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Your reference:

Our reference:

Date: 7 February 2014

Dear Stella

In response to your letter of 24 January 2014 inviting the NI Environment Agency (NIEA) to make an oral presentation to the Committee regarding the Reservoirs Bill on 18 February 2014, I can inform you that Mr Peter Close will attend on behalf of NIEA's Environmental Protection Directorate and Mr Bob Davidson on behalf NIEA's Natural Heritage Directorate.

I also attach the submission of written information from NIEA ahead of the oral evidence being given.

I trust this information is of assistance, should you require anything further please contact me directly.

Yours sincerely,

Helen Richmond
DALO
[by e-mail]

The Northern Ireland Reservoirs Bill – safety policy proposals.

Submission of written information from the Northern Ireland Environment Agency (NIEA) ahead of oral evidence being given to the Agriculture and Rural Development Committee.

NIEA officials attended and contributed to the development and stakeholder engagement relating to the Northern Ireland Reservoirs Act. NIEA fully supports the safety aims and objectives of this legislation. NIEA recognises that the 17 (possibly more) planned reservoir releases for Northern Ireland Water (NIW) are important and necessary from a health and safety / reduction in flood risk perspective and therefore must be completed.

An expert engineer has inspected and recommended that refurbishment of the scour / stop valves in the existing structures must be replaced in the interests of safety. This recommendation will mean full drawdown of the reservoir to reduce the water pressure on the structure to enable the refurbishment of control valves. With the development of the Reservoirs Bill for Northern Ireland, these new policies and procedures should significantly reduce the risk of a dam failure and therefore an uncontrolled release of water, which could cause widespread flooding, damage to buildings and potentially loss of life.

NIW's targeted emptying plan does not need to wait for the Reservoirs Bill in Northern Ireland to be on the statute book and lessons learned will help inform the production of 'on site' emergency plans.

Environmental risks / potential impacts of the controlled emptying of reservoirs.

Poorly managed water releases from reservoirs can have significant impacts on the environment. The release of water from the bottom layers of the reservoir through the scour valve will inevitably contain suspended solids from the floor of the reservoir and the water / sediment may contain polluting concentrations of metals and possibly chemicals.

If not carefully controlled, the release volume, its velocity and the pollutant content can significantly impact habitats, damage ecosystems, displace fish, erode river banks and flood properties and displace people. NIEA recognises that some sediment release is inevitable and acceptable, since in the absence of the dam it would have been transported naturally down the river and controlled quantities of sediment can be beneficial. However, it is important that the released sediment does not overwhelm the natural transport mechanism and damage the downstream river and established ecosystems.

Timing the planned opening of scour valves to coincide with higher natural river flows, for example, following rainfall when the river is transporting elevated concentrations of natural sediments will help to prevent localising sediment accumulation.

The gradual opening of the scour valve will also mobilise less sediment.

As the scour valves have not been opened for some years, NIW should first carry out a survey to establish how much sediment has accumulated and estimate the quantity likely to be washed out through the scour valve. Alternatively, water could be siphoned off from the top of the reservoir with the siphon pipe being lowered as the reservoir level drops.

NIW should also consider whether pollutants might be present in significant amounts within the sediment and/or the water.

If an initial risk assessment indicates that sediments might contain pollutants, the sediment must be chemically tested.

If NIW identifies high levels of metals or other pollutants in the dam sediment, then NIW must consult NIEA to discuss additional mitigation measures which may be required.

It may be necessary for NIW to dredge sediment from the reservoir before the emptying of water through the scour valve. Dredged sediment will be waste and treated as such within the bounds of the waste regulatory framework. Stratification is one of the most environmentally damaging aspects of reservoir releases; causing pollution and killing fish and other creatures that may reside in the reservoir itself.

The Northern Ireland Reservoirs Bill – safety policy proposals.

Submission of written information from the Northern Ireland Environment Agency (NIEA) ahead of oral evidence being given to the Agriculture and Rural Development Committee.

1. NIEA officials attended and contributed to the development and stakeholder engagement relating to the Northern Ireland Reservoirs Act. NIEA fully supports the safety aims and objectives of this legislation.
2. NIEA recognises that the 17 (possibly more) planned reservoir releases for Northern Ireland Water (NIW) work is important and necessary from a health and safety / reduction in flood risk perspective and therefore must be completed.
3. An expert engineer has inspected and recommended that refurbishment of the scour / stop valves in these existing structures must be replaced in the interests of safety. This recommendation will mean full drawdown of the reservoir to reduce the water pressure on the structure to enable the refurbishment of control valves.
4. With the development of the Reservoirs Bill for Northern Ireland, these new policies and procedures should significantly reduce the risk of a dam failure and therefore an uncontrolled release of water, which could cause widespread flooding, damage to buildings and potentially loss of life.
5. NIW's targeted emptying plan does not need to wait for the Reservoirs Bill in Northern Ireland to be on the statute book and lessons learned will help inform the production of 'on site' emergency plans.

Environmental risks / potential impacts of the controlled emptying of reservoirs.

6. Poorly managed water releases from reservoirs can have significant impacts on the environment.
7. The release of water from the bottom layers of the reservoir through the scour valve will inevitably contain suspended solids from the floor of the reservoir and the water / sediment may contain polluting concentrations of metals and possibly chemicals.
8. If not carefully controlled, the release volume, its velocity and the pollutant content can significantly impact habitats, damage ecosystems, displace fish, erode river banks and flood properties and displace people.
9. NIEA recognises that some sediment release is inevitable and acceptable, since in the absence of the dam it would have been transported naturally down the river and controlled quantities of sediment can be beneficial. However, it is important that the released sediment does not overwhelm the natural transport mechanisms and damage the downstream river and established ecosystems.
10. Timing the planned opening of scour valves to coincide with higher natural river flows, for example, following rainfall when the river is transporting elevated concentrations of natural sediments will help to prevent locally damaging sediment accumulation.
11. The gradual opening of the scour valve will also mobilise less sediment.
12. As the scour valves have not been opened for some years, NIW should first carry out a survey to establish how much sediment has accumulated and estimate the quantity likely to be washed out through the scour valve. Alternatively, water could be siphoned off from the top of the reservoir with the siphon pipe being lowered as the reservoir level drops.
13. NIW should also consider whether pollutants might be present in significant amounts within the sediment and/or the water.
14. If an initial risk assessment indicates that sediments might contain pollutants, the sediment must be chemically tested.
15. If NIW identifies high levels of metals or other pollutants in the dam sediment, then NIW must consult NIEA to discuss additional mitigation measures which may be required.
16. It may be necessary for NIW to dredge sediment from the reservoir before the emptying of water through the scour valve. Dredged sediment will be waste and treated as such within the bounds of the waste regulatory framework. Stratification is one of the most environmentally damaging aspects of reservoir releases; causing pollution and killing fish and other creatures that may reside in the reservoir itself.
17. During summer months, the sun warms the surface waters whilst the deeper water remains colder. This produces two separate layers of water that do not mix, separated by a layer where the temperature and density change rapidly, called the thermo-cline.
18. As the lower layer of water is not in contact with the air, little oxygen reaches it. The decay of organic matter in the water and the depletion of oxygen on the bed of the reservoir may make it become completely anoxic.

19. This increases the concentrations of substances such as iron, manganese, ammonia and sulphides in the water and it may become toxic to fish and other aquatic life as well as creating an offensive smell and appearance.
20. NIW can prevent stratification in reservoirs by using de-stratification devices, such as a bubble curtain, that keeps the water mixed in spring and summer.
21. However, since stratification can be unpredictable, the undertaker should continuously monitor and test the dissolved oxygen levels in the reservoir during the emptying process as the reservoir may stratify. A significant release of reservoir water containing low levels of dissolved oxygen would adversely impact the receiving waterway and its ecology.
22. The authorisation from NIEA may make it an offense to make planned releases of bottom water when the reservoir is stratified.
23. Algal blooms in the reservoir may also result in poor quality discharge water.
24. NIW should not empty a reservoir at a time when a significant algal bloom is occurring, unless it can be shown that the bloom will not affect the receiving waterway.
25. Where planned work could affect Natura 2000 sites the competent authority is required to carry out a Habitats Regulations Assessment to ensure that the project will not adversely affect the integrity of the Natura 2000 site.
26. Where planned work could impact on Areas of Special Scientific Interest (ASSIs) public bodies must ensure that the work does not cause significant damage to ASSI features.
27. Planned work must not be allowed to harm European protected species or nationally important species and where necessary appropriate licenses sought and mitigation measures put in place.
28. Outside designated sites priority habitats and species should not be subject to unacceptable adverse impact.

In summary, a suggested programme of works.

29. Environmental risk assessments should be completed at each reservoir where there are issues relating to Natura 2000 sites, ASSIs, locally important sites, European priority species, nationally important species, priority habitats, priority species or other natural features consulting NIEA Natural Heritage as necessary.
30. A method statement should be developed for the refurbishment work clearly identifying in the plan the steps to be taken to mitigate against the cumulative impacts of numerous emptying activities on the receiving waterway if that is planned. An example of this is in the Woodburn series of reservoirs.
31. Following an assessment of the environmental risks NIW should agree with NIEA the order in which reservoirs will be emptied.
32. If feasible, divert any feeder streams to prevent them from entering the reservoir; this will greatly reduce the time needed to empty these systems.
33. Quantify the sediment load within the reservoir and the amount likely to be mobilised. Test the sediment for contamination and provide detailed mitigation proposals if a pollution risk is identified.
34. Plan sediment releases using the following steps – take as much potable water as possible out of the reservoir via the drawdown tower. Once sediment and pollutant risks are mitigated for start the scour valve drawdown. The volume and velocity should be ramped up to mimic a natural storm event.
35. If sediment quantities, sediment availability and pollutants contained in sediment present an unacceptable risk to the receiving waterway, NIW should consider pumping water out of the reservoir via the spillway or using a large siphon pipe system to draw out of the reservoir. The siphoning method was suggested by the Scottish Environmental Protection Agency (SEPA) and possibly could allow for a mobile drum filter to be used to further reduce pollution risk.
36. Assess the risk for the reservoirs located around Belfast and Bangor where the release water will travel through urban streams / culverts that *in situ* pollutants are not mobilised which then impact fish, or estuarine / coastal water quality. These reservoir releases may be better planned for periods when sufficient natural flow could buffer any likely impacts. The volume and velocity planning will need careful consideration.
37. Downstream abstractors, dischargers and recreational water users should be made aware of when these releases occur.
38. NIW should as a priority consult with NIEA (Natural Heritage Directorate) to discuss any additional monitoring / surveys *etc* needed to inform the Habitats Assessment process. Biodiversity and protected sites should also be taken into consideration.

39. NIW will be required to submit a pollution prevention plan and monitoring plan to ensure that each controlled release meets the NIEA requirements. Flow, velocity, quality, biodiversity requirements will need prior agreement with NIEA.
40. NIW should consider as a mitigation measure 'in river' enhancement works following these controlled reservoir releases. A good source of advice and guidance on river enhancement works is the River Restoration Centre in the UK.
41. NIEA will not licence this issue, however, it will regulate under Article 7 of the Water (Northern Ireland) Order 1999, which makes it an offence, whether knowingly or otherwise, to discharge or deposit any poisonous, noxious or polluting matter so that enters a waterway or water in any underground strata.