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Official Report

RURAL AFFAIRS AND ENVIRONMENT COMMITTEE

Wednesday 15 December 2010

Session 3

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RURAL AFFAIRS AND ENVIRONMENT COMMITTEE
29th Meeting 2010, Session 3

CONVENER

*Maureen Watt (North East Scotland) (SNP)

DEPUTY CONVENER

*John Scott (Ayr) (Con)

COMMITTEE MEMBERS

Aileen Campbell (South of Scotland) (SNP)
*Karen Gillon (Clydesdale) (Lab)
*Liam McArthur (Orkney) (LD)
*Elaine Murray (Dumfries) (Lab)
*Peter Peacock (Highlands and Islands) (Lab)
*Bill Wilson (West of Scotland) (SNP)

COMMITTEE SUBSTITUTES

Rhona Brankin (Midlothian) (Lab)
Jim Hume (South of Scotland) (LD)
Jamie McGrigor (Highlands and Islands) (Con)
*Sandra White (Glasgow) (SNP)

*attended

THE FOLLOWING GAVE EVIDENCE:

Professor David Crichton
Peter Farrer (Scottish Water)
Tom Inglis (Scottish Environment Protection Agency)
Alex Macdonald (Institution of Civil Engineers)
Mark Noble (Scottish and Southern Energy)
John Reid (Tinto Reservoirs Ltd)

CLERK TO THE COMMITTEE

Peter McGrath

LOCATION

Committee Room 1

Scottish Parliament

Rural Affairs and Environment Committee

Wednesday 15 December 2010

[The Convener *opened the meeting at 10:00*]

Subordinate Legislation

Beef and Veal Labelling (Scotland) Regulations 2010 (SSI 2010/402)

Plant Health (Import Inspection Fees) (Scotland) Amendment Regulations 2010 (SSI 2010/405)

The Convener (Maureen Watt): Good morning. I welcome everyone to the committee's 29th meeting of the year. I ask you all to switch off your mobile phones and BlackBerrys as they impact on the broadcasting system. Once again, Sandra White is substituting for Aileen Campbell. We offer Aileen and Fraser our congratulations on the birth of their son Angus a few days ago.

The first item of business is consideration of two negative instruments: the Beef and Veal Labelling (Scotland) Regulations 2010 (SSI 2010/402) and the Plant Health (Import Inspection Fees) (Scotland) Amendment Regulations 2010 (SSI 2010/405). The Subordinate Legislation Committee has commented on the beef and veal labelling regulations, and copies of the extract from the relevant report have been issued to all committee members with their meeting papers.

No motions to annul have been lodged on either instrument. If members have no comments, does the committee agree that it has no recommendation to make on SSI 2010/402 and SSI 2010/405?

Members *indicated agreement.*

Reservoirs (Scotland) Bill: Stage 1

10:01

The Convener: The main purpose of our business today is to take evidence on the Reservoirs (Scotland) Bill. We will hear from two panels of stakeholders.

For our first panel, I welcome to the committee: Peter Farrer, customer service delivery director at Scottish Water; Tom Inglis, chief officer operations at the Scottish Environment Protection Agency; and Alex Macdonald, member of the all-reservoir panel and fellow of the Institution of Civil Engineers. I thank the witnesses for their submissions from their organisations, which we have all considered with interest. To maximise the time available we will go straight to questions, which Peter Peacock will begin.

Peter Peacock (Highlands and Islands) (Lab): Good morning, gentlemen. You are obviously aware of the detail of the proposal that the size at which reservoirs are controlled under the legislation will change from 25,000m^3 to 10,000m^3. First, is that the right size? Is it an appropriate figure or it is too big or small? Secondly, how many additional reservoirs do you expect to fall into the category of 10,000m^3?

Alex Macdonald (Institution of Civil Engineers): I can answer in relation to the 10,000m^3 capacity.

The figure of 10,000m^3 came from discussions that took place when legislation and changes to legislation were considered for England and Wales. The Environment Agency wanted to move towards a risk-based approach for reservoirs as opposed to an approach based on the straight 25,000m^3 capacity. It proposed various capacity figures that were subsequently discussed with the Institution of Civil Engineers. A figure as low as 5,000m^3 was talked about at one point. From ICE's perspective, we felt that that would be too low. We believe that there is a case for moving down from the current 25,000m^3 figure and, having looked at the results of various research studies in England and Wales, we believe that 10,000m^3 is the appropriate de minimis figure to use for new legislation. My understanding is that it is the figure that is ultimately planned to be used in England and Wales, too.

Peter Farrer (Scottish Water): On the number of reservoirs, clearly I am speaking only about Scottish Water's reservoirs. We currently have 270 reservoirs that are covered; a further 95 reservoirs are between 10,000m^3 and 25,000m^3 and will come under the new legislation. Of those 95, 34

are small dams and 61 are what we class as clear water tanks, which are treated drinking water tanks.

Tom Inglis (Scottish Environment Protection Agency): In the wider sphere, I understand that the existing legislation covers 650 reservoirs and that the Scottish Government is working on a geographic information system to find out how many other reservoirs might be covered with this reduction. At the moment, SEPA has guesstimated a total of 1,150. The final total could well be below or greater than that in due course, but all our financial planning has been based on that figure.

Peter Peacock: And that includes everything.

Tom Inglis: Yes. That is the national figure.

Peter Peacock: How many of those reservoirs have been classified or registered by SEPA under the Water Environment (Controlled Activities) (Scotland) Regulations 2005?

Tom Inglis: I cannot tell you right now, but I can certainly get you the figure.

Peter Peacock: Will it be a significant proportion?

Tom Inglis: It should be, but it all depends on the number of operators that have registered. The Scottish Government's work will help us to identify any existing gaps in the controlled activities regulations register and the need for further registration under the Reservoirs (Scotland) Bill. We expect to use the same database of information to deliver the requirements of both the CAR and the bill, simply by appending additional features to it.

Peter Peacock: As Mr Macdonald indicated, the bill moves towards a more risk-based approach. On the face of it, there will be a significant increase in the number of regulated or controlled reservoirs, which will add to administrative burdens, costs to owners and so on. Is there a case for taking a very light-touch approach to any very low-risk reservoirs that might now be covered in this category?

Tom Inglis: Having read the bill, I am quite clear that that is exactly the policy intent. On low-risk reservoirs, the obligation on the operator is far lower than that on an operator of a high-risk site. Equally, however, any risk is important, given that under the Flood Risk Management (Scotland) Act 2009 we have the responsibility of looking at a wide range of flood risk throughout a whole catchment. It is important to know that a reservoir of such a size exists but, as I have said, lesser regulation would apply than that for a high-risk reservoir.

Peter Peacock: In the wider environment, new small hydro schemes are being encouraged as part of our efforts to combat climate change. I am advised that 10,000m^3 is about the volume of four Olympic swimming pools, which is not that huge. Is there any danger that the legislation might catch in a new regulatory scheme the new small-scale hydro developments that the Government is encouraging or, in your experience, do the reservoirs for such developments tend to fall below the 10,000m^3 threshold?

Alex Macdonald: Many of the new small hydro schemes are what we call run-of-the-river schemes. It will all depend on the size of their head and intake works, but some might well have a capacity of greater than 10,000m^3 and therefore fall within the scope of the bill. I know that a 3MW or 5MW scheme that was recently built by Scottish and Southern Energy fell within the terms of the Reservoirs Act 1975. Although that is not huge, it is nevertheless covered by the current provisions and it is possible that some of the small hydro schemes to which you refer will come within the bill's scope.

Peter Peacock: Did you want to add anything, Mr Inglis?

Tom Inglis: I was simply going to highlight the difference between schemes with reservoirs and run-of-the-river schemes and say that the majority of new hydro schemes that we deal with are run-of-the-river schemes with very small storage elements.

Peter Peacock: I am advised that, over the decades, the original plans for some reservoirs have been lost—I take it that that is for reservoirs that are not natural. How easy is it to calculate that a reservoir is 10,000m^3? People whose reservoirs are on the border of that capacity will not want to get involved in more administration or responsibility if they can avoid it, so there is scope for debate on that. How will you proceed on that issue? Perhaps that is a question for SEPA, although I do not know.

Tom Inglis: It is an interesting question because, if SEPA wishes to take enforcement action against an individual for failing to register their reservoir under the proposed legislation, we will need to have evidence. So, the onus will fall back on to the regulator if it wishes to take enforcement action. Initially, we would wish to work with reservoir operators to assist them in identifying whether they fall into that category. We will have a two-stage approach. We wish to work with the operators to assist them in identifying the size of their reservoir but, at the end of the day, if we wish to take enforcement action, the onus will fall wholly on SEPA to demonstrate that there has been a failure to register.

Peter Peacock: Is it comparatively straightforward to get agreement on the size? I do not know, as I am not an engineer. Would the process ultimately be arbitrated?

Tom Inglis: There are proposals in the bill for regulation that sets out how to calculate the size of a reservoir, so that option is there. However, it is a surveying exercise that requires the profile of the bed of the reservoir to be surveyed and the total volume to be calculated, and it is very much a well-known and well-rehearsed civil engineering process.

Peter Peacock: What is your estimate of the potential cost to SEPA of doing that? Is it an expensive process?

Tom Inglis: I cannot give you an exact figure, but we have included that cost in our overall costings for the bill.

Alex Macdonald: I can give an indication of the cost, because the issue arises under current legislation when reservoirs border on 25,000m^3. For a typical reservoir of that size, a bathymetric survey and calculation of the volume might cost between £500 and £1,000.

Peter Peacock: That is helpful.

Liam McArthur (Orkney) (LD): I will stick with the issue of cost. Mr Inglis talked about a desire to work collaboratively with reservoir owners and operators. I presume that part of the thinking behind the incentive of the six-month period of free registration is to give that signal. In your calculations, how many reservoir operators sit outwith CAR and are likely to have to be registered, and how many of those are likely to take advantage of the six-month grace period?

Tom Inglis: There is a difficulty in identifying that number. The existing legislation requires CAR impoundment operators to register with us, so we have a database with all the registered CAR activities. The exercise that the Scottish Government is undertaking is a map-based one and should identify the extent of the gap. As I do not know how many there are potentially, I do not know what the difference is between the number that we have and the total number that will come out of that exercise.

Liam McArthur: Will you start by approaching directly those who are CAR registered, for whom it is fairly clear that they fall under the bill and will be required to register? So it is simply those who are not CAR registered—

Tom Inglis: The issue is the gap between the total number of operators in Scotland and the number who have registered under CAR.

Liam McArthur: It strikes me that there is considerable uncertainty on the numbers. I understand why that is, but it is difficult to see how you could have done the modelling to arrive at costs for registration with any degree of certainty, given the number of unknowns in the process.

Tom Inglis: The figures that I have seen for the additional number range from 150 to 1,000. We have taken a midpoint, added that to the 650 that are registered under the current legislation and come up with a working number of 1,150. We have designed our processes for 1,150. If there are substantially more, we would have to rethink the costs.

Liam McArthur: At what level will the registration costs that you envisage be pitched? I presume that they will be somewhat short of the £500 to £1,000 that it would require to undertake the mapping exercise to which Mr Macdonald referred.

10:15

Tom Inglis: In the early stages—the six-month period—we would not see the applicant paying for that exercise.

Liam McArthur: What about thereafter?

Tom Inglis: Thereafter, we would recover our costs.

Liam McArthur: Do you have any idea what the applicant might have to pay in order for you to recover your costs, given the uncertainty that exists around the overall numbers and those who are likely to take advantage of the six-month grace period?

Tom Inglis: We have calculated estimated costs for each of the risk categories. I do not have them to hand, but they range from a few hundred pounds to a few thousand pounds, depending on the risk. I can present those figures to the committee in due course.

Liam McArthur: That would be helpful.

You will be writing to those people who are currently CAR registered, anyway. Are you satisfied that the work that SEPA will do will not overlap with the work that is already being done by the reservoir managers under CAR, in terms of the mapping of those reservoirs?

Tom Inglis: Our clear desire is to minimise duplication all the way down the line. That is why I indicated that we see a clear integration of the CAR-controlled activities regulations and the reservoirs legislation. We want to minimise bureaucracy wherever possible with regard to the themes of better regulation. That is an underlying principle of the bill.

John Scott (Ayr) (Con): In terms of risk assessment, ICE suggests that only

consequences should be taken into account, rather than the environment, cultural heritage and other social and economic interests. Do the other members of the panel agree?

Peter Farrer: Scottish Water's submission says that we consider that risk is a product of consequence and probability. We have about 92 concrete clear water tanks that will fall under the legislation, and our view is that they are not subject to the same level of risk as an impounding dam is. We can control flows into a clear water tank, whereas an impounding reservoir is subject to weather conditions and flows of water into the reservoir that cannot be controlled, in a lot of cases.

Tom Inglis: I understand that the policy objective behind the inclusion of those parameters is to ensure consistency with the Flood Risk Management (Scotland) Act 2009, which also uses them. SEPA has to take those parameters into account in terms of its wider responsibilities under the 2009 act.

John Scott: Mr Macdonald, I presume that you are happy with your statement.

Alex Macdonald: Yes. The reservoirs legislation is primarily concerned with public safety, and public safety should be paramount. Our main concern on risk was to do with the assessment of some of the other aspects that were covered by the bill and whether, for example, maintenance and the form of the construction of the reservoir should be taken into account. We believe that it is difficult to assess the probability of the failure of structures such as impounding dams or embankment dams.

Extensive studies were conducted a number of years ago by the Department for Environment, Food and Rural Affairs—I chaired one of the steering groups—to consider the issue of quantitative risk assessment for United Kingdom dams. The bottom line of those studies was that there was not sufficient evidence to allow probability to be fully taken into account with regard to reservoir safety, and that consequence should be the key driver.

John Scott: Are there any specific types of dams that have failed elsewhere in the UK and worldwide and which are more prone to failure than others? Can you work out the probability from the type of dam construction, or is that simply not relevant?

Alex Macdonald: Looking worldwide is very difficult. Embankment dams are generally regarded as being more prone to failure than concrete dams or the concrete storage tanks that Peter Farrer talked about.

John Scott: What kind of dams? I am sorry.

Alex Macdonald: Embankment dams are more prone to failure than concrete dams. However, there is not a lot of information worldwide. An issue in the UK is that our dams are older than many others because of our history, with the industrial revolution. Many of our dams are 100 to 150 years old, and we are only now starting to gather evidence on their ageing process and what the risks of ageing are. We can assess the likelihood of failure in terms of overtopping due to floods, because there is a lot of hydrological information, but there is hardly any information on aspects such as the internal erosion of dams, which is the second most common cause of failure, that will allow us to assess probability.

John Scott: It seems slightly unsatisfactory that we cannot do something because it is too difficult, but that could be the real world.

On the ICE evidence and SEPA essentially being the main regulatory body, is there a sufficient level of civil engineering expertise in SEPA to be able to police matters effectively?

Tom Inglis: The bulk of the bill sets out an administrative role for SEPA. There are exceptions in respect of stop notices and the assessment of risk, but we certainly wish to engage and use panel engineers where that engineering knowledge is required. We have enough knowledge to be able to be an intelligent customer for the panel engineers.

Bill Wilson (West of Scotland) (SNP): I want to know whether I understood Mr Farrer's answer correctly. He seemed to say that one type of dam is safer because it can be opened up and allowed to drain off. Is that correct?

Peter Farrer: I was simply distinguishing between the earth embankment dams in impounding reservoirs that Alex Macdonald talked about and the concrete storage tanks that we use in the network for clear drinking water storage. In that case, water goes into and out of the tank through pipes that we control. We can control flows in and out of the tanks, in effect, and we consider that there is a different probability of failure for them than there is for an impounding reservoir, in which there is no control over weather conditions or upstream flows.

Bill Wilson: That implies that you tend to view risk more in relation to your ability to respond to something going wrong than in relation to something actually going wrong. Is that your view?

Peter Farrer: No. I have made it clear that we consider it as a product of consequence and—

Bill Wilson: I understand that; I was just considering the risk aspect, not the consequence aspect. You seemed to say that you have a lower risk because you can respond, whereas there is

not an effective response in other dams, which are therefore higher risk. That implies that you view risk in terms of your ability to respond rather than in terms of the possibility of failure. Am I overinterpreting what you said?

Peter Farrer: Yes. Basically, we are saying that there are proposals in the bill that use consequence and probability for the risk designation, and we agree with that.

John Scott: I want to return to the concept of an intelligent customer. Are there other precedents? The responsibility for managing reservoir and dam structures is being given to SEPA from local authorities. Many local authorities will have resident engineers who consider such matters. My degree is in civil engineering, so I have the highest respect for the Institution of Civil Engineers. Nonetheless, is it normal practice for a regulatory body such as SEPA to give over regulatory capacity to another body? In essence, you are depending on ICE and the panel of engineers to provide you with the regulatory interpretation that you will then enforce. Is that normal practice? Are there other areas of the regulatory world in which expertise is farmed out in that way?

Tom Inglis: We occasionally have to call in additional expertise. For example, we will seek to have elements of our decommissioning work at Dounreay reviewed by experts in that field. We will take their advice and come to a view on how to regulate on that basis. Such practice is not uncommon. We certainly respect the fact that the panel of engineers is the only place where we can find the expertise on reservoir safety that is essential for fulfilling the obligations under the legislation.

John Scott: Is SEPA content that it can successfully integrate the Water Environment and Water Services (Scotland) Act 2003, CAR, flood risk management and reservoir safety? Can all that be pulled together in an integrated and cohesive way, or do you foresee problems?

Tom Inglis: I do not foresee any significant problems. We have the capacity at the moment to record the impoundments in the controlled activities regulations. That database will be essential to assist us with our flood risk management work. Obviously, an uncontrolled release from a reservoir will be an element in all our flood risk management work. So, there is a very sensible integration of all those responsibilities into a single body, which we hope will deliver a consistent approach across Scotland to all matters relating to flooding.

John Scott: Does anyone else foresee problems?

Peter Farrer: Our only concern is that the reservoirs that we operate are for drinking water purposes only. We do not operate those reservoirs for flood prevention purposes. Clearly, additional responsibilities are associated with the Flood Risk Management (Scotland) Act 2009, which may mean that some things have to be clarified further. For example, if a disused reservoir has to be abandoned under the legislation it may be better to keep that reservoir in action to prevent flooding downstream. There are complexities that still have to be ironed out.

John Scott: That leads us on nicely to the discussion of the costs, not only to public bodies but to individuals, of subsistence charging. Costs are likely to increase enormously, given the further overlay of regulation from the bill. Have you any comment to make on that? Are the costs financially sustainable?

Peter Farrer: We provided detailed costs as part of our submission to the Finance Committee. The indicative costs for us, bearing in mind that we have had to make some judgments on the risk designation categories for reservoirs, are roughly £95,000 per year additional operational costs, with a one-off cost of about £2 million.

John Scott: But you are currently not funded to do that, are you?

Peter Farrer: We are not funded to do that within the current regulatory period 2010 to 2015.

John Scott: So you are not funded to do it as a public body. For private individuals, too, the costs will be an additional burden that they must deal with. However, I think that we will take evidence on that from the next panel.

Will the wording of section 21(2) enable SEPA to treat public safety as the primary concern? Does the wording need to be changed? Are you happy with it, or do you think that amendments are needed?

10:30

The Convener: Section 21(2) talks about

"potential damage to ... human health ... the environment"

and

"cultural heritage".

John Scott: Have I already asked about that? Forgive me. I will move on to another subject.

The Convener: You had not asked the question before.

John Scott: I just thought that I had. I will leave it for now.

How many engineers are on the current panel? Is that sufficient to administer the new reservoir

safety regime adequately? Will engineers come from throughout the United Kingdom?

Alex Macdonald: I have figures that I have picked off the current list of panel engineers. The UK has 44 all-reservoir panel engineers, who are qualified to do any activity under the 1975 act. Eight of them are based in Scotland. The population of all the panel engineers is ageing. Of the eight who are based in Scotland, roughly six are over 60.

There are two smaller panels of engineers for non-impounding reservoirs and service reservoirs. The non-impounding reservoir panel has four members and the service reservoir panel has six members, and one member of each panel is based in Scotland.

The other major panel is the supervising engineer panel, which has 163 members. That population is ageing, too. At its peak, that panel had about 350 members, but it is now down to 163. Of those 163, 28 are based in Scotland. They are a mix of people who work for consultancies, for public bodies such as Scottish Water and for other private owners.

The institution believes that the number of all-reservoir panel engineers is probably sufficient for the foreseeable future, even if we allow for some people to retire from the panel, as some new members will always join. Our major concern is about the number of supervising engineers, which is declining. That issue will need to be addressed here and in England and Wales.

All-reservoir panel engineers operate throughout the UK, so I operate throughout the UK. Supervising engineers are probably a bit more geographically focused, because they are responsible for a reservoir at all times, as the 1975 act says. Supervising engineers tend to work in fairly narrow geographical areas.

John Scott: You said in your submission that you were not happy with the concept of an engineer being responsible at all times and that the responsibility should be more for one job and then another job. Am I right in saying that?

Alex Macdonald: That comment related to inspecting engineers, who we felt should have one job. At present, supervising engineers are responsible at all times, whereas inspecting engineers are appointed for an inspection, in the role of construction engineer or to supervise measures in the interests of safety—those are individual appointments. Supervising engineers are appointed at all times.

John Scott: Am I right in saying that you were not happy with the six-year inspection period and that you preferred a 10-year period?

Alex Macdonald: We felt that 10 years fitted in more with the inspection period. However, since writing the submission, I have come to understand that the period of six years is based on other legislation that relates to floods—that is the reason for the six-year period. We have no strong feelings; we just felt that 10 years would give reservoir managers more stability. They would know where they were for those 10 years.

John Scott: Does the United Kingdom panel have sufficient engineers for a six-year inspection regime?

Alex Macdonald: The requirement is not for the inspection regime to be every six years; it is the risk category that SEPA will assess every six years. The inspection regime will still be every 10 years.

Tom Inglis: The correlation with the six-year period is to ensure that, when SEPA reviews its flood risk plans, which it has a statutory responsibility to do, it should take account of any changes at that time and consider reservoir risk. The policy intent is not to have a full-blown review every time we come round on the six-year cycle but to have cognisance of reservoir safety in our overall responsibility for reviewing flood plans on a six-year programme.

John Scott: It is proposed that construction engineers are to be prevented from further involvement in a reservoir's alteration. How might that be rectified? Is that a sensible proposal?

Tom Inglis: Personally, I do not think that it is a sensible proposal, as the construction engineer is probably one of the optimal people to look at any further work on a dam in whose core design they have been involved.

John Scott: That would seem to be the case to me, but there must be some raison d'être for the proposal.

Alex Macdonald: I am not sure what the reason is. Currently, construction engineers are not allowed to act as inspecting engineers when a reservoir in whose construction they were involved comes up for inspection. There is a good reason for that, which is to provide an independent review of the reservoir at the first inspection. However, we cannot see any reason for the original construction engineer to be excluded from involvement when a reservoir is being altered and is being enlarged in size. In fact, we think that it would be a very positive thing for that construction engineer to be involved.

John Scott: Finally, I will ask about the risk to reservoirs of peat slide and landslip, which is raised in particular in Professor Crichton's evidence. Do you take those matters into account

when you evaluate the long-term safety of a structure?

Alex Macdonald: Yes, we do. Every inspection report that I write will have a section to do with a review of the reservoir basin and the banks. It is very rarely a problem and I have never known it to be a problem in Scotland. There was one very high-profile failure in Italy back in the late 1950s at Vaiont, where there was a major landslip, water went over the top of the dam to about 100m in height and many people were killed downstream.

I have never known landslip to be a major issue in the UK. There is a reservoir down in the peak district that I was involved in where there is an active landslip on the reservoir side. That is actively monitored and reported on in inspecting engineer reports, so it is taken into account.

John Scott: Professor Crichton suggests that the risk will increase, and we will quiz him about that later, but we have you here just now. Are the risks massive? He suggests that risk will increase because of climate change as there may be higher rainfall and more slip circle—I am scratching something out of my memory—clay subsidence. Is there increased risk because of climate change?

Alex Macdonald: There is certainly likely to be an increased risk of shallow failures in reservoir basins, due to the fact that, as we get intense rainfall, the ground may become saturated and may slip. We have seen that on some trunk roads in Scotland, where there have been some failures. On whether there is a serious risk, the failures are generally fairly small and shallow and the amount of material going down into most of our reservoirs will not cause a major problem; it will be absorbed in the body of the reservoir. The more deep-seated failures, certainly in a Scottish context, will tend to result from major faulting in rock or major slip areas in some of the rock strata. In Scotland, the risk of that is likely to be low.

John Scott: We talked about some of the structures in question being 100 to 150 years old. Is there no way of assessing the ageing process of those structures, except to say that they have almost aye been there, so they are likely to remain there? How do you propose to model the risk of that ageing process in future, or are dams static once they have been put in place?

Alex Macdonald: The highest-risk period for any dam is the first 10 years after construction and then, ultimately, as it starts to get really old. The intent of the Reservoirs Act 1975 was to introduce the concept of the supervising engineer, who would be responsible for a reservoir at all times. That was to try to ensure that someone with an engineering background would visit the reservoir. That might happen only once or twice a year, but at least the reservoir would be kept under observation and change would be monitored. The key factor that we look for in any dam that we inspect or supervise is change. Have the levels changed? Is settlement occurring in the dam? Are the drainage flows increasing? Is the drainage flow clear or is it coloured? With reservoirs, we rely on a lot of visual observation. Unless we heavily instrument dams—the cost of which, for the UK's stock of dams, would be enormous and unjustified—we must rely on visual observation.

John Scott: Does anyone else have any views on that?

Peter Farrer: No, other than to add, as someone who has acted as a supervising engineer, that Alex Macdonald is right: it is about monitoring the change associated with dams. Even if small seepages occur, they can heal homogeneously over time. A supervising engineer's duty is to monitor flows. We put in things such as V-notch weirs so that we can monitor flows to ensure that we can identify change as soon as it happens. It is a fairly robust process. The Reservoirs Act 1975 has served us well in allowing us to have a good handle on the stability of our assets.

Elaine Murray (Dumfries) (Lab): I want to move on to the provisions on the preparation of detailed flood plans. Concerns were expressed during the consultation period that such plans might be onerous to prepare. When the bill team appeared before us the other week, it suggested that what would be required would be determined by the level of risk that had been assessed as being associated with a reservoir. With a low-risk reservoir, it might simply be a case of making available the contact details of the person who was responsible for it. Do you agree with the estimates in the financial memorandum on the likely costs of preparing flood plans?

Tom Inglis: Yes, definitely. We were actively engaged in that work, so I agree with those estimates.

Elaine Murray: At the time, I felt that a cost of £250 for just providing a name and contact details sounded rather expensive.

Tom Inglis: We probably tried to err on the conservative side to ensure that we would not mislead anyone. I expect that we sat to the high end of any estimate just to be sure that we did not indicate to anyone that the cost might be £10.

There will be flood mitigation plans in place for most of the large raised reservoirs, which will show an understanding of how water would be released in a flood event. It will be known what sequence of valves, gates and so on is in place. The gap will be for the smaller reservoirs that are high risk. That is the area in which most of the additional work will arise.

Elaine Murray: Some smaller reservoirs that are of high risk might be owned by farmers, private landowners or sometimes charities. Some non-governmental organisations have land that is associated with work on wildlife and biodiversity. Is there a case for such organisations getting help, both financially and in guidance, with the preparation of flood plans?

10:45

Tom Inglis: We certainly expect them to get clear guidance. The best thing that we can do is to ensure that simple templates are available for them to use in developing the plans. There is nothing in the bill on financial support at present and I have no indication of whether the Government might be thinking of doing something along those lines in due course.

Alex Macdonald: A few years ago, DEFRA funded a research study into emergency planning for UK reservoirs, and a draft guide has been published on that. An Environment Agency research project is being planned that will take that work a bit further, with a view to providing definitive guidance. I compared the costs in the financial memorandum against my recollection of what was in the draft guide—I was involved in the steering group for that—and found that they are roughly in line. The financial memorandum gives reasonable figures.

Peter Farrer: Scottish Water is in favour of having emergency flood plans in place, because it is good operational practice to ensure that the right plans are in place. However, we have said that confusion might arise from calling them flood plans, because of the links to flood risk management plans and inundation flood plans. We propose that the name be changed to "on-site contingency plan" or something of that nature, just to be absolutely clear.

Elaine Murray: It might be of most concern to Scottish Water that there are security implications involved in making available information on reservoirs, particularly those that supply water to centres of population. Who should have access to such information? How much information should be public? How do we deal with the security implications of people being able to access information on reservoirs?

Peter Farrer: We have detailed our concerns on that because quite a number of our assets that will fall under the bill are under UK Government security arrangements. Therefore, we do not propose that the information should go into the public domain.

Tom Inglis: The existing controlled activities regulations require us to have information on those impoundments, and that information is held securely as a subset of our overall database, because we are required to respect that security direction from Westminster.

Elaine Murray: The Institution of Civil Engineers has expressed concern about the possibility of the supervising engineer's contact details being available at a reservoir, as it believes that that might encourage people to make hoax calls about flooding incidents. The institution argues that it is sufficient to have the reservoir manager's details and to state that, if the reservoir manager is not available, people should go to SEPA. How do you respond to that?

Peter Farrer: Scottish Water, as an undertaker of reservoirs and as a reservoir manager under the proposed legislation, agrees with that. The immediate action in the event of an emergency would be taken by the reservoir manager, implementing the contingency plans that we have just talked about. We agree with the ICE on that.

Tom Inglis: Taking a practical view, as the supervising engineer might not be in the locale, I think that there is a case for not including that name in the information that is required to be displayed at a particular site.

The Convener: Chapter 9 of the bill creates enforcement powers for SEPA. Is the proposed regulatory toolkit proportionate with the potential offences and the risks of breaching them?

Alex Macdonald: We have not responded in detail on chapter 9 other than to say that we feel that the enforcement regime that is set out is more extensive than in the current legislation. We just want to be sure that it has been considered critically to ensure that it is all required. We have no strong views on the matter.

Peter Farrer: We have laid out that we feel that the new civil enforcement powers in the bill are directed towards everything that would be in an engineer's report, whereas, under the 1975 act, enforcement action is focused purely on safety matters. Our concern is that the new enforcement powers could be used for things that reservoir supervising engineers and inspection engineers put in their reports regularly in monitoring minor maintenance. We are concerned that the enforcement powers might be focused on more operational, administrative things rather than on—as they are at the moment—safety matters.

Tom Inglis: I recognise the concerns that Scottish Water has as a reservoir manager. However, as SEPA's representative, I welcome the width, extent and variety of the tools that will be available to us. It is difficult and time consuming to mount civil cases in court, and chapter 9 gives us a range of opportunities for action on lesser offences. Those will, of course, be subject to discussion when regulations are

evolving, so there will be further opportunity to comment on the shape and form of those as they are produced.

Karen Gillon (Clydesdale) (Lab): I am interested in why you have concerns and what kind of things you think will be brought into regulation that are not already there. Will the bill give SEPA more powers to tackle things through regulation when you think that there may be the potential for environmental damage?

Tom Inglis: That should sit with the controlled activities regulations. All our impoundments are authorised in some shape or form. If there are activities going on that pose a risk to the environment, those will rightly be covered by the controlled activities regulations.

Karen Gillon: What additional powers would the bill give you that you think would be beneficial? Convince us.

Tom Inglis: I do not think that we should necessarily be concerned with matters other than reservoir safety when we apply these enforcement tools, as Scottish Water has said. The controlled activities regulations will deliver the offence provisions that we require for environmental protection.

Karen Gillon: I am slightly confused as to why you think that the new powers are necessary. What additional benefits do they bring? What are you concerned about them doing? If we are to take a balanced view on whether they are right or wrong, we need to know why you have concerns about them and why you think that they are necessary.

Tom Inglis: For me, the powers should be used when the reservoir manager has, for instance, failed to take instruction from the inspecting engineer or failed to appoint an inspecting engineer. We feel that those are important concerns for public safety, and we want provision in the bill to allow enforcement action to be taken in such circumstances. We would like a proportionate approach to be taken to that, as is reflected in the bill, so that certain offences that are seen to pose a much higher risk to downstream residents are subject to a greater penalty than other offences.

Karen Gillon: That seems quite reasonable. What is the problem with that from Scottish Water's perspective?

Peter Farrer: Under the bill, civil enforcement could be associated with minor issues of an operational or maintenance nature. However, we believe that, as Tom Inglis has suggested, it should be focused on matters in the interest of safety. With regard to civil enforcement and the question of fixed or variable penalties, there should be an appeals mechanism other than having to go to court if fixed penalties are going to be handed out.

Alex Macdonald: As drafted, the bill allows for enforcement to be applied to all measures that are recommended by an inspecting engineer. Under current legislation, however, enforcement can be applied to measures that an inspecting engineer recommends are required in the interests of safety or for future monitoring and supervision.

Any report that I write as an inspecting engineer will include a section on measures that are required in the interests of safety, setting out key concerns where studies or works require to be carried out to ensure the reservoir's safety. The report will also have a section on other measures that are required but not in the interests of safety, which might include trimming the grass or removing a fish heck from in front of a spillway, and that will also have requirements for monitoring and supervision. In the bill, any measure that I recommend, be it in the interests of safety or just for general maintenance, is likely to be enforced. Our institution simply does not think that that is required.

Karen Gillon: Having a lot of issues to do with maintenance and so on might indicate to a layperson such as me that there is something wrong with a reservoir's management and give me concern. I have seen what happens when reservoirs are not maintained properly. If the bill allows us to step in earlier, as a layperson, I cannot see anything wrong with that.

Alex Macdonald: The difference is that many of these measures are relatively minor and are desirable rather than immediately essential. As an inspecting engineer, I will look at what is required to ensure a reservoir's safety for the next 10 years and my recommendations will be made accordingly. Under the 1975 act, the reservoir engineer is required to implement those measures as soon as is reasonably practicable. That has always been something of a weakness; the new bill requires inspecting engineers to stipulate a timescale within which measures should be carried out. I as an inspecting engineer and our institution in general believe that that is a positive step, because it gives SEPA the opportunity to work to a definite timescale within which it knows these things must be completed. The other maintenance measures are for the reservoir's ultimate wellbeing but are not of immediate concern.

John Scott: I assume that you are still discussing with the Scottish Government the various other concerns that you raise in your submission.

Alex Macdonald: To my knowledge, we have no discussions on-going with the Government. We have said that we would like to be involved in further discussions and to have a chance to comment as regulations are developed or any amendments are proposed to the bill because, after all, the inspecting and supervising engineers, along with SEPA as the enforcement authority, will have to make this work in practice. We are keen that, whatever the final act looks like, everyone can fully understand and work with it.

John Scott: Of the various suggestions that you have made for amendments to the bill, are there two or three that you think are fundamental?

Alex Macdonald: The bill's apparent requirement for inspecting engineers to be employed at all times, which we have already discussed, is not required and should be changed. We also believe that any enforcement should focus on measures in the interests of safety rather than on other aspects and, although we are keen about and very much support the move from a quantitative to a risk-based approach, we feel that the detail of the risk assessment is critical and think that we could provide valuable input to the Scottish Government on the matter either before the bill is finalised or as the regulations are drafted.

The Convener: As there are no further questions, I thank the witnesses for their evidence. If you have anything to add, please send it to the clerks as soon as possible.

11:01

Meeting suspended.

11:07

On resuming—

The Convener: I welcome our second panel, which comprises David Crichton, a chartered insurance practitioner; Mark Noble, generation civil operations and maintenance manager with Scottish and Southern Energy; and John Reid, reservoir undertaker with Tinto Reservoirs Ltd. I thank you all for providing your written submissions. We move straight to questions.

Peter Peacock: Those of you who were in for the previous evidence session will have heard our questions, and I am going to cover somewhat the same territory. The first question is whether you think that the new 10,000m^3 limit for controlled reservoirs is the right level.

Mark Noble (Scottish and Southern Energy): As a company, SSE has no real issues with the 10,000m^3 limit. We already interpret one or two reservoirs of less than 25,000m^3 as being under the provisions—we deem that good management.

Professor David Crichton: I have no problem with the figure of 10,000m^3. If there are different levels of risk—low, medium and high—that will take into account the differences in size.

John Reid (Tinto Reservoirs Ltd): Reservoirs of any capacity at all need to be monitored.

Peter Peacock: Is there much scope for dispute about the size of a reservoir?

Mark Noble: Yes.

Peter Peacock: How would the bill work in that regard?

Mark Noble: We did some costings on this. We have some reservoirs that would come under the provisions, but for some of them we do not know, and we would have to monitor and survey them. We would do a bathymetric survey if we did not have any other details on them, and costs would be associated with that. I have a cost of £25,000 written down. If 10 out of 20 reservoirs needed to be surveyed, that would mean £2,500 or £3,000 each, depending on the size and extent of the work.

Peter Peacock: And the location, no doubt.

Mark Noble: Absolutely—yes.

Peter Peacock: Do you have any thoughts about the scope for dispute regarding whether or not a reservoir is 10,000m^3? Are the provisions sufficient to resolve the matter?

Professor Crichton: It makes sense to have the same limit as England. If England is going for 10,000m^3, Scotland should be consistent with that—certainly, there should not be a lower standard.

Peter Peacock: It is interesting that you say that. I did not ask the question to the previous panel, although I have reflected on the matter. You could argue that many of Scotland's geographical circumstances are significantly different from those south of the border, which might argue for a different conclusion. Is your recommendation proposed for reasons of consistency within the engineering profession, for insurance purposes and so on?

Professor Crichton: Consistency for insurance purposes, certainly.

Peter Peacock: And for a general understanding of what the provisions are across the country?

Professor Crichton: Yes.

Mark Noble: There would be disputes—not with ourselves, but with smaller owners. There would

also be fear, and people would think, “If these provisions are coming in, should I not run the digger through the dam?”—God forbid, but something like that could happen.

John Scott: Is there an argument to be made here? I accept your view that 10,000m^3 is a reasonable figure when it comes to standardisation, and it is particularly important for engineers to work to a consistent figure across the United Kingdom. Nonetheless, is there an argument to be made for low-risk reservoirs to be subject to a figure greater than 10,000m^3, perhaps in special cases?

Mark Noble: I am a supervising engineer, and I have been to quite a few British Dam Society conferences. The consensus at the BDS is that 10,000m^3 is a reasonable limit. There has to be a limit somewhere. If the risk is very low, the number of actions that the inspecting and supervising engineers and the reservoir owner will have to undertake will be minimal. In effect, the bill is tailored to the risks, however minimal. I do not see big issues with that. If a reservoir of 10,000m^3 or less is high risk, for whatever reason, be it the condition of the reservoir or the people who are downstream, that will be picked up.

Peter Peacock: Let me take you to another issue on which the Institution of Civil Engineers and Scottish and Southern Energy have raised concerns: how the bill could be interpreted as covering intakes and tunnels that supply reservoirs. Could you say a bit more about those issues and their implications?

Mark Noble: I will get some of these figures slightly wrong, but we have 200km of tunnels attached to reservoirs; there are extended catchments going from 10 square miles up to 30-odd square miles, all covered by open aqueducts, pipes and intakes. We interpret the bill to mean that all of those would come under the provisions, so they would need to be inspected. They are inspected anyway, obviously, because they are our revenue streams, but they are not strictly to do with dam safety.

In the past, we have taken as apertural structures anything that is attached to the dam, which is covered by legislation. As far as the mapping of floods is concerned, anything that comes into the dam is picked up. However, we do not inspect the structures. The bill could extend the scale of inspection way beyond anything that is really envisaged. With a lack of guidance, people could interpret the provisions to mean all the extended catchments.

Peter Peacock: Have you sought to clarify with Government officials whether that is the intention? I note that Scottish and Southern Energy and the ICE have come to the same conclusion about interpretation, but has the matter been checked out with the Government?

Mark Noble: We have asked. I have attended meetings at which we have asked about that, and we have been given assurances. As soon as someone uses the word “reasonable”, however, it becomes difficult—and there is no guidance. The Reservoirs Act 1975 has a fairly hefty tome on guidance, and it is essential for all supervising and inspecting engineers, as it wipes out any dubiety. It is really clear.

We do not have guidance with the bill, so the only way to find out whether the provisions are reasonable would be through a challenge, and challenges cost money and take time—time probably being even more important. If we do not get clarity on the issue, owners of small reservoirs will struggle. For us, it is essential to have an independent guidance document that interprets the provisions.

11:15

Peter Peacock: Can you see any rationale for including intakes and tunnels in any circumstances? Where does the thinking on that come from? What risk is attached to them?

Mark Noble: Generally, a pipe is not like a river. In most of our catchments, a pipe will take four or five times the average flow, and no more. In a flood situation, we know exactly how much can come through a tunnel, because it is a certain size. With a river, which is natural, we do not know that. When we analyse our floods, we can work out exactly what the flow in a peak storm would be, because only so much can get through the pipe. I struggle to think of areas where intakes and tunnels would be included. There may be some, but I cannot think of them at the moment.

Peter Peacock: Speaking as a layperson, I assume that the risk of the catastrophic collapse of pipes is a reason to inspect them to ensure that that does not happen. One could argue that a collapse in a pipe would diminish the intake risk, but one could also argue the opposite. What are the implications of a collapse?

Mark Noble: If a pipe fails, the water goes back to its natural catchment. It is as simple as that—it comes down the river.

Peter Peacock: That could increase the flow and overall volumes.

Mark Noble: Yes, in the river, but remember that we will not dry up those rivers anyway. In the majority of cases, the volume of water coming down the river will increase and it will be in storm conditions. In storm conditions, five times the average is not a big flow—it is a very small flow.

Peter Peacock: So your argument, which could be reflected, in part, in the committee's report, is that the Government should clarify the intention of the provision and that, if there is a clear intention and a good underlying policy reason for the provision, adequate guidance should be provided to help everyone to interpret it. Is it fair to say that, subject to that, you are reasonably satisfied with the approach that is being taken, or would you like the matter to be clarified by having any dubiety removed from the bill?

Mark Noble: We would like to have a guidance document. That would clear up all the issues, because the meaning of "reasonable" would be clarified.

Professor Crichton: The Glendoe dam, which was opened by the Queen in June last year, was closed in August that year because of a rockfall. What were the implications of that? Why did the dam have to be shut down? I understand that the rockfall closed off a pipe. Was the pipe included in the inspection? I have yet to see a parliamentary report that discusses geology, landslip risk, peatslide risk or avalanche risk. So just last year, there was a good example of a rockfall, at one of the newest and biggest dams in Scotland.

Peter Peacock: We must be slightly careful about that, because I think that an inquiry is under way. If a remember rightly, there was a fatality.

Mark Noble: That was not related to the rockfall.

Peter Peacock: So it was a separate incident. Can you say anything about it?

Mark Noble: There is published information on many websites. There are 6km of pressure tunnel, which feeds from a distance away from the dam. The dam is separated from the intake by a good distance; I would hate to quote the figure, but it is hundreds of metres. Roughly halfway down the tunnel, there was a fall from a fault. When that was picked up, we shut the tunnel.

Peter Peacock: So there was no increased risk to or pressure on the reservoir capacity.

Mark Noble: No. The flows were nothing compared with flood risk, and the reservoir is designed to deal with flood risk.

Peter Peacock: I am thinking of another circumstance that is relevant to hydro, in a sense, although it does not involve Scottish and Southern Energy. In Kinlochleven and around Fort William, a large volume of water is supplied to smelters from tunnels and inlets all over the mountainsides. Could they be captured by the bill, or are they captured by other regulations?

Mark Noble: In the absence of guidance, the answer is yes, potentially. It is all potential. Guidance is needed.

Peter Peacock: Thank you for your helpful responses.

Bill Wilson: Are not some of the pipes in Kinlochleven overground? If those were fractured, presumably water would be lost coming down the hill.

Mark Noble: Yes. The bill specifically excludes external penstocks. I do not want to drift away too much here, but without the bill other legislation will catch us, such as the Health and Safety at Work etc Act 1974, under which the Health and Safety Executive could prosecute us. There is other legislation in the background. We have many other structures that pose a fire or explosion risk, such as pressurised containers, and they all fall under separate pieces of legislation. There are also the work equipment regulations. All that legislation exists to provide security for the workers and for members of the public.

Bill Wilson: So I am covered by the law if I come down the far end of the deil's staircase.

John Scott: I want to develop the theme of risk, if I may. I will start with ICE's contentious comments that

"reliable and accepted tools are not yet available ... to determine the probability of failure of any structure"

and that risk designation should focus only on consequences. Do you have views on that statement?

Mark Noble: I broadly agree with it. I know that BC Hydro spent more than 5 million Canadian dollars on a risk analysis of one of its major dams, and abandoned it at the end. It is difficult to quantify consequences at reasonable cost, even if they are easy to quantify. It should also be about the people below the dam.

We have some issues with the way in which dam breaks are analysed. If you look at the international situation, you can see that dams do not fail all at once; a dam is not there one minute and gone the next. A chunk comes out of it as if a bite has been taken out of it, and water comes through. It is difficult to quantify that water. It takes quite a lot of experience, time and judgment to be able to analyse that risk.

John Scott: Yes, but we are concerned with human safety here.

Mark Noble: Absolutely.

John Scott: That is self-evident. Do others have a different view? Should we make an effort to assess risk better than we do currently, no matter how difficult it is?

Professor Crichton: I was involved with the panel that looked at reservoir risks about 10 years ago. There is something like 2,500 to 3,000 reservoirs in the whole of the UK. If the probability of failure is, say, 1 in 1,000, that means that an average of three reservoirs will fail every year. We know that some reservoirs have a much higher probability of failure than 1 in 1,000 and some have a much lower probability. From an insurance point of view, if you have the whole book of business, you can expect so many failures per year. You might not know which ones will fail, but you know that a certain number will.

You then have to measure the consequences of that in terms of human life and property, which is fairly easy to do. The computer software to do that was produced by a European Union research project, and it is in the public domain. Unlike many inundation maps, which are secret, the software to generate those maps is not secret, and it is user-friendly. Insurers can therefore access it, and indeed under the EU solvency directive are obliged to access it and calculate the costs. I can see a time very soon when insurance companies will have a much better idea of the potential for reservoir failure than will the reservoir industry or Government, just because they are under pressure from the EU to have that.

John Scott: I take the academic point that you can analyse statistically that failures are likely to happen. The conundrum is how to find a practical way of dealing with that from an engineering perspective, and how to deliver it in a way that is compatible with that statistical analysis.

Professor Crichton: That is where public liability insurance comes in. There are a number of benefits to the public in having that; I can go through some of them if I have the time.

John Scott: Not all failures will be catastrophic, of course. A failure does not have to cause loss of life, but we must ultimately be concerned about human safety.

John Reid: I have two reservoirs. My background is not technical, but from a technical point of view I have a levelling survey done every few years and I have six-monthly inspections done by a supervising engineer. For all intents and purposes, I live on site, so the reservoirs are under constant supervision, which should come into the equation.

I could not afford to go down the line of taking geometric studies and getting equipment in, although I doubt very much that the big boys would have difficulty with that.

Mark Noble: We have 79 reservoirs: 36 of them are category As, 30 are Bs and some are Cs and Ds. Those risk categories are based on consequences. The bulk of our reservoirs are high risk, but they are concrete dams founded on rock, and they are not going anywhere.

I used to work for North West Water on Pennine clay-core dams. That involved looking at piping failure and all sorts of other mechanisms, which is very difficult. I know that I have concrete dams, whereas I do not know how the puddle clay was laid in the 1860s.

John Scott: So your joint view is that it would be reasonable to proceed on the basis of consequences, rather than what is suggested in the bill.

Mark Noble: We would not drift away from what the ICE suggests.

John Scott: You would support that.

How are subsistence charges likely to affect reservoir managers? Should there be alternatives to the charges? Are they proportionate? What would be the implications?

Mark Noble: One of my concerns is the testing of on-site and off-site flood plans. The bill states that testing should be "reasonable", but there is no guidance on that, so how often should we do it?

British Waterways tested one of its flood plans. Someone went out at 2 in the morning, rang up the local attendant and said, "There's a hole in your dam," to see what happened. It was all organised. The company got out pumps and pulled out contractors with diggers to provide access for the pumps, and it put the pumps in place, just to ensure that everything that it had put in its plan would actually work. It was a fairly small dam, but the figure that we were quoted for the test was £15,000 for material costs. There was also the planning beforehand, the monitoring and the digestion of the results afterwards, so there will be costs for man-time on top of that figure. That was £15,000 for a relatively small site.

We have emergency plans, as you can imagine. Many of them are generic, but some are very specific, particularly on the big floodgate sites. We do yearly training on all the floodgate sites: 12 or 15 guys on site are trained every year, given the size of those structures. On some of the smaller structures, a proportion of that training will be done, but how often should we do it? At our drum-gate sites we do it annually, and on the smaller sites we test valves on a regular basis. Is that classed as training or not? That leads us to a discussion about what is reasonable.

11:30

The figures that you were quoted on 1 December were something like £250 to £3,000 to produce a flood plan for each reservoir. That would probably write something, but I am not sure

that the sign that you would put up would cost £250—it would cost more than that. Quite a few costs start to build up. We have some fairly large dams, although we also have some very small ones, and our cost estimates are £5,984 per reservoir initially, plus an annual cost of £3,400 per reservoir across the stock. We have had to guess what is reasonable, because there is no guidance, so we have struggled a little. We have taken a fairly conservative view of what is reasonable. Some of the costs are already on our books anyway, such as the cost of the training that we do and the cost of the plans that we have. We also have control rooms, which have emergency plans as well, so we are fairly well covered.

We started to draft flood plans based on the Environment Agency guidance. It produced a list of things to do, but it takes a considerable effort to fill it out.

That is our view on the costs. There are costs, and they are big.

John Scott: What is the perspective from an individual owner?

John Reid: There are costs. It is difficult for me to quantify how much they would be, but at the end of the day it would be down to me to draw up the plan, probably in conjunction with my supervising engineer. I have an emergency plan as it is, and the panel engineer is quite satisfied with it. He sees room for improvement, so I have gone part of the way down that road, but how involved does it have to be? I have not yet looked at the Environment Agency guidance from England. I have a copy of it to work with, but to date I have not got round to preparing the plan.

John Scott: Your evidence suggests that the costs appear to fill you with, at least, apprehension.

John Reid: We do not know how we would be categorised in terms of risk. My supervising engineer takes the view that we would probably be rated as either a medium or high risk. Until we know how we are categorised, we will not know exactly what the amounts will be. I have taken the figures for the highest level, which is high risk. The costs work out at an initial one-off payment of about £15,000 and, including my normal maintenance, about £15,300 per annum.

John Scott: Large and small-scale operators do not necessarily make such an income. What are the likely consequences of the increased regulatory burden in terms of costs?

John Reid: I would seriously have to look at my whole position and consider where I stood. We would move on to the legislative side, but I would find myself in a very difficult position if I was burdened with two reservoir assets that were no longer of any great value. I have been quoted £300,000 to decommission and breach each dam, and I have two of them. There is no way that I could find £600,000.

John Scott: Quite. So we are moving towards an impossible situation where people who own reservoirs cannot afford to maintain them and cannot afford to decommission them either. Your evidence suggests that, in some cases, that could lead to insolvency. Do you agree with that, Mr Noble and Professor Crichton?

Mark Noble: If I step away from SSE, yes, I do.

Professor Crichton: If there was insolvency after a failure, there would be no compensation for the people who were injured by the failure, unless there was public liability insurance.

John Reid: I have public liability insurance, but I do not know how far it would stretch. Our neighbouring farm has some £750,000 in cattle on the hoof, not to mention their sheep.

Professor Crichton: To put the cost of making a flood plan into perspective, synthetic aperture radar transponders cost about £100. They give continuous protection by monitoring any movement in hillsides, embankments or dams, yet not a single reservoir owner in Scotland has installed them. They are installed in England and in Italy. Why do we not use new technology? It baffles me.

The Convener: What do you think the reason is? Why do reservoir owners in Scotland not use them?

Professor Crichton: I do not think that reservoir owners are aware of them. This is fairly new technology; it has been around for only 15 to 20 years. Engineers are probably not trained in earth observation science. It is an extremely powerful tool. Synthetic aperture radar satellites give you monitoring three times every 35 days, and can detect movement of less than 1mm a year up, down or sideways. That can all be done automatically. The cost per transponder is about £100.

John Scott: That is the actual cost, but to find the area most at risk, there would be geological surveying costs. Alex Macdonald, who was on the previous panel, suggested that the risk in Scotland was essentially low. The underlying geology in Italy might be completely different. I venture to suggest, as Peter Peacock did, that the underlying geology and structure of our water catchment areas in Scotland might be different from in England. Do you concur?

Professor Crichton: Indeed. Scotland and Ireland are subject to peat slides, which are fairly rare in England. Peat slides are independent of

the geology. We have had some really big ones in Scotland.

John Scott: I declare an interest as a farmer. I have areas of peat and I understand the concept of peat slides all too well. Are there well-documented examples of them affecting roads, trunk roads and/or reservoirs in Scotland?

Professor Crichton: Oh yes, certainly. In 2003 there were several major peat slides in Scotland and Northern Ireland. They were all due to a period of prolonged summer drought followed by a period of heavy rainfall. Those are the sort of weather conditions that we can expect more often with climate change. A large number of livestock in Scotland were killed by peat slides and buildings were knocked down. It made the BBC national news, which is unusual for a Scottish event.

John Scott: Alex Macdonald seemed to think that there is still a lower risk. Mr Noble, do you agree?

Mark Noble: We have been monitoring faults under the direction of inspecting engineers like Alex Macdonald, in some cases since 1949, with no movement whatever. We have monitored areas where we have scree slopes. As supervising engineers, we take photos and monitor. That is precautionary; it is not because we expect anything to happen. We take a very conservative attitude as supervising engineers. Have I seen peat slides? Yes, but not near reservoirs. They have been very localised and very small on wind farm sites, which I look after.

Professor Crichton: One of the peat slides in Scotland in 2003 was very close to a major reservoir. There is a town of about 20,000 people in the inundation area below that reservoir.

The Convener: I want to go back to the monitors: have Mr Noble and Mr Reid heard of them? Why are they not being used?

Mark Noble: At Cruachan, we put in a vibrating wire piezometer-type arrangement. It was a harmonic, state-of-the-art unit. It ran for the period of construction and post construction and was then taken out, if I remember rightly. I have certainly seen V-notches, which collect the water. If the dam is going to move, you often see it in leakage. Leakage paths under the dam come out at a certain point. I have seen automatic downloading of data coming out of these things. We have had lot of instrumentation put in dams over the years and we have taken a lot of it away after a time, certainly after the construction period, because the inspecting engineers have advised us to do so. Often, you are monitoring only one area when in fact, if you have a dam, you do not know where it will fail—you could have a nice solid bit up on the bank in one place with your measuring device, but the dam could fail at the other end. We take advice from the inspecting engineers. To say that we are not aware of these things is not quite true.

There is a hell of a lot of technology. For example, there are Willowstick devices for measuring leakage paths. Highly complicated computer-oriented devices are available for monitoring, but lots of experience has shown that their use has not been deemed practical or to give us any value. We take advice, by the way—we do not make that decision on our own.

John Scott: If there were any doubts, one would reasonably expect inspecting engineers to take advice from the British Geological Survey or—

Mark Noble: One of the most valuable things that we have is the local man who goes up to the dam once a week, or more often in some cases. He sees the whole dam; he does not see a spot on the dam.

Professor Crichton: With respect, a visual inspection cannot tell you that there has been a movement of 1mm over a period of a year. None of the devices that you are talking about uses earth observation satellites, which are a totally new way of observing dams. They are synthetic-aperture radar satellites that work at night and through heavy cloud base, and which are extremely accurate.

Bill Wilson: Compared with Mr Noble, Mr Reid represents a different scale of operation. It would be useful to hear Mr Reid's comments on the matter.

John Reid: The supervising engineer has never mentioned the use of such devices to me. We have level surveys taken every two years. Pins, which are set out along the dam, are measured to datum points. We get fluctuations, but they are minimal. That will be to do with whether the ground is a wee bit drier or a wee bit wetter. In one instance, one of the reservoirs was drained for three years but there was no significant movement in the levels. They are monitored constantly.

Mr Noble makes the point that when you are out and about walking around reservoirs, you will notice patches. You are looking for patches that are particularly green compared with the rest of the grass. The dam faces should be cut at least two to three times a year so that there is a smooth surface that allows you to see any potential movement or slides or whatever. It is only by walking along the dam face that you can feel whether the ground under your feet is a wee bit soggier than it was the last time you walked on it.

I had to put in drains on the sides of one of the reservoirs as a monitoring tool to see whether any leakage came through into them. I monitor that. If

it was a dry period and water was coming out, that would give some cause for concern and would need to be investigated. There will be some private undertakers who do not do that and who might not see a reservoir from month to month.

John Scott: I presume that if it is an issue that the insurance industry is concerned about, before providing public liability insurance it could, if it wanted to, insist on the installation of the type of monitoring device that Professor Crichton mentioned. That would be reflected in the premium for public liability insurance thereafter. Is that a reasonable assessment of the situation?

Professor Crichton: Yes, that is very true. Insurers these days are very used to dealing with synthetic-aperture radar interferometry and with earth observation generally. That would be an extremely useful tool.

If we are talking about the publication of flood maps and inundation maps, it is important to mention that there will be a danger of blight among people who live in such danger zones if they cannot get insurance. If the reservoir owner has public liability insurance, people who live in such areas should be able to get household insurance because the household insurer will know that he can claim back from the reservoir owner, because in this country there is strict liability on reservoir owners.

John Scott: I will stop you there because we will discuss inundation maps later. I just want to finish my area of questioning, if I may, which is essentially predicated on SSE's submission, which says:

"in introducing this new legislation there is a danger that the new process may actually reduce the effectiveness of the existing legislation by being overly bureaucratic."

Can you justify that, please, Mr Noble?

11:45

Mark Noble: This comes back to guidance and interpretation. If we do not have guidance on how the legislation is to be interpreted, people will take different views on it. What is reasonable to me might not be reasonable to my colleague John Reid—there is a different scale of things. What it really comes down to is that, without guidance, there will be so much room for wiggle and movement.

John Scott: Can you give an example of how the bill might be less effective than the existing legislation?

Mark Noble: One example is the maintenance issues that Alex Macdonald raised. If we treat cutting the grass with the same degree of rigour as a safety matter, we will be reporting backwards and forwards on issues that may be relevant but are issues of good maintenance rather than dam safety. Alex Macdonald was exactly right .

Bill Wilson: I understood John Reid to say that he cuts the grass so that he can inspect the facility properly. Is that not part of safety?

Mark Noble: We have areas where we cut down scrub, grass and all sorts to get a certain level of swarth, which can be to prevent overtopping. Papers published by the Construction Industry Research and Information Association and through the British Dam Society set out the level of grass that is ideal to resist overtopping—water going over the top of a dam. In other cases, it can be that work makes the reservoir look good or tidy and gives a feeling that it is maintained. It could involve a coat of paint, which may not be essential but looks good. It can be a desirable thing to do as opposed to a matter in the interests of safety. That is what the issue really comes down to.

John Scott: Okay. I will revert to spends on reservoir safety in general. From both the large and small-scale perspective, how much do you spend on panel engineers? How much do you see yourself spending under the new regime?

John Reid: It is too difficult to say until we know exactly what is involved. The frequency of inspections might well have to go up, but it might go down in some instances. Whether the dam is high risk or low risk, there is not much difference at the end of the day: either could fail.

John Scott: Do you have costings of how much you spend on panel engineers at the moment?

Mark Noble: Not to hand. Generally, unless we call one in, we appoint panel engineers on a 10-year basis. Most of our large dams are visited by a supervising engineer at least twice a year. That work will increase because of the time involved in looking at the flood plans—the onsite plans, offsite plans and so on—and testing them on paper and outside. We do not know how often we will have to test them—I do not have the guidance—but we will have to test them in the office and then onsite for real at certain intervals. In our costings, we made estimates as to how often that would be. There will be a significant increase in supervising engineers' time.

John Reid: My current bill per annum is £1,500. That covers both the six-monthly inspections and putting £600 aside for my 10-year inspection, which is £6,000 for a panel engineer.

John Scott: For one inspection?

John Reid: For two reservoirs, but they are linked.

John Scott: Thank you.

Elaine Murray: The first part of my question has been answered—on maintenance and safety—so I can hurry things on a wee bit.

Scottish and Southern Energy also has concerns about section 48(2)(g), which provides that a supervising engineer has to supervise any proposed drawdown in respect of a reservoir. You point out in your written evidence that the levels of reservoirs can alter everywhere, and I imagine that they go up and down with hydro schemes. Will you say a little more about that?

Mark Noble: If we have a pump storage scheme in which we have water going up and down nightly and if you read the bill in the way that we read it, that scheme will have to be monitored. The Government does not really mean that, but without any guidance that is what the bill means—we would have to supervise something that cannot be supervised because it happens 24 hours a day. We supervise the levels electronically. The data are collected and sent straight to our control room in Perth, so we can say what the level is almost to the second, but that is not what the bill is asking for; it asks us to supervise.

If a Pennine or clay-core dam in England is watered too quickly there can be slumps and all sorts of problems in the centre, which can be disastrous, but a concrete dam is designed to allow water levels to go up and down, and that is what we do.

Elaine Murray: So that issue requires clarification from the minister?

Mark Noble: Yes—absolutely.

John Reid: Part of an inspection might be that the supervising engineer wants you to drop the level by a metre or so, so that you can inspect the pitching at the water break line to make sure that there has been no extra erosion from wave action there.

Sandra White (Glasgow) (SNP): Some of my questions, particularly those on costs, have been answered. I would like to hear more from Mr Reid as his submission is excellent and raises several questions, but we will perhaps go through it later.

John Reid: It is maybe a bit too emotive.

Sandra White: No, it is a good submission. It tells us exactly what is happening on the ground, which is important.

I want to ask about site flood plans and inundation maps. Professor Crichton submitted written evidence regarding how the information should be held. We heard from the witnesses from the ICE and Scottish Water what they think about the issue. What is your take on how the information should be held and who should be able to access it? Could some of the information be a security risk? Would the information on inundation maps affect land use planning?

John Reid: It would be good if the inundation maps were readily available to almost anyone with an interest in the area, whether it be the farmer, someone who intends building a house further down the stream or people in a local hamlet. The maps should set out how serious the impact would be if there was a complete and total breach. That is the worst-case scenario—the whole dam disappears and a volume of water comes out. From my point of view, I would want to know how far the water would go before it dissipated and what effect it would have, but the knock-on effect might be that public liability is not available; there might not be any insurance companies prepared to underwrite it.

Professor Crichton: Inundation maps should be publicly available and integrated with general coastal and river flood maps, so that people can see the whole picture on a single flood map that shows the total flood hazard. That should be available on the web, in public libraries and even in local shopping centres.

John Reid: With river monitoring, the areas that are likely to flood are known, but reservoirs have never been put into that scenario.

Mark Noble: We have spent quite a bit of money and done inundation maps for all our major dams. We have maps showing one in 10,000 year floods, or probable maximum floods. That is a Noah's ark or ice age flood—we will not see it. In certain areas, we have done maps showing one in 150 year floods, which is something that we could expect and might happen. SEPA has published on its website flood plans for rivers, which I think show one in 200 year floods. They are coarse, but very useful, as they give an indication. Such things exist.

When we say that we should publish plans, we need to ask what the plans should show. Should they be for a dam break, a one in 10,000, a one in 150 or a one in 200 year flood? We need to consider where the plan is going and who will use it. Security issues are involved: people might think, "Let's go and blow up a dam and see what happens." Are we going to publish that information? There are severe security issues.

Sandra White: So you agree with Scottish Water that the Scottish Government should consider the security risks in that respect?

Mark Noble: I absolutely agree with that.

Sandra White: What information is sufficient to be included on a panel at or near a reservoir? Previous witnesses said that the engineer's contact details should not be available, basically

because that would invade their privacy. Exactly how much information should be on the panel?

Mark Noble: We are in a good position because we can give the number of our control room, which is staffed 24/7 all year round, but it will be quite difficult for a small reservoir owner.

Sandra White: John Scott touched on my last question, which is about the cost for reservoir managers should they be required to have public liability insurance for each reservoir. Is it even possible for them to have public liability insurance? The Association of British Insurers says that it is not. I would like your take on that.

Professor Crichton: It should be possible. A low-risk reservoir might require only a low limit of indemnity—say £250,000—and a high-risk reservoir might require a high limit of indemnity. There would be numerous benefits to reservoir managers having insurance. In addition to averting blight, which I mentioned, the manager would get an independent risk assessment of the reservoir by risk experts. Insurers have experts in flooding, geology, subsidence, GIS, earth observation and so on. There are other, economic, aspects, too. If every reservoir in Scotland was insured with the insurance industry, the public liability risk would be reinsured in the global reinsurance market, so if there were a series of major catastrophes in any one year, the load would not fall entirely on the Scottish economy; it would be spread over the global economy.

Another benefit is the fact that insurance companies can provide financial incentives to improve the risk—for example, incentives to install permanent scatter interferometric synthetic-aperture radar transponders and incentives to implement engineers' recommendations—and disincentives not to do things that would increase the risk. That would be at zero cost to the taxpayer; they would not have to stump up any money. At the same time, the insurance industry would probably be working quite closely with SEPA, supporting SEPA with data, assistance, advice and moral support—as we do already on flood risks. In flood liaison advisory groups, we frequently find that it is SEPA and the insurance industry against everyone else. I hope that that provides SEPA with a certain amount of comfort.

There is always a risk of totally unforeseen events, which a panel engineer might not have thought about. Every panel engineer's report that I have read has made no mention of landslip, avalanche or peatslide. I am sure that some engineers' reports look into those things, but not the ones that I have seen. There are also other things such as rockfall, aircraft crash and earthquake. I know that the risk of earthquake in the UK is limited, but there was a case of a dam in England collapsing due to earthquake causing liquefaction. There is a range of unforeseen perils that it is pointless to try to foresee in detail, but a liability policy will cover any liability arising from the dam—it has to under our law, which requires strict liability on dam owners. Last but perhaps most important, if somebody is killed or injured in a dam break, you can be sure that they will get compensation even if the dam owner goes bankrupt.

Sandra White: How would it affect you, Mr Reid, as a small reservoir owner, if you had to have public liability insurance? People are saying that it is advantageous.

John Reid: SEPA has been looking at insurance in bonds. Whether that is from the point of view of SEPA underwriting itself or whether SEPA is looking to make that a requirement, I do not know.

12:00

Sandra White: Cost-wise to yourself, what would that be?

John Reid: It goes back to whether reservoirs are to be classified as low, medium or high risk—that would determine the premiums. I initially had difficulty getting public liability insurance. I managed to get it only through NFU Scotland. The trade-off was that it wanted all the buildings insurance as well.

Sandra White: That is another new angle to look at, I suppose.

John Scott: It is another market.

Sandra White: As John Scott says, as a farmer, it is another market. Mr Noble, do you have any comments to make on that?

Mark Noble: I do not think that most managers of reservoirs of 10,000m^3, which will suddenly come under regulation, will have insurance.

John Reid: Nor do I.

Mark Noble: So there will be people looking for insurance and possibly not being able to find it. What will happen then? That is not an issue for us.

The Convener: Let us move on. Bill Wilson has a final question.

Bill Wilson: The bill proposes new civil enforcement powers. What does the panel think about the regulatory toolkit?

Mark Noble: In the lead-up to the bill, we have worked well with SEPA and understand SEPA's aims. I come back to the point that there should be no great issues if we have guidance. As I keep saying, it comes back to the need for a guidance document and knowing where we all stand. The last thing we want to do is challenge what is

reasonable; the only way to challenge that is through dispute, and no ones wins at that.

The Convener: There are no further questions. Thank you for providing the committee with written submissions, and thank you for your oral evidence today. If, as a result of today's meeting, you think of any further evidence that you would like to give us, please provide it to the clerks as soon as possible.

That concludes the public part of today's meeting. I thank everyone in the public gallery for their attendance.

12:02

Meeting continued in private until 13:00.

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