredibly important to Australia, the last thing Australian and overseas tourists want to see is more mines. Promote Eco Tourism instead. • Do not destroy the tourism industry in WA. • As a visitor to WA, I come to see a pristine environment not one put at risk by deadly, insidious, long-lasting uranium mining! Think again about putting your people and tourists in danger of cancer!	Vimy acknowledges that 'resources, agriculture, unique landscape and wildlife' can be a strong draw for tourism but does not accept the implied assertion that the development of this project might in some way undermine any of these factors that act as a draw to tourism. Vimy notes that there is no agriculture or pastoralism practiced in the area and that there is no tourist accommodation within more than 100km. Vimy acknowledges that tourism (including ecotourism) is important to Australia and that there may be benefits from promoting ecotourism, but Vimy does not accept that this constitutes a reason for 'in principle' objection to mining in an area so far away from any tourist facilities and which is not expected to have any significant residual impacts upon the environment. Vimy does not accept the implied assertion that the approval of this proposal would somehow destroy tourism in WA. Vimy notes that the proposed site is not close enough to any tourist attractions to affect them and it is more than 100km from any tourist accommodation. Vimy acknowledges that visitors to WA may be attracted by the high quality of our environment, but does not accept the assertion that uranium mining is either deadly or insidious, or that this environment will in any way be put at risk by the proposed development of a uranium mine. Vimy completely rejects the implied assertion that the approval of this development could put people and

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		tourists in danger of cancer and would refer the submitter to Section 13 of the PER which deals with Human Health.
Proforma	How would this proposed mine benefit the people of WA? What is the cost benefit analysis, given the relevant costs?	The development of this proposal is expected to result in the creation of almost 500 full-time jobs with the majority of those jobs going to people who reside in WA. The payments to the State of WA, in terms of royalties and payroll tax are expected to amount to over $300 million over the life of the project. The people of WA will not be required to fund the investment but will benefit from the royalty payments and other revenue flows. Vimy notes that there are not expected to be any significant residual impacts upon the environment.
Proforma	Submitters contended that mining lobby groups should be rejected/stopped.	Vimy does not accept the assertion that mining lobby groups should be rejected or stopped or the implied assertion that the development of this proposal involved the use of mining lobby groups in a manner that would constitute a reason for objecting to the proposal.
Proforma	The Shire of Chapman Valley is a nuclear free zone. The proposed port of Oakajee is therefore not suitable for export of uranium or import of wastes. This should be included in the proposal, as in the future the operation may change its mind and want to utilise the proposed facility.	Vimy acknowledges that the Shire of Chapman Valley is a 'nuclear free zone' and that were a port ever to be built at Oakajee it would not be suitable for the export of uranium under current planning regulations. However, Vimy does not accept the assertion that its proposal needs to deal with planning regulations that may change, in a port that is unlikely to be built, in a location that would not be suitable as an export facility under any reasonably foreseeable circumstances.
Proforma	Submitters raised issues about the EPA's role: • The EPA should very carefully consider the proposed uranium mine. Reconsider your stance on approving uranium mines in WA. • This is an abrogation of EPA accountabilities to protect our precious natural resources for future generations.	Vimy does not accept any implied premise that the EPA is not properly considering proposals or the assertion that there is a need for its stance on approving uranium mines in WA needs reconsidering. Vimy does not accept the implied assertion that approval of this proposal would be an abrogation of its accountability to protect our precious natural resources for future generations or that such an approval would in any way damage natural resources in a manner that would prevent future generations from

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	• The EPA has a duty (free from political pressure of the incumbent government to balance their books) to protect the environment of our state for future generations. • Concern that the EPA is recommending approval for all projects. This is disheartening to any scientists who understand environmental land and reserve management. • Extremely dishonest to hurry through disastrous legislation like this just for fear they won't be able to after the election. • Decision makers should take into consideration the uniqueness of the area and make a responsible decision on the outcome. • The EPA would be well counselled to observe its conservative duty of care, on behalf of WA citizens today and tomorrow, against rash political and expedient economic imperatives of a State government that is exhausted. • Public servants should pay extremely close attention to due process. • The EPA should undertake assessments according to the EP Act. *"Key aims of the Act include the sustainable use and holistic management of the environment, ensuring consultative processes are adopted so that community input is a key driver of environment protection goals and programs and encouraging a co-operative approach to environment protection"*. To help achieve these aims, a number of Principles of Environment Protection were added to the Act in 2001: integration of economic, social and environmental considerations; the precautionary principle; intergenerational equity; conservation of biological diversity and ecological integrity; improved valuation, pricing and incentive mechanisms; shared responsibility; product stewardship; wastes hierarchy; integrated environmental management; enforcement; accountability. • Has economic and government become more important for the EPA in the 'environment' and give all the amendments and subacts more weight to industrial and financial environments?	enjoying them. Vimy notes that the development of this proposal is not expected to result in any significant impacts to the environment. Vimy does not accept the implied premise that the EPA is under pressure from the government to approve projects because of the budget deficit or the implied assertion that the EPA is failing in its duty to protect the environment for future generations because of this alleged pressure. Vimy notes that there are not expected to be any significant residual impacts upon the environment. Vimy does not accept the assertion that the EPA is recommending approval for all projects, or that scientists who understand how to manage sensitive environmental areas or reserves would be disheartened by this approval. Vimy notes that no sensitive environmental areas or reserves will be impacted by the development of this proposal. Vimy does not accept the premise that this approval is being hurried through, or the assertion that it involves the implementation of any legislation (disastrous or otherwise). Vimy notes that the approvals process was commenced in July 2013 and respectfully suggests that the EPA is not hurrying this any more than is reasonable and appropriate. Vimy acknowledges that decision makers should take into account the uniqueness of the area and make a responsible decision on the outcome, but Vimy would respectfully suggest to the submitter that this is happening as part of this approval process. Vimy does not accept the implied assertion that the issue of the State's budget deficit ("against rash political and expedient economic imperatives of a State government that is exhausted") has been, or is in any way, resulting in pressure being put on the EPA to make particular decisions regarding approvals or that it is in any way abrogating its duty of care on behalf of current and future citizens of WA.

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	• Remember your original plight, when you are not yet encapsulated by industry and government. • As the EPA's role is to protect the environment, I cannot understand how uranium mining can ever be approved. • The EPA has a responsibility to look after the environment for all of the people in the state and the primary constituency of WA is the electorate, not business interests. • I would like to see the EPA make a stand for the environment on this matter and encourage sustainable sources. • Think beyond mining, remember you have guidelines. Think and act in the best interests of all. • If the EPA continues down this track, then you will be known not for protecting our environment but destroying it. People have long memories when it comes to the wrongs of government.	Vimy is confident that public servants will be paying extremely close attention to due process and ensuring that all policies and guidelines are being strictly adhered to. The Western Australian EPA is required to undertake assessments according to legislation enacted by the Parliament of Western Australia – namely the *Environmental Protection Act 1986* (WA); it is not required to undertake assessments according to legislation enacted by the Parliament of Victoria. The statement: "Key aims of the Act include the sustainable use and holistic management of the environment, ensuring consultative processes are adopted so that community input is a key driver of environment protection goals and programs and encouraging a co-operative approach to environment protection". This is not a statement to be found in either the *Environmental Protection Act 1986* (WA) or the *Environment Protection Act 1970* (Vic) but is a statement on the website of Environment Protection Authority Victoria. That same website also includes the following statements: "To help achieve these aims, a number of Principles of Environment Protection were added to the Act in 2001: integration of economic, social and environmental considerations; the precautionary principle; intergenerational equity; conservation of biological diversity and ecological integrity; improved valuation, pricing and incentive mechanisms; shared responsibility; product stewardship; wastes hierarchy; integrated environmental management; enforcement; accountability". Vimy does not accept the implied assertion that the EPA is giving preference to economic and political considerations or that there have been legislative amendments giving greater weight to industrial and financial considerations rather than the environment.

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		Vimy does not accept the premise that the EPA has ever been in "original plight' or the implied assertion that the EPA might become "encapsulated by industry and government". Vimy acknowledges that the EPA's role is to protect the environment but does not accept the implied assertion that any approval of a uranium mine would be tantamount to not properly fulfilling that role. Vimy's proposal involves mining uranium in a manner that does protect the environment and Vimy notes that the development of its proposal is not expected to have any significant residual impacts upon the environment. Vimy acknowledges the responsibility of the EPA to look after the environment, but does not accept the implied assertion that the approval of this proposal would somehow amount to giving preference to business interests rather than voters. Vimy does not accept the implied assertion that the EPA does not support the environment or encourage sustainable sources sufficiently or that approval of this proposal would in any way improve the situation. Vimy does not accept the implied assertions that the EPA is overly focussed on mining, or that it doesn't give due consideration to its guidelines or that it does anything other than thinking and acting in the best interests of all. Vimy does not accept the implied premise that approving this proposal might somehow amount to a 'wrong of government' or the assertion that approval would lead to the EPA being known for destroying the environment rather that protecting it. Vimy notes that its proposal is not expected to result in any significant residual impacts to the environment.
Proforma	Submitters were concerned that uranium mining would leave a toxic legacy to future generations. Consideration should be given to future generations:	Vimy acknowledges the concerns of submitters who are worried about uranium mining leaving a "toxic legacy" to future generations, but does not accept the premise that the development of its proposal (uranium mining) results in any toxic legacy or that any of the tailings produced will in any way impact upon

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	• It is irresponsible, short sighted, reprehensible and incredibly selfish to mine today and leave such a devastating legacy for future generations. • Short sighted and perverse to approve a mine which will create so much damage and a legacy of thousands of years of pollution and waste for a commodity which continues to decline in value. • Uranium mining is short term and toxic – it leaves a dangerous legacy for tens of thousands of years. • Toxic legacy that we will leave to future generations – radioactive waste, contaminated land and water, disease. For the sake of future generations uranium must stay in the ground. • Unacceptable cost to current and future generations. Uranium mining will impact future generations and the quality of their life on earth. • It leaves an enormous burden on society and closes off options. • There seems to be a culture of "who cares about tomorrow, let's just look after ourselves today" approach. • Mining companies leave behind a mess. • No future for us if we continue to be used as the global economy's mining camp and waste dump. • Politicians should consider they will be held accountable for this toxic legacy if they commit us down this road. • Please see: The Roy process for neutralization and eliminating of radioactive waste *https://www.youtube.com/watch?v=vt1jITEAe9U* • Humans have adequately demonstrated that they cannot yet safely manage radioactive material, whether it be the persistence of nuclear weapons, insecure nuclear power stations, or ongoing dilemma of how to dispose of nuclear waste, or inability to adequately rehabilitate mining sites. • We need to think long term, big picture and stop messing up our land for future generations. Too much is done in haste without enough consideration of long term consequences of the action.	future generations. Vimy notes that there are not expected to be any significant residual impacts upon the environment. Vimy does not accept the premise that any devastating legacy is being left for future generations or the assertion that the mining associated with this proposal is irresponsible, short sighted, reprehensible or selfish in any way. Vimy notes that there are not expected to be any significant residual impacts upon the environment. Vimy does not accept the assertion that the development of this proposal will create any enduring damage or result in a legacy of thousands of years of pollution and waste. There are not expected to be any significant residual impacts upon the environment. Whilst Vimy acknowledges that the value of uranium has declined to low levels in recent years, it does not accept the implied assertion that uranium will continue to decline in value to an extent that would prevent the proposal from being developed or might in any way alter the impacts in detrimental manner. Vimy acknowledges that uranium mining is only expected to last for around 16 years and could therefore be characterised as short-term in relation to a time period stretching for tens of thousands of years, but it does not accept the assertion that the development of this proposal will be toxic or that it will leave any dangerous legacy for any period of time. Vimy notes that there are not expected to be any significant residual impacts upon the environment. Vimy acknowledges that the tailings (waste) that it produces as a result of processing the uranium ore will be radioactive but does not accept the assertion that the development of the proposal will contaminate any surface land areas or any water in a manner that could reasonably be characterised as a toxic legacy being left to future generations, or the assertion that the uranium ought to remain in the ground to protect future generations. Vimy also completely rejects the assertion that the development of its proposal might cause disease.

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	• Disregard for the future of this extraordinary country, which is home to many unique species. • Approval to vandalise Mulga Rock will provide a dreadful model for our youth to emulate. We need to be setting a far better example for our young people. • Your children and grandchildren will bear this legacy in their lives, please do not sell their future for a few royalty dollars needed to prop up the current account deficit. • We are custodians of our children and their children. We have no right to leave behind a legacy we are unable to clean and clear. • Concerns raised about the long term environmental impact of uranium mining. • Uranium mining creates short and long term contamination locally and internationally. • Concern that the assets of the country are being treated without understanding or insight into the consequences. You should be educating yourselves. • If you keep abusing the planet, it's going to be harder for future generations to even survive. • We have an ethical responsibility to our land and future generations. Preserve our country in good condition for our children and grandchildren. • This decision will have consequences far beyond our own lifetimes. • Toxic waste products would remain to cause major health and environmental problems for future generations.	Vimy does not accept the assertion that any costs are being imposed on either current or future generations. Vimy also does not accept the assertion that the development of this proposal has any negative impacts upon future generations or the quality of their life on earth and notes that the development this proposal is not expected to have any significant residual impacts upon the environment. Vimy does not accept the assertion that the development of this proposal will impose any burden on society and is not aware of any options being closed off that are relevant to an environmental impact assessment. Vimy does not accept the assertion that its culture could be characterised as "who cares about tomorrow, let's just look after ourselves today" and refers the submitter to Section 1.6 of the PER which describes the Proponent's details and in particular, Vimy's Mission Statement which is "Mining a cleaner tomorrow". Vimy does not accept that "Mining companies leave behind a mess" is a valid generalisation or the implied assertion that the development of this proposal would leave behind a mess. Vimy notes that there are not expected to be any significant residual impacts upon the environment. Vimy does not accept the premise that Australia is the global economy's 'mining camp and waste dump' or the implied assertion that approval of the proposal has adverse implications for human beings ("us"). Vimy notes that there are not expected to be any significant residual impacts upon the environment. Vimy does not accept the premise that the development of this proposal will result in any toxic legacy or the implied assertion that politicians might be voted out of office (held accountable) if they allowed the EPA to approve the proposal. Vimy notes that the environmental assessment process is undertaken by the EPA without the involvement of, or any influence by, politicians; Vimy does not believe that it is appropriate to suggest that politicians might be voted out simply for allowing the approval process to be undertaken without their involvement.

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		Vimy assumes that this refers to a process (here being attributed to Dr. Radha Roy) by which nuclear waste is transmuted and essentially involves the reprocessing of nuclear fuel by separating out the high level actinides and then transmuting them by bombarding them with neutrons in a reactor to produce material with less long-lived isotopes. Vimy acknowledges that this represents an option for dealing with long-lived radioactive wastes but does not believe that the issue is of relevance to this Environmental Impact Assessment. Vimy does not accept the assertion that humans have demonstrated that they cannot safely manage radioactive materials, or indeed the premise that nuclear power stations are insecure or that there is a dilemma over how to dispose of nuclear waste. Vimy notes that in relation to the rehabilitation of uranium mining sites, the rehabilitation of the Nabarlek site demonstrates that it can be done safely. In relation to nuclear weapons, Vimy's production will only be used for peaceful purposes. In relation to the disposal of nuclear waste, it can be disposed of safely in deep geological deposits. Vimy does not believe that the issues of the 'persistence of nuclear weapons', 'insecure nuclear power stations', or the 'ongoing dilemma of how to dispose of nuclear waste' are relevant to this Environmental Impact Assessment. Vimy does not accept the implied assertion that this proposal would result in any land being messed up for future generations or that it is being undertaken in haste without enough consideration of the long term consequences. Vimy notes that the approvals process has been in progress for more than two and a half years and that the proposal is not expected to result in any significant residual impacts. Vimy acknowledges that the development of this proposal will result in the clearance of almost 4000 ha of native vegetation and that this represents a fauna habitat that may host some threatened species. However, Vimy would draw the submitter's attention to Sections 6-9 of the PER where the impacts upon species are dealt with and concludes that no rare species will be threatened, and that there are not expected to be any significant residual impacts.

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		Vimy does not accept the implied premise that the approval of this proposal would amount to the authorisation of any malicious destruction (vandalise); nor does Vimy accept the assertion that it would somehow provide a bad model for youth to emulate. Vimy does not accept the premise that royalty dollars are required to prop up any current account deficit, or the implied premise that approving this proposal would amount selling anybody's future for money, or the assertion that approval would result in a legacy that would be disadvantageous to future generations. Vimy notes that the State of Western Australia does not run a current account deficit and that royalty payments would not rectify such a deficit were one to exist. Vimy also notes that there are not expected to be any significant residual impacts upon the environment. Vimy does not accept the implied premise that approval of its proposal would leave behind a legacy that would require any cleaning or clearing. Vimy notes that all areas cleared will be rehabilitated (as soon as no longer required) and that there are not expected to be any significant residual impacts upon the environment. Vimy acknowledges that submitters have concerns about the long-term environmental impacts of uranium mining but does not believe that those concerns stem from an examination of the expected impacts on the environment that will result from the development of this proposal. Vimy notes that there are not expected to be any significant residual impacts. Vimy acknowledges that submitters have concerns about short and long-term environmental contamination locally and internationally but does not believe that those concerns stem from an examination of the expected impacts on the environment that will result from the development of this proposal. Vimy notes that there are not expected to be any significant residual impacts. Vimy does not accept the premise that there is no understanding or insight into the consequences of approving this proposal – the expected impacts and the underlying understanding are both extensively detailed within the PER. Vimy

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		does not accept the implied assertion that more studies are required (educating ourselves). Vimy does not accept the premise that its proposal involves any abuse of the planet or the assertion that the proposal would make it harder for future generations to survive. Vimy notes that the proposal is not expected to result in any significant residual impacts. Vimy acknowledges that it has an ethical responsibility in relation to the land that comprises the area affected by the proposal and to ensure that there are no adverse impacts upon future generations. However, Vimy notes that the development of the proposal is not expected to have any significant residual impacts upon the environment and that the country will be preserved in good condition for current and future generations. Vimy does not accept the implied assertion that there will be adverse consequences for future generations and notes that there are not expected to be any significant residual impacts upon the environment. Vimy acknowledges that there will be tailings (toxic waste products) but does not accept the assertion that they will cause any major health problems or any major environmental problems for future generations. Vimy notes that there are not expected to be any significant residual impacts on the environment.
Proforma	Submitters were concerned about nuclear proliferation: • Links between nuclear power and weapons are complex and cannot be ignored. • Uranium mining is a threat to world peace. • No doubt the proponent wants to export uranium to nuclear weapons states – states refusing to sign or ratify the CTBT, dictatorships etc. • As weapons material, it is a disaster for humanity. • Miners, investors, governments and regulators seem to be totally unwilling to consider the worst possible end uses of uranium product,	Vimy acknowledges that submitters are concerned about the issue of nuclear proliferation, but notes that Vimy will only export uranium under Australia's uranium export policy (under the auspices of ANSO), which will ensure that it is only exported for peaceful non-explosive purposes under a network of bilateral nuclear cooperation agreements. These agreements will ensure that there is coverage by IAEA safeguards and that there are fall backs in place in the unlikely event that those safeguards fail for any reason. Vimy is therefore confident that any uranium that it produces and exports will only be used for peaceful purposes.

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	such as the production of fissile nuclear materials. This is evading responsibility for end use of what's dug up. • Nuclear proliferation in unstable geopolitical regions, by failed states and possibly, non-state groups is an increasing worldwide risk. This is a time of terrorism, and also growing hostility by Russia. • Opposed to the production and use of nuclear weapons within and outside of Australia. Uranium sent to another country for peaceful purposes only has the potential to free up that country's own uranium reserves to make weapons. • We do not have the facility to produce arms and we should not sell the means to do so to other countries. • The more uranium that is mined, the higher the risk of terrorists being able to access radioactive material which puts the free world in great danger. • Australian uranium gets used in warheads that ruin the lives of thousands of people in other countries. This is shameful, especially considering that the local indigenous people of the lands do not want their land/resources used in this way. • Uranium continues to end up in enriched uranium weapons around the world. Australia has a responsibility to prevent these disasters from happening by refusing to sell uranium until nuclear disarmament has completely taken place and there are proven ways to produce power without causing waste or risk of deadly accidents. • Producing weapons-grade plutonium could be the only possible reason for mining uranium and for your government to invest $300 million of taxpayer's money in doing so displays an evil intent. We will ensure that your grandchildren will be reminded of their ancestor's part in this path to destruction – if they or any of us survive.	Vimy acknowledges that there are potentially complex links between nuclear power and nuclear weapons, but does not accept the implied assertion that the approval of this proposal would in any way be ignoring those links. Australia's uranium export policy which will govern where any uranium produced by Vimy goes to is specifically designed to deal with those links and will ensure that Vimy's uranium will only be used for peaceful purposes. Vimy does not accept the implied assertion that Vimy's uranium could be used in nuclear weapons and become a threat to world peace. Vimy's uranium will only be used for peaceful purposes. Vimy acknowledges that it will seek to export uranium and that this could potentially include countries such as the USA, China, France and the UK – all of which are nuclear weapons states. Vimy also notes that although India is not yet a signatory to the Comprehensive Nuclear Test Ban Treaty (CTBT) and possibly may never be, India has supported the treaty's basic principle of banning nuclear explosions by declaring a unilateral moratorium on nuclear testing. India and Australia have signed a cooperation agreement covering the peaceful uses of nuclear energy. Vimy may export uranium to India and therefore Vimy also acknowledges that it may export uranium to a country that has not signed the CTBT; however, Vimy remains confident that no Australian uranium will be used for anything other than peaceful purposes and therefore exports to India, should they eventuate, should not give cause for concern over nuclear proliferation. Vimy does not accept the assertion that it wants to export uranium to any countries that could be characterised as "dictatorships". Vimy does not accept the premise that any uranium that it produces could be used as weapons material or the assertion that it is therefore a disaster for humanity. Vimy's uranium will only be used for peaceful purposes. Vimy does not accept the assertion that those involved in the development of this proposal (miners, investors, governments and regulators) have not considered the worst possible end-uses of the product or that the production of fissile material could be characterised as the worst possible end-use. Vimy, the government and the appropriate regulators are all aware of the issue of

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		nuclear proliferation and Vimy's production will only be exported under conditions that ensure that it can only be used for peaceful purposes. Those peaceful purposes will only involve its use in nuclear reactors and only for the purposes of generating electricity or possibly the creation of isotopes require for medical purposes, but in all cases this will involve exploiting the properties of the fissile material that exists in natural uranium and will most likely involve concentrating the fissile element for use in a reactor in order to generate electricity. Vimy therefore does not accept the assertion that the production of 'fissile material', which nuclear fuel is, can reasonably be characterised as a 'worst possible end-use'. Vimy acknowledges that nuclear proliferation, particularly in unstable geopolitical regions, or by failed states or by non-state groups is a risk but does not accept the implied assertion that the development of this proposal might contribute to increasing that risk. Vimy also acknowledges that terrorism is an issue and that Russia's action might be interpreted as hostile, but again does not accept that there is any connection between those issues and the necessarily peaceful purposes to which any exports made by Vimy will be put. Vimy acknowledges that the submitter opposes the production and use of nuclear weapons anywhere in the world; Vimy also strongly opposes these things. Vimy also acknowledges that even though uranium exported from Australia can only be used for peaceful purposes, nevertheless if the country to which they were exported had domestic supplies that were so committed to a domestic nuclear energy program that as a result they were unavailable to support a clandestine nuclear weapons programme, Australia's exports could in theory free up those domestic supplies to be diverted to other than peaceful purposes. Vimy does not believe this is a credible scenario and does not accept there is any inevitability ("only") that such an outcome would occur or that that it any way represents a reason not to allow the exports of Australian uranium. Vimy does not accept the premise that selling uranium to other countries represents selling them the means to produce nuclear weapons (arms) in the

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		context of the existing controls over the export of Australian uranium which effectively guarantees that the product will only be used for peaceful purposes. Vimy does not accept the implied premise that an increase in the production of natural uranium (more uranium that is mined) necessarily increases the risks of terrorists being able to access radioactive material or the accompanying assertion that this puts the free world in great danger. Vimy's product will be uranium concentrate which in its unenriched form does not constitute a particularly attractive target for terrorists seeking to use it in a manner designed to put the free world in great danger. Vimy acknowledges that an increase in 'enriched uranium' may present an increased risk in relation to terrorist activities but would respectfully suggest that this matter is beyond the remit of this Environmental Impact Assessment. Vimy does not accept the premise that Australian uranium gets used in warheads let alone the assertion that those warheads might subsequently be used to ruin people's lives. Vimy also does not accept the implied premise that the development of this proposal adversely affects local Aboriginal people or that there are any Aboriginal people who claim any Native Title Rights or any other Traditional Rights over the land where mining will occur or that such people have expressed the view that they do not want this land used for the development of this proposal. Vimy does not accept the implied assertion that the development of its proposal could result in more enriched uranium ending up in nuclear weapons given the existence of the export controls that ensure that any exported Australian uranium can only be used for peaceful purposes. Vimy does not accept the assertion that Australian entities should refuse to sell uranium to nuclear utilities and other entities seeking to generate electricity for entirely peaceful purposes until such time as complete nuclear disarmament has taken place. Nor does Vimy accept the premise that those same sales should not take place until there are "proven ways" to produce power without producing waste or, as is implied, that they should be prevented until the risk of deadly accidents has been effectively reduced to zero.

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		Vimy completely rejects the assertion that the only possible reason for mining uranium is in order to produce weapons grade plutonium. Vimy will sell uranium to nuclear utilities for the sole purpose of producing electricity (or isotopes required by medicine) and there will be restrictions on its uses that will effectively guarantee that it can only be used for peaceful purposes. Vimy also completely rejects the premise that the government has invested $300 million of taxpayers' money in uranium or that there will be any destruction or any risks to anybody's descendants as a result of this proposal being implemented.
Proforma	Submitters raised concerns about the government's approach with uranium mining and urged the government to listen to their opinions and to decide this issue at the next election: • Deep disbelief that the state governments seem uninhibited to destroy the amazing and unique countryside and wildlife. • Much more reflective treatment of these kinds of proposals are experienced in Germany, instead of supporting the mining lobby. • The current government's push to suppress protests is almost certainly laying the ground work for a massive push to turn this state into the world's nuclear dumping ground and supplier of raw materials. • Irresponsible on the part of governments to allow mining of uranium. • The actions of the present WA government and its administration regarding the push for uranium mining runs against sensible, conservative principles. • The leaders of the country should apply themselves to support Australian development and not leave it to other countries to take over. • Does the Government of West Australia really want to poison its beautiful land, its Miners, and its wildlife? Does the Government of West Australia really want to lose the next election? • It is time the Australian Government and those responsible for protecting this beautiful country's unique environment take positive	Vimy acknowledges that uranium mining is considered by many to be a contentious and essentially political issue and therefore that the approval of uranium projects ought to be postponed and determined by the outcome of the State elections scheduled to be held in March 2017. However, Vimy does not accept the implied assertion that the government is not listening to their views or that any approval should be subject to the outcome of the next election. Vimy notes that is currently legal to mine uranium in WA and that the approval process is based upon an assessment of the environmental impacts rather than political views on the in-principle acceptability of uranium mining. Vimy does not accept the implied premise that the approval of this proposal would result in the destruction of "amazing and unique countryside and wildlife" or the implied assertion that that would be something that the State government would not care about (uninhibited). Vimy notes that the development of its proposal is not expected to result in any significant residual impacts upon the environment. Vimy does not accept the premise that environmental approvals processes concerning uranium mining in Germany are given a much more reflective treatment (assumed to mean 'careful consideration') or the implied assertion that the treatment of environmental approvals in Australia panders to the wishes of mining lobby groups. Vimy notes that uranium mining in Germany ceased in what had been East Germany after German reunification in 1990 and

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	steps to halt the continuous destruction of that environment in the pursuit of wasteful, harmful corporate endeavours. • The Australian government needs to think long and hard about what future it wants for Australia. The economy is in trouble and we rely way too much on non-renewable resources which are going to run out and are now selling in some cases at a loss. You only have to look at the WA government budget to see a great example of mismanagement and bad forecasting. • People like me will continue fighting against a government and an EPA that believe that profits matter over country and its people. • I am generally a Liberal voter, but if this development is accepted, I shall be happy, indeed obliged, to give my support, to the WA Labor Party. • Do we really have to wait for the Labor Government to stop uranium mining? • I will not support any government, organisation, nor persons that wish to open, dig, drill or by any other method continue the old ways of thinking to make energy. • It is time that our governments commit to genuine action on preserving what little remains of our natural world, rather than looking to short term gain and profits. • Please show leadership and respect our future by denying Vimy the opportunity to go ahead. • The damage in creating the mine, the ecological impact of running the mine and the impossibility of safely maintaining the waste products indefinitely should be enough deterrent to governments and the EPA. • Mulga Rock belongs to the people of WA. It is not for some miner to destroy.	that there has been no proposal to mine uranium in Germany for more than 25 years. Vimy does not accept the premise that the current government has in any way attempted to suppress protests or the assertion that this is being done in order to facilitate turning Western Australia into the "world's nuclear dumping ground". Vimy notes that the approval of its proposal does not have any implications for the concept of Australia accepting spent nuclear fuel as a separate service that Australia could provide to the world's nuclear energy industry. Vimy does not accept the assertion that the approval of this proposal would demonstrate any irresponsibility on the part of government and notes that the development of this proposal is not expected to have any significant residual impacts upon the environment. Vimy does not accept the premise that either the current WA government or its administration is undertaking any push for uranium mining that might be regarded as inappropriate and in particular the assertion that it runs against sensible, conservative principles. Vimy notes that the development of this proposal is not expected to have any significant residual impacts upon the environment and cannot sensibly be regarded as violating any sensible or conservation related principles. Vimy does not accept the implied premise that the development of this proposal would result in any other countries taking over anything or the assertion that there is a requirement for the leaders of the country to do more to assist in the development of Australia. Vimy notes that it owns 100% of the Project and that the vast majority of Vimy's shares are owned by Australian entities. Vimy does not accept the implied assertion approving this proposal would potentially result in any land or people (miners) or wildlife being poisoned or that there is any relationship between this proposal and the outcome of the next State election.

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	• As citizens, we have rights - keep this land we live in a highly functioning state. If this is a truly democratic society then show us you can hear us.	Vimy does not accept the implied premise that the development of this proposal will result in any destruction of the environment or that the proposal could be fairly characterised as the pursuit of wasteful, harmful corporate endeavours or the assertion that the Australian government ought to take steps to halt the development as a result. Vimy notes that the development of this proposal is not expected to result in any significant residual impacts upon the environment. Vimy does not accept the premise that the Australian economy is in trouble (notwithstanding a government structural deficit problem) or that Australia relies too much on non-renewable resources or that they are about to run out or that we are selling them at a loss in a manner that would be relevant to the approval of this proposal. Nor does Vimy accept the assertion that an examination of the WA government budget would show examples of mismanagement and bad forecasting. Vimy notes that it expects to sell its uranium production at a profit and that the royalty payments from the development of the proposal will assist in bringing down the WA government's deficit. Vimy does not accept the assertion that either the government or the EPA acts in a manner that would support the belief that profits are preferred over 'country and its people'. Vimy notes that the development of this proposal is not expected to result in any significant residual impacts to the environment (which includes the country and its people). Vimy acknowledges the submitter's right to vote for whichever party the submitter chooses to. Vimy notes that this PER is assessed by the EPA and its recommendations are not subject to control by any political party; Vimy does not therefore believe that the voting proclivity of the submitter is in any way a relevant consideration in relation to this environment impact assessment. Vimy does not accept the notion that party political considerations should be taken into consideration when assessing the environmental impact of a proposal.

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		Vimy acknowledges the right of the submitter not to support any government or organisation as the submitter sees fit. However, Vimy does not believe that an expression of a lack of support for any activity involving opening, digging or drilling in order to extract energy should be considered a reason for not approving this proposal. Vimy notes that although it will be extracting energy (uranium concentrate) by drilling and digging and undertaking open-cut mining, the development is not expected to result in any significant residual impacts upon the environment. Vimy does not accept the premise that approval of this proposal would represent a preference for 'short term gain and profits' over the preservation of our natural world or the implied assertion that rejecting the proposal would somehow constitute genuine action to preserve 'what little remains of our natural world'. Vimy notes that this proposal is not expected to result in any significant impacts upon the environment. Vimy does not accept the assertion that rejecting this proposal would show leadership in a positive manner or that it would constitute respect for 'our future'. Vimy notes that the proposal is not expected to result in any significant residual impacts upon the environment. Vimy does not accept the implied premise that creating the mine will cause damage, that running the mine will have an adverse ecological impact or that it is impossible to safely deal with waste products in a manner that would warrant the assertion that the proposal ought to be rejected. Vimy notes that the proposal is not expected to result in any significant residual impacts upon the environment. Vimy acknowledges that the uranium resource at Mulga Rock is owned by the State, but does not accept the implied assertion that the development of this proposal would result in the destruction of Mulga Rock. Vimy notes that it will pay royalties to the State in recognition of the State's ownership of the resources and that the development of this proposal is not expected to result in any significant residual impacts to the environment.

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		Vimy acknowledges that citizens have rights but does not accept the implied assertion that the development of this proposal might somehow affect the functionality of the State. Vimy does not accept the implied assertion that the democratic nature of our society would be undermined by a failure to hear whatever the submitters concerns might be, especially when the actual concerns have not been articulated. Vimy notes that this proposal is being assessed for its acceptability in relation to the impacts it will have on the environment and that there are not expected to be any significant residual impacts.
Conservation Council WA	The submitter maintains that a Public Inquiry under the provisions of the Environmental Protection Act would be able to address more strategic questions about the proposal, a broader cost benefit analysis of uranium mining in the broader context of the global nuclear industry and its trajectory and unsolved problems.	Vimy does not accept the premise that there are strategic questions about the proposal that require addressing, or that the global nuclear industry has either a 'trajectory' or 'unsolved problems' that require a broader cost benefit analysis to be undertaken as part of an assessment of this proposal, or the assertion that these issues warrant a more detailed examination (a Public Inquiry under s.40(2)(c) of the Environmental Protection Act) than can be undertaken within the context of a normal Public Environmental Review. Vimy notes that this proposal is not expected to result in any significant residual impacts to the environment.
P4, Proforma	Many other countries are closing down their nuclear plants and there are quite a number about to be decommissioned also. Therefore, there is a decreasing demand for uranium and the value of it is very low, which would make destroying this environment even more abhorrent and pointless. Uranium from mining is used almost entirely as fuel for nuclear power plants. The price of uranium concentrate remained near a five-year low, the uranium price having fallen more than 50% from the peak spot price in January 2011, reflecting the loss of Japanese demand following the 2011 Fukishima nuclear disaster. Open pit mining is destructive and companies that engage in these activities do little or nothing in the way of cleaning up their mess after they have taken what they want. I believe	Vimy acknowledges that a few countries intend to close down their nuclear plants and that there are quite a large number of nuclear plants that will be decommissioned when they reach the end of their design lives. However, Vimy does not accept the assertion that this means that the demand for uranium will decrease or the implied assertion that the price of uranium will therefore remain low. Vimy also rejects the implied premise that the development of Vimy proposal would destroy the environment and the assertion that approving the proposal would be either abhorrent or pointless. Vimy notes that the proposal is not expected to result in any significant residual impacts to the environment. Vimy acknowledges that uranium mining is used almost entirely as a fuel for nuclear power plants and that the price of uranium concentrate is currently near a five-year low. However, Vimy does not accept the assertion that open pit

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	nuclear power should be phased out as we now have ample alternatives that are far less damaging to the environment and pose little to no threat if things go wrong. Nuclear waste is another issue that has long term negative ramifications associated with it.	mining is somehow inherently destructive or the implied assertion that Vimy would not properly rehabilitate cleared areas once they are no longer required. Vimy acknowledges the submitters belief that nuclear power should be phased out but does not accept the implied assertion that there are ample alternatives that could provide low carbon emission baseload power in a manner that nuclear power is capable of doing or that these alternatives don't pose any threat when things go wrong. Vimy acknowledges that spent fuel is another issue that has long term negative ramifications associated with it; Vimy notes that there are solutions, including deep geological deposits, but believes that this issue of beyond the scope of this environmental impact assessment.
Conservation Council WA	In considering the consequences of not proceeding - Vimy claim that the "uranium shortage would be exacerbated". The perceived shortage of uranium is a fallacy. In the preliminary findings of the SA Royal Commission into the Nuclear Fuel Cycle they clearly identify that existing inventories do not warrant new mining. In fact, here would be scant negative impact for the industry, the environment or the economy if the mine does not proceed. While the EPA cannot consider the economy in making their recommendation it is essential that the EPA look at the capacity of the company to meet environmental conditions. To consider the company's capacity, it is worthwhile considering some comments made by market analysts that suggest there is no merit in establishing new uranium mines. For example: • Greg Peel from FNArena states that prices are below the cost of production for "many mines." Rob Chang, an analyst with Cantor Fitzgerald, states that the break-even costs for new uranium mines is around $70-$80. The uranium price is currently US $32.15. • Thomas Meade and Julian Steyn state "The sizeable gap between projected production and forecast reference demand through the	The Nuclear Fuel Cycle Royal Commission considered uranium mining only in the context of South Australian mines and it concluded that there were significant barriers to the viability of new uranium mine developments in South Australia. One of the reasons cited was the current low price of uranium and uncertainty about the timing of any price increases. It went on to state "Increases in the uranium price in the short-term are unlikely given existing inventories". Vimy agrees with the assertion that there are currently excess inventories and over the short-term that that will inhibit a recovery in the price of uranium. However, Vimy does not expect to be exporting uranium before 2018 and it expects to be exporting uranium for at least 16 years. Viewed in the context of this time period (2018 to 2034 or later) Vimy stands by its expectation of a uranium shortage which it believes will come about due to a net increase in nuclear capacity (predominantly as a result of Chinese new builds driven by air quality and climate change issues). Vimy does not accept the assertion that there would be no adverse impact upon the industry, the environment or the economy if the mine does not proceed. Vimy does not dispute that it will be a small producer given the overall size of the market – Vimy's production is expected to be less than 2% of global

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	early 2020s indicates that there may not be much upward pressure on market prices until the next decade. ... Unfortunately for uranium suppliers, excess supply is expected to persist. In an effort to maintain near-term viability suppliers have postponed new mines under development, cut back production activity or completely halted production ... The uranium market continues to struggle with oversupply, which is forecast to continue beyond the current decade. There are several causes, but the decline in demand after Fukushima remains the primary one." • Steve Kidd former World Nuclear Association executive stated that "the case made by the uranium bulls is in reality full of holes" and he predicted "a long period of relatively low prices, in which uranium producers will find it hard to make a living". • Japan is "swimming - some would say drowning - in uranium" according to Jim Ostroff, senior editor of Platts Nuclear Publications. According to nuclear booster James Conca, Japan's uranium inventory will suffice to fuel the country's power reactors "for the next decade". Perhaps more, given the slow pace of the reactor restart process. Considering the low price, the lack of demand and the market oversupply it would be folly for WA to open a uranium mine only to find it's not commercially viable. The benefits of a uranium mine are clearly overstated and no doubt the promises will not be delivered unless there is a demonstrable change to the uranium market fundamentals. In exchange for a non-commercially viable project full of empty promises we must consider what is at stake. The consequences of proceeding include losing 15 ML/d of water from the environment, losing 3,094 ha of native bushland and important habitat for 93 reptile species, 28 bird species and 10 mammal/marsupial species. In exchange for the environmental flows of water and habitat we would have a legacy of 30 million tonnes of radioactive tailings and mine waste that would pose a threat to the environment for no less than 10,000	production – and therefore it will not significantly impact total global production. However, Vimy expects to employ almost 500 people in Western Australia and, based upon reasonable price assumptions, Vimy expects to contribute almost $20 million per year to the State in the form of payroll tax and royalty payments and does not believe that this contribution should be dismissed as scant. The essence of what the CCWA is suggesting is that based upon the comments of a number of commentators there is no merit in establishing new mines – and by implication Vimy would not be expected to survive and therefore might not be able to meet its environmental conditions. To take one example: Rob Chang, an analyst with Cantor Fitzgerald is quoted as stating that the break-even costs for a new uranium mines is around $70-$80. Vimy is aware of statements made by Rob Chang and believes that this comment can be attributed to an interview he gave in December 2015 to Michael Grace of the Energy Report in which he stated “The breakeven costs for planned uranium mines are $70-80/lb”. However, the essence of what he was arguing in that article was that the price was too low to justify new mines being developed and that since utilities were likely to begin to run short of fuel before 2020, prices were likely to rise to a level that would bring on new production, which incidentally he suggested required prices to rise to somewhere around $90-100/lb. Vimy does not disagree with the notion that prices are currently low and that they are below the costs of production for some mines, nor does Vimy disagree with the notion that Fukushima has been a significant contributing factor to the current oversupply. Indeed, Vimy also agrees with the suggestion that Japan has excess inventory and that it will be many years before that excess has been used up; but that is not the same thing as the world having excess inventories for the same period. It is quite possible for Japan to hold excess inventories whist the rest of the world is suffering from a shortage of supply – and that is what Vimy expects will happen. Vimy expects to secure a significant proportion of its production under long-term contracts and it expects to secure those contracts at prices that will justify

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	years. This waste would need active and ongoing management and regulation to ensure the threat to the environment and public health is being managed. The drain on the Government regulators and taxpayers to effectively regulate and monitor post closure legacies, when Vimy no longer exists, is not worth the marginal perceived benefits.	continued production over the period of the contracts. Vimy's mining process involves mainly continuous backfill and progressive rehabilitation which means that the vast majority of the rehabilitation costs are met from operating revenues during operations and that at any one time outstanding rehabilitation liabilities will be quite limited. Moreover, Vimy remains confident that prices will increase and that Vimy's operations will remain profitable throughout its period of operations. It is also worth noting that Vimy's most recent estimate of its net operating cost was US$31/lb and its breakeven cost (including capital cost recovery) was estimated at US$50/lb (ASX release 17/11/15). This should give comfort that Vimy is likely to survive even in a difficult trading conditions and will be able to meet all its environmental obligations. As previously explained, Vimy expects to secure long term offtake contracts for a significant portion of its output which will in effect guarantee that the project will remain viable for the duration of those contracts – so Vimy will not find itself in the position of having opened a uranium mine only to find that it is not commercially viable. Vimy does not accept the assertion made by CCWA that the benefits of the mine have been overstated or that any promises will not be delivered unless there is a demonstrable change in the uranium market fundamentals. It is incorrect to assert that the project results in 15 million litres of water per day being lost from the environment. Vimy has effectively sought approval for the extraction of up to 5.5GL/a, of which up to 2.5GL/a will come from mine dewatering and up to 3GL/a will come from the borefield (PER Table 5.3). The actual volume of water extracted as a result of dewatering the mine varies with the mining schedule and is currently estimated to be at its maximum in year 10 when it reaches 1.5GL/a (PER Table 10.1). However, the average rate of water extraction over the life of mine works out at 0.46GL/a, which equates to only 1.26 million litres per day.

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		The water extracted from the borefield was estimated at up to 3GL/a – but to average 1.8GL/a, over the life of the mine (PER- Table E-3); this equates to around 4.93 million litres per day. Adding these two totals together the gross rate of extraction is estimated to average 6.19 million litres per day over the life of the mine. This is the estimate of the average of gross rate of extraction – however surplus mine dewatering water will be reinjected downstream into the same aquifer that it was extracted from and processing water (once it becomes too saline for continued use) will be pumped to tailings for disposal – so the net extraction will be much lower at approximately 2 million litres per day. It is also important to note that although the proposal includes the clearing of up to 3,787ha of native vegetation, this clearing will take place progressively over the life of the mine and it will also be progressively rehabilitated. The total amount that is lost as habitat for terrestrial fauna will be less than this amount at any one time and all areas that have been cleared will subsequently be rehabilitated when no longer required. The tailings will be pumped to the tailings disposal facility and therefore the majority of tailings will consist of water. The dry weight of the tailings over the life of the mine is estimated at just over 20 million tonnes – which will require almost 50 million tonnes of tailings (@40% solids) to be pumped for disposal. Most of the uranium will have been extracted from the tailings and its radioactivity will mostly be derived from daughter products that were originally present in the ore and which weren't extracted during processing. These tailings will be radioactive but the amount of radioactivity will be less than was present in the ore when initially mined – since the vast majority of the uranium will have been removed. Most, if not all, the tailings will be deposited back below the surface into the area from where they were mined and permanently isolated from any sensitive environmental receptors. They will not represent any threat to the environment once they have been sealed and covered.

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		This method of disposal does not require “active and ongoing management and regulation to ensure the threat to the environment and public health is being managed” and nor will it constitute a “drain on the Government regulators and taxpayers to effectively regulate and monitor post closure legacies, when Vimy no longer exists”. The carbonaceous material sequestrates the heavy metals in the same permanent manner that created the deposit in the first place. Any ongoing monitoring and management measures would be expected to be trivial if required at all.
Conservation Council WA	*Regulating uranium* The submitter would like to draw the EPAs attention to the findings of the Bureau d'audiences publiques sur l'environnement (BAPE) inquiry into the environmental and health impacts of uranium mining in Quebec, Canada. This Inquiry is the most recent and comprehensive review of uranium mining to occur globally. The BAPE panel found that there are *"significant gaps in scientific knowledge of the impacts of uranium mining on the environment and public health."* BAPE recommended that a new regulatory system in Canada would be needed to regulate uranium mining. This view is at odds with the actions of the DMP and other WA Government agencies that have been making attempts to normalize and integrate uranium into risk based regulations. WA's approach is not only at odds with the BAPE findings but is also at odds with advice given to the DMP from their own advisory group - the Uranium Advisory Group (UAG). UAG was established by the DMP to benchmark WA's regulations for uranium mining with 'World's Best Practice'. There were several areas where WA regulations fell short. The UAG made recommendations that the DMP amend the 1999 Tailings Guidelines. Inexplicably in the 2013 updated guidelines there is not a single mention of uranium. Under current regulations there are serious limitations in the DMP's ability to hold companies accountable for non-compliance with	The BAPE inquiry reviewed the uranium sector utilising Canadian data and concluded that the presence of a uranium mine could generate radioactive exposure in excess of 1 MSv/yr for populations living in the vicinity of the mine’s facilities. There are no populations living in the vicinity of Vimy’s facilities; moreover, Vimy’s studies suggest that the level of exposure for a theoretical population living at the boundary of the Project would be well below this threshold level (see Table 13.18 in PER document). Much of the concern in the report stemmed from the issue of the containment of waste material and included the possibility of toxic material pervading through the aquatic environment that characterises Northern part Quebec Province where the mines would be located. Vimy’s site location in an arid region on the flanks of the Great Victoria Desert means that Vimy’s facilities are located in an entirely different environmental context from that which underlay the BAPE report. The quote provided by the CCWA was taken out of context – the full sentence read “In addition to these limitations and uncertainties, there are some equally significant gaps in scientific knowledge of the impacts of uranium mining on the environment and public health”. It went on to say “As a result, the experts are divided; some believe current knowledge provides sufficient grounds to move forward, while others believe it does not. Clearly, opinions on this issue are far from unanimous, and there is no substantial scientific or social consensus”.

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	environmental conditions. In the *Mining Act 1978* there are no heads of power given to the DMP to regulate or enforce conditions on environment or assess Environmental Management Plans. A DMP report on improving environmental regulations contains many recommendations to improve compliance with the environment. Despite this there are still no legislative powers for the DMP to enforce compliance with environmental obligations. Equally there are no powers for the EPA to enforce environmental conditions imposed by the DMP. In light of the Canadian regulatory problems and lack of scientific evidence the BAPE recommended that uranium mining not be approved. It is irresponsible for WA agencies to press ahead with an industry that has failed to deliver on basic promises of compliance and rehabilitation across Australia and without serious reflection or uptake of advice from the Uranium Advisory Group. We urge the EPA to consider the BAPE findings and heed the warnings found in the panel's recommendations. Uranium Advisory Group. The submitter urges the EPA to consider the BAPE findings and heed the warnings found in the panel's recommendations.	Vimy does not agree with the assertion made by CCWA that the "Inquiry is the most recent and comprehensive review of uranium mining to occur globally" – indeed the inquiry was really only relevant to the environmental context of province of Quebec. In relation the issue of the regulation of uranium mining, the recommendations by BAPE were that there was a need to develop and legal framework compatible with the respective missions of its departments that would allow the control of uranium mining to be harmonised with federal legislation through a federal-provincial agreement. Vimy does not accept that recommendations made in the local context of a particular province in Canada are relevant to Western Australia. Nor does Vimy accept that that any of the recommendations made by BAPE were relevant to the issue of normalising and integrating uranium into risk-based regulations. Vimy does not accept the assertion that the WA regulations covering uranium mining are inadequate. Vimy does not accept the assertion that the Department of Mines and Petroleum and the Environmental Protection Authority do not have the requisite powers to enforce conditions and obligations that fall under their remit. The BAPE recommendations were essentially that three requirements needed to be satisfied before uranium mining should be allowed to be authorised in the context of Quebec province. Because the commission responsible for the BAPE report believed that it would take several years for the three conditions to be achieved it recommended that in would be "inappropriate to authorise uranium mining in Quebec in the present context".
Conservation Council WA	*Annual Environmental Reporting* A quick review of the DMPs mine database - MINEDEX reveals that out of 3382 active mine projects in WA only 661 have active annual environmental reporting. Whether this is because of an issue with MINEDEX, an inability to apply annual environmental reporting on some	The proponent asserts that the submission amalgamates a number of separate matters to make a case that is not relevant to the environmental assessment of the MRUP. Contrary to the submitter's claim, the proponent is the sole registered party to a condition against lease M39/1080, requiring that an Annual Environment

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	mines or just a lack of compliance with regulations it is clear there are serious problems with the annual environmental reporting system. Many of those 661 active annual environmental reporting requirements are held by environmental consultants - not mining companies. On a quick search of those 661 projects with listed Annual Environmental Reporting requirements we note that many sites did not have an annual environmental report on MINDEX and no indication that they are compliant with their requirements to lodge an Annual Environmental Report (AER).	Report (AER) be submitted to the Department of Mines and Petroleum (DMP) in September of each year, starting in 2016. This AER will provide a brief review of the project operations, minesite environmental management and rehabilitation work undertaken in the previous 12 months, as well as the proposed operations, environmental management plans and rehabilitation programmes for the next 12 months. This and subsequent AERs will be fully available to the public, in line with current DMP policies.
Conservation Council WA, proforma	*Rehabilitation Securities/ bonds/ MRF* There is no clarity, commitment or acknowledgement of any requirements to hold bonds or securities for the rehabilitation of the proposed Mulga Rock mine. Under the MRF and new Mine Closure Guidelines, the requirements for bonds are now only applied if there is a Ministerial decision. There is concern that the political desire of the Government to approve and establish a uranium mine may cause a Minister to be lenient on bonds to show support and good will to the company and the industry. The clear view of the DMP is that bonds are a disincentive for mining companies and an economic barrier to developing mines. There is a clear economic barrier for uranium mining given the low uranium price and lack of investment. These economic factors should be a cause to apply further bonds to better protect the environment and the state from the closure liabilities. These economic factors should not be used as a reason to be lenient on the company in applying further bonds. What is best for environmental protection is an incentive to rehabilitate. That incentive to rehabilitate is best achieved through bonds. Without bonds mining companies can (and often do) leave mine sites un-rehabilitated or in preference to rehabilitating may put the mine in Care and Maintenance for an extended time. We note the arguments by the	The proponent asserts that the current Mining Rehabilitation Fund (MRF), which came into effect with the passing of the *Mining Rehabilitation Fund Act 2012 and Mining Rehabilitation Fund Regulations 2013* is the most appropriate mechanisms to ensure that companies do fulfil their environmental obligations. This new mechanism was born out of the recognition that the previous instruments available to the regulators, in the form of unconditional performance bonds, did not cover the full rehabilitation costs and overall represented a misallocation of capital, nor did they offer the flexibility of addressing the problem of legacy abandoned minesites. On that basis, it also better satisfies the EPA's principle of intergenerational equity. Contrary to the submission, the MRF provides significant incentive to companies to discharge their environmental obligations early and ensures a much more reliable, transparent and robust mechanism (through the pooling of funds across projects) for handling current and future environmental protection issues in the context of rehabilitation of resources projects. By capturing multiple projects involved in different commodities and economic cycles, the MRF effectively insulates the State of Western Australia issues arising from potential shortfalls in environmental rehabilitation of mining projects.

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	mining sector that closure costs are low when there is progressive rehabilitation - while we support progressive rehabilitation this does not equate to mine closure. Mine closure with progressive rehabilitation can still be expensive and costs should not be passed on to the taxpayer or compromise the MRF that has struggled to meet targets of generating funds. Ministerial discretion may be influenced by industry advocacy or short term political considerations. Bonding for the proper and long-term management of uranium mine tailings should not be politicised. It should be enshrined in law to ensure rehabilitation, the ongoing protection of the environment and effective long-term management of tailings. Such an approach would also facilitate building the community confidence needed to sustain an industry's social license. The submitter considers that Vimy should, in addition to the 1% levy under the MRF, be required to provide a bond that equates to 100% of the expected cost of closure and that this bond be reviewed and adjusted annually. We recommend this for all mines but emphasise the particular need for this arrangement for uranium mining given the unique risks, complexity and costs associated with rehabilitating uranium mines and given the uncertainty on the uranium price. There are clear reasons why mine securities for uranium mines should be applied: • The uranium market is particularly volatile and is dominated by low prices. The industry has presented overly optimistic forward projections that may be quite out of touch with reality. We have seen a number of uranium projects in Australia close, or be downsized and sold off indicating that optimism around long-term projections is not warranted. This is clear in the recent decision by Rio Tinto to withdraw support for the extension to mining at the Ranger operation in Kakadu, the job losses at Olympic Dam and the Honeymoon mine being place in Care and Maintenance. In the case of any new proposals there is a real risk that they will open and then close	The proponent also notes that the Department of Mines and Petroleum (DMP) has recently commissioned rehabilitation works at the Black Diamond Pit Lake site (identified as a pilot site under the DMP's Abandoned Mines Program), an initiative funded by proceeds from the MRF. The nature of the uranium market is vastly more complex than argued in the submission with a multitude of participants and significant price discovery around the secondary market but much more limited data in the public domain surrounding primary supply (more often than not the subject of confidential long-term contracts), and overall subjected to the same supply and demand rules that bound the trading of any commodity. The proponent notes that best-practice is site specific and that environmental best outcomes result from mine closure planning starting before mining commences and continues throughout the life of the mine until final closure conditions are met. It is worth noting that rehabilitation of the Shogun trial pit (open between 1983 and 1995) was successful, resulting in the site being signed off by the DMP in 2001 in recognition of the previous operator having discharged its environmental obligations. As a consequence, the DMP approved the return of security lodged with the tenement license (E39/3). The fact that successful rehabilitation criteria were met for a large scale landform less than six years after backfilling provides a valuable benchmark for the proponent.

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	prematurely without rehabilitation, leaving a burden on the taxpayer and the MRF to rehabilitate and secure the site. • There is no incentive for companies to rehabilitate. An article by the Chairman Barton from Norton Rose Fulbright LLP summarised the problem with removing bonds in this way "The requirement for a performance bond creates the main incentive for meeting closure and rehabilitation obligations. Payment of an annual levy under the new Fund may not create the same incentive. In transitioning to the Fund, comparable incentives and enforceability will need to be provided through DMP's environmental compliance regime. Failure to do so presents a significant risk to the state. It is currently unclear how DMP will treat performance bonds in the future or how the existing performance bond regime will transition to the Fund." Again please note that the under the *Mining Act 1978* the DMP does not have powers to enforce environmental conditions. • There is no example in Australia of a uranium mine site that has been successfully rehabilitated. The world's best practice for uranium rehabilitation was carried out at Wismut in Eastern Germany at a cost of US $9.3 billion. Please note the West Australian Government made a promise to deliver world's best practice uranium mining - and currently the world's best practice uranium rehabilitation costs approximately $9.3 billion. • Rehabilitation of uranium mines is disproportionately high, even below world's best practice standard rehabilitation is likely to cost hundreds of millions. For example, the projected costs of the rehabilitation of the Ranger uranium mine in the Northern Territory is upwards of AUD $512 million. • Uranium tailings are different to other mine wastes and pose a long term risk to the environment and public health. The unique problems of uranium mine tailings are noted in the Management of Radioactive Waste from the Mining and Milling of Ores (IAEA, 2002a). It states "Of the different waste streams produced by mining and milling operations, tailings represent the greatest challenge, particularly in	

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	terms of long-term management, because of the large volumes produced and their content of very long lived radionuclides and heavy metals". • The DMP engaged the UAG to benchmark WA regulations for uranium. In the final report to the DMP in relation to bonds they said this "Bonds should reflect the maximum, full third party costs of closure and rehabilitation. While this requirement may not be that onerous for true ISR operations, when applied to conventional mining operations (where TSFs and waste rock dumps have to be rehabilitated), the costs could be extremely high. Nevertheless, this requirement is entirely appropriate and should be retained". The submitter urges the EPA to recommend a 100% bond, annually reviewed and adjusted, be applied to any approval for uranium mining at Mulga Rock. The government has removed environmental bonds from mining projects and replaced them with a rehabilitation fund. This fund is completely inadequate and companies are increasingly walking away from their environmental responsibilities when their mines fail, as this one will, leaving the public to pick up the pieces of a mine that was not environmentally sound and sustainable in the first place.	
Conservation Council WA	Transport • In a recent study by the National Transport Insurance, Australia (NTI) on truck accidents there were some key findings that are relevant to WA. Some key findings are listed below: • "Western Australia was noteworthy with the highest proportion (30%) of major crash incidents attributed to fatigue." • "Queensland and Western Australia continue to be over represented in large incidents when likened to their share of the freight task. We did comment in that report that this could in fact be attributed to the growth in the freight task servicing mining communities usually in	Vimy notes the key findings of the National Transport Insurance study and in particular the role played by inappropriate speed and driver fatigue as contributory factors in truck accidents. Vimy's output will be transported by approximately 40 round trip truck movements per year – Vimy does not believe that such a small number of truck movements will materially increase the risk associated with more trucks being on the road. Vimy notes the exemplary record associated with the movement of uranium concentrates by truck on roads in Australia over the past 25+ years and will

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	remote areas. This again seems to be the case when we chart the actual location of incidents." • "As highlighted in the 2013 crash report, the worst performing State was Queensland followed by Western Australia." • "Most incidents occurred between the hours of 10.00 and 16.00 when the on-road population of commercial vehicles is at its highest." This point highlights the increased risk factor with more trucks on the road. This is a cumulative risk that should be considered with increased trucks from other mines or proposed mines. • "Truck fires continue to account for 10.7% of large loss incidents with electrical failure accounting for 68.5% of cabin / engine compartment fires."	ensure that its trucks demonstrate the same high standards when transporting uranium concentrates.
Proforma	Submitters considered the nuclear industry to be uneconomical and that there is no market for uranium: • Uranium is a fuel of the past – there will be no market for it. In light of global economics uranium mining is unnecessary. • The demand for uranium ore worldwide has declined as reprocessing technology has improved. • Market price for uranium is highly volatile. When the price bottomed in the USA during the 1980s, mining companies simply abandoned their polluted mines and tailings, leaving a huge ecological disaster still being dealt with. • Power production for uranium is ebbing out both in the sense of international political consensus and in the sense that high grade uranium is harder to come by. • Decline in demand for Australian resources should be warning enough for the Government to cease all funding to develop these industries. • The recently released preliminary report on nuclear industry in South Australia has concluded that neither nuclear power nor uranium mining are financially viable anymore.	Vimy does not accept the premise that 'nuclear industry' is uneconomical or the assertion that there is no market for uranium. There is ample evidence that on a 'levelised cost basis' nuclear energy can compete with other form of electrical generation and that over 380GW of operable nuclear capacity that currently exists globally represents a market for those that produce uranium. Vimy also notes that nuclear capacity is expected to show net increases over the next couple of decades. Vimy does not accept the assertion uranium will not be required as a fuel in future or that there will be no market for it or that the economics of uranium mining will somehow make uranium unnecessary as a fuel. Vimy does not accept the implied premise that improvements in reprocessing technology have had a significant impact on the demand for uranium or the assertion that global demand for uranium has declined. Vimy notes that global demand for uranium for use in commercial nuclear reactors in 2016 is estimated by the World Nuclear Association to be about 77,000 tonnes of U_3O_8 equivalent and that seven years ago (in 2009) the level of demand was estimated to be about the same. Vimy also notes the reprocessed fuel currently (2015) only makes up around 2% of the fuel used in nuclear reactors and that

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	• So far no uranium mine has been established in WA because the industry is dead, with huge decrease in the uranium market spot price and no sign of recovery. The Ranger mine is an example of how rehabilitation of the land can never be achieved in such a volatile market. Why should there be continual approvals of uranium mines in WA when neither Toro Energy nor Cameco have enough money behind them to even start the mine approved by the EPA? Instead Toro has postponed their plans from 2016 to start operations in 2020. These companies can't even have plans to secure bonds for land rehabilitation because they don't have the financial security behind them. • Added cost to the taxpayer to provide for much of the transport infrastructure for any completed project. • Uranium will go the same way as coal – a dead, stranded asset. All you will have is a hole where you could have spent quality time that money could never buy back. • It is not a good investment whether in financial terms, in ethical terms or in terms of pollution.	improvements in reprocessing technology aren't likely to have a large enough effect on demand for uranium to offset its expected growth. Vimy acknowledges that the spot market price for uranium is highly volatile, but does not accept the implied assertion that price volatility was alone responsible for the abandonment of uranium mines in the USA (the end of the cold war and the demand for uranium for use in nuclear weapons programs must shoulder some responsibility) or the insinuation that price volatility could somehow lead to uranium mines being abandoned in Australia with similar environmental consequences to those that occurred in the USA. Vimy notes that it expects to be able to underpin the development of its proposal with long term contracts that will provide a significant hedge against price volatility and that its proposal which includes in-pit tailings facilities and a progressive backfill and rehabilitate schedule poses far lower environmental risks in the unlikely event that the operations cannot be sustained financially. Vimy does not accept the assertion that there is any international political consensus which is moving away from supporting nuclear energy (power production for uranium) or the relevance of the assertion that 'high grade uranium is harder to come by' in the context of this proposal. Vimy does not accept the premise that 'the Government' is funding the development of 'these industries' in the context of this proposal or the assertion that there is or has been a decline in demand for Australian resources that should serve as a warning. Vimy does not accept the assertion that 'Nuclear Fuel Cycle Royal Commission' established by the South Australian Government concluded that 'neither nuclear power nor uranium mining are financially viable anymore'. The Tentative Findings of the Royal Commission were that "An expansion of uranium mining has the potential to be economically beneficial" although it was acknowledged not to be the most significant opportunity. In relation to nuclear power the findings were that "..it would not be commercially viable to generate electricity from a nuclear power plant in South Australia in the foreseeable future". Vimy notes that this finding was specific to the context of generating

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		electricity in the South Australian market rather than a statement about the financial viability of nuclear power more generally and that the Tentative Findings went on to suggest that "Nuclear power may be necessary, along with other low-carbon technologies" if Australia's electricity system is to meet future global emissions reduction targets. Vimy acknowledges that 'so far no uranium mine has been established in WA' and that there has been a significant reduction in the price of uranium in the last few years and that so far there has been little sign of any sustained recovery, however Vimy does not accept the assertion that the uranium mining industry is dead or any implication that the lack of developed uranium mines in WA can be attributed solely to the currently depressed prices prevailing in the uranium spot market. Vimy does not accept the premise that the rehabilitation that will be undertaken at the Ranger mine is a function of market volatility or the implied assertion that the Ranger mine will not be rehabilitated. Vimy does not accept the implied assertion that the EPA should not evaluate proposals and give approvals based upon an assessment of the acceptability of the environmental impacts if the proponents don't already have in place the financing to allow development to proceed. Vimy notes that environmental approvals are often prerequisite for being able to obtain the necessary financing. Vimy does not accept the implied assertion that Cameco does not have enough money to be able to afford to commence construction on their proposal. Vimy does not accept the assertion that Toro Energy has postponed their plans from 2016 to start operations in 2020 or the implied assertion that plans have been delayed for four years. Vimy notes that Toro used to have a target of achieving financing in 2016 and that more recently it has stated that it intended to be in production by 2020; these are two different targets and cannot be directly compared.

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		Vimy has no detailed knowledge of the financial positions of Cameco and Toro, but does not believe that the current financial security of any company or their ability to secure bonds for rehabilitation is a relevant factor in any environmental impact assessment as the necessary financing for project development (including where necessary any money required for bonds) cannot usually be finalised until after environmental approvals have been achieved. Vimy does not accept the implied assertion that there will be any additional taxpayer funded cost associated with transport infrastructure that would result from the approval of this proposal. Vimy does not accept the premise that coal is a 'dead' or 'stranded asset' or the assertion that uranium will suffer this fate. Nor does Vimy accept the implied premise that the area where the Mulga Rock project is located is an area where people could or might be likely to spend 'quality time that money could never buy back' or the assertion that the development of this proposal will result in a 'hole' in the ground. Vimy notes that its proposal entails progressive backfilling and rehabilitation and that there will be no 'holes' left after the rehabilitation has been completed. Vimy does not accept the implied assertion that the development of this proposal might be a poor investment in financial terms or that the financial returns should be a relevant factor in any environmental impact assessment. However, Vimy remains confident that the proposal will be financially attractive and that it will be developed and that it will contribute to employment and to State revenues in WA (royalties and payroll tax) and that it will pay corporation tax as a result of being profitable. Vimy acknowledges that some people have concerns in relation to the ethical nature of investment in uranium mining. Most of these concerns relate to fears that uranium mined in Australia could be used for other than peaceful purposes. However, Vimy does not accept that these fears are reasonably founded or that

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		there is any significant risk that Australian exports of uranium will be used for anything other than peaceful purposes. Vimy does not accept the assertion that the development of this proposal will result in any pollution. Vimy notes that the development of this proposal is not expected to have any significant residual impacts upon the environment.
Proforma, Conservation Council WA	*Australia's Uranium Industry* Uranium accounts for a tiny percentage of Australian export revenue. In the 2011/12 financial year: • uranium accounted for 0.19% of national export revenue (the 2013/14 figure was also 0.19% and the figure for 2014/15 would be very similar); • uranium revenue was 4.4 times lower than Australia's 20th biggest export earner, wool; • uranium revenue was 8.7 times lower than Australia's 10th biggest export earner, aluminium; and • uranium revenue was 103 times lower than the biggest earner, iron ore. In 2011, the total value of global uranium requirements was approximately US$10 billion, and the current figure would be very similar (with recent contract prices typically around US$50—55/lb U308). From 2011 to 2013, uranium was produced in 21 countries, and a 2014 UN report states that *"more than 20 countries around the globe produce uranium".* Thus many countries are competing in a market that is modest in size.Even using the most optimistic assumptions, uranium will remain a very small contributor to national export revenue. During the years 2002-2011, uranium's peak contribution to national export revenue was 0.45%. There is no sound basis for concluding that there will be any significantly increased demand for uranium in the medium and long term. Plausible	Vimy acknowledges that Australian exports of uranium are a small percentage of Australia's overall export revenue, and that uranium exports, in revenue terms, are less than iron ore, wool or aluminium. Vimy does not believe this is relevant to an assessment of its proposal. Vimy regards the assertion that 'more than 20 countries around the world produce uranium' as misleading because although the 'Red Book', jointly produced by the OECD Nuclear Energy Agency (NEA) and the International Atomic Energy Agency (IAEA), which the CCWA refers to as a '2014 UN Report' claims that uranium was produced in 21 countries, no uranium mining takes place in Germany, France or Hungary and yet these three countries are included in that figure; their small levels of production consist of uranium produced from rehabilitation activities. However, Vimy does not believe this is relevant to an assessment of its proposal. Vimy acknowledges that uranium is unlikely to become a large contributor to national export revenue in the near term. However, Vimy does not believe this is relevant to an assessment of its proposal. Vimy does not accept the assertion that there is 'no sound basis for concluding that there will be any significantly increased demand for uranium in the medium to long term". Vimy believes that over the next twenty years, nuclear energy will grow its share of electrical generation, underpinned by attempts to reduce carbon emissions and an overall increase in the demand for electricity globally and that this will result in a significant increase in demand for uranium and that this reasoning is entirely sound. However, Vimy does not believe this is relevant to an assessment of its proposal.

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	projections for the next 20 years range from a modest decline in demand to a modest increase. Politicians, academics and uranium industry representatives have drawn comparisons between the potential of Australia's uranium industry and Saudi oil revenue. The comparisons do not stand up to scrutiny. Using 2011 data, Saudi oil exports were 466 times greater than revenue from Australian uranium exports; Australia would need to supply *entire global* uranium demand 31 times over to match Saudi oil revenue; and if all of Australia's Reasonably Assured plus Inferred uranium resources (to US$130/kg U) were mined and sold at the price realised for 2011/12 uranium exports, the one-off economic windfall would fall short of annual Saudi oil revenue by $128 billion. From 2011 to 2013, uranium was produced in 21 countries, with Kazakhstan, Canada and Australia as the largest producers, accounting for approximately 63% of world production. Australia now accounts for approximately 11% of global production, compared to Australia's 2002-2011 average of 18.2%. Australia's uranium production of 5,000 tonnes in 2014 was the lowest for 16 years. The industry generates less than 0.2 per cent of national export revenue (0.19% in 2013/14) and accounts for less than 0.02 per cent of jobs in Australia. Claims that Australia should aspire to a market share commensurate with our percentage of the world's known uranium reserves generally overlook the point that Olympic Dam accounts for a large majority (>70%) of Australia's uranium reserves. According to a 2012 report by the federal Bureau of Resources and Energy Economics, Australia's identified uranium resources have more than doubled in the past two decades and increased by 62% from 2006 to 2010. However, a large majority of the increase comes from revised estimates of Olympic Dam (first discovered in 1975). New resource	Vimy acknowledges that Australia's uranium industry is unlikely to ever grow to the stage where associated revenues might equal those currently enjoyed by Saudi Arabia from oil revenues. However, Vimy does not believe this is relevant to an assessment of its proposal. Vimy notes that it believes that the correct figure for the number of countries producing uranium over the period 2011 to 2013 ought to be 18 countries and not 21 (as explained above). Vimy acknowledges that Kazakhstan, Canada and Australia are the three largest producers and that over the period 2011 to 2013 they accounted for approximately 64% of world production that was produced by mining. Vimy notes that in 2014 Australia produced about 8.9% of total uranium produced by mining globally and acknowledges that this represents a fall in Australia's share compared with previous years. However, Vimy does not believe this is relevant to an assessment of its proposal. Vimy acknowledges that Australia's uranium production as measured by the amount of contained uranium was approximately 5,000 tonnes in 2014, that this represents a low level compared to production in recent years and that it doesn't represent a large percentage of national export revenue. However, Vimy does not believe this is relevant to an assessment of its proposal. Vimy does not accept the assertion that Australian uranium production represents less than 0.02 per cent of jobs in Australia and notes that the industry employs around 3,000 people (source: MCA) and as such this represent just over 0.025% of Australia's seasonally adjusted number of employed people as of March 2016. However, Vimy does not believe this is relevant to an assessment of its proposal. Vimy acknowledges that Olympic Dam currently represents more than 80% of Australia's uranium reserves, but notes that Ore Reserves are not a good measure of resources potentially capable of development. Vimy also acknowledges that Australia has around 31% of the world's known resources and that aspirations to gain a similar global market share are unlikely to be met

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	discoveries include Beverley Four Mile (SA - 2005), Samphire (SA - 2007), Lake Mackay (WA - 2011), and some other mostly small, technically challenging deposits - primarily in WA and Queensland (note: a long-standing state prohibition on uranium mining has been reinstated in Queensland). Another point that is overlooked by the uranium industry is that a vast expansion of uranium mining in Australia would inevitably result in reduced global prices. The plan to mine and export 19,000 t U308 annually from Olympic Dam, as envisaged under the abandoned mega-expansion, would have resulted in Olympic Dam producing about one-quarter of global uranium requirements (with an estimated global requirement in 2015 of 66,883 tU or 78,855 tU308). As Flinders University academic Richard Leaver said of an earlier period: *"In essence, the idea that world prices could remain high while Australian production skyrocketed required that the basic laws of supply and demand be suspended."* Richard Leaver further notes: "'Potential' is one of the most powerful chemicals available to the political alchemist. Any individual firm or sector deemed to have potential is relieved of a massive and perpetual burden - the need to account for past and present achievements (or, more probably, the lack of them). ... The history of Australian involvement in the civil uranium industry offers an excellent example of this alchemy at work." Industry and government have a long track record of providing implausible uranium industry growth estimates. The Australian Uranium Association frequently and prominently promoted a consultant's estimate of 14,000 tonnes (t) U308 exports in 2014, earning $1.7 billion. But production in 2014 was less than half that figure (5,001 tU or 5,896 t U308). The consultant's report was produced before the Fukushima disaster, but even post Fukushima projections have proven to be inaccurate:	in the short to medium term, but does not believe this is relevant to an assessment of its proposal. Vimy acknowledges that Olympic Dam makes up the majority of Australia's identified uranium resources and has been significant contributor to recent increases in recorded level of Australia's identified resources. Vimy does not believe this is relevant to an assessment of its proposal. Vimy does not accept the premise that "a vast expansion of uranium mining in Australia would inevitably result in reduced global prices" or the assertion that this matter has been "overlooked by the uranium industry". Vimy notes that most potential Australian uranium producers require increases in the price of uranium in order to make development feasible and that Vimy expects that future shortages in supply as a consequence of increased demand from China will bring about such a price increase. Vimy also acknowledges that the original Olympic Dam expansion, which is not now expected to be implemented, would have taken overall Olympic Dam production to a level that equated to about 25% of world demand. Vimy does not believe this is relevant to an assessment of its proposal. Vimy notes that Mr. Richard Leaver, who is an Associate Professor in the School of History and International Relations at Flinders University is not an economist. Vimy acknowledges that forecasting is not an exact science and that in the past forecasts related to Australia's uranium exports and the associated mines that were expected to supply this uranium, have on occasion proved to be optimistic as have forecasts of expected prices. However, Vimy does not believe this is relevant to an assessment of its proposal.

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	In a 2012 paper, the Australian Uranium Association predicted production of 9,800 t U308 in 2014, but actual production in 2014 was 5,896 t U308 or just 60% of the estimate. In June 2011 (three months after the Fukushima disaster), the Australian Uranium Association claimed there were *"good prospects that four or five projects in WA will begin operation in the next three to four years".* No uranium mines are operating in WA as of February 2016. The federal Bureau of Resources and Energy Economics (BREE) also has a track record of providing inaccurate and inflated estimates, even in the aftermath of the Fukushima disaster. For example, a March 2012 BREE report: • estimated that the spot price would average around US$53 per pound (lb) in 2012, but it fell to US$43.50 (and the average was around US$48). • estimated export revenue of $708 million in 2011/12, but the true figure was $607 million. • estimated 15 reactor restarts in Japan in 2012, but there have been only two restarts. • estimated revenue of $1.69 billion in 2016/17 - an estimate that stretches credulity in light of figures in recent years ($610m in 2010/11; $607m in 2011/12; $823m in 2012/13; and $622m in 2013/14). Along with inflated, inaccurate estimates of nuclear power growth and demand for Australian uranium, predictions regarding the uranium price have also repeatedly proven to be inaccurate and inflated.	
Conservation Council WA	*Export policy / customer countries* The industry hopes that bilateral nuclear cooperation agreements concluded over the past decade with China, Russia the United Arab Emirates (UAE) - along with the nuclear cooperation agreement with	Vimy acknowledges that there have been a number of bilateral nuclear cooperation agreements concluded over the past decade (China; Russian Federation; USA; Euratom; UAE and India) and that the existence of these agreements is helpful in facilitating export sales.

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	India - will lead to export growth. Increased sales to China can be anticipated however sales to Russia have been suspended - and in any case should they ever be resumed it is likely to be a small market given the slow pace of nuclear power growth in Russia and the country's domestic uranium resources. It is unclear whether significant growth will be achieved in India and current uranium demand is very low. The UAE is building its first reactors so will be - at most - a small market. There is little prospect for growth in other current export markets for Australian uranium: Plans to expand nuclear power (or at least to maintain current capacity with new build) are in trouble in the UK, the USA and Canada. Germany and Belgium plan to abandon nuclear power. The restart of reactors in Japan promises to be a protracted, contentious affair and Japan has a very large uranium inventory. South Korea's nuclear industry has been hit by a series of scandals including bribery, corruption and cover-ups, and the proportion of South Koreans who consider nuclear power safe fell from 71% in 2010 to 35% in 2012. France plans to reduce its reliance on nuclear power. Taiwan, Finland, and Spain have fewer than 10 reactors each and will remain, at most, small markets. Sweden has 10 reactors, with no scope for growth under existing government policy. India is used by the industry and some politicians as the basis to produce inflated, asinine estimates of uranium export revenue growth. A September 8, 2015 media release by Wyatt Roy, Chair of federal Parliament's Joint Standing Committee on Treaties, makes the claim that	There are a variety of views about the prospects for nuclear power in various countries. Vimy does not agree with the assertion that plans to expand nuclear power are in trouble in the UK, USA and Canada. These three countries collectively have 63.7GW of capacity that is under construction, or is planned or proposed. Although Germany and Belgium both have plans to shut down their nuclear industries by determined dates the decisions were essentially political and may be reversed before those dates are reached. Vimy agrees that the restart of reactors in Japan promises to be a protracted and contentious affair – but nevertheless expects that a significant portion will eventually be restarted. Vimy also agrees that Japan has accumulated substantial inventories and that Japanese utilities are unlikely to be active buyers for a considerable period of time. Although South Korea's nuclear industry experienced some safety issues in 2012/13 concerning the use of counterfeit parts that issue does not appear to have changed the fact that nuclear energy remains a strategic priority for South Korea and its nuclear capacity is expected to increase as a percentage of its overall electricity generating capacity. Although France has stated its intention to reduce reliance upon nuclear power and has introduced a cap on nuclear capacity there is no mechanism to drive down nuclear capacity and the arbitrary percentage target for the contribution of nuclear energy was entirely political and will be subject to change with the political cycle. Vimy agrees that Taiwan, Finland and Spain have fewer than 10 reactors each (Taiwan -6; Finland – 4; and Spain -7) and that they are likely to remain small markets. Sweden has 9 operating nuclear reactors (not 10 – it was announced in October 2015 that the Oskarshamn 2 reactor would never be restarted). Vimy does not agree with the assertion that there is no scope for growth under

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	selling uranium to India will double the size of the uranium mining industry in Australia and export revenue could amount to $1.75 billion. These figures do not stack up. According to the World Nuclear Association, India's uranium demand this year will be 1,862 tonnes of uranium oxide. Australia supplies 11% of global demand, so if Australia supplies 11% of Indian demand that's an extra 205 tonnes. Exports would increase from 6,702 tonnes to 6,907 tonnes and revenue would increase by $19 million from $622 million to $641 million - an increase of 3%. So how does a paltry 3% increase turn into a doubling of the size of the uranium industry? And how does $19 million turn into $1.75 billion? Firstly, via absurd projections of the long-term growth of India's nuclear power industry. The Treaties Committee report says that India's nuclear power capacity is expected to grow exponentially from 5.3 gigawatts (GW) in 2014 to 1,094 GW in 2050. The 1,094 GW figure is taken from the Minerals Council of Australia (MCA), and the MCA in turn takes it from the World Nuclear Association. But the World Nuclear Association doesn't predict 1,094 GW of nuclear capacity, it predicts 1,094 GW of total *"base-load capacity"* across all fuels. Further, such projections confuse annual export revenue and total revenue over many years. Even with all those accounting tricks, you can't reach the $1.75 billion figure. That figure appears in the foreword to the Treaties Committee report but it isn't mentioned (or justified) in the body of the report. Most likely, the figure is based on some speculation from the MCA: "Australian uranium sales to India by 2030 could be between 1,000 and 2,000 tonnes, worth between $100 million and $225 million in export earnings. The total additional revenue through to 2030 could be between $750 million up to $1.5 billion to the Australian economy." Perhaps industry enthusiasts then added GST to get from $1.5 billion to $1.75 billion.	existing government policy – the current policy restricts construction to existing sites and to the replacement of existing units but doesn't preclude increases in capacity. Again it needs to be recognised that policy is political and subject to change. Vimy acknowledges that in a media release issued by the Joint Standing Committee on Treaties (which was chaired by Mr Wyatt Roy MP) the Committee Chair said that the deal could increase export revenue by an estimated $1.75 billion and double the number of Australians employed in the uranium mining industry. Vimy also acknowledges that according to the WNA India's demand for U_3O_8 was estimated to be 1,862 tonnes in 2015. According to the WNA, India currently has a nuclear capacity of about 5.3GW, it has 4.3GW of capacity under construction and a further 61.3GW of capacity that is planned or proposed. If all the planned and proposed reactors for India were to be built – India's nuclear capacity would exceed 65GW and would require about 13,000 tonnes of uranium concentrate as fuel per year. At an assumed long-term contract price of $75/lb that would represent about $2.15bn worth of uranium concentrate. Whilst Vimy does not necessarily have a view on what percentage of Indian imports of uranium Australia could reasonably be expected to capture – it does not believe that this level should be restricted to 11% as the CCWA submission implies. The figure of $1.75bn appears to be an estimate of the total export revenue that Australia could potentially earn from exports of uranium to India between now and 2030. The CCWA submission includes a premise that Australia's share of the Indian market would be the same as its current global market share. Vimy does not accept that premise.

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	Even the MCA's upper figure of $225 million annual revenue by 2030 only represents a 36% increase on 2013/14 uranium export revenue. Other figures provided in the Treaties Committee report sharply contradict the more enthusiastic industry claims. For example, the report cites an estimate by the Australian Safeguards and Non-Proliferation Office that India's uranium demand could reach 2,000 tonnes by 2025, valued at about $200 million. So if Australia secures 11% of that demand, annual revenue would be $22 million. According to IBIS World's March 2015 market report, 987 people are employed in Australia's uranium industry. Uranium exports would likely increase by 3% if sales to India proceed, and if we assume that jobs also increase by 3% that takes to the total up to 1,016 jobs – an increase of 29 jobs. As mentioned previously, India's nuclear program is in a "deep freeze" according to a November 2014 article in the *Hindustan Times,* and India's energy minister Piyush Goya I said in November 2014 that the government remains "cautious" about developing nuclear power and he pointed to waning interest in the US and Europe.	The CCWA is correct when it asserts that the figure of 1,094GW relates to the expected overall base-load capacity required to meet Indian needs in 2050; that is entirely how it was presented by the MCA and appears to have been misrepresented by the Committee. The Committee's estimate of $1.75 billion in additional export revenue appears to be an estimate of additional export earning between now and 2030. Vimy does not believe that different views about the amount of uranium exports that Australia may or may not make to India in future is relevant to an Environmental Impact Assessment of Vimy's project. Vimy's project does not rely upon Indian demand. There are different methods of estimating employment and different methods of categorising sectors. Vimy does not recognise the IBIS figures as being reflective of employment in Australia's uranium sector and notes that Olympic Dam alone employed almost 4,000 people in 2015. Similarly, Vimy does not agree with the assertion that jobs would only increase by 3% and that therefore only 29 jobs would be created. As previously mentioned, India currently has six nuclear reactors under construction and many more planned or proposed, and this would appear to be inconsistent with any newspaper article suggesting that India's nuclear program is in a deep freeze. Indeed, the Hindustan Times article being quoted was commenting on the slow progress being made by India following the Indo-US nuclear deal made in 2008 and was describing what the Narenda Modi was doing to solve the problem that had resulted from suppliers of nuclear components being liable in the event of an accident which had made supplier reluctant to supply equipment to India.
Conservation Council WA	*The 2005-07 uranium bubble* The uranium bubble that peaked in 2007 was a sadly familiar case of speculative mining of the market. Journalist Marcus Priest provided a	Whatever unscrupulous practices may have occurred during the so called "2005-07 uranium bubble" are irrelevant to Vimy's project or an assessment of its proposal. Vimy has granted mining leases and a JORC compliant Mineral Resource.

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	detailed account in the Australian Financial Review in May 2007. Priest described some of the practices: • Shallow drilling or drilling beside an old hole that had good grades (called 'address pegging' or 'nearology'). • Claiming to have found a geological type resembling a known deposit (e.g. Olympic Dam-style mineralisation). • Citing in-situ values for possible deposits without any reference to the cost, viability or legality of mining. • Using a lower cut-off grade of recoverable uranium to inflate the size of the estimate. • Capital raising or floating based on nothing more than applications for exploration lease which may never be granted because for various reasons such as environmental constraints (e.g. Fission Energy had licence applications in a WA national park and nature reserve). • Conflating a tenement application with a "project". • Companies with little or no experience, and a track record of jumping from one fad to the next, jumping on the uranium bandwagon. • Conflating the old and the new - Priest cites the example of Reefton Mining announcing a "major new uranium discovery" in Namibia which was in fact discovered in the 1970s. • Spending only a small fraction of the funds raised on exploration. Michael West wrote in The Age in 2011: "Until now inveterate fraudsters, even convicted heroin traffickers, have happily promoted their floats on the ASX. Of the 2,300-odd companies listed on the bourse it would be safe to say a couple of hundred are simply pump-and-dump schemes, executive options scams and the like that are controlled by people whose primary intent is to mine wallets, not mineral deposits." Until now, the same promoters have beaten a path back to the market - decade in, decade out - pouncing on every fad, boom and bubble. That	Vimy does not agree with the assertion that compliance and regulation remain compromised. Vimy does not believe that whatever measures uranium mining companies may or may not be doing in an international context has any relevance to an Environmental Impact Assessment of its project.

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	they haven't been required to disclose their myriad failures - before "backdoor listing" the likes of a "uranium" asset into a nickel explorer's shell, itself born from a dotcom play, having emerged from the ruins of a biotechnology float - has played nicely into the hands of the promoters, brokers, lawyers, accountants and other capital markets fee-takers. Retail investors, though, have been savaged time and again. Mechanisms have been developed seeking to address the over inflation of resource estimates. Changes to the requirements of the Joint Ore Reserves Committee code were expected to come into effect in December 2013 - for example a pre-feasibility level study will have to be conducted before including an estimate of an ore reserve in a public report. However, deficiencies remain and there seems to be little or no appetite or activity to address a raft of other problems. Moreover, compliance and regulation remain compromised - the JORC Committee has no powers, the Australian Stock Exchange (ASX) prefers the light touch of providing "additional guidance" to companies, and Australian Securities and Investments Commission (ASIC) rarely prosecutes. Meanwhile, uranium mining companies are resisting reform. Examples include Rio Tinto and BHP Billiton lobbying the European Union to abandon plans to enforce full financial disclosure on all projects including those in developing nations, and Paladin Energy lobbying against proposed changes to Australia's anti-bribery and corruption laws in relation to mining in Africa. A detailed timeline of the 2005-07 speculative uranium bubble in Australia and its aftermath is posted online.	
Conservation Council WA	*Uranium sales to India* The key concern about selling uranium to India from Government, Bureaucrats, academics, environmentalist and peace advocates is	Vimy is confident that the controls and supervision exercised by ASNO and the IAEA are sufficient to ensure that the export of Australian uranium will only be used for peaceful purposes.

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	based on the lack of distinction between India's civilian and military nuclear program. In addition, there have been major concerns about the safety of nuclear reactors and independent monitoring of reactors. Firstly, it is important to note just how actively India is progressing their nuclear weapons capabilities. Between November 2014 and December 2015 India tested the following nuclear capable missiles: • the Nirbhay nuclear capable cruise missile 17th October of 2014; • the Agni II ballistic missile tested at a military base in Odisha missile 9th November 2014 (3000km range); • the Prithvi-II surface to surface ballistic missile, tested at a military base in Odisha on thel9th February 2015, (350km range); • the Dhanush nuclear capable ballistic missile, launched from a naval ship in the Bay of Bengal on the 9th April 2015; • the Agni III missile, launched from Wheeler Island off the Odisha coast, on April 16th 2015, (3,00km + range); • the B-05 India's first submarine launched nuclear capable missile launched from INS Arihant submarine on 11th July 2015; • the Nirbhay cruise missile tested at a military base in Odisha on the October 16th 201 (750km - 1000km range - but test failed); and • the Agni IV launched from Abdul Kalam Island off the Odisha coast on the 9th of November 2015 (4,00km range). The Indian Government has boasted about their ability to launch nuclear weapons from air, land and sea and expressed excitement about joining an elite club of countries with Inter- Continental Ballistic Missiles (ICBM). The Joint Standing Committee on Treaties (JSCOT) report on uranium sales to India make an interesting distinction between a nuclear arms race between India and Pakistan, and the increasing tensions between India and China - driving India's ambitions to develop thermonuclear weapons.	The development of Indian missile technology that is capable of carrying nuclear weapons does not alter the fact that uranium exported from Australia to India will only be used for peaceful purposes. To the extent that mining uranium at Mulga Rock displaces mining in jurisdictions where the associated regulations are not sufficient to protect local people (such as those referred to in locations in India) from exposure to harmful effects the development of Mulga Rock should be regarded as a positive development in that respect. The Australia-India Nuclear Cooperation Agreement permits Australian companies to commence commercial uranium exports to India. The supply of Australian uranium will help India meet its rapidly growing electricity demand and improve the welfare of its people. The agreement sets out strict conditions for the peaceful use, safeguarding and security of Australian uranium. Vimy does not believe that differing views about the strength of the associated safeguards is relevant to an Environmental Impact Assessment of the Mulga Rock Project. Vimy does not believe the issue of whether the signing of the Australian-Indian Nuclear Cooperation Agreement will lead to a weakening of safeguards in relation to other agreements is relevant to an Environmental Impact Assessment of Vimy's project.

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	It would be very short-sighted not to consider the very real connection and risk that if the mines at Mulga Rock are progressed and sell uranium to India it is very possible that uranium from WA could end up in Indian nuclear weapons - fuelling tensions between India and China and between India and Pakistan. It is naive to think of the Mulga Rock proposal as just a mine with local impacts. It is not. It is part of an industry that has inextricable links to the development of the most horrific and destructive weapons on earth. The submitter notes that some of India's poorest people in the villages of Jaduguda and Koodunkalum or the 27 villages surrounding the Jaitapur nuclear power proposal bare the brunt of the nuclear industry in India. Jadugoda has suffered decades of radiation exposure from a uranium mine - and consequently the communities have suffered from miscarriages, birth defects and leukemia. In Koodunkalum, a fishing village that was devastated by a tsunami in 2004, there is now a nuclear reactor under construction. Following thousands of residents protesting there was an outbreak of violence from police and villagers were shot and killed. The Australian government has compromised the safeguards system by signing a nuclear cooperation agreement with India that weakens safeguards standards in many respects. The Australian Parliament's JSCOT argued that uranium sales to India should not proceed until stringent conditions have been met. Instead of taking this sound advice, the government has shamefully rejected JSCOT's recommendations. In its current form the agreement has been strongly opposed by, among others, a former Director-General of the Australian Safeguards and Non-Proliferation Office - John Carlson, a former Chair of the Board of Governors of the International Atomic Energy Agency – Ronald Walker, a former Assistant Director of the US Arms Control and Disarmament	

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	Agency - Prof. Lawrence Scheinman, and an Australian nuclear arms control expert -Crispin Rovere. John Carlson, who headed Australia's safeguards office for 21 years, argued that the agreement with India *"represents a serious weakening of Australia's ... safeguards conditions"* and that weaknesses in the agreement *"mean Australian material could be used in support of India's nuclear weapon program."* It is likely that there will now be sustained pressure for Australia to apply equally inadequate standards to other countries. As John Carlson noted in a submission to JSCOT: "If the Government does compromise Australia's safeguards conditions, inevitably this will lead to other agreement partners asking for similar treatment." Moreover, other nuclear and uranium exporting countries are likely to follow Australia's lead and weaken their safeguards requirements. This disturbing and cascading retreat from responsibility would further compromise non-proliferation objectives and mechanisms.	
Conservation Council WA	*Safeguards* There are many problems and limitations with the international safeguards system. In articles and speeches during his tenure as IAEA Director General from 1997- 2009, Dr. Mohamed El Baradei said that the Agency's basic rights of inspection are "fairly limited", that the safeguards system suffers from "vulnerabilities" and "clearly needs reinforcement", that efforts to improve the system have been "half-hearted", and that the safeguards system operates on a "shoestring budget... comparable to that of a local police department". Problems with safeguards include: • Chronic under-resourcing. El Baradei told the IAEA Board of Governors in 2009: "I would be misleading world public opinion to create an impression that we are doing what we are supposed to do,	Vimy does not believe that statements related to the adequacy of funding of the IAEA are of relevance to an Environmental Impact Assessment of the Mulga Rock project. Vimy does not believe that there are problems with safeguards that are relevant to an Environmental Impact Assessment of its project.

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	when we know that we don't have the money to do it." Little has changed since 2009. Meanwhile, the scale of the safeguards challenge is ever-increasing as new facilities are built and materials stockpiles grow. • Issues relating to national sovereignty and commercial confidentiality adversely impact on safeguards. • The inevitability of accounting discrepancies. Nuclear accounting discrepancies are commonplace and inevitable due to the difficulty of precisely measuring nuclear materials. The accounting discrepancies are known as Material Unaccounted For (MUF). There have been incidents of large scale MUF in Australia's uranium customer countries such as the UK and Japan. • Incorrect/outdated assumptions about the amount of fissile material required to build a weapon. The fact that the IAEA has no mandate to prevent the misuse of civil nuclear facilities and materials - at best it can detect misuse/diversion and refer the problem to the UN Security Council. As the IAEA states: "It is clear that no international safeguards system can physically prevent diversion or the setting up of an undeclared or clandestine nuclear programme." Numerous examples illustrate how difficult and protracted the resolution (or attempted resolution) of such issues can be, e.g. North Korea, Iran, Iraq in the 1970s and again in the early 1990s. Countries that have breached their safeguards obligations can simply withdraw from the NPT and pursue a weapons program, as North Korea has done. Safeguards are shrouded in secrecy - to give one example, the IAEA used to publish aggregate data on the number of inspections in India, Israel and Pakistan, but even that limited information is no longer publicly available.	

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	There are precedents for the complete breakdown of nuclear safeguards in the context of political and military conflict - examples include Iraq, Yugoslavia and several African countries. Currently, IAEA safeguards only begin at the stage of uranium enrichment. Application of IAEA safeguards should be extended to fully apply to mined uranium ores, to refined uranium oxides, to uranium hexafluoride gas, and to uranium conversion facilities, as well as enrichment and subsequent stages of the nuclear fuel cycle. The JSCOT recommended in 2008 that "the Australian Government lobbies the IAEA and the five declared nuclear weapons states under the NPT to make the safeguarding of all conversion facilities mandatory." However, the Australian Government rejected the recommendation in its 2009 response to the JSCOT report. There is no resolution in sight to some of the most fundamental problems with safeguards such as countries invoking their right to pull out of the Nuclear NPT and developing a weapons capability as North Korea has done. More generally, responses to suspected non-compliance with safeguards agreements have been highly variable, ranging from inaction to economic sanctions to UN Security Council-mandated decommissioning programmes. Some states prefer to take matters into their own hands: Israel bombed and destroyed a nuclear reactor in Iraq in 1981, the US bombed and destroyed a reactor in Iraq in 1991 and Israel bombed and destroyed a suspected reactor site in Syria in 2007. In 1982 Mike Rann identified the core problem: "Again and again, it has been demonstrated here and overseas that when problems over safeguards prove difficult, commercial considerations will come first."	
Conservation Council WA	*Australia's uranium export policy / customer countries* In 1998, the then Director-General of the Australian Safeguards and Non-proliferation office (ASNO) said: "One of the features of Australian policy... is very careful selection of our treaty partners. We have	Vimy will only sell uranium to countries that it is permitted to export uranium to. Vimy accepts the assurances of ASNO that exports of Australian uranium will only be used for peaceful purposes.

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	concluded bilateral arrangements only with countries whose credentials are impeccable in this area." That was not true at the time (e.g. sales to declared nuclear weapons states that pay scant regard to their NPT obligations) and it is certainly not true now. The federal government permits uranium sales to: • Repressive, secretive countries (e.g. China and Russia - albeit the case that sales to Russia have been suspended). • Nuclear weapons states that are not fulfilling their disarmament obligations under the Nuclear Non-Proliferation Treaty (US, Russia, China, France, UK) or countries that are not NPT signatories, ie/ India. • Countries that have not ratified the Comprehensive Test Ban Treaty (China, USA, India). • Countries with a history of weapons-related research based on their civil nuclear programs (South Korea and Taiwan).	
Conservation Council WA	*Provisions in bilateral agreements - enrichment and reprocessing* In addition to IAEA safeguards, countries purchasing Australian uranium must sign a bilateral agreement. However, there are no Australian inspections of nuclear materials stockpiles or facilities using AONM – (primarily uranium and its by-products such as plutonium) - Australia is entirely reliant on the inadequate and underfunded inspection system of the IAEA. The most important provisions in bilateral agreements are for prior Australian consent before Australian nuclear material is transferred to a third party, enriched beyond 20% uranium-235, or reprocessed. However, no Australian government has ever refused permission to separate plutonium from spent fuel via reprocessing (and there has never been a request to enrich beyond 20% U-235). Even when reprocessing leads to the stockpiling of plutonium (which can be used directly in nuclear weapons), ongoing or 'programmatic' permission has	Vimy is confident that the controls and supervision exercised by ASNO and the IAEA are sufficient to ensure that the export of Australian uranium will only be used for peaceful purposes. With respect, the plutonium that is present in nuclear fuel after it has been used within a commercial nuclear reactor for the roughly three years that it is utilised, will contain sufficiently high levels of the isotope Plutonium-240 as to render the plutonium unsuitable for the construction of nuclear weapons. Weapons grade plutonium requires high levels of Plutonium-239 but since it is not possible to separate Plutonium-239 from Plutonium-240, the plutonium is rendered unavailable for making nuclear weapons and is reprocessed into a mixed oxide fuel that can be burned again in nuclear reactors. It is not correct to assert that separated plutonium can be used directly in nuclear weapons.

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	been granted by Australian governments. Hence there are stockpiles of Australian-obligated separated plutonium in Japan and in some European countries. Japan, a major customer of Australian uranium, has a nuclear 'threshold' or 'breakout' capability - it could produce nuclear weapons within months of a decision to do so, relying heavily on facilities, materials and expertise from its civil nuclear program. An obvious source of fissile material for a weapons program in Japan would be its stockpile of plutonium - including Australian-obligated plutonium. In April 2002, the then leader of Japan's Liberal Party, Ichiro Ozawa, said Japan should consider building nuclear weapons to counter China and suggested a source of fissile material: "It would be so easy for us to produce nuclear warheads; we have plutonium at nuclear power plants in Japan, enough to make several thousand such warheads." Similar comments are made on a semi-frequent basis by Japanese politicians. Japan's plutonium program increases regional tensions and proliferation risks. Diplomatic cables in 1993 and 1994 from US Ambassadors in Tokyo describe Japan's accumulation of plutonium as *"massive"* and questioned the rationale for the stockpiling of so much plutonium since it appeared to be economically unjustified.61 A March 1993 diplomatic cable from US Ambassador Armacost in Tokyo to Secretary of State Warren Christopher, obtained under the US Freedom of Information Act, posed these questions: "Can Japan expect that if it embarks on a massive plutonium recycling program that Korea and other nations would not press ahead with reprocessing programs? Would not the perception of Japan's being awash in plutonium and possessing leading edge rocket technology create anxiety in the region?" Japan's plutonium stockpiling and reprocessing plans continue to cause regional concern - for example China has recently voiced concern. Moreover, it continues to complicate efforts to prevent other regional	As previously explained, the plutonium present in spent nuclear fuel cannot be used in the manufacture of nuclear weapons because it does not consist of high enough levels of the required isotope and they cannot be separated; this applies to the Japanese the same as anybody else. Vimy does not accept the assertion that Japan's plutonium holdings increase regional tensions or proliferation risks and Vimy does not believe that this issue is of any relevance to its Environmental Impact Assessment; indeed, Vimy does not believe that any aspect of what happens to legally exported uranium that meets all the necessary controls is relevant to an Environmental Impact Assessment of its Project.

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	countries (esp. South Korea) from going down the same plutonium/reprocessing path. Despite this, Australia continues to provide open-ended ('programmatic') approval for Japan to separate Australian-obligated plutonium. The government could and should prohibit the stockpiling of Australian-obligated plutonium. At the very least, the government should revert to the previous Australian policy of requiring approval for plutonium separation / reprocessing on a case-by-case basis. It is frequently claimed that the "strict" or "stringent" conditions placed on AONM encourage a strengthening of non-proliferation measures generally. However, by permitting the stockpiling of plutonium the Australian government is not 'raising the bar' but is setting a poor example and encouraging other uranium exporters to adopt or persist with equally irresponsible policies. While the Australian government does not have the authority to prohibit stockpiling, it does have the authority to permit transfers and reprocessing of AONM and could therefore put an end to the stockpiling of Australian-obligated plutonium.	
Conservation Council WA	*Not all facilities processing AONM are subject to IAEA inspections* Australia allows the processing of AONM in facilities that are not covered by IAEA safeguards at all. While AONM is meant to be subject to IAEA safeguards from the enrichment stage onwards, ASNO is willing to make exceptions. For example, ASNO has recommended that the Australian government agree to the processing of Australian uranium in unsafeguarded enrichment plants in Russia and the recommendation was readily accepted by the federal government. ASNO states: "Russia does not propose to place these enrichment facilities on its Eligible Facilities List because the facilities were never designed for the application of safeguards and could not be readily adapted for safeguards purposes."	Vimy does not believe that this issue is of any relevance to its Environmental Impact Assessment.

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	The enrichment facilities would not require any adaptation whatsoever. Russia simply needs to permit the application of safeguards and the IAEA could then adopt safeguards measures such as inspections, the use of video monitoring etc.	
Conservation Council WA	*Australia's uranium exports are shrouded in secrecy* Nuclear transfers and developments demand the highest level of transparency; however, this is often not the case. Some example of unjustified secrecy includes the refusal of successive Australian governments to publicly release: Country-by-country information on the separation and stockpiling of Australian-obligated plutonium. 'Administrative Arrangements' which contain vital information about the safeguards arrangements required by Australia. Information on nuclear accounting discrepancies (MUF) including the volumes of nuclear materials, the countries involved, and the reasons given to explain these accounting discrepancies. The JSCOT recommended that: "Further consideration is given to the justification for secrecy of Material Unaccounted For". There is no legitimate justification for the secrecy surrounding MUF. ASNO has done no better than to cite commercial confidentiality. All MUF information, past, present and future, should be reported publicly and this should be done on a country-by-country and facility-by-facility basis. Some other countries (e.g. Japan) release MUF data and thus Australia's secrecy clearly fails to meet best practice. The quantities of AONM held in each country are confidential. ASNO states: "The actual quantities of AONM held in each country, and accounted for by that country pursuant to the relevant agreement with Australia, are considered by ASNO's counterparts to be confidential information."	Vimy does not believe that this issue is of any relevance to its Environmental Impact Assessment.

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Conservation Council WA	*Radon* In recent years the ICRP has upwardly revised its estimate of the carcinogenicity of radon. The latest ICRP evaluation of epidemiological studies of lung cancer risk from radon and radon progeny indicates that the risk is greater by approximately a factor of two than previously estimated. The ICRP's upwards revision of the hazards associated with radon exposure is clearly inconsistent with specious claims that the 'modern' view is that low-level radiation exposure is harmless. ARPANSA has noted that the reassessment of the hazards associated with radon exposure "will have significant implications for the uranium industry worldwide, particularly for underground uranium mines."	Noted. As discussed above, the final upshot of ICRP discussions on Radon Decay Product dose conversion factors is as yet uncertain and it wouldn't be appropriate for the proponent to pre-empt potential outcomes. However, Vimy is aware that this matter is being actively considered by various international institutions and will await its uptake into Australian guidance such as ARPANSA Codes of Practice prior to reassessing hazards associated with radon exposure related to the Project, in particular its toxicity in association with other environmental factors (such as lifestyle factors such as smoking). Vimy does not accept the assertion that the increase in the effective dose per unit of exposure or the accompanying recommendation made by ICRP that the upper value for the reference level for radon gas in dwellings should be reduced from 600Bq m^{-3} to 300Bq m^{-3}. This is inconsistent with the view that low level radiation exposure is harmless. However, radon levels in homes in levels much higher than the generally accepted figures of 200 and 1,000 Bq/m^3 for active management (and restricted entry) of Rn level in workplaces have been recorded in a number of regions worldwide (most famously in Ramsar, Iran). Those high natural concentrations have been shown to have no detrimental effect on human health (Ghiassi-nejad *et al.*, 2002, Health Physics). Vimy notes that the revised assessment may have significant implications for underground uranium mines but unlikely to have any impact upon open-cut mines where the level of radon exposure is far lower and far below the sort of levels being discussed.
Conservation Council WA	*Uranium, Radiation and Health* In a paper prepared for the Australian Uranium Association, Sydney University academic Manfred Lenzen states:	The submission contains a number of misleading and erroneous statements. In the most comprehensive review of radon flux from rehabilitated and un-rehabilitated uranium mill tailings, Sonter et al (2002, Radiation Protection in

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	"According to the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), the global component from mill tailings is the most significant source of radiological exposure in the entire nuclear fuel chain. This holds irrespective of whether the 1993 or 2000 assessment is taken as a basis. Taking the higher estimate as more realistic, 150 sieverts per gigawatt electric (Sv/GWe) translate into 55.5 kSv globally, which is equivalent to an annual dose of about 0.01 mSv/capita if the entire world population were equally exposed. This estimate agrees well with ranges given in the assessment of uranium mines by Nilsson and Randhem 2008, who state a range of 0.1 to 0.001 mSv/cap." Using the above figure (55.5kSv) and using a risk estimate for exposure to low-level radiation of 0.05-0.1 cancer fatalities per Sievert, radiation exposure from uranium mine tailings is responsible for 2,775-5,550 deaths annually. A similar analysis is presented by nuclear physicist Richard Garwin. The following discussion on the topic of radiogenic effects from uranium mining is excerpted from a longer paper by Nuclear Radiologist Dr Peter Karamoskos: "The link between uranium mining and lung cancer has long been established. Certain groups of underground miners in Europe were identified as having increased mortality from respiratory disease as early as the 16th century. Lung cancer as the cause was not recognised until the 19th century. The radioactive gas, radon, was identified as the cause in the 1950's. Studies of underground miners, especially those exposed to high concentrations of radon, have consistently demonstrated the development of lung cancer, in both smokers and non-smokers. On this basis, the International Agency for Research on Cancer (IARC) classified radon as a carcinogen in 1988. In 2009, the ICRP stated that radon gas delivers twice the absorbed dose to humans as originally thought and hence is in the process of reassessing the permissible levels. Previous	Australasia) showed that the general assumptions made in UNSCEAR (1993) no longer stood. In particular, as a result of the review of the resulting estimations of collective doses by SENES Consultants, UNSCEAR (2000) reduced its estimated radon release rates from abandoned but stabilised tailings from 3 to 1Bq/m^2/s. As summarised in the SENES report, the biggest errors associated with the original (1993) UNSCEAR report arose from the following factors: • Unrealistic rate of radon release: the initial assumption ignored the role of cover, in particular water for aqueous tailings disposal; various tests carried out on actual tailings suggests that a limited thickness of cover results in attenuation factors of 10 to 500-fold reduction (and more typically 30-100). • Tailings area per GWe-year: The areas affected are much smaller, due to the actual thicknesses of the tailings deposited (typically greater than 5m and more often than not 10m and sometimes greater where in-pit backfill is involved, such as is proposed at MRP). The original UNSCEAR assessment incorrectly assigned a complete radon release, ignoring that that the radon release rate scales proportionally with ore grade, but only minimally with increasing thicknesses beyond the first approximately 2 metres of tailings depth. • Population density: The submission incorrectly assumes an equal dose to the global population, ignoring that the bulk of the tailings are generated and kept within isolated regions of the world, characterised by very low population density. Given the residence time of radon in air, the majority of the radon emitted by tailings will never reach the densely populated regions of the world. The LNT model was recommended by the US National Academy of Sciences in 1956 for assessing risks from ionising radiation, at a time when actual data on risks from ionising radiation was extremely scarce. There is now countless evidence that there are no scientific merits to the Linear No-Threshold (LNT) model used to derive a flawed increase in cancer rates

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	dose estimates to miners need to be approximately doubled to accurately reflect the lung cancer hazard." "The Biological Effects of Ionising Radiation VI report (1999) reviewed eleven cohort studies of 60,000 underground miners with 2,600 deaths from lung cancer, eight of which were uranium mines in Europe, North America, Asia and Australia. These found a progressively increasing frequency of lung cancer in miners directly proportional to the cumulative amount of radon exposure in a linear fashion. Smokers had the highest incidence of lung cancer, as would be expected; however, the greatest increase in lung cancer was noted in non-smokers. The highest percentage increase in lung cancer was noted 5-14 years after exposure and in the youngest miners." "Uranium miners are also exposed to IR (ionising radiation) directly from gamma radiation and the dose from this is cumulative to that from radon. At the Olympic Dam underground uranium mine, the total dose per miner is approximately 6mSv, of which 2-4 mSv (allowing for the new ICRP dose coefficients) are due to radon and the balance due to gamma radiation." "Most modern uranium mines have air extraction systems and monitored ambient measures of radon concentrations to ensure levels remain low. Current levels of radon in underground uranium mines are only a fraction of mines over one hundred years ago. Furthermore, miners are given PPE including masks to filter out the radioactive particulate matter. However, many underground miners find the masks extremely uncomfortable, especially in the hot underground environment they must contend with. It is estimated that up to 50% of underground uranium miners in Australia do not use their masks, and thus drastically increase their risk of lung cancer, whilst underestimating their actual radiation dose (since this is calculated assuming PPE's are used)." "The Olympic Dam doses mentioned above are typical of modern mine practices. The average miner at Olympic Dam is in his twenties and stays	based on the total and inflated tailings activities. The LNT is based on extrapolation to zero dose and to low dose rates from risks observed at very high to extreme doses. This lack of scientific basis is acknowledged by the ICRP which currently recommends that the LNT model should be assumed for the purpose of optimising radiation protection practices but that it should not be used estimating the health effects of exposures to small radiation doses received by large numbers of people over long periods of time (Higson, 2015, Radiation Protection in Australasia). A large body of peer reviewed international publications (Mitchel and Boreham – 2000, Mitchel - 2006, Raabe – 1999, Cutler – 2014, Sakamoto – 2004, Matanoski – 1991, Chen and Luan – 2004, Berrrington *et al.*, 2001) has shown a net health benefit to exposure of mammals against a range of medical conditions, including various forms of cancers. This is also due to the fact that different biological responses to radiation predominate at doses and dose rates that are substantially (orders of magnitude) lower than those at which risks have been observed (Higson, 2015). This is consistent with mounting evidence from a range of disciplines showing that natural background radiation if essential for normal life and health. The health benefits (instead of risks) can and do occur at low levels of exposure as a result of the stimulation of the body's protection systems, not just against radiation but against all potentially carcinogenic and mutagenic damage. A number of points discussed in the submission are irrelevant to the project, related to exposures and incidence of cancers in underground poorly ventilated mines, at a time that predated radiation protection, and modern occupational health and safety systems in the mining industry in general. The only people wearing respiratory protection at Olympic Dam are people fitted with airstream helmets, which cannot and are not easily taken off.

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	on average five years at the site. A typical calculation using the linear no threshold model and the latest BEIR-VII figures of radiation carcinogenesis risks indicates miners at Olympic Dam therefore have a 1:420 chance of contracting cancer, most likely lung cancer. Note that as the research demonstrates risk of developing lung cancer is greater for younger workers. These risks are not insubstantial. Radiation safety and risk principles can be quite complex and it is debatable whether miners have the training to understand the basis of such risks, or are even informed of these risks in a comprehensive and accurate manner that they can comprehend and make an informed work decision."	In a seminal publication, the World Health Organisation quantified the positive impact of the nuclear industry on the world population, by quantifying the impact of replacing the current fleet of nuclear power plants (NPP) by facilities reliant on fossil fuels, which cause much higher air pollution-related mortality and green-house gas emissions per unit energy produced. Its main findings were as follows: • Nuclear power prevented nearly two million net deaths worldwide between 1971 and 2009. • It prevented an average of 64billion tonnes of CO_2 equivalent net GHG emissions globally between 1971 and 2009, in effect preventing the building of hundreds of large coal-fired power plants. Using an assessment of operational NPPs between 2010 and 2050 (and taking into account the effects of the Fukushima accident) and modelling a nuclear-phase out scenario instead, it showed up to 7 million deaths and 240 billion tonnes of CO_2 equivalent net GHG emissions globally. This is against estimates of 4.3million premature deaths associated with air pollution worldwide.Those findings are summarised in the figure below and demonstrate the public health benefit associated with nuclear power generation:

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		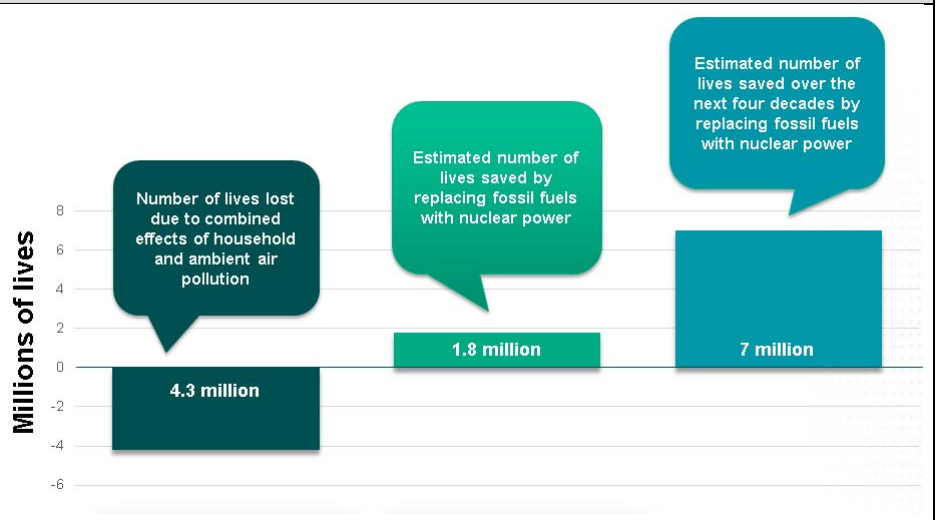
Kalgoorlie Boulder Chamber of Commerce and Industry (KBCCI)	Mining in general is an integral component of this region's economy. It is the Chamber's primary mandate to ensure the region itself gains the maximum economic benefit from any investment considered for the region. We are confident this regional community and the proponents can both obtain mutually beneficial outcomes with collaboration and effective communication should approval to proceed be achieved.	Vimy acknowledges the importance of mining to the economy of the Goldfields region and the mandate that the Chamber has for ensuring that the economic benefits for the region from any investment in the region are maximised. Vimy shares the confidence of the Chamber that with collaboration and effective communication mutually beneficial outcomes will be achieved as a result of approval being given.
KBCCI	The following key issues are considered to be the Chambers Executive position on the Mulga Rock project: • Regional Briefings - Provide regular briefings to this business community. • Opportunities for regional businesses - The Chamber recommends the establishment of a process where regional businesses can register expressions of interest, tender or quote on supplies and service needs of the operation.	<u>Regional Briefings</u> Vimy has provided regular briefings to the Kalgoorlie Boulder business community, including the KBCCI, and will continue to do so. Stakeholder consultation up until October 2015 is detailed in Appendix J1 of the PER Documentation; it included two briefings of the KBCCI in 2015. <u>Opportunities for Regional Businesses</u>

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	• Opportunities for regional businesses - The Chamber recommends encouraging primary contractors to provide regional businesses with an opportunity to provide goods and services for the project. • Employment Opportunities - Provide the opportunity for people living in the region to gain employment. • Long Term Legacy - The Chamber recommends supporting a regional community foundation that has the capacity to provide long term benefits in conjunction with others. • Building business relationships - Establish relationships to assist local businesses, including Aboriginal, to participate in opportunities is encouraged. Business Local, a new service funded by the Small Business Development Commission and managed by the KBCCI would be complimentary. • Training - Business training, inventory start-ups to underpin the longer term sustainability of regional communities is encouraged. Again the Business Local service located in the City of Kalgoorlie - Boulder could be complimentary as it has connections with the Mid-West of the State as well. • Transport Management - Assurance that transport routes have a transport management plan to deal with fatigue, incident management in collaboration with regional authorities. • Regional Communities - Assurance that regional communities on the transport route are taken into consideration in the event of unforeseen circumstances.	Vimy supports the concept of maximising the use of local/regional businesses and considers their involvement a key part of establishing a strong social licence to operate. Vimy will consider all methods of maximising local/regional business involvement - including a register where those entities can express their interests and capabilities - as it moves towards the implementation phase of this Project. However, it does not consider this matter to fall within the remit of an Environmental Impact Assessment. Vimy will consider all methods of maximising local/regional business involvement - including encouraging primary contractors to provide local/regional businesses with an opportunity to provide goods and services for the Project. However, it does not consider this matter to fall within the remit of an Environmental Impact Assessment. <u>Employment Opportunities</u> Vimy supports the concept of maximising recruitment from within the local and regional communities and considers such a process a key part of establishing a strong social licence to operate. Vimy will work with all its suppliers and contractors and with local agencies in order to maximise local and regional employment opportunities. However, it does not consider this matter to fall within the remit of an Environmental Impact Assessment. <u>Long term legacy</u> Vimy will consider any request for support for a regional community foundation on its merits; but only once Vimy is established as a profitable operating entity able to afford such contributions. However, it does not consider this matter to fall within the remit of an Environmental Impact Assessment. <u>Building business relationships</u>

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		Vimy intends to build local business relationships, including with local Aboriginal businesses, as it moves towards the implementation phase of its Project. Vimy will be utilising the services of Business Local as appropriate when required. However, it does not consider this matter to fall within the remit of an Environmental Impact Assessment. <u>Training</u> Vimy appreciates the importance of training as part of developing a suitable workforce and maximising local employment opportunities. Vimy will work with Business Local and any other local agencies able to support such an initiative if appropriate. However, it does not consider this matter to fall within the remit of an Environmental Impact Assessment. <u>Transport Management</u> Vimy has already developed a Transport Radiation Management Plan (MRUP-EMP-022) which has the objective of ensuring the safe delivery of UOC product to the required destination, in accordance with Australian and International guidelines. This Management Plan is in Appendix K1. Transport will be undertaken by trucks classed as heavy vehicles under the Heavy Vehicle National Law which will apply in South Australia through which they will pass. That will include the associated Heavy Vehicle (Fatigue Management) National Regulation. Although this law and associated regulations have not yet commenced in Western Australia Vimy's trucking operations will necessarily be abiding by their requirements through the entire transport route. Vimy will develop an Emergency Response Management Plan (MRUP-EMP-023) to deal with the management of any incidents should they occur during the transportation phase. This plan will be developed in consultation and collaboration with local and regional authorities.

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		Regional Communities Vimy will develop an Emergency Response Management Plan (MRUP-EMP-023) to deal with the management of any incidents should they occur during the transportation phase. This plan will be developed in consultation and collaboration with local and regional authorities and will also consider regional communities along the transport route.