Glyn Rhonwy Pumped Storage EN010072

WRITTEN REPRESENTATION REGARDING THE ISSUE OF WATER DISCHARGE and ENVIRONMENTAL QUALITY

11th April 2016

FROM JEFF TAYLOR ON BEHALF OF THE GROUP "CONCERNED ABOUT GLYNRHONWY"

Reference number: 10031989

Dear Mr Cowperthwaite

ENVIRONMENTAL EFFECTS OF WATER DISCHARGES

The Developer's assessment of environmental effects of water discharged by the proposed project is based on an inadequate sampling regime which grossly underestimates the potential effects of contamination resulting from the site's history as a dump for chemical and conventional weapons, and industrial and domestic waste both legal and illegal.

Control of such discharges is critically dependent on any monitoring regime imposed by the regulatory authorities. This may be have to be severe if it is to be effective. This may not be achievable in practice.

The quality of water discharges is clearly crucial for the aquatic environment downstream on both upper and lower sides of the scheme, the recreational use of the locality and its attendant socio-economic benefits, and the status of Llyn Padarn as a SSSI with Good bathing water status.

It may be that this is essentially regarded as a problem for the regulatory authority Natural Resources Wales, but it is worth considering the scale of the problem presented.

DISCHARGE DURING CONSTRUCTION

During construction it is proposed to pump c.100,000m^3 water from Q6 into Llyn Padarn, and c.5,000m^3 into the Nant y Betws.

The quality of this water is critical to the environment downstream of any discharge. Even at this advanced stage of the development very little is known about the quality of this water.

As far as I can tell from the developers documentation the almost derisory sampling effort of 2012 (four 500ml samples taken one fine July day and apparently scooped from the surface, just one liter per quarry) and with which the GC planning consent was secured, has now been supplemented by a further ***single*** sample from a few meters down in each of Q1 and Q6. A comprehensive suite of tests was carried out on these two samples (except testing for radioactivity – which might be advisable considering the site's history), but the effort is compromised by the likelihood that the tested samples are simply not representative as the quarry waters are currently fairly still and undisturbed, and contaminants are likely to lie within the slate and munitions debris piles at the bottom of the quarries (particularly Q6 but Q1 may also be suspect).

Quoting from the developer's documentation regarding 2015 sampling *: "a single sample taken from the lake centre was considered as being representative"* and *"No sediment found so none sampled"* hardly surprising .. the diver , knowing of the munitions history (see below), sensibly didn't go poking around in the slate rubble .. and of course that's where all the sediment, and likely contamination, will be.

And it seems remiss that no proper bathymetric survey has been carried out in the quarry ponds .. and that the developer's understanding of bottom topography is based on guesswork.

This apparently limited understanding of the quarry pondwaters is unacceptable.

The history of the site as a dumping ground for munitions from the second world war presents major challenges for the control of water quality discharged into both upper and lower catchments during the dewatering exercise, (particularly Q6 the tailpond), but the developer's documentation appears to gloss over the scale of this problem.

I strongly suspect that the whole Glyn Rhonwy site, but Q6 in particular, is contaminated not just with conventional munitions but with chemical weapons including Tabun nerve gas bombs, mustard gas bombs and phosphorus incendiary devices. Much of this material will be lying at the base of the known "bomb pile" in Q6 and covered to a large extent in slate rubble.

This is now supported by a large amount of documentation recently discovered in the public domain… *see my submission regarding the issue of munitions*

The same documentation indicates extensive communications with the public bodies of the time .. Gwynedd River Board Authority, The National Pollution Laboratory and The Chemical Defence Establishment at Porton Down (now superceded I believe by the Defence Science and Technology Laboratory) regarding the mortality of fish exposed to the contents of items found in Q6 (very high). So the environmental implications of the proposed discharge have been considered before.

Potential contaminants will likely include all the associated components and breakdown products of conventional weapons and their partial and complete incineration eg Lead Zinc Mercury Magnesium Phosphorus, phenolic compunds etc plus the actual products and breakdown products of Tabun nerve gas, Mustard Gas and possibly phosgene

Additionally, the whole wider site has been the receptacle over the years for legal and illegal dumping of industrial and domestic waste so these will add to the potential for pollution of the quarry ponds and therefore the downstream catchment areas.

As dewatering progresses and the water levels are lowered, it's likely the previously submerged slate piles will relax to a lesser angle of rest in air and there will be considerable mechanical disturbance. So there is a high chance of the contaminants mentioned above being re-mobilised.

- **If dewatering is to take place into the local catchment areas then monitoring of discharges will be critical.**
- **Therefore it is essential that any monitoring effort is effective in detecting such contamination and stopping the process before any of this water enters the downstream catchments and that an alternative plan is in place for dealing with this discharge.**
- **I think that the effluent should be pumped into alternating holding tanks/ponds and each one separately tested fully for contaminants as above before being released. Such complex analysis will not be instantaneous and once contaminated water has been discharged it will be too late, so a batch collection monitoring and discharge arrangement is essential.**

DISCHARGE DURING OPERATION

There will inevitably need to be discharge of excess water during the operational phase. This will have potential for carrying with it a similar suite of contaminants to the dewatering discharge.

Even at this advanced stage the flowpaths of water between the quarries and out of them seem to be poorly understood. **There may be routes for groundwater out of the quarries and into the downstream catchments over which the developers may have no control**. This is worrying if the quality of this water has been degraded by the thorough mixing effect of daily uphill and downhill movement between head and tail ponds.

In 2012 the developers estimated that before development there was 800m^3 per day going into Llyn Padarn from the quarry catchment through known routes .. now they are suggesting excess water of around 336m^3 per day. Why the discrepancy?

During the dewatering exercise in the nineteen seventies, it was reported that on one occasion after a period of heavy rainfall, the pumped out pond in Q6 (pit 2c as they called it then) was observed to rise by fifteen feet in 24hours .. (see documentation presented with munitions submission) suggesting that the catchment is very "flashy" and **there could well be a big problem with excess water. And this will likely occur at the same time that the Dinorwig scheme (and the wider region) is experiencing similar problems and needing to discharge into the Seiont thereby further exacerbating problems downstream. Will there be any attempt to co-ordinate with the competitor company across the valley?**

The developers are assuming that once the quarries are lined the water in the essentially closed system will be isolated from any other contaminating material previously impacted on the base and side of the quarries and in the much reworked slate waste around the edges … how will they know it's not leaking to some extent? Such leakage may carry contaminants via groundwater movement into into Nant y Betws or Llyn Padarn. They may even have sealed contaminants out of the quarries but into the debris behind the barrier which may then be mobilised by groundwater. If this happens then potential contaminants emanating from improperly disposed munitions at some later date may be beyond the reach of any engineering solution.

And **how might this discharge be monitored if flowpaths are not completely understood, such that some of the discharge is bypassing the monitoring points**?

The developer's documentation asserts that any excess water is essentially rainwater runoff and non-polluting and therefore not requiring permitting. **This is clearly not the case**

And so for these reasons operational discharges should be subject to the same rigorous control measures as described above for constructional discharges.

It may not even be possible to effectively monitor and control operational discharges as above if permitted as a continuous flow, i.e. the effluent should be pumped into alternating holding tanks/ponds and each one separately tested fully for contaminants as above before being released. In times of heavy rainfall this might require some *very* large batch holding tanks and a very quick turnaround for obtaining results from chemical analysis, and an effective alternative plan B if discharge to the local environment is unacceptable.

IN CONCLUSION

- **Because of the strong likelihood of contamination with chemical and conventional weapons the proposed discharges should only permitted with such rigorous monitoring and control conditions that , in order to be effective, they would require batch holding tanks of enormous size. This is probably not a practical proposition without re-designing much of the scheme, and the regulatory authorities may have difficulty in imposing such a regime. This may not be achievable in practice and, given the likely cost to the Developer, is even less likely to be successful if self-regulation is involved.**
- **It seems very strange that the developer would wish to proceed with major expenditure without much greater understanding of the chemistry of the pond waters. I believe that a far greater effort to research and define the water quality of the upper and lower quarry ponds is required before proceeding with this development.**
- **I believe the only way to ensure no detrimental effect to the local environment from water discharges from this scheme is to properly remediate the site with regard to munitions and other waste dumping, prior to reworking it for any development. The Ministry of Defence has pointedly *NOT* certified the site to be cleared of munitions (Q6), in spite of their efforts to achieve even the partial clearance they did manage in the seventies. But the developer has understated the challenge of addressing this issue and it may be beyond the resources anyone but national government.**