Office of Environment & Heritage

NSW GOVERNMENT

Date: 2nd June 2014
Your reference: SSD 5594, SSD 5602 & PA_0021 MOD4
Our reference: DOC14/86969
Contact: Liz Mazzer 68835335

Margaret Kirton
Senior Planner
Mining Projects
GPO Box 39
Sydney NSW 2001

Dear Margaret

RE: Springvale Mine Extension Project (SSD 5594), Angus Place Mine Extension Project (SSD 5602) and Angus Place Development Continuity Project (PA_0021 Modification 4)

I refer to your requests seeking comment from the Office and Environment and Heritage (OEH) on the proposed extensions to the Springvale and Angus Place Mines, and for the Angus Place Development Continuity Project.

OEH has serious concerns with regard to the potential impacts of these proposals on Biodiversity, including nationally and state listed EECs, threatened fauna and threatened flora, geodiversity, National Park estate, World Heritage and wilderness. Therefore OEH encourages a precautionary approach to the assessment and any subsequent approval of these proposals including a rigorous monitoring program.

OEH has particular concerns regarding Springvale Mine Extension Project. OEH notes that it is expected by the proponent and their consultants that fracturing of the top most bedrock will occur as a result of these proposals (see MSEC 2014, page 81). OEH is very concerned that this fracturing will lead to altered hydrology impacting on the Newnes Plateau Shrub Swamp Endangered Ecological Community (EEC) and its associated threatened plants and animals.

OEH strongly recommends not using the longwall mining technique beneath swamps, creeks, pagodas, rock outcrops or cliffs unless there has been a modification to the mining techniques that will ensure that impacts will be prevented.

While OEH objects to the expansion of longwalls under Newnes Plateau Shrub Swamps, we strongly support the use of the modified panel and pillar technique at Clarence Colliery which leads to lower subsidence and consequent impacts and to long-term stable pillars. Use of such mining configurations provides an important compromise that enables coal extraction and preservation of important endangered ecological communities (EECs) in the area. This is preferable to the longwall technique proposed.

OEH also has concerns regarding the expansion of Angus Place and recommends longwalls are modified to avoid directly undermining Tri-Star and Trail 6 Swamps.

PO Box 2111 Dubbo NSW 2830
Level 1 48-52 Wingewarra Street Dubbo NSW
Tel: (02) 6883 5312 Fax: (02) 6884 8675
ABN 30 841 387 271
www.environment.nsw.gov.au

OEH placed a request via the Department of Planning and Environment that Centennial Coal provide the raw data to enable an assessment of the conclusions presented in the EISs on 16th April 2014. A letter was received from Iain Hornshaw of Centennial Coal on 15th May 2014 which, rather than providing the requested data, referred OEH to graphs contained within the EISs and other documents. OEH has therefore been unable to complete a comprehensive review all the results and conclusions presented in the EISs relating to the impacts of longwall mining on water levels within swamps, hard rock aquifers, monitored pools and water flows.

Detailed comments and our recommendations are provided in Attachment A, and a review of specific issues by OEH Science Division is provided in Attachment B.

If you have any questions regarding this matter please contact Liz Mazzer on 02 6883 5325 or email liz.mazzer@environment.nsw.gov.au

Yours sincerely

SONYA ARDILL
Senior Team Leader Planning, North West Region
Regional Operations

Attachment A: OEH review of Springvale Mine Extension Project (SSD 5594), Angus Place Mine Extension Project (SSD 5602) and Angus Place Development Continuity Project (PA_0021 Modification 4)

Attachment B: OEH Science Division Review of Springvale and Angus Place Mine Extension EISs

Attachment C: OEH advice regarding the Subsidence Management Plan Variation Application for Springvale Colliery Longwalls 416 to 418.

ATTACHMENT A

OEH review

Springvale Mine Extension Project (SSD 5594)
Angus Place Mine Extension Project (SSD 5602)
Angus Place Development Continuity Project (PA_0021 Modification 4)

Acronyms

BBAM	BioBank Assessment Methodology
DP&E	Department of Planning and Environment
EEC	Endangered Ecological Community
EISs	Environmental Impact Assessments
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
Mod 4	Angus Place Development Continuity Project Modification (PA06_0021 Modification 4)
NPSS	Newnes Plateau Shrub Swamp
NSWTI	New South Wales Trade and Investment
OEH	Office of Environment and Heritage
PAC	Planning Assessment Commission
SDWTS	Springvale Delta Water Transfer Scheme
THPSS	Temperate Highland Peat Swamps on Sandstone
TSC Act	*Threatened Species Conservation Act 1995*

1 Impacts on Newnes Plateau Shrub Swamps

OEH has consistently stated that it does not support the direct undermining of Newnes Plateau Shrub Swamp Endangered Ecological Community (EEC) using the longwall mining technique unless there has been a modification to the mining techniques that will ensure that impacts will be prevented. This is because of the direct and long-term damage that has already occurred to a number of Newnes Plateau Shrub Swamps (NPSS) EECs as a result of previous Springvale and Angus Place mining operations.

Detailed comments are provided in OEH's Science Division review (Attachment B), and are summarised below.

OEH refers to the claim made for the 2006 Springvale mining application:

Given the available data and previous experience, there can now be a high level of confidence that the shrub swamps will suffer no long-term adverse impacts from the proposed mining. At worst there may be minor transient changes to groundwater and surface water flow, which may produce minimal short-term impacts. Connell Wagner (2005).

Mining-related damage has occurred to shrub swamps on the Newnes Plateau. In OEH's view, the current EIS's for Springvale and Angus Place expansions contain very similar conclusions to the 2006 application, despite scientific evidence to the contrary.

It is also important to note that Centennial has already agreed to an enforceable undertaking ($1.4M) for impacts to Temperate Highland Peat Swamps on Sandstone (Commonwealth Government 2011). Despite having significantly damaged Newnes Plateau Shrub Swamp EECs in the past, the EISs do not provide any definitive evidence or guarantee that further NPSS will not be impacted by the current mine plan or future longwalls given:

- Bedrock fracturing and impacts to pool and swamp aquifers have already been demonstrated to occur above existing longwalls
- Predicted subsidence levels (stress, upsidence and valley closure) for the proposed longwalls are much greater than thresholds for bedrock fracturing
- A number of important NPSS lie above Type 1 & 2 geological structures (lineaments) – similar to the impacted East Wolgan, Narrow and Kangaroo Creek Swamps
- At least some of the previous impacts occurred with 262m wide longwalls.

These concerns are supported by the Subsidence Predictions and Impact Assessments for Springvale and Angus Place, (MSEC 2014a and 2014b) which state:

The swamps which are located directly above the proposed longwalls are predicted to experience tensile strains greater than 0.5 mm/m and compressive strains greater than 2 mm/m. It is expected, therefore, that fracturing would occur in the top most bedrock beneath these swamps.

The irreversibility of impacts to EECs are a significant consideration for OEH. If the relatively impermeable base of the Newnes Plateau Shrub Swamps or Hanging Swamps is fractured, then any perched aquifer is likely to drain downwards into the fracture network, thereby altering natural groundwater levels within the swamp and leading to increased desiccation.

Desiccation of swamps can lead to increased oxidation and subsidence of peat deposits; increased drying potential and a consequent increase in fire risk, changes in hydraulic conductivity and a loss of recharge potential (the swamp peat loses some of its absorption capacity), 'flashier' flooding during storm events, and an increased tendency for the catchment valley to dry up faster in post rainfall periods, that is an increase in the number of cease to flow days (Balek and Perry 1973, Worsten et al ; Rielly 2007; Schlotzhauer and Price 1999).

These impacts have already been demonstrated for Centennial's longwall operations at both Springvale and Angus Place mines. They have also been well documented in the Southern Coalfield for coastal upland swamps (DECCW 2010, Gibbins , Krogh 2012, Krogh 2013, Heritage Computing 2012, 2013 amongst others). In contrast to the experience at Springvale and Angus place mines, OEH notes the comparative lack of impact at Centennial's Clarence Colliery operations which uses an alternative mining methodology[a].

OEH's view is also supported by the Interim Independent Expert Scientific Committee on Coal Seam Gas and Coal Mining (IESC 2011) who provided advice for the Mining of Longwalls 415, 416 & 417 at Springvale Colliery, NSW (EPBC 2011/5949) and Mining of Longwalls 900 and 910W at Angus Place Colliery, NSW (EPBC 2011/5952). This advice is provided in Appendix 1

OEH believes there are alternative options available to the Proponent to avoid impacts to the NPSS Endangered Ecological Community (EEC) that would enable coal mining and conservation of rare and endangered species and ecological communities on the Newnes Plateau.

Instead, mining is proposed directly underneath (or in the vicinity of) ten of the largest and most important NPSS (Sunnyside East, Carne West, Gang Gang West, Gang Gang East, Marrangaroo, Pine Swamp, Paddys Swamp, Tri-star, Twin Gully, Trail 6 Swamp)[b] on the Newnes Plateau. Collectively these swamps make up approximately 12-15% of the known NPSS EEC.

It is concluded that the current expansion at Springvale Mine represents a considerable risk to some of the most important NPSS EECs on the Newnes Plateau. It also represents a threat to populations of the State and Nationally endangered Blue Mountains Water Skink, one of the rarest lizards in NSW and Australia. In addition the potential impacts to important populations of Giant dragonflies (State listed as endangered) and *Boronia deanei* (State listed as vulnerable) are also considered high. OEH considers that there is a significant risk of fracturing of bedrock beneath these swamps

[a] The recently approved 900 Series at Clarence Colliery are located just on the other side of the Pine Plantation from the proposed Springvale mine longwalls and operates in similar depths of cover. Subsidence at Clarence Colliery is of the order of 100mm compared to 1500-2000mm at Springvale and Angus Place.

[b] Using the 10th percentile for size of NPSS as a criteria for importance, the following swamps would be considered to be amongst the most important swamps on the Newnes Plateau because of their size: Swamp 67 (approximately 27 Ha), **Broad Swamp** (26.6 Ha; referred to as Barrier Swamp by Centennial); Upper Dingo Creek Swamp (24.8 Ha); **Pine Swamp** (17.8 Ha); **Carne West Swamp** (13.8 Ha); Swamp 55 (13.6 Ha); **Gang Gang East Swamp** (12.8 Ha). Collectively, these 7 swamps make up approximately 21% of the 650Ha of Newnes Plateau Shrub Swamp EEC in existence. The current Springvale plans threaten **Broad Swamp** (2nd largest NPSS), **Pine Swamp** (3rd largest), **Carne West Swamp** (5th largest) and **Gang Gang East Swamp** (7th largest). Areas are preliminary and approximate and dependent on the current boundary mapping of individual swamps and will be refined once the Macquarie University swamp mapping project is completed.

and drainage of the perched aquifer down into the fracture network. This risk is exacerbated further by the Type 1 and 2 lineaments that lie directly underneath a number of the NPSS EECs.

The proposed Springvale & Angus Place mine expansion plans also represents a potential threat to Newnes Plateau Hanging Swamps (nationally listed under the EPBC Act as THPSS) where they are located directly above the longwall panels.

It is also concluded that the current expansion at Angus Place Mine could be modified so that there was no direct undermining of the NPSS (only two swamps Trail 6 Swamp and Tri-Star Swamp lie directly above the planned longwalls). Shortening of longwalls to avoid adverse geological conditions has been common practice in the past at Springvale and Angus Place mines and OEH believes this should be applied to the two NPSS located directly above the proposed Angus Place longwalls.

Recommendations

1.1 That mining at Springvale avoid Newnes Plateau Shrub Swamps and Hanging Swamps or use the panel and pillar technique used at Clarence Colliery.

1.2 That the mine plan at Angus Place be modified to avoid Trail 6 and Tri-Star Swamps

2 Predictions for Stress, Upsidence, Valley Closure and Surface to Seam Fracturing

OEH has concerns regarding predictions for stress, upsidence and valley closure. Further detail is provided in Attachment B.

It is noted that subsidence assessments in the EIS use a factor of 10x maximum curvature in stress calculations. MSEC (2014a) states,

Adopting a linear relationship between curvature and strain provides a reasonable prediction for the conventional tensile and compressive strains. The locations that are predicted to experience hogging or convex curvature are expected to be net tensile strain zones and the locations that are predicted to experience sagging or concave curvature are expected to be net compressive strain zones. In the Western Coalfield, it has been found that a factor of 10 provides a reasonable relationship between the predicted maximum curvatures and the predicted maximum conventional strains.

OEH notes that in previous subsidence assessments for the southern coalfield, MSEC has used a factor of 15 to estimate conventional strains based on predicted maximum curvatures (e.g. see MSEC 2009). MSEC has provided no data, statistical analysis or graphics to support the factor of 10x maximum curvature used in their stress calculations. OEH notes the large differences between the estimates of stress obtained by the DgS (2014) methodology for longwalls 416-418 and the estimates of stress obtained using a factor of 10x maximum curvature and used by MSEC for the same longwalls.

If MSEC's 95% or 99% confidence intervals for strain above the goaf are considered, then these actually approach those of the DgS (2014) derived maximum strains and levels of stress that have been measured previously at Angus Place and Springvale. OEH believes it is more appropriate to use these estimates than the "average" strains produced using the 10 X maximum curvature calculation.

Of significant note is that MSEC (2014a,b) predicts significant levels of non-conventional subsidence, with 75 – 750mm upsidence and 100-1000mm closure within the swamps. These non-conventional subsidence movements exceed thresholds for demonstrated impacts on swamps (e.g. Bulli Seam PAC) and for closure, are up to 5 times the industry suggested threshold for such impacts (i.e. 200mm closure).

Additionally, MSEC (2014b) state:

Type 1 and Type 2 geological structure zones have been identified within the Extension Area, which are shown in Drawing No. MSEC593-07. It is expected, that locally increased subsidence and compressive strains will be observed in these locations.

And

The potential for impacts generally result from differential movements (i.e. curvature and strain), rather than from vertical subsidence. It is expected that the compressive strains at the lineaments above the proposed LW1001 to LW1019 will be similar to those observed above the previously extracted longwalls at Angus Place and Springvale Collieries, which were typically between 5 mm/m and 15 mm/m.

Given that stresses will be similar to previously extracted longwalls, OEH believes that impacts will not necessarily be lower under the current mine plans than what has been demonstrated to occur over existing operations. While Springvale longwalls have been reduced to a width of 261m, the EIS fails to point out that impacts to one NPSS (ie Kangaroo Creek Swamp) occurred as a result of earlier longwalls that were 262m wide (LW940). Since the longwalls at Angus Place have actually increased their width by over 18% (to 360m), there is a significant potential for increased impacts as a result of the Angus Place proposed longwall layout. OEH notes that the predictions lines for Angus Place (A1 & A2) appear to miss the majority of incised drainage lines and steep slopes that lie above the proposed Angus Place mine.

With regard to surface to seam fracturing, OEH considers that there is a risk of connective fracturing from the wider panels (360m) at Angus Place where depth of cover is the least. There is also a risk of connective fracturing over Springvale mine where the depth of cover goes down to 180m (LW432 and LW501 to LW503).

The EIS does not provide information on the height of fracturing that has already occurred as a result of earlier Springvale and Angus Place mining operations. No extensometer data is reported, but it is noted that a wide range of impacts have been measured on groundwater aquifer levels over both Springvale and Angus Place mines (see summary in Adhikary and Wilkins 2013; Appendix E Part 4 of the EISs).

Recommendations

2.1 That the derived maximum strains and levels of stress obtained by the DgS (2014) methodology be used for subsidence predictions rather than the 10x maximum curvature calculation.

2.2 That information is provided on the height of fracturing that has occurred as a result of earlier Springvale and Angus Place mining operations.

3 Fracturing of bedrock in drainage lines

Fracturing is likely in the bedrock in drainage lines 1, 2 & 3 as well as the drainage line for Tri-star Swamp.

MSEC state:

It is expected that fracturing of the bedrock would occur beneath some sections of the drainage lines which are located directly above the proposed longwalls. Where the beds of the drainage lines have exposed bedrock, there may be some diversion of surface water flows into the dilated strata beneath them. It is unlikely that there would be any net loss of water from the catchment, however, as any diverted surface water is likely to re-emerge into the catchment further downstream.

MSEC provide no scientific evidence that diverted surface water re-emerges in the catchment. Water drainage from East Wolgan Swamp was stated to have moved down to 70m (Aurecon 2009). There

is also no mention in the EIS of the flow monitoring at Junction Swamp or explanation for why, post-mining of LW409, there has been virtually no flow in the creek line below Junction Swamp, except after heavy rain or a “balance tank overflow”. It is probable that flows in the creek line were once reasonable to warrant the size of the V-notch weir installed below Junction Swamp.

While there is little to suggest that LW408 impacted flows from Junction Swamp, no flow was recorded at the v-notch weir downstream of the swamp after the passage of LW409 and for approximately 6 years afterwards (discounting the balance tank overflow). Apart from the “balance tank overflow” [minewater?] around December 2008, some (assumed) rainfall related spikes in flow appear to have occurred close to December 2010, November 2011, and around March-April 2012. The recession of flows at these latter periods are very different (very abrupt) compared to pre-mining data. This is similar to what has actually been measured downstream of Swamp 1b after it was directly undermined and impacted by Dendrobium LW9 in the Southern Coalfields (Krogh 2013).

The assessment of potential subsidence impacts to streams in the EIS is does not include a specific assessment of 3rd order streams.

For Springvale, MSEC 2014a only discusses Wolgan River and Carne Creek specifically, with all other streams included under the generalized term “drainage lines”. This is despite 3rd order stream sections occurring within and downstream of Gang Gang East and Marangaroo Creek swamps which will be directly mined beneath

OEH considers that these streams have the potential to be fractured and drained. OEH notes no detail or specific predictions for these 3rd order streams (apart from point estimates for swamps) or any commitment to remediate these 3rd order streams if impacts occur. It is likely that fracturing of bedrock under the swamps and drainage of perched aquifers will also lead to a loss of flow in these 3rd order streams.

For Angus Place mine, MSEC 2014b also only discusses Wolgan River and Carne Creek specifically with all other streams included under the generalized term “drainage lines”. This is despite 3rd order stream sections occurring above, within and downstream of Twin Gully and Tri-Star swamps which will be directly mined beneath.

OEH considers that these streams have the potential to be fractured and drained. OEH notes no detail or specific predictions for these 3rd order streams (apart from point estimates for swamps) or any commitment to remediate these 3rd order streams if impacts occur. It is likely that fracturing of bedrock under the swamps and drainage of perched aquifers will lead to a loss of flow in these 3rd order streams.

There is no appropriate monitoring of flow in these streams which is capable of testing the veracity of the claims made in the EIS of no impact to flows.

Further detail is presented in Attachment B.

Recommendation

3.1 That 3rd order streams are monitored to determine whether mining-related impacts occur.

4 Angus Place Development Continuity Project (PA06_0021 Modification 4)

The overall objective of the proposed Angus Place Development Continuity Project Modification (Mod 4) is to obtain an approval for Angus Place Colliery which allows for continued development of the main headings and first workings associated with two longwall panels (LW 1001 and LW 1003) forming part of the Angus Place Mine Extension Project (SSD 5602).

OEH considers that it is inappropriate for a modification application to be lodged over an area also subject to an application for a larger project. The proposed modification for the two longwall panels is likely to set the width of longwalls across the proposed extension area prior to the application for the larger extension project being determined. This will potentially set a precedent for longwall dimensions, and pre-empts the decision regarding SSD 5602.

It is proposed that the width of LW 1001 and LW 1003 be 295m. OEH has not conducted an assessment of PA06_0021 Modification 4 as this is being reviewed as part of SSD 5602. However, OEH considers that there is potential for the modification to result in fracturing in Carne Creek drainage line 1. In addition, there is potential for impacts on a hanging swamp at the top of Tri-Star Swamp due to the proximity of LW 1003.

OEH is also concerned about the number of modifications (to development applications and subsidence management plans) that have been lodged for Springvale and Angus Place. While individually these may be relatively minor, the cumulative effect of these can be substantial.

For example, a Subsidence Management Plan variation application for Springvale Colliery Longwalls 416 to 418 was approved by NSW Trade and Investment (NSWTI) in early April 2014. This modification was to increase the cutting height of sections of the longwalls from an average 3.25m to a maximum of 3.5m. While this appears to be a relatively minor modification, it had implications for Newnes Plateau Shrub Swamps in the area. OEH's advice to NSWTI is also relevant to this modification and to SSD 5602 and is provided in Attachment C.

Recommendation

4.1 That the Angus Place Development Continuity Project be assessed as part of the Angus Place Extension Project (SSD 5602) rather than as Modification 4 to PA06_0021 due to the potential for cumulative impacts.

5 Regional Biodiversity Strategy

A Regional Biodiversity Strategy is provided in Appendix I of both EISs. In OEH's requirements provided to DP&E on 26th October 2012 for multiple Centennial Coal projects, we stated that all EISs would need to contain full flora and fauna studies and offset proposals. In addition, the Director-General's requirements issued for the project on 6th November 2012 required,

An offset strategy, which is clearly quantified, to ensure that the development maintains or improves the terrestrial and aquatic biodiversity values of the region in the medium to long term.

Supplementary Director-General's Requirements issued on 30th August 2013 also required an offset package,

Where impacts cannot be avoided or mitigated, an offset package to compensate for any predicted or potential residual signficiant impacts on matters of national environmental significance. Offsets should demonstrate consistency with the Commonwealth EPBC Act Environmental Offsets Policy (October 2012, or subsequent versions)…

The Regional Biodiversity Strategy proposes a combination of land offsets and supplementary measures which have taken into consideration the *Draft NSW Biodiversity Offsets Policy for Major Projects* (the Draft Policy) and the *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy*.

OEH considers that the Regional Biodiversity Strategy included in the EISs does not fulfil the Director-General's requirements as it has not demonstrated that the biodiversity values of the region will be maintained or improved in the medium to long term. Importantly, the proponent has only assessed offsetting requirements for impacts associated with vegetation clearing activities and has not considered losses to habitat and ecosystem condition that will be a direct impact from rock fracturing and changed hydrology in its offsetting strategy.

In addition, the selection of the proposed offset is not justified and the proposed Regional Biodiversity Strategy does not fulfil all of the *NSW Offset Principles for Major Projects* as presented in the Draft Policy, in particular:

Principle 2: Offset requirements should be based on a reliable and transparent assessment of losses and gains.

The calculation of ecosystem and species credits has been conducted using the BBAM methodology. However, the Regional Biodiversity Strategy only contains a summary of the outcomes of this

assessment and lacks copies of the full credit reports. OEH is therefore unable to determine the validity of the final results.

In addition, as flora plot data has not been provided for the proposed offset site, OEH is unable to verify that the assignation of vegetation communities as listed in the Regional Biodiversity Strategy is accurate.

Section 10.0 of the Regional Biodiversity Strategy outlines supplementary measures to support conservation outcomes. It provides a list of entities that could potentially benefit from additional research and recovery funding. However, no detail is provided regarding the level of investment the proponent is intending to provide for each of the entities listed. OEH is therefore unable to determine the extent to which the supplementary measures are likely to contribute to biodiversity gains.

Recommendations

5.1 That DP&E should note the shortcomings with the approach taken to assessing impacts and offset requirements and consider amendments to the Regional Biodiversity Strategy and/or take this into account when drafting approval conditions.

5.2 That full BBAM credit reports and flora plot data (including maps showing locations of flora plots) are included in the Regional Biodiversity Strategy.

5.3 That an indication of the intended level of investment in supplementary measures is included.

Principle 3: Offsets must be targeted to the biodiversity values being lost or to higher conservation priorities.

The Regional Biodiversity Strategy offers two parcels of land (Lot 135 DP 755757 and Lot 163 DP 48336) as an offset area for residual impacts associated with the following projects:

- Springvale Mine Extension Project
- Angus Place Extension Project
- Angus Place Mod 2 – Ventilation facility
- Springvale Colliery Mod 3 - Bore 8
- Western Coal Services Upgrade
- Clarence Colliery Reject Emplacement Area VI
- Neubeck Coal Project

The proposed offset site for residual impacts at Springvale and Angus Place is Lot 135/DP755757. Lot 163 DP 48336 is presented as an offset area for residual impacts at the Neubeck project site. Offsetting of residual impacts at other sites (such as Clarence Colliery) is not presented in the Regional Biodiversity Strategy.

The BioBank Assessment Methodology (BBAM) has been used to assess the offset requirements resulting from the proposal and the offset value of the proposed offset site. The Ecosystem Credit Balance (Table 21) and Species Credit Balance (Table 22) indicate that there is a significant shortfall. The combined Springvale and Angus Place proposal credit deficit is -3,441 ecosystem credits. The proposed offset provides only 477 ecosystem credits.

As well as a significant shortfall, the proposed offset site is not like-for-like compared with the Springvale and Angus Place Project sites. There are no vegetation communities listed that are common to both the project and offset sites.

In addition, the offset requirements do not include the impacts from the ongoing exploration programme. Areas of past and future disturbance of native vegetation from exploration activities have not been included in the EISs.

As stated in our Director-General's requirements of 26th October 2012, OEH understands that Centennial Coal has ownership of approximately 7,000ha of land off-lease. The Regional Biodiversity Strategy only considers two lots; Lot 163 DP 48336 covering 260.10 ha (the proposed land offset for the Neubeck project) and Lot 135 DP755757 covering 86.7ha (the proposed land offset for Springvale and Angus Place projects). There is no justification in the Regional Biodiversity Strategy for excluding other available lands. OEH considers that the Regional Biodiversity Strategy should include an assessment that considers all available lands as potential land offset areas.

Recommendations

5.4 That the Regional Biodiversity Strategy assesses the biodiversity values of all available lands to identify more appropriate areas with a relationship to biodiversity being lost. These should provide higher ecosystem and species credits in similar vegetation types to the impact sites.

5.5 That the selection and exclusion of available land for offsets is fully justified, particularly in terms of Principles 2 and 3.

5.6 That the residual impacts of all projects listed above, and the credits generated by proposed offset lands, be calculated using BBAM and all calculations included in the Regional Biodiversity Strategy.

Principle 4: Offsets must be additional to other legal requirements

Section 10.0 of the Regional Biodiversity Strategy discusses some of the proponent's current monitoring efforts on the Newnes Plateau. This section states that the Regional Biodiversity Strategy will result in a regionalised monitoring program with greater effort on remote sensing data collection across a wider distribution of the Newnes Plateau and will focus on supporting research into rapid mapping techniques and defining vegetation community boundaries.

The Regional Biodiversity Strategy states that this current monitoring effort is approximately $2 million per year, and that the implementation of this Biodiversity Strategy will see the costs of this monitoring effort reduced.

While changes in monitoring techniques may be appropriate, this monitoring is part of current conditions of consent for the Springvale and Angus Place Collieries, and any research and monitoring must fulfil the requirements of these consents.

Offsets for Springvale, Angus Place and subsequent proposals must be in addition to these existing requirements.

Recommendations

5.7 That offsets presented in the Regional Biodiversity Strategy be clearly identified and be additional to current legal requirements.

5.8 That current research and monitoring techniques are only modified where they can achieve the requirements of the relevant conditions of consent. These should not be reduced as a result of providing offsets for residual impacts.

Principle 5: Offsets must be enduring, enforceable and auditable

Section 8.0 of the Regional Biodiversity Strategy states that,

The offset land will be placed under a restrictive covenant (or similar) to provide for in perpetuity conservation. For purposes of clarity, in perpetuity is defined as the life of the Project, or achievement of completion criteria (whichever comes first). The restrictive covenant will place restrictions on future land use commensurate with conservation outcomes.

Section 1.8 of both EISs indicates that the Angus Place project will have a project life of 25 years, and the Springvale project 13 years. Therefore, based on section 8.0 of the Regional Biodiversity

Strategy, the proponent has defined “in perpetuity” as a period up to 25 years. OEH does not consider this to be in perpetuity conservation, as it does not provide an enduring gain to biodiversity.

In addition, no detail is provided in the Regional Biodiversity Strategy regarding the mechanism of a restrictive covenant.

Principle 5 of the *Draft NSW Biodiversity Offsets Policy for Major Projects* lists five criteria for appropriate mechanisms for securing offsets, and states that a biobanking agreement is the only mechanism tested in NSW that meets these criteria. Under the Draft Policy, other mechanisms to secure offset sites may be developed provided they meet the criteria. There is no evidence provided in the Regional Biodiversity Strategy that a restrictive covenant will meet the five criteria presented in the Draft Policy.

Recommendation

5.8 That any proposed offset land be secured with a mechanism that is demonstrated to meet the five criteria of Principle 5.

Principle 6: Supplementary measures can be used in lieu of offsets
Principle 6 of The Draft NSW Biodiversity Offsets Policy for Major Projects allows for supplementary measures to be used in lieu of offsets. Table 1 of the Regional Biodiversity Strategy states,

Supplementary measures, as identified in this report, have been included to complement the offset package and to reduce the monitoring effort required to establish impacts.

Principle 6 of the Draft Policy states.

All reasonable attempts must be made to locate appropriate offset sites before supplementary measures can be undertaken, as offset sites covered by biobanking agreements achieve a more clearly measurable conservation gain.

The Regional Biodiversity Strategy has not demonstrated that all reasonable attempts have been made to locate appropriate offset sites. As outlined in the discussion regarding Principle 3, OEH considers that the Regional Biodiversity Strategy should include an assessment that considers all available lands as potential land offset areas.

In addition, the Draft Policy states that the amount of money to be contributed to supplementary measures will be calculated so it is approximately equivalent to the cost of an offset site. The Regional Biodiversity Strategy has not included costings for supplementary measures.

Recommendations

5.9 That the intended use of supplementary measures is reviewed once land offsets have been assessed and quantified consistent with Principles 2 to 5 of the Draft Policy.

5.10 That costings (including how these were calculated) for any supplementary measures are clearly quantified in the Regional Biodiversity Strategy.

6 Mine Water Discharge

The Springvale Mine Extension Project includes upgrading of the Springvale Delta Water Transfer Scheme (SDWTS) to increase the water delivery capacity from the existing 30 ML/day to up to 50 ML/day. The predicted increase in mine inflows would be managed using a combination of direct water transfer to Wallerawang Power Station, via the SDWTS, and discharge through Angus Place Colliery’s licenced discharge point LDP001 (Kangaroo Creek) and Springvale Mine’s LDP009 (Coxs Creek). Both EISs state (section 3.11.3) that,

A maximum of up to 30 ML/day of mine water can be transferred to Wallerawang Power Station. If the power station is unable to take any water then the mine inflows are discharged Coxs River via LDP009 in accordance with EPL 3607 volumetric limit of 30 ML/day.

OEH is aware that electricity generation from Wallerawang Power Station has been suspended, a process that began in early 2014. The EIS has not been updated to reflect this change in circumstances.

OEH assumes, therefore, that the proposal would result in a significant increase in waste water being discharged via the licenced discharge point into Coxs River, with none of the mine water being utilised for power production.

OEH has considerable concerns regarding the impacts of increased mine water discharge on aquatic biota. While the *Aquatic Ecology and Stygofauna Assessment* (Cardno 2014) assesses impacts of discharges into the Coxs River, it appears to do so with the assumption that water will be transferred to Wallerawang Power Station. The project description in the Executive Summary of the Aquatic Ecology report includes,

Management of mine inflows by transferring water to Wallerawang Power Station (WPS), via the SDWTS, and discharge through Angus Place Colliery's licensed discharge point LDP001 and Springvale Colliery's LDP009.

In addition, section 7.2.1.3 states,

The transfer of mine water make to the SDWTS results in a significant reduction in the potential impact of any discharges into the Coxs River. The volume of discharge from LDP009 to the river is, however, predicted to increase during the Project. The increase in the volume of the discharge is likely to affect the flow regime, geomorphology, water quality, aquatic habitat and aquatic biota of the river, with impacts depending on the level of river flow.

OEH considers that the EIS and associated documents need to be revised to take into account the closure of Wallerawang Power Station. In particular, the expected discharges and associated impacts on the Coxs River need to be re-assessed.

In addition, OEH considers that the Proponent should develop a strategic approach to the treatment and discharge of large volumes of wastewater produced by Centennial's multiple operations throughout the upper Coxs River catchment, with a focus on minimising negative impacts.

Further detail is provided in Attachment B.

Recommendations

6.1 That the EIS and associated documents need are revised to take into account the closure of Wallerawang Power Station. In particular, the expected discharges and associated impacts on the Coxs River need to be re-assessed.

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6.2 The Proponent should develop a strategic approach to management of waste water produced by Centennial's multiple operations throughout the upper Coxs River catchment, taking into consideration the changed circumstances of Wallerawang Power Station.

7 Stygofauna

Cardno Ecology Lab (2014) identified the significant limitations of the preliminary Stygofauna survey.

The assessment of potential impacts on stygofauna is limited by the lack of information on their occurrence in the aquifers within the Project Area, their response to environmental perturbations and likely conservation significance.

Despite these limitations it is important to note that stygofauna (and potential stygofauna) were actually found. Since this was the first survey of its kind for stygofauna in the area, there is the potential for the species collected to be unique. Unfortunately the taxonomic level of identification is currently inadequate to investigate whether these animals are new to science, and the implications of potential impacts from longwall mining affecting groundwater aquifers in which the stygofauna exist cannot be ascertained.

Recommendation

7.1 That further assessments of stygofauna be undertaken.

8 Exploration Programme

Section 3.2 of each EIS broadly outlines the exploration programmes at Springvale and Angus Place Mines. Section 4.2 of both EISs states that exploration activities will continue to be undertaken within the Project Application Area, that the exploration programme will be undertaken throughout the life of the Project and approval for these activities is sought as part of the Project.

The EISs state,

All exploration activities will be carried out in accordance with the requirements of the Mining Act 1992 and relevant mineral authorities, including environmental impact assessment and development consent. Approval for the proposed exploration activities is currently sought under Part 5 of EP&A Act from DTIRIS following the preparation of Review of Environmental Factors to assess the potential environmental impacts of the proposed activity.

In Section 4.2, it is also stated,

The location of proposed geological exploration boreholes is currently unknown, and as a consequence, detailed environmental and social impact assessment cannot be undertaken at this time. As the required drill hole locations are determined, Springvale Coal will undertake a series of due diligence assessments to consider ecology, archaeology and noise as relevant. The appropriate industry and legislative guidelines and policies in force at the time will be referenced and the assessments provided to the Department of Planning and Infrastructure.

Disturbance includes clearing of vegetation for the drillhole sites and access tracks and construction of process ponds.

Neither EIS provides any information regarding how much disturbance is required per drillhole or how many drillholes are estimated over the life of the Projects. There is no information provided regarding how much cumulative disturbance the exploration programme has caused in the past, nor how much is anticipated in the future. This has the potential to impact a large area over time.

While it is proposed that assessments will be provided to DP&E, there is no information provided regarding whether these will be reviewed, or whether further approvals will be required.

OEH considers that the EISs do not contain sufficient information to enable an informed and legally defensible decision to be made regarding the proposed exploration programme.

Recommendations

8.1 That the impacts of previous disturbance due to exploration be quantified.

8.2 That an estimate of future disturbance due to exploration be detailed.

8.3 That the process for future assessment of the exploration programme be provided.

9 Assessment and management of sensitive features

Due to the extremely wide longwalls (360m) proposed at Angus Place, OEH expects there will be widespread fracturing of cliffs, steep slopes and drainage lines (potentially similar to cliff and drainage line impacts at Baal Bone Colliery and earlier Angus Place operations). Detail regarding this issue is presented in Attachment B.

OEH believes contingency plans must be put in place to remediate such impacts if they occur. Consideration should also be given to the aesthetics of potential cliff/rockfalls immediately adjacent to the national parks.

Section 10.1 of both EISs provides an outline of sensitive features (such as cliffs, pagodas and swamps), summarises potential impacts and consequences of impacts, and gives a brief overview of intended monitoring. However, there is no indication of what actions will be taken if monitoring indicates that mining-induced impacts occur.

OEH considers that triggers, actions and responses are required along with the monitoring of all sensitive features. These should be designed to identify impacts early and take action to minimise further damage.

Section 10.1.2 of the Springvale EIS briefly addresses impacts on pagodas. However, section 10.1.2.3, consequences of potential impacts on pagodas, contains no text.

In addition, OEH does not support the definitions of cliff and minor cliff presented the Subsidence Impact Assessments, as these specifies that a cliff must have a minimum height of 10 metres, a minimum length of 20 metres and a minimum slope of 2 to 1, while a minor cliff has a height between 5 and 10 metres, minimum length of 20 metres and a minimum slope of 2 to 1. It is noted that the Geographical Names Board describes a cliff as simply *"A perpendicular or steep face of rock considerable in height, either inland or along the coast".*

OEH is concerned that the definitions of cliff and minor cliff in the Subsidence Impact Assessments will exclude consideration of impacts on some sensitive features.

Recommendations

9.1 Negligible impact criteria should be applied to all sensitive features.

9.2 Contingency plans should be put in place to monitor, minimise damage on, and remediate impacts on sensitive features such as cliffs, steep slopes and drainage lines.

9.3 That the consequences of potential impacts on pagodas at Springvale are considered.

10 Gardens of Stone National Park

Potential impacts on the Gardens of Stone National Park are identified in Section 10.1.4 of the Angus Place EIS. Longwall LW1014A will come within approximately 170m of the National Park boundary.

While the National Park is outside the angle of draw, MSEC has calculated that the extent of far field movements from the longwalls at Angus Place is 800m from the goaf.

The EIS predicts that the area of national park closest to LW1014A could experience very small vertical movements (less than 20mm), but is not expected to experience any measureable conventional tilts, curvatures or strains.

It is also noted that, "…*it is possible that minor and isolated fracturing of bedrock in ephemeral drainage lines will occur in the National Park."*

As a result, Section 10.1.4.4 states,

Extraction from LW1014A will occur late in the mine schedule, with mining moving towards the National Park, thus allowing for an adaptive management approach. Predicted ground movements due to valley closure in the vicinity of the National Park can be monitored as mining approaches, and any adverse impacts avoided by the implementation of strategies to be prepared in a trigger action response plan. By the time mining approaches the National Park boundary, the flow monitoring data on drainage lines with 800m of the National Park boundary will inform the risk profile for far field effects and the adaptive management strategies to be implemented where monitoring is above the predicted levels.

Table 9.4 of the EIS considers that groundwater monitoring on the Project Application Area and "Wollemi National Park" boundary is not required. OEH considers that, given the potential for fracturing of bedrock in drainage lines, monitoring of groundwater and flows on drainage lines within 800m of the Gardens of Stone National Park is required.

OEH notes that a number of dewatering bores are proposed to be constructed in close proximity to the national park boundary. These will require additional access tracks. OEH is concerned regarding damage caused by recreational use of these new tracks and the potential for them to create new access points to the national park.

We also note two the presence of two flora reserves, Birds Rock and Snow Gum. These should be afforded equivalent protection to national park estate.

Recommendations

10.1 That Trigger, Action, Response Plans (TARPs) are designed and implemented for all monitored features for the Gardens of Stone National Park, including groundwater. These should include actions and responses to minimise further impacts and remediate damage where possible.

10.2 That recreational use of new access tracks is discouraged through use of locked gates where practicable. No tracks are to extend into the adjacent national park.

10.3 That the flora reserves within the project areas, be afforded equivalent protection to national park estate.

11 Interaction between Springvale and Angus Place Longwalls

Figure 8.6 of Angus Place and Figure 8.6A of Springvale indicate that Springvale Longwall LW 413 is close to Angus Place longwall LW1002, in the vicinity of Sunnyside Swamp.

In the subsidence constraints analysis (section 9.3.2 in both EISs) it is stated that,

Cumulative impacts – Angus Place Colliery is operating close to Springvale Mine. The proposed mining which forms part of this Project has the potential to have a cumulative impact with regard to mine subsidence.

While both EISs address the issue of cumulative impacts in section 10.3.6, the interaction of the two mines where they come into close proximity to one another does not appear to have been specifically addressed apart from an indication in Table 9.4 of the Springvale EIS, which for "cumulative affects" includes,

- Review monitoring at the Angus Place and Project Application boundary, and
- Consider integration of TARPs re progressive mining.

Assessment of cumulative impacts and monitoring at the boundary of the two project areas is particularly important where sensitive surface features (natural and cultural) are located above and between two close sets of longwalls.

Recommendations

11.1 That an analysis be provided regarding the likely impacts from interactions between sets of longwalls, particularly where Angus Place is operating close to Springvale.

11.2 That monitoring and TARPS are applied at the boundary of the two extension projects.

12 Aboriginal Cultural Heritage

The Cultural Heritage Assessment Reports concluded that, while a number of sites were located within the project areas, these would not be directly disturbed.

Some sites were identified as potentially at risk of harm from subsidence. These included grinding grooves and site 45-1-2756/2757, which is a shelter with art and has high regional and local significance.

OEH considers that a more definitive assessment of the probability of roof fall collapse is required in rock shelters that have cultural deposits. In other assessments the standard used in assessing subsidence effects on ACH in long wall mining operations has been based on percentage estimates. A minimum 10% chance of roof fall collapse is an accepted threshold range from which decisions about appropriate mitigation can be considered. It is OEH's view that in circumstances where the chance of roof fall collapse exceeds 10% the appropriate mitigation is to excavate the shelter for salvage of Aboriginal objects and extract as much information that is appropriate for interpretation and educational purposes.

The Cultural Heritage Assessments recommends three main phases of monitoring of structurally sensitive sites,

- Phase 1: Baseline recording (prior to site being undermined)
- Phase 2: Post mining initial condition (within a reasonable timeframe following undermining)
- Phase 3: Post mining secondary condition (approximately 8 months after mining)
- Phase 3a (Longwall Mining) – in instances where final subsidence is not achieved until after a number of longwall extractions have taken place, then additional inspections by a qualified cultural heritage consultant may be required to assess any further risks to Aboriginal sites.

The Cultural Heritage Assessments identify that in Phase 2, if the site is assessed to be at a greater risk of harm as a result of mining activities, the Proponent must notify and inform the OEH (Environment line: 131 555) that there is a potential for harm to the site and follow the advice given by OEH.

OEH considers that structurally sensitive Aboriginal sites should also be monitored during the progression of adjacent longwalls and as the underlying longwall progresses. If damage begins to appear during progression of mining in proximity to the sites, appropriate action should be taken. This should be incorporated in the Cultural Heritage Management Plans, which should be developed in consultation with the Registered Aboriginal Stakeholders and OEH.

While not included in the Cultural Heritage Assessment reports, it is noted that section 10.4.6 of the EISs includes,

In the unlikely event that skeletal remains are found, work will cease immediately in the vicinity of the remains and the area will be cordoned off. The local police will be contacted to make an initial assessment to ascertain whether the remains are part of a crime scene or possible Aboriginal remains. If this is the case, the local police will contact OEH so that they can determine if the remains are Aboriginal.

OEH recommends that this be reworded to,

In the unlikely event that skeletal remains are identified, work must cease immediately in the vicinity of the remains and the area cordoned off. NSW Police are to be contacted in first instance. No further action is to be taken until the Police provide written advice to the proponent on how to progress. If determined to be Aboriginal, the proponent must contact the Enviro line (on 131 555), a suitably qualified archaeologist and representatives of the local Aboriginal community stakeholders to determine an action plan for the management of the skeletal remains, formulate management recommendations and to ascertain when work can recommence.

<u>Recommendations</u>

12.1 That the probability of roof fall collapse is calculated for rock shelters that have cultural deposits and appropriate mitigation measures included in the Cultural Heritage Management Plan.

12.2 That structurally sensitive Aboriginal sites be monitored during the progression of adjacent longwalls and as the underlying longwall progresses. If damage begins to appear during

progression of mining in proximity to the sites, appropriate action should be taken in consultation with Registered Aboriginal Stakeholders and OEH.

12.3 That the Cultural Heritage Management Plans be developed in consultation with the Registered Aboriginal Stakeholders and OEH.

12.4 That the action relating to skeletal remains be reworded as above.