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Nature Conservation Saves for Tomorrow

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Major Project Assessments,
NSW Department of Planning & Environment
Sydney NSW 2001.

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Springvale Water Transfer and Treatment Project SSD 16_7592 [SWTTP]

1. Summary and conclusions

1.1 Overarching comments

- The Blue Mountains Conservation Society (herein BMCS or the Society) recognises the benefits of transferring mine-water to the Mount Piper Power Station (MPPS); indeed, along with the Colong Foundation and others within the Gardens of Stone Alliance, BMCS has strongly advocated this action.
- The SWTTP states (Executive Summary piii) that the key objectives are to (i) *"improve environmental outcomes for the receiving waters of the Upper Coxs River catchment"*, and (ii) *"meet the water quality performance measures for mine-water discharges required under the Springvale Mine Extension Project"*. Objective (i) is admirable, but objective (ii) entrenches performance measures that were a compromise devised[1] to accommodate discharges through LDP009 and various other discharge points; the SWTTP renders the compromise redundant.
- The SWTTP emphasises compliance with SSD_5594 Schedule 4 Condition 12 in relation to mine-water discharges (Executive Summary piii), but seemingly disregards Condition 13 (Upper Coxs River Action & Monitoring Plan)[2] items (c) and (e).
- **The Society strongly opposes parts of SSD 16_7592 because they fail to more comprehensively use the transfer option and insufficiently avoid adverse environmental consequences; these deficiencies can and must be rectified.**

1.2 List of conclusions

C1. The performance measures relating to mine-water discharges in SSD_5594 Schedule 4 Condition 12 are rendered inapplicable by Option 2 in the EIS; any consent related to the SWTTP must include new performance measures and have an appropriately amended Upper Coxs River Action & Monitoring

[1] Through discussions between Centennial, the EPA, and perhaps other unknown parties.
[2] The Secretary may have deferred the Plan's submission date (due 30/06/2016), but major concerns exist about the aquatic system in relation to the long-term objective for salinity and the concentration-limits for a range of toxic metallic and non-metallic ions; the EIS inadequately addresses this.

Plan; and, any SWTTP consent must contain penalties for failing to meet the planning, construction and commissioning deadlines determined for Option 2.

C2. No significant argument has been presented in favour of the northern easement and that, from an environmental viewpoint, the southern easement must be followed.

C3. Treatment to a salinity of 500 µS/cm EC inadequately meets the long-term target of 350 µS/cm EC for the Coxs River catchment and definitely does not restore the pre-mining water quality of ~30 µS/cm EC.

C4. SWTTP (SSD 16_7592) inadequately addresses the consequences of: shutting down (temporarily or otherwise) the MPPS; transferring excess treated water to Wangcol Ck; and failing to fully comply with SSD_5594 Schedule 4 Condition 13 items (c) and (e), and MPPS's Water Access Licence #27428 Condition 4.

C5. Irrespective of which option, or variant of an option, in EIS Table 4.1 p4-4 is ultimately chosen, the existing southern easement should be used.

C6. As advocated in the EIS, Option 2 is the best of the five options proposed, but it is deficient in the context of conclusions C1, C3 and C4, and must be modified.

C7. If the treatment plant shuts down, the raw mine-water should be diverted to Thompsons Ck Reservoir for dilution and future availability - this issue must be addressed and a solution identified in any approval of a modified SSD 16_7592.

C8. Excess treated water should be transferred to the Thompsons Ck Reservoir, rather than sending it, via the proposed new discharge point, to the already polluted Wangcol Ck – this should be addressed and an outcome justified in any approval of a modified SSD 16_7592.

C9. The treatment plant could continue to operate after the permanent shut down of MPPS. The treated water could discharge principally to Wangcol Ck and the treatment should achieve a salinity of less than 350 µS/cm EC, but as close to 30 µS/cm EC as is practicable – these aspects should be considered in any approval of a modified SSD 16_7592.

C10. With due reference to conclusions C6, C8 and C9, the raw mine-water supply could and should be boosted by supply from other LDPs and Clarence Colliery, and treated water in excess of MPPS's needs should be sent to Thompsons Ck Reservoir, and/or the treatment plant's salinity target should be lowered.

C11. The proposed closure of LDP009 and the transfer of the raw mine-water to a treatment plant at MPPS, together with returning excess treated water to the Wangcol Ck catchment, would yield positive outcomes. Nevertheless, there are simple modifications which could and should be made; they would increase the effectiveness of the treatment plant and have better environmental outcomes.

C12. Wangcol Ck contributed salinity and other contaminants to the Coxs R pre-LDP006. The toxic discharges from LDP006 have greatly magnified the problem, and discharging treated water (~500 µS/cm EC) to Wangcol Ck from the proposed new discharge point will further detract from water-quality of the Coxs R. To the extent that an important aim of the whole exercise is to greatly improve the water-quality, there has been a lowering of the salinity but this has in many cases been accompanied by increased water volumes and larger salt loads. There is room for improvement.

2. Contentious issues

2.1 The selected strategy

The base case (Option 1) and the preferred case (Option 2) are in the Environmental Impact Statement (EIS) Section 4.2 pp 4-3 to 4-7; there is no difference between these two until June 30, 2017, at which time the much-vaunted consent in SSD_5594 Schedule 4 Condition 12[3] should be implemented. In reality, there has been no significant movement in relation to Option 1, and Option 2 is the preferred strategy. This means that

[3] Meet limits for salinity of 700 (50th percentile), 900 (90th percentile) and 1,000 (100th percentile) µS/cm EC **by 30 June 2017.**

the requirements in footnote 3 **will be disregarded** and highly saline mine-water (1200 µS/cm) will be discharged via LDP009 on Sawyers Swamp Creek to the Coxs River **until the transfer infrastructure and treatment plant at MPPS are fully commissioned.**

Based on the Secretary's apparent decisions to date, it is unlikely that the consent condition for 30 June 2019[4] will be rigidly enforced. Statements about fast-tracking the infrastructure required for Option 2 are easily made, but the current situation of discharging saline mine-water (→1200 µS/cm) to the Coxs River could continue unabated until such time as Option 2 comes on line; it is unlikely that this would disturb Centennial! In effect, the whole process would now seem to be open-ended, as there are no applicable performance measures.

The Society concludes that:

C1. The performance measures relating to mine-water discharges in SSD_5594 Schedule 4 Condition 12 are rendered inapplicable by Option 2 in the EIS; any consent related to the SWTTP must include new performance measures and have an appropriately amended Upper Coxs River Action & Monitoring Plan; and, any SWTTP consent must contain penalties for failing to meet the planning, construction and commissioning deadlines determined for Option 2.

2.2 Raw mine-water transfer pipeline (EIS Section 4.2.3 pp4-11 to 4-13)

The Society finds the argument, that the northern alignment has better environmental outcomes than the southern alignment, totally devoid of logic. It is conceivable, that the new route is preferred because it will cost less to implement and be easier to maintain, but if this is the case, presenting an argument based on environmental outcomes is deceptive and should be treated accordingly.

In terms of the number of hectares compromised, the northern alignment is said to impact 3.6 ha less. This is seemingly due to the southern route being slightly longer, which BMCS acknowledges, but it seemingly disregards the fact that the southern route is already damaged by emplacement of the Springvale-Delta-Water-Transfer-Scheme (SDWTS).

The northern easement will desecrate a scenic and ecologically significant section of the escarpment termed the Clerestory Spurs, as well as impacting endangered ecological communities, removing large numbers of hollow trees and threatening fauna[5]. These aspects can be offset under the current system, but it must surely be asked why cause this damage with a new route when the original southern route (at least considered the best route at that time) has already suffered?

Exacerbating disturbance along an already damaged route, as opposed to creating a new route down an undamaged section of the escarpment is deplorable.

The Society concludes that:

C2. No significant argument has been presented in favour of the northern easement and that, from an environmental viewpoint, the southern easement must be followed.

2.3 Raw mine-water treatment (EIS Section 5.1.2 pp5-3 to 5-4)

The Society supports **the concept** of transferring raw mine-water to MPPS for treatment and industrial use. However, the matters to be resolved are whether or not: (i) the level of treatment, and (ii) the non-industrial disposal of excess treated water, best fit the long-term ambitions for water quality in the Upper Coxs River catchment. Although items (i) and (ii) are inevitably interdependent, the principal examination of item (ii) will take place in Section 2.4.

In Section 3.1 above, the original consent (SSD_5594 Schedule 4 Condition 12) set the target salinity for mine-water **discharges from LDP009** as 500 (90th percentile) µS/cm EC by 30 June 2019, and the EPA opted for a long-term aspirational target for the Coxs River catchment of 350 µS/cm EC [6]**.** The aspirational

[4] Meet a limit for salinity of 500 (90th percentile) µS/cm EC by **30 June 2019.**
[5] MU 11 (HN 572) Snow gum grassy forest on damp flats, and MU 53 (HN 602); see EIS Fig. 11.1 and Tables 11.3 and 11.7 pp11-6 and 11-13 to 11-15 respectively.
[6] This is to be determined as identified in SSD_5594 Schedule 4 Condition 13(c).

target seemingly disregards the fact that the waters upstream of mining have very low salinities in the order of 30 µS/cm EC.

The selection of 500 µS/cm EC as the treatment outcome under the **original consent** apparently resulted from discourse between the EPA and Centennial, and a statement by Energy Australia[7] that it would prefer the water in Lake Wallace to have a salinity at (or less than) 500 µS/cm EC. BMCS was not a party to the discourse which resulted in the **original consent,** and nor was it a party to the discourse leading to the **SWTTP** and the **current EIS.** In both cases, however, it seems that 500 µS/cm EC was chosen to meet the needs of Springvale and Energy Australia, rather than to achieve the best environmental outcome for the Coxs River.

The Society concludes that:

C3. Treatment to a salinity of 500 µS/cm EC inadequately meets the long-term target of 350 µS/cm EC for the Coxs River catchment and definitely does not restore the pre-mining water quality of ~30 µS/cm EC.

2.4 Treated water disposal (EIS Section 5.2.2 pp5-7 to 5-9; Section 5.4 pp5-17 to 5.18)

The Society is only concerned with the disposal of the excess treated water (i.e., the water excess to MPPS's needs that will be directed to Wangcol Ck and then, in the open watercourse, to the Coxs R). Fig. 5.5 p5-9 shows that the piped excess will enter an improved channel, which already carries the discharge from LDP006, before **both** enter Wangcol Ck. The input to Wangcol Ck in terms of flow-volumes and salinity will be a function of the two sources.

EIS Section 5.4 provides information pertinent to the effectiveness of the SWTTP and the water quality entering Wangcol Ck:

- Transfer of raw mine-water will peak at 36 ML/dy, but losses in the treatment process of ~4ML/dy will reduce this to about 32 ML/dy of treated water. The raw mine-water supply is variable (see Fig. 5.9 p5-18); **the available treated water** will follow the same-shaped curve but, assuming constant treatment-losses, will be consistently less by 4 ML/dy.
- MPPS's 'make-up' water needs range from 54 ML/dy at full capacity, down to 30ML/dy when working at or less than 50% capacity, to virtually nothing should shut down be necessary.
- The 'make-up' (under the favoured Option 2) is to be firstly met by the available treated water and secondly (only when necessary) by water from the catchment under the Coxs River and Fish River Water Supply schemes.
- When MPPS is operating at 50% capacity or less, excess treated water will be sent to Wangcol Ck – amounts at 50% capacity will be 0-5 ML/dy, but this could be 32ML/dy should MPPS be shut down temporarily (~1-2 dy/annum) or permanently. The latter would have ramifications; **the possibility MUST be covered in any agreement between Centennial and EA, and in any approval of SSD 16_7592**.

The principal problems associated with favoured Option 2, **in addition to those already identified in Section 2.3 conclusion *C3* and dot-point 4 above,** are now more apparent and comprise:

- wasting treated water by sending it to Wangcol Ck and thence down-stream to the Coxs River, rather than retaining it for industrial use;
- using treated water to flush the polluted Wangcol Ck would enhance the **volume of polluted water** and thereby increase its dissolution capacity; in contrast, the EIS (Executive Summary, pvi) places emphasis on the reduction of Wangcol Ck's salinity by averaging it down through mixing (but still leaving it highly saline and toxic), and thereby providing a beneficial outcome[8].

[7] Prior to the discussions related to transferring the raw water to Mt Piper for treatment and industrial reuse

[8] In simple terms, if a litre of high-salinity water is mixed with a litre of low-salinity water the result is two litres of moderate-salinity water – examination of EIS Tables 10.5 and 10.7 provide some insight into the water-volumes and salt-tonnes contributions from the proposed discharge point and LDP006.

- failing to treat other polluting discharges (e.g., LDP006) in accordance with what was envisaged in SSD_5594 Schedule 4 Condition 13 items (c) and (e), despite the emphasis placed on this in EIS Section 4.1 p4-2[9]; and,
- failing to comply with MPPS's Water Access Licence #27428 Condition 4 which requires that all available mine-water be used for generating power, before drawing water from the Coxs River.

The Society concludes that:

C4. SWTTP (SSD 16_7592) inadequately addresses the consequences of: shutting down (temporarily or otherwise) the MPPS; transferring excess treated water to Wangcol Ck; and failing to fully comply with SSD_5594 Schedule 4 Condition 13 items (c) and (e), and MPPS's Water Access Licence #27428 Condition 4.

3. Resolution of contentious issues

Conflict exists between the key objectives of SSD 16_7592 (SWTTP – see Section 1 dot-point 2 above), SSD_5594 Schedule 4 Conditions 12 and 13 [items (c) and (e)], and MPPS's Water Access Licence #27428 Condition 4. The aim should be to reconcile these whilst minimising the environmental damage resulting from ongoing discharges of LDP009, **and various other discharge points,** to the Coxs River. The conflict reflects the evolution of the consent conditions in SSD_5594 Schedule 4 from ones designed to enable approval of the Springvale extension, whilst concurrently cleaning up a range of other saline discharge points, **all to be done at Springvale's expense**, to ones potentially considering the industrial reuse of mine-water in relation to stipulations in MPPS's Water Access Licence[10].

3.1 The transfer and treatment system

3.1.1 Transfer to LDP009 (Relates to Section 2.2 above)

Section 3.2, conclusion ***C2***, indicated that the southern easement for the raw mine-water transfer pipeline must be followed to ensure the least environmental impact. Provided that the southern easement is followed, this part of the transfer system is not contentious because all five options in EIS Table 4.1 p4-4 require piping the mine-water to LDP009.

The Society reiterates that:

C5. Irrespective of which option, or variant of an option, in EIS Table 4.1 p4-4 is ultimately chosen, the existing southern easement should be used.

3.1.2 Treatment and reuse aspects (Relates to Section 2.3 above)

Due to the expressed preference for Option 2 in the EIS, relatively little consideration (beyond EIS Section 4.2.2 p4-11) was given to why Option 2 was chosen. There are, however, significant differences, so to highlight this, each is now summarised:

- Option 1 (base case) plus Option 1 (involving RO desalination of **'all flows'**[11] before discharge through LDP009) is as originally negotiated between Centennial and concerned parties including the EPA, Water NSW and Energy Australia. It requires treatment by RO before discharge at LDP009 and therefore involves minimal additional piping. All the LDP009 effluent is **ultimately** to be treated to a salinity of 500 µS/cm EC. The option is considered by Centennial to be too costly and impracticable, despite Centennial having the benefit for many years of more than favourable discharge conditions and high coal prices.
- Option 2 requires piping the raw mine-water through to the treatment plant at MPPS – all the water will be treated to achieve a salinity of 500 µS/cm EC – provision exists for disposal ('environmental release') of excess treated water to Wangcol Ck and thence to the Coxs River.

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[9] Condition 13 includes the requirement to *"…identify all available water management measures including…consideration of all licensed discharge points within the Upper Coxs River Catchment."*

[10] The details of any agreement between centennial and Energy Australia regarding who pays for what are unavailable.

[11] This is taken to mean flows from LDP009 **plus other Centennial-controlled LDPs impacting on the Upper Coxs River.**

- Option 3 involves direct transfer of raw mine-water to MPPS for use without prior treatment – MPPS would need to make substantial modifications to its plant and operational procedures – raw mine-water excess to MMPS's requirements would be sent either to Thompsons Ck Reservoir or Angus Place underground storage. This may well have satisfied Centennial, but it is likely that MPPS opposed this.
- Option 4 involves direct transfer of raw mine-water to Thompsons Ck Reservoir where dilution would be effected by blending with water from Lake Lyell via Thompsons Ck Reservoir. This was arguably the best option in view of it using much existing infrastructure and resolving the problem in Option 3 of storing 'excess' raw mine-water. Option 4 would have suited Centennial and MPPS but was considered to have substantial social and technical difficulties, and faced the risk of accumulated salinity in the reservoir.
- Option 5 necessitated transferring raw mine-water to Wallerawang Power Station to use the existing RO infrastructure. Although this has the advantage of using existing pipelines and RO infrastructure, the limited capacity of the RO plan meant that large volumes of raw mine-water would need to be sent to Thompson's Ck Reservoir as in Option 4.

All of these options potentially resolve Centennial's problem of needing to stop highly polluting mine-water from LDP009 being discharged to the Coxs River**, but only Option 1 (post-June 30, 2017) and Option 2 treat all the raw mine-water by RO**[12]. The importance of RO treatment, as opposed to various forms of dilution and blending employed in several of the other options, is that as well as reducing the salinity, it more efficiently removes the toxic metallic and non-metallic ions which particularly impact on macroinvertebrate fauna. This is especially important for Option 1 because **all the treated water** will be discharged to the Coxs River.

The downside for Option 1 is that **none of the treated water** will be industrially reused, whereas in Option 2, a high proportion will be reused by MPPS. From an environmental viewpoint, industrial reuse is preferable because the costs associated with treatment are effectively offset by a form of industrial reuse which greatly lessens the need to use 'make-up' water from Lake Lyell.

In terms of achieving the 500 µS/cm EC 'consensus'[13] value, or aiming for something better, Option 1 will not reach 500 µS/cm EC until June 30, 2019, while Option 2 has yet to have performance measures finalised, unless those in SSD_5594 Schedule 4 Condition 13 items (c) and (e) are deemed to apply?

The Society concludes that:

C6. As advocated in the EIS, Option 2 is the best of the five options proposed, but it is deficient in the context of conclusions C1, C3 and C4, and must be modified.

3.2 Option 2 water disposal (Relates to Section 2.4 above)

3.2.1 Treatment plant shut down

Were the treatment plant to shut down for maintenance, or on a more protracted basis, the raw mine-water would need to be transferred to a holding reservoir. Two possibilities are envisaged:

- Transfer to Angus Place's underground workings, where it would effectively become part of the groundwater and, although not clearly stated, be lost from the SWTTP – there is some concern about the integrity of this option to the extent that it might leak to the nearby surface[14].
- Pumping the mine-water to Thompsons Ck Reservoir where a degree of dilution could take place – the diluted water could then be sent to the treatment plant (or direct to the MPPS) should the need arise. **BMCS sees this as the better possibility**.

[12] Unless, with either option, the treatment plant is shut down for maintenance or a major breakdown occurs – in such circumstances, raw mine-water would probably be sent to Thompsons Ck Reservoir or Angus Place underground storage.
[13] The 'consensus' does not include environmental groups which continue to argue that the RO output should match the pre-mining salinity of the receiving watercourse (**~30 µS/cm EC);** even where this salinity-level is opposed on the basis of cost, the output should at least conform with the Upper Coxs R catchment target of 350 µS/cm EC.
[14] This is covered in the submission by Mr Muir on behalf of the Colong Foundation.

The Society concludes that:

C7. If the treatment plant shuts down, the raw mine-water should be diverted to Thompsons Ck Reservoir for dilution and future availability - this issue must be addressed and a solution identified in any approval of a modified SSD 16_7592.

3.2.2 MPPS shut down and treated water exceeds MPPS's needs

The main concerns to be resolved in this subsection are: the reduction of economic and environmental benefit from sending the treated water down Wangcol Ck; the future of the treatment plant should MPPS permanently shut down; and, the long-term implications for the transfer of raw mine-water to the treatment plant.

Other concerns such as the impact of the cumulative flows on Wangcol Ck, and the role of Wangcol Ck and other sources of pollution in the water quality of the Upper Coxs R will be considered in Section 3.4.1 and 3.4.2.

Were the MPPS to shut down (temporarily or otherwise), or were the availability of treated water to exceed MPPS's needs, up to 32 ML/dy of treated water could be transferred to the proposed discharge point near Wangcol Ck (refer to Sections 2.4 and 3.1.2 Option 2). Should this transfer happen, or should the treated water be retained for future use in the MPPS?

Treating Springvale's polluted mine-water, as opposed to sending it down the Coxs River, creates a substantial environmental benefit. By promoting reuse of mine-water in place of water from Lake Lyell, the EPA is commendably attempting to clean up the consequences of past practices. Energy Australia also gains an efficiency dividend by having a compositionally consistent low-salinity source of water for use in the MPPS.

The EIS Option 2 does not consider retaining the treated water, presumably because the costs of transferring it to Thompsons Ck Reservoir for subsequent reuse are apparently deemed unacceptable. The Society believes that transfer and reuse should be (re)considered, rather than Centennial being too influenced by the cost and claims of a beneficial outcome from discharging to Wangcol Ck (refer to Section 2.4 arrow-point 2 above and also to footnote 8). The need for reconsideration particularly applies, because the high volumes of water using Wangcol Ck, especially if MPPS is shut down or on less than 50% capacity (for an indication, see EIS Table 10.5 p10-14), could cause local flooding and scouring of the water course with release of partly buried coal waste.

The Society concludes that:

C8. Excess treated water should be transferred to the Thompsons Ck Reservoir, rather than sending it, via the proposed new discharge point, to the already polluted Wangcol Ck – this should be addressed and an outcome justified in any approval of a modified SSD 16_7592.

The future of the treatment plant should MPPS **permanently shut down**, and the implications for the transfer of raw mine-water to the treatment plant over the long term, do not seem to have been addressed in the EIS. It is likely that:

- the treatment plant would continue to process all available mine-water;
- the treated mine-water would presumably be sent to the Coxs R via the proposed discharge point on Wangcol Ck, although some could be used to maintain water levels in Thomsons Ck Reservoir, despite this no longer being needed for the MPPS; and,
- there seems to be no reason why this couldn't continue over the longer term, although the impact on Wangcol Ck's morphology would need further investigation (see EIS Section 10.3.3 p10-41.

In view of the large volume of treated water continuously flowing down Wangcol Ck and into the Coxs R system, the RO process should achieve a salinity of at most 350 µS/cm EC and ideally about 30 µS/cm EC to maximise the environmental benefit.

The Society concludes that:

C9. The treatment plant could continue to operate after the permanent shut down of MPPS. The treated water could discharge principally to Wangcol Ck and the treatment should achieve a salinity of less than 350 µS/cm EC, but as close to 30 µS/cm EC as is practicable – these aspects should be considered in any approval of a modified SSD 16_7592.

3.3 The SWTTP – an aims/deficiencies summary

From an environmental viewpoint, the main aims of the SWTTP should be to:

- use mine-water in MPPS in place of surface water which feeds Sydney's drinking-water supply – this benefits Springvale by taking its mine-water and Energy Australia by accepting the mine-water and thereby complying with its Water Access Licence;
- ensure discharges from LDP009 and several other Centennial-controlled discharge points comply with water quality performance measures and the action and monitoring plan stipulated in SSD_5594 Schedule 4 Conditions 12 and 13 [items (c) and (e)] – this benefits Centennial by focusing the need to resolve long-standing discussions with the EPA over many LDPs, and thereby improve water quality in the Upper Coxs River Catchment; and,
- not to enshrine parts of existing operations which detract from the overriding intention to restore water quality within the Upper Coxs River Catchment.

Neither Option 2 nor any of the other options fully comply with the aims. The main deficiencies of the favoured Option 2 are:

- The MPPS at times requiring **more than** the available amount of treated water and therefore needing to draw water from Lake Lyell – this contravenes dot-point 1. **This could be overcome by increasing the supply of raw mine-water by adding the supply from other LDPs, and including the relatively low-salinity water from Clarence Colliery**[15].
- The MPPS at times requiring **less than** the available amount of treated water, thereby necessitating the excess treated water being discharged to Wangcol Ck – in fact, the discharge-volumes increase as power generation decreases (e.g., see EIS Table 10.5 p10-14). Dot-points 1 and 2 are both contravened, but the matter could be resolved by sending the discharges to Thompsons Ck Reservoir, and/or lowering the salinity of the treatment plant's output.
- The failure to commit to treating the other sources of polluted water that exist within the catchment (see EIS Fig, 10.1 p10-10) contravenes dot-point 3. The problem could be resolved by connecting these discharge points to the treatment plant or (perhaps less satisfactorily) to Thompsons Creek Reservoir.

The Society concludes that:

C10. With due reference to conclusions C6, C8 and C9, the raw mine-water supply could and should be boosted by supply from other LDPs and Clarence Colliery, and treated water in excess of MPPS's needs should be sent to Thompsons Ck Reservoir, and/or the treatment plant's salinity target should be lowered.

3.4 Wangcol Ck and other sources of pollution (Partly relates to Sections 2.4 and 3.3 above)

3.4.1 Wangcol Ck condition pre-LDP006

EIS Fig 5.2 p5-2 shows the relationships between the Coxs R, Wangcol Ck and Neubecks Ck, while EIS Fig 10.1 p10-10 shows the location of LDPs, coal mines, and handling and treatment facilities, relative to Wangcol Ck. A legend of ownership of the LDPs is in EIS Fig 10.4 p153.

[15] This is environmentally desirable in that it would protect the Wollangambe R and World Heritage Area from Clarence's polluting discharges.

LDP1 (also reported as LMP1 in EPA Licence #13007)[16] relates to a holding pond which seems to drain via a narrow channel to Neubecks Ck. Below the confluence, the watercourse is called Wangcol Ck

Neubecks Ck has been used as a guide to background water-quality in the EIS's modelling, despite it running through a cleared region with possible evidence of exploration activity that suggests less than pristine conditions. This, together with input from LDP1, may explain why the modelling opted for a run-off salinity of 108 µS/cm EC[17], whereas pristine headwaters of the Coxs catchment have salinities ~30 µS/cm EC[18].

Further downstream on the northern bank of Wangcol Ck, the Yarraboldy Extension of the Pine Dale open-cut mine (currently owned by Energy Australia and under 'care and maintenance') has interfered with the groundwater regime and remains an ongoing potential source of contamination. The old Original Pine Dale open-cut mine has a much larger footprint, fully encompassing Wangcol creek [still called Neubecks Ck in some documents such as the Pollution Incident Response Management Plan (PIRMP), referred to in footnote 18 (b)] such that the whole tract was intensely disturbed, inadequately rehabilitated, and certainly a substantial source of pollution[19]. The damaged region extends through to LDP013, close to the Wangcol Ck-Coxs R confluence.

Wangcol Ck pre-LDP006 was a disrupted watercourse with significant salinity due to being a 'gaining' (influent) system with respect to the contaminated groundwater. In EIS Tables 10.1 p10-5 and 10.3 p10.7, the Wangcol Ck's catchment run-off of 2180 ML/yr and the contained 317.1 t/yr of salt, are not representative of the pre-mining natural conditions; rather, **they convey the characteristics imposed by mining before the advent of LDP006.**

3.4.2 Wangcol Ck condition post-Cooks Dam/LDP006 discharges

The Cooks Dam/LDP006 discharges are highly saline (~4550 µS/cm[20]) and toxic. For existing conditions (2016), EIS Tables 10.1 and 10.3 show that (at 50% power generation) LDP006 discharges 720 ML/yr of highly saline liquid with 1465 t/yr of salt load; for conditions into the future (2030) EIS Tables 10.5 p10-14 and 10.7 p10-29 predict that LDP006 will discharge 785 ML/yr with a salt load of 1614 t/yr.

Disregarding any proposed LDP discharges, which should be sent to the Thompsons Ck Reservoir rather than to Wangcol Ck (conclusion C10 above), the cited Tables show that salt loads entering the Coxs R from Wangcol Ck are dominated by LDP006. Even if the proposed LDP discharges are considered, the salt loads become roughly equivalent for Scenario 2 (25% power generation), but dominant for Scenario 1 (0% power). This outcome implies that:

- As the aim is to substantially improve the water-quality of the Coxs R, the LDP006 and proposed LDP discharges must be transferred to the treatment plant via Thompsons Ck Reservoir. To do otherwise would be totally unacceptable.
- Due to the proposed LDP discharges, Scenarios 1 and 2 show that the volume of salt entering the Coxs R increases, while the power generated falls to zero. This must always happen unless the salt-load in the treated water is zero. However, the rate of salt-increase is a function of the amount of salt stripped by the treatment process – the more efficient the stripping, the better will be the outcome.

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[16] I have not investigated the details of this discharge, but the holding pond would seem to relate to run-off from the main coal reserve – the discharge is likely to be saline and carry some coal fines and metallic ions.

[17] The upstream water-quality was based on 1 Neubecks Ck site and 3 Wangcol Ck sires and showed increasing salinity down flow (EIS Section 10.2.5 p10.11).

[18] Birch, G., Siaka, M., and Owens, C. (2001). The source of anthropogenic heavy metals in fluvial sediments of a rural catchment: Cox's River, Australia. Water, Air and Soil Pollution **126**, pp.13-35

[19] The history and current concerns may be sighted by entering https://www.google.com.au/search?q=LDP013+pinedale+NSW&ie=utf-8&oe=utf-8&gws_rd=cr&ei=5pQeWLiHPMr-0gShxrDwCA, clicking on: (a) Independent Environmental Audit Pine Dale Mine 2014 and opening the pdf; and (b) Energy Australia NSW Pine Dale Mine and opening the PIRMP pdf.

[20] Submission about Springvale Water Transfer and Treatment Project SSD 16_7592 by Keith Muir on behalf of the Colong Foundation.

Although salt-loads are important, it is salinity which influences the ecological health of the creek. EIS Table 10.10 p10-39 obtains a 'model' salinity of 850 µS/cm at the Wangcol Ck-Coxs R confluence for Scenario 3. This is too high from an environmental viewpoint and supports the view that:

- the LDP006 discharges must be transferred to the treatment plant via Thompsons Ck Reservoir; and,
- the treatment plant should be designed to achieve a lower salinity output (<<350 µS/cm EC).

3.4.3 Other sources of Coxs R pollution

EIS Figs 10.1 p10-10 and 10.4 p10-20 show the distribution of the other LDPs linked to Springvale and Angus Place mines. They comprise LDP001 and LDP002 from Angus Place Colliery, Springvale's LDP001, and Lidsdale Siding's LDP004[21]; others such as Springvale's LDP009 and LDP010 will be discontinued (EIS Exec Summary pvii), or are in a different catchment (Springvale's LDP004 and LDP005).

The sources collectively amount to 922.3 ML/yr (EIS Table 10.6 p10-16) and 436.6 t/yr of salt load (EIS Table 10.8 p10-30) under all Scenarios. These sources are of little significance in terms of their impact on the Coxs River catchment. Likewise, even if diverted to the Thomsons Ck Reservoir, their contribution to power generation would be negligible. It follows that their principal value is environmental, and that will only be achieved by sending them to the treatment plant via Thomsons Ck Reservoir so that most of their salt and metallic ions are stripped from the Coxs R catchment.

It seems likely that the reason the EIS made no provision for these sources of raw mine-water to be captured and treated is one of cost for the companies.

3.4.4 Flow and Salinity outcomes

The decision by Springvale to discharge highly saline (~1200 µS/cm EC) and toxic mine-water into the Coxs R via LDP009 on Sawyers Swamp Ck was strongly opposed by environmental groups, the EPA and the IESC (Independent Expert Scientific Committee). The ultimate Consent Conditions (not least in respect of SSD_5594 Schedule 4 Conditions 12 and 13) were a somewhat clumsy and contrived attempt to deal with problems which should have been sufficient to reject the Springvale Extension. The matters of how to resolve the mine-water discharge and adequately protect endangered Newnes Plateau Shrub Swamps and Hanging Swamps are still an unacceptable mess.

The EIS Tables 10.9 and 10.10 p10-39 attempt to portray the SWTTP in a positive light. Only Scenario 3 is used to convey what might happen as predicted by modelling.

The water-volumes at various points in the Upper Coxs R system (Tables 10.9) show very little difference other than for the Wangcol Ck-Coxs R confluence and the Sawyers Swamp Ck-Coxs R confluence. The latter is a direct function of the proposed closure of LDP009; the former reflects the proposed transfer of the LDP009 discharges to the treatment plant and the discharge of excess treated water to the proposed LDP adjacent to Wangcol Ck and LDP006.

The salinity data (Table 10.10) are more interesting. The Swayers Swamp Ck-Coxs R confluence result for Scenario 3 is a direct consequence of the proposed closing of LDP009. The Wangcol Ck-Coxs R confluence shows a small decease in salinity due to flushing of the system by substantial discharges from the proposed LDP of excess low-salinity (~500 µS/cm EC) treated water. The remaining locations show substantial improvements (lowering) of the salinity due to salt being removed in the treatment plant and excess treated water being returned to the system.

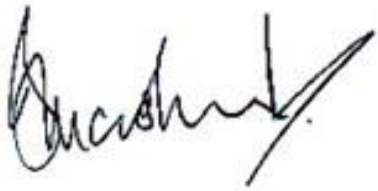
3.4.5 Conclusions for Section 3.4

[21] The possibility of transferring mine-water from Clarence Colliery to Thompsons Ck Reservoir as a basis for expanding the feed to the treatment plant is not part of this EIS, but it could resolve Clarence's problems over its pollution of the Wollangambe R.

The Society concludes that:

C11. The proposed closure of LDP009 and the transfer of the raw mine-water to a treatment plant at MPPS, together with returning excess treated water to the Wangcol Ck catchment, would yield positive outcomes. Nevertheless, there are simple modifications which could and should be made; they would increase the effectiveness of the treatment plant and have better environmental outcomes.

C12. Wangcol Ck contributed salinity and other contaminants to the Coxs R pre-LDP006. The toxic discharges from LDP006 have greatly magnified the problem, and discharging treated water (~500 µS/cm EC) to Wangcol Ck from the proposed new discharge point will further detract from water-quality of the Coxs R. To the extent that an important aim of the whole exercise is to greatly improve the water-quality, there has been a lowering of the salinity but this has in many cases been accompanied by increased water volumes and larger salt loads. There is room for improvement.



Dr Brian Marshall,
For the Management Committee.