

PCU53308

16 May, 2014

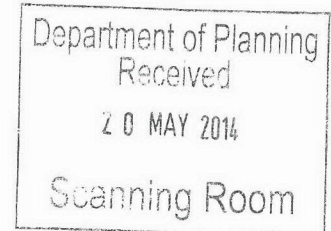
Major Projects Assessment
Department of Planning & Environment
GPO Box 39
SYDNEY NSW 2001

Our ref: 10.123.167.

Your ref: MP10_0046 Mod 2

Attention: Howard Reed

Dear Howard,



**Environmental Assessment
Russell Vale Colliery – Underground
Modified Preliminary Project (MP 10_0046 Mod 2)**

A. BACKGROUND

The Dams Safety Committee (DSC) has received a copy of the Environmental Assessment (EA) for Russell Vale Colliery's modification to their underground mining approval. The proposed longwall extraction (400m of LW6) lies wholly with the Cataract Notification Area.

Cataract Dam is a major water supply dam which is prescribed by the Dams Safety Committee. It is a 56m, mass gravity dam that forms a significant part of Sydney's water supply. The Dam is owned by Sydney Catchment Authority (SCA) and forms a significant part of the SCAs integrated asset base, supplying Sydney with water via the Upper Canal and Prospect Reservoir.

The DSC is currently regulating mining within the Cataract Notification Area (NA) which surrounds the Cataract Dam, using its powers under the Dams Safety Act (1978) and the Mining Act (1992). The proposed mining lies wholly within the NA and as such an application to the DSC to mine within the NA will be required.

The DSC is aware of previous mining related movement of the Cataract Dam wall and spillway and will be carefully assessing any application to mine within the NA for likely impacts on the dam wall or spillway. Cataract Dam has a consequence category of Extreme for both sunny day and flood failures.

Together with concerns for the safety of the Dam itself, the DSC has concerns for the security of the stored waters. A connection from the Reservoir to the underground workings

G:\DamSafety\DataServer\Files_123_MiningApp\167_Russell_Vale_1\submission to DP&E_Modified EA LW6.docx

in Wonga East, at the confluence of the Cataract Creek and Cataract River, would result in a significant loss of the available storage capacity of the Reservoir.

At the current stage of the proposal the DSC requires more information before being in a position to support the proposal.

An application to mine within the Cataract NA must achieve:

- An assessment of the dam safety risks to Cataract Reservoir and to Cataract Dam Wall as a result of mining;
- Clear demonstration that the risks associated with mining will be tolerable as defined by the DSC.

B. KNOWLEDGE DEFICITS

Information the DSC requires prior to making a decision about mining within the Cataract NA includes, but is not limited to:

1. A assessment of geological structures intersecting both the Reservoir and the mine workings;
2. A ground water model that addresses the possibility of losses from the reservoir as a result of mining;
3. A Detailed monitoring plan
 - Including water chemistry
 - Mine water balance
 - Groundwater monitoring borehole between the Reservoir and the mining.

Concern 1 – The presence of structure in the Wonga East Area

From the information compiled in the EA, which includes past workings, it is obvious that:

- Structures have interrupted the Bulli and Balgownie workings in the Wonga East area. However, there is no discussion of the likely impact of structures on subsidence or the possible loss of storage via a structure connecting from the Reservoir to the mine;

Of potential concern are the observations that:

- The Corrimal Fault has been intersected by LW6 gateroads and the fault does not appear to be petering out
- In this area a dyke D8 crosses the area. It is present in the workings and exposed in the sides of the Reservoir.

Pells (2012) produced x-sections that show the Reservoir lies in the Bulgo Sandstone (BSS) below the Bald Hill Claystone (BHCS). Later 'ground truthing' of the surface geology has been undertaken, verifying that the creek does indeed lie in strata below the BHCS aquitard.

An inspection of the plan that shows Bulli seam workings around the junction of Cataract Creek and Cataract River in the adjoining Corrimal Colliery, indicates workings are absent between the projections of the dyke (D8) and Corrimal Fault in the neighbouring Corrimal Colliery. The absence of workings in this area is supportive of there being more than a reasonable probability that the Corrimal Fault exists in the area. That is, the evidence regarding absence or presence of the Fault is contradictory. A statement that indications that Bulli Seam workings have not intersected the Fault is not sufficient justification to claim that the Fault is not present.

Assuming the fault is present and projecting the fault to the surface (ie offset 200m to the south west from trace on Bulli seam), results in the surface expression aligned with the Reservoir.

Longwall 6 maingate and tailgate roadways have both intersected the Corrimal Fault with throws of over 1m. The fault is present in the area to be extracted by the first 400m of LW6.

The proposed first 400m of LW6 extracts through the zone of the Corrimal Fault. In TG6 the development intersected 3 faults (between 12c/t and 13c/t) which had total throws of approximately 1.8m upthrown to the SW. In MG6, three faults have been intersected so far (development not completed). One is upthrown by 0.93m another downthrown by 0.55m and the third is upthrown by 0.48m.

No assessment of the height of connective fracturing through this zone is presented. Adding to the uncertainty about the height of connective fracturing is the presence of Bulli Seam goaf on the SW of the fault zone.

The report on the Assessment of Groundwater Data (SCT), estimates the height of the zone of depressurisation above a Wongawilli Seam longwall where the Bulli Seam has been extracted as 222m. It is therefore likely that connective fracturing will extend to the Bulgo Sandstone in this area. The Reservoir to the west of LW6 may lie in the Bulgo Sandstone. If a highly permeable layer or a shear zone develops, as a result of mining similar to the one that exists at NRE D and P514, in the Bulgo Sandstone, then a connection from the Reservoir to the mine exists.

A borehole between LW6 and the Reservoir that investigates/monitors the Bulgo Sandstone needs to be in place before LW6 extraction commences.

Concern 2 – Absence of Regional Aquitard

The absence of the Bald Hill Claystone (BHCS-the regional aquitard) in this area means there is a permeable unit, the Bulgo Sandstone (BSS), connecting the Reservoir to the fracture zone above the Wongawilli goaf.

Even if the Corrimal Fault does not connect the reservoir to the mine, then consequently there is still the reality of the BSS (an aquifer) present in the bottom of the reservoir and within the fracture zone of the longwalls.

Multiple seam operation complicates development of Contingency and Closure Plans for the worst case scenario, in which Reservoir water enters the mine. The presence of three seams being mined along the escarpment means there are numerous portals to seal on the escarpment. Possible vertical cracks in the strata close to the escarpment would mean the sites for plug installation would have to be in competent ground away from the escarpment. This would involve old and waste workings which are inaccessible, making seals an improbable solution to containing an inflow.

Contingency and Closure Plans need to be developed and agreed to by all parties before LW6 commences extraction.

Concern 3 – The working section height appears variable and no information is provided on the maximum working height of the longwall through the faulted zone.

A range of working section thickness is stated in the EA (up to 3.2m). However, it also states that extraction to the standard working section could be successful to recover more coal. The resources are based on clay band section at 1.87 to 2.61m. There appears to be a variety of working section thickness which would alter the maximum subsidence depending on which one is worked. A plan showing a working section of 2.8 to 2.9m has been provided. However, no working section plan is provided to assess the varying height of extraction through the fault zone. As the area of LW6 that passes through the Corrimal Fault zone is assumed to be broken ground and therefore difficult to mine, it is also assumed that the height of fracturing in this area will exceed that over the normal extracted height in good ground.

Concern 4 – a groundwater model that addresses the possibility of losses from the reservoir as a result of mining has not been provided.

The EA lacks a groundwater model that addresses the possibility of losses from the reservoir as a result of mining.

Among the issues that are not considered in the current modelling is the presence of pathways for loss of Reservoir Waters or the impact of mining on hydraulic conductivity.

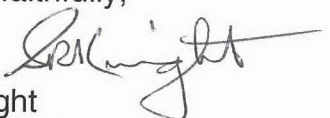
Concern 5 – The potential for loss of Reservoir Waters Via Structure.

The FMEA looked at the impact of “lack of geological data on the ability to predict subsidence” – the geological data was deemed adequate. The Groundwater Report mentions the possible impact of a permeable geological structure but goes on to say it has not been modelled. The mine has based its assessment that the Corrimal Fault peters out on 1940 record tracings of the Bulli seam workings. No notations on a 1940 plan, does not mean the fault is not present. It simply means that if it is present, the displacement is small and not noteworthy. As discussed above, the connection of the mine to the Reservoir by geological structure is a possibility, but this is not addressed in the groundwater model.

Any approval for this project should include conditions requiring:

- A program to collect and analyse data and report on the water chemistry of the overlying strata, the water entering the mine and the Reservoir waters.
 - At a minimum water should be sampled on a monthly basis and include algae, trace element analyses and Tritium isotopes.
 - Sampling borehole sites between the mine workings and the Reservoir should be established.
- A geological risk assessment should be undertaken with emphasis on identifying possible conduits for loss of Reservoir water to the mine or to catchments outside that of the Reservoir's.
- Contingency and Closure Plans need to be in place before LW6 extraction commences.
- The establishment of a borehole between the Reservoir and LW6 to monitor groundwater pressure in the Bulgo Sandstone below the level of the thalweg of the Reservoir.

Yours faithfully,

 16/5/14
S. Knight
Executive Engineer
Dams Safety Committee