

COMMISSIONER: Reconvene at 11.15 and welcome to the Environmental Protection Authority. Mr Handshin?

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MR HANDSHIN: Thank you. The Environmental Protection Authority is the independent environment protection regulator in South Australia. In addition to administering legislation concerned with environmental protection and community safety, it provides advice on environmental management practices to both industry and the government. Since joining the EPA in 2004, Keith Baldry has held a number of directorial roles and is currently the director of mining radiation and regulatory services. Daniel Bellifemine has worked for the EPA for 12 years and is the team leader in mining and the environment. Mr Bellifemine is experienced in the regulation of uranium mining and other areas of radiation protection. Gabrielle Wigley is a senior hydro geologist and specialises in assessments of groundwater contamination both during the life of a mine and post-closure.

COMMISSIONER: Thank you. Welcome all. Part of our terms of reference require the commission to look at expansion of uranium mining and other aspects of the nuclear fuel cycle and with particular reference to safety and today we want to explore some of the implications of uranium mining and exploration and particularly the start with mining and in situ recovery techniques. I guess in terms of mining, the area that worries most people would be the tailings and the technique itself in terms of in situ mining. So perhaps we might just start with what does the EPA look at in terms of those two areas? In terms of tailings in the broader sense and then we'll unpack that as we go? And in situ mining, what are the areas of concern that you are particularly mindful of as you look at these activities?

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MR BALDRY: I think that probably the main concern is that there is control of the waste and control of the mining fluid, such that they don't result in impact in groundwater aquifers and/or surface waters or off the mining site. And so much of our work is around the assessment of proposals to see that there is an understanding of the geological and other conditions. That there is an understanding of the potential impact from the waste arising from mining activities or from mining fluids and that those can be adequately controlled and that there is sufficient monitoring and standards in place such that compliance with the requirements can be understood and reported to the regulator. We obviously need a framework to be able to step in and take action if we are not confident that it's being done sufficient to protect the environment.

COMMISSIONER: And that would be equally applicable to in situ recovery?

MR BALDRY: Yes. In situ recovery mining is a particular technique which,

as you will have heard earlier today, involves – requires to undertake the mining, a really good understanding of the geological conditions underground. That is very important for us also because we – whilst the operator has to understand the movement of mining fluids in order to maximise the recovery of the uranium, we need to make sure that the hydro geology and the movement of mining fluids is understood sufficient to protect the aquifers beyond the aquifer that is being mined.

COMMISSIONER: Might just unpack some of that now. Mr Baldry, the EPA has involvement in the approval process of new mining operations, is that right?

MR BALDRY: Yes.

COMMISSIONER: And so in relation to a proposal for example for ISR mining operations, can you give us an idea of the sorts of things that EPA would be looking at? And then after that we might deal with what sort of control measures you might identify as part of your review process.

MR BALDRY: Okay. I will give that a broad overview then I might pass over to Gabrielle who is particularly expert in this area. A mining lease proposal would be given to the Department of State Development and would be referred to us for our advice on its content. So what we would be looking for is that there is sufficient understanding of the local conditions and the proposed activities such that we can be confident that it can be undertaken and the controls required to do that. But Gabrielle would be one of the people that would be doing assessments so it might be useful for her perspective.

MS WIGLEY: Initially a proposal will come through in terms of a mining lease proposal and we would then look through that and then give our comments back to DSD and we would refer to information on whether they had adequately defined the area that they want to mine, so that their conceptual site model would be robust enough to incorporate all the base line data and then move on forward so that when they actually did start the mining, they would understand the groundwater specifically and also the geology in the area that they are proposing to mine. Then they would – when the mining lease has been approved that all has to be sort of embedded, all that information has to be embedded in their PEPR which is the programme for environmental protection and rehabilitation. That document would then look at the outcomes and the criteria and how that can be assessed to look at the risks and then of course the residual risks.

MR HANDSHIN: Why is it important as part of that process that the prospective operator demonstrate an understanding of the geology and the likely impacts of their operation on the environment?

MS WIGLEY: Well, because usually there are issues that they might not have considered when they're mining. And as you actually start that mining process, specifically with the groundwater, they might impact groundwater areas that they didn't know about, or they might impact mineralogy that they weren't initially understood and that actually can affect when you sort of expose, for instance acid forming minerals to oxygen then you can actually get acid mine drainage and that can drastically impact the groundwater. So having a good understanding of the area that you're actually going to be mining, whether it's in situ, recovery or open pit, or underground mining is really important and that is the things that we are looking at initially in that assessment of the mining lease proposals and PEPRs.

MR HANDSHIN: So can it be the case that as part of this process, that the EPA request further information or further studies be undertaken to ensure that you can check off on all of the relevant considerations/

MS WIGLEY: Yes. So we will get – sometimes we will be getting a draft MLP and sometimes also mining companies might approach the EPA separately and say what are you looking for? How can we do this better? How can we get this sort of streamlined once we get this - mining lease proposals in? And the PEPRs as well.

MR HANDSHIN: And MLP that is an abbreviation for mining lease proposal is it?

MS WIGLEY: Mining lease proposal, yes.

MR HANDSHIN: Okay. What role do environmental impact statements have at this stage of the process?

MS WIGLEY: Generally environmental impact statements will come along with the mining lease proposals and they usually detail more of the – my understanding is that they would have an impact on the actual surficial environment and they usually deal more with infrastructure that is associated with the mining lease and the municipal lease. So – or licence sorry. But it really is the mining lease proposals that we would be looking at.

MR HANDSHIN: Does the EPA have any role in relation to environmental impact statements?

MR BALDRY: Yes, we do. We do. So we would look at both of them.

MR HANDSHIN: Okay.

COMMISSIONER: Can I just pick up on how you keep current with what's happening in the world in terms of ISR for instance? Because we have only got one mine here?

5 MS WIGLEY: Yes.

COMMISSIONER: How do you keep yourself current with latest developments in terms of regulatory oversight and techniques being used, and it's particularly useful if we're thinking about expanding?

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MS WIGLEY: Yes. Usually a couple of times a year, the EPA is invited to conferences or usually sometimes workshops or just sort of courses that DSD are putting on and they want us to be sort of – have as much knowledge as we can to sort of assist them.

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COMMISSIONER: So these are intra-state as opposed to - - -

MS WIGLEY: They are intrastate as well as interstate, yes.

20 COMMISSIONER: And international?

MS WIGLEY: I think we have been invited to some international conferences. I haven't personally but, yes.

25 MR HANDSHIN: Is there a discernible international view on ISR mining?

MS WIGLEY: There is, yes.

MR HANDSHIN: And what is it?

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MS WIGLEY: We use different chemicals in different areas of the world because we've got different geology, so – and Australia specifically because we have got the sandstone predominantly sandstone – uranium in the sandstone. We would actually use different quantities of chemicals than they might use in other countries where they might have more limestone. So we're sort of knowledgeable about what other areas and what other geological provinces use but generally, the mining companies will work out what is the best chemicals and the best technique that they need to use for their particular site and we will actually look at that information, as well as the international information to sort of compare the risks and how – if they are using the best practice.

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MR HANDSHIN: Is it an accepted practice, and it's implicit perhaps in what you've said, internationally?

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MS WIGLEY: Yes. So we have got some – we have actually got some guidelines that we're actually currently updating, sort of Australian guidelines that we're actually updating to be more in line with international guidelines as well.

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MR HANDSHIN: And what formed the basis of those guidelines? Did you draw on international material or are they locally generated?

MS WIGLEY: I mean I'm not working on these guidelines, but I believe from just literature that I've read, that they will be looking in international standards as well.

MR BALDRY: So the Commonwealth government in 2007 with Geoscience Australia published the in situ recovery best practice guidelines. And that certainly drew on the sort of international experience and the US and Kazakhstan are two countries that with uranium use in situ techniques and the nature of it is that it's very locally geology and hydro geology dependent and so you can't just take one experience and transplant here. But certainly it broadens our sort of knowledge about the best practice approaches. And in terms of best practice regulation, then certainly the EPA is involved nationally to make sure that we work with our fellow regulators in other jurisdictions and general regulatory approaches. And in relation to radiation regulation, we've got a national committee that ensures we've got national standards for radiation protection. However, as the only state in Australia that actually has in situ recovery mining of uranium, then we would - - -

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COMMISSIONER: That's a good point.

MR BALDRY: Yes. We do have a lot of experience though. We've had in situ recovery mining at Beverley since 2000, I think.

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COMMISSIONER: Yes.

MR BALDRY: And so it's not as if – we would consider ourselves reasonably expert in terms of our experience with the operations that we've directly regulated as well.

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COMMISSIONER: Is that experience localised at Beverley? I mean because we are looking at the potential to expand that. Are you confident that the information base for ISR within the EPA could address other locations with different geology?

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MR BALDRY: Yes, I am. I mean the geology is different but - - -

COMMISSIONER: Yes.

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MR BALDRY: - - - the principles of understanding geology and the controls required are the same and experts within the EPA such as Gabrielle do work on non-mining activities in many parts of South Australia that require an understanding of that geology. I think even the difference between the Honeymoon mine that we did assess and approve and the Beverley and the Four Mile there is different geologies in each of those locations which require slightly different approaches in the way that we require monitoring and reporting to be undertaken.

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MR HANDSHIN: What sort of considerations might arise in the event of a proposal to expand ISR mining outside of the Frome embayment?

MR BALDRY: I think that from my perspective, the two key things are the sensitivity of the receptors: are we looking at an environment where, either because it's completely sensitive or because there's a potential for movement of mining fluids to more sensitive receptors, does that require more control, more monitoring, more assessment? And the other thing that would make a difference is the number of people in proximity to a uranium mine, because the consultation engagement with community is a really important aspect. Now, that is something that both Heathgate and formerly Uranium One needed to do, was engage with the local communities, but the more people you have near to an activity, the more extensive the engagement program you're going to have. Those are two general aspects that would make a difference if you did it elsewhere.

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COMMISSIONER: Have there been any particular challenges with the Beverley operation in terms of concerns for the EPA during the 10 or 15 years they've been operating?

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MR BALDRY: I think that certainly in the early operations of Beverley there was concern at particularly the control of the mining fluids on the surface and there were some spills, and we actually introduced reporting criteria over and above our normal reporting criteria such that if there were spills they're reported not only to us but publicly as well, and I think that was in the nature of - it was a new operation for Australia and they have improved considerably since those early years, yet there were some spills in the early years that we required action to be taken on.

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COMMISSIONER: So spills on the surface, in terms of water movement under the surface, in terms of their recovery, no particular concerns with the movement and the plume going beyond where they expected it?

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MR BALDRY: No. I mean, there has been some movement of plumes that weren't where - - -

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COMMISSIONER: Forecast.

5 MR BALDRY: Yes, but we're confident that that was understood and
monitored and recoverable. I think that the thing that's changed over time is -
some things we've required additional monitoring or different techniques for
sampling, and other things we found not to be necessary anymore and relaxed
in terms of the parameters that we require to be reported on. So we have
learned ourselves over time as to what's important in terms of environment
10 protection.

MR BELLIFEMINE: I'll just add, certainly from a radiation protection
perspective, we've got sufficient data that demonstrates that over the course of
time the doses to workers are quite low and certainly consistent with other
15 operations internationally.

COMMISSIONER: This is in Beverley?

20 MR BELLIFEMINE: Yes, Beverley, and the Honeymoon operation as well.

MR HANDSHIN: Is that because of the nature of the technique?

25 MR BELLIFEMINE: Yes. I guess most of the workplace exposures are in the
areas where product is actually handled. Obviously the in situ recovery
technique means that there's less potential for exposure to the materials, which
in themselves are relatively low radioactivity to begin with, but I guess the
techniques that they use means that it's even more so amenable to reducing
those exposures.

30 MR HANDSHIN: Mr Baldry, you referred a moment ago to some issues
arising in relation to the movement of plumes and you said that you were
confident that those issues were understood and they were then monitored and
were recoverable. Can you tell us what the EPA actually did at a grassroots
level and when those issues came to its attention?

35 MR BALDRY: We have regular meetings with operators and that - as a
minimum, we meet quarterly with the Department of State Development as
well, and we discuss in detail the reports that are provided and so for every
single monitoring well that will get reported during the lifetime that it's doing
40 the monitoring, and when we have concerns we'll require further explanation at
those meetings. We'll require, if needed, further information or further
monitoring, and really that's a case of making sure that we're confident that the
operator understands and can control the mining fluids. It hasn't got to the
point where we've ever required operations to stop as we were concerned about
45 off-site impacts. So it's more of an ongoing process to ensure that they're

continually in control of their operation.

MR HANDSHIN: Does the EPA have power to close down an operation if they consider its practices are giving rise to substantial environment risks?

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MR BALDRY: Yes. The Department of State Development is able to issue ministerial directions and that would be the usual first course of action in terms of directing a mine to stop or change operations, but there are powers under both the Environment Protection Act and the Radiation Protection Control Act that mean that we can step in and take action if we think it's needed.

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MR HANDSHIN: We've heard some evidence this morning that one of the ways that the containment of the mining solution used in ISR is monitored to ensure that it doesn't leave the mining aquifer is to install monitoring wells around the perimeter of the mining site.

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MR BALDRY: Yes.

MR HANDSHIN: Does the EPA have a view on whether that's a satisfactory control measure to prevent unwanted excursions of mining solution?

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MR BALDRY: I think it's the ideal way of seeing if you've got lateral movement of the mining area, and so you need a pretty good understanding through modelling, but, you know, those perimeter bores, to actually see, you know, has it got to this point, is an essential part of the assurance program.

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COMMISSIONER: Do you map the location for those facilities or do you take advice from the mining company itself?

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MR BALDRY: The mining company provides all of the maps and all of the locations and all of the monitoring results.

COMMISSIONER: Right. Okay.

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MS WIGLEY: I was just going to add that, going back to the developing conceptual site model, not only do you not want any lateral migration, that you don't want any vertical migration as well, and that goes towards knowing that you've got a robust basement at the bottom where there won't be any sort of infiltration past the depth that you're actually targeting, and so that goes to having enough baseline data in the beginning to know what you've got.

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MR HANDSHIN: And that's a product of the natural underlying geologies in it.

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MS WIGLEY: That's right, and, like, we know what the geology is of South

Australia, so that sort of has to be supported with the localised - the localised geology that the mining company will develop has to be supported with the regional geology as well, and that's what we're looking at, that there's a consistency in their approach as well.

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MR HANDSHIN: One of the other topics that came up this morning was the concept of natural attenuation and how that might remediate any residue mining solution that's left over in the mined aquifer post operations. Does the EPA have a view about the concept of natural attenuation and whether it's been verified on a national or international basis as a legitimate scientific concept?

MR BALDRY: Yes. As part of the proposal for mining, we would require that at the conclusion that there's no unacceptable legacy left, and, yes, the natural attenuation mining fluids is the expected way over the time that the sites will return to their pre-mining state. That's not to say that we're relying on that, because there's - we require monitoring over time to demonstrate that it's occurring in accordance with the scientific expectations and should it not occur, then we would require alternative means of remediation, for example, removing the treatment to mining fluids or, you know, injection of different reagents. The experience we've had does tend to back up the expectation of natural attenuation, and so as the monitored fluids move through the rock there is a neutralising effect and the further it moves the more it gets neutralised. For the mining aquifer there is no human or stock or other use of the aquifer other than for mining and so we don't require a quick remediation of that at the conclusion of mining so they can be used for other purposes, so in that sense natural attenuation is an acceptable technique if it can be shown to be effective.

COMMISSIONER: It might work for that site, but if we're to expand to ISI then presumably you'd need other assurances of attenuation.

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MR BALDRY: Yes, and certainly it would not be acceptable to contaminate aquifers that had a use or had environmental sensitivity and I think certainly that's where the international experience, for example in the US, shows that treatment of aquifers to attenuate rather than just leaving it to nature to do it is a technique that's possible. Clearly we'd want to really understand that that was possible whatever the local circumstance was.

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MR HANDSHIN: Post closure of an ISR site how long would you expect that monitoring of the aquifer would need to occur for to ensure that the process of attenuation is in fact operating?

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MR BALDRY: I think that that depends on the natural speed of movement of the aquifers once you've stopped actually moving the fluids around for the mining itself and so there was the field trial at Oban which in relatively quick time the monitoring demonstrated that natural attenuation was going to be

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effective for that. I think for Beverley there's an expectation that over a seven to 10 year period on the conclusion of mining you would be able to demonstrate that your modelling and expectations on attenuation were correct, that depends on the results of the monitoring though and it may be possible to shorten that timeframe or if there was concerns it would be possible to expand that timeframe as well, but the expectation is that within a relatively few years after closure the monitoring would demonstrate whether your expectations were proving correct or not.

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10 MR HANDSHIN: Apart from groundwater issues and mining solution issues does the EPA consider that ISR techniques give rise to other environmental considerations, perhaps on the surface?

15 MR BALDRY: I think any industrial activity in sensitive environments there's a potential impact to which needs to be understood and effectively managed. The advantage with in situ recovery techniques over other mining techniques is that the footprint is considerably reduced and the impact is much less. You don't have waste rock and tailings systems, you don't have a big hole in the ground, so the potential to return the location to pretty close to what it was before mining is good. Obviously the surface infrastructure and the sort of storage evaporation ponds need remediation, but it's much more readily done with in situ recovery techniques than other mining techniques.

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25 MR HANDSHIN: We heard this morning that some of the waste streams produced, at Four Mile for example, are relocated to the Beverley aquifer for storage. What's the EPA's view on the suitability of that practice? Obviously it's an approved one, but what's the EPA's view on that as being an appropriate disposal method?

30 MR BALDRY: It's referred to in the Geoscience Australia best practice guide for in situ recovery mining is that injection to mined aquifers is the preferred disposal technique, so in principle we would support that. Every situation needs to be explained to us and demonstrated the environmental impacts of course.

35 MR HANDSHIN: What qualifications might there be when you say "in principle"? What would you need to see to develop a degree of confidence that that is a suitable long term solution for waste storage?

40 MR BALDRY: I'll say something quickly and then hand over to Gabrielle. I think it's the same as with the mining fluids. You want to make sure that any waste fluids you understood where it's going to move to and what the attenuation over time was and what the ultimate sensitive receiver, whether that be another aquifer or some other use, was, so you'd need the same understanding as you would for the mining fluid.

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MS QUIGLEY: That's pretty much what I was going to say. Also just what Keith mentioned about monitoring we sort of consider natural attenuation, but we say it has to be monitored natural attention. It's always MNA, it's not just
5 NA and that's an important thing that we look at because it is that risk based regulation.

MR HANDSHIN: Can we perhaps move on to tailings more generally in relation to other types of operations and get an idea from the EPA on what the
10 relevant environmental concerns are in relation to generation of tailings and there long term storage.

MR BALDRY: I think that tailings are common to many mining techniques and uranium is one of those. The main environmental risks with tailing
15 systems are the fact that you've got things like acids and heavy metals, so the radioactive material tends to not be the most significant aspect with uranium mining, it's just one of the additional hazards that needs to be addressed. Containment, effective containment, is an issue with tailings because it's – if you look at the examples that we've got such as Olympic Dam because it's
20 above surface they need to be engineered structures which can be demonstrated over time to effectively contain the tailings and that would probably be the most significant issue; is the demonstration of the containment.

COMMISSIONER: I know I've seen them, at Olympic Dam there are a
25 number of tailings dams. Before a company has approval I presume they will need to have their tailings dam plan approved by the EPA; how it's going to be managed, where it's going to be located, the construction, the geology of the area. All those issues need to be considered?

MR BALDRY: Yes, certainly and the EPA and the Department of State
30 Development have published guidelines for a miners perspective, miners on the expectations for tailings management, but, yes, we would expect to as part of the proposal understand that waste can be effectively managed and that's a key part of it. I think there's different roles between DSD and ourselves in that
35 there's a lot of mining engineering requirements to make sure that structures retain the tailings and so we'd probably rely on DSD's advice that the mining engineering aspects were effective on that and the standards were met. We've probably got more of an interest in making sure that the impact on surface waters and aquifers were adequately understood and controlled.

COMMISSIONER: In relation to the tailings at Olympic Dam, and we're
40 again not seeking to go back, we're seeking to think forward as well, but clearly in the management of those activities it's relevant to expansion. How do you manage the impact of fauna and wildlife on the dam activity itself? Is
45 that part of the EPA's responsibility or is it - - -

MR BALDRY: It's not part of the EPA's responsibility for example to control the fact that if fauna enter the tailing facilities and drink the water that there's - for example birds and other animals, so we don't regulate those aspects, but we would regulate the wider environment in terms of if tailings was not effectively contained within the structure. There are other agencies that look at the impact on - - -

COMMISSIONER: Who is responsible for the fauna aspect?

MR BALDRY: DSD is the main regulator of mining operations. They would get advice from Department of Environment, Water and Natural Resources on the impact on the fauna and the flora to do that.

COMMISSIONER: In relation to the Olympic Dam operation, have they actually sealed up a tailing stand yet, or are they all still operating? I am seeking to understand how you – once it's full, how do you close it off and how do you monitor it over the longer term?

MR BALDRY: The tailings are constructed to be in their final form, such that they can be capped and then left as the final form and over time BHP Billiton has moved on from its original tailings.

COMMISSIONER: Yes.

MR BALDRY: Daniel's probably got the – best placed to answer the progress that has been made on that.

MR BELLIFEMINE: Yes. I mean at the moment the closure plans specific to the Olympic Dam operations are being revised and developed, so the current ones are being reviewed at the moment but the current approved ones have enough – sufficient detail for us to understand what BHP propose to do but the actual operational detail of that will be developed further towards closure. I mean the operation is set to run for quite an extensive period. So that detail will be developed as time will go on. I guess the main sort of processes that have been identified at the moment is allowing the tailings to sufficiently dry to allow earthmoving equipment to go on to them. And then they would be covered with soil, rock cover and the slopes reinforced and then there'd be an ongoing monitoring programme around that to demonstrate the stability criteria and also the radiation protection aspects had been achieved, so that those closure activities are able to meet those criteria.

COMMISSIONER: And that presumably goes on for a very long time?

MR BELLIFEMINE: The monitoring, again, would need to be – and the

extent of that would need to be developed as the actual detailed closure plan is developed but that would need to be ongoing until as needed. So some of the lead times would be variable.

5 COMMISSIONER: But at the moment it's reasonable to assume that the tailings facilities will remain in their current location? So the remediation will involve capping, as you described but the facilities themselves would be there in the long term?

10 MR BELLIFEMINE: Yes. I mean given that they are around 400 hectares presently, the residues would be managed in situ. So part of that is the actual management of them as they are.

COMMISSIONER: Has there been any specific concerns over the operation
15 of the mine in terms of the tailing dams themselves? Leakage?

MR BELLIFEMINE: Yes, there have been some leakage from the walls.

COMMISSIONER: Yes.

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MR BELLIFEMINE: So that has triggered additional monitoring around those.

COMMISSIONER: Do we learn any particular lessons from those activities?

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MR BELLIFEMINE: Yes. So they have – probably I think it was two years ago, TSF5 was developed and that's taken on a lot of the lessons learnt from the previous tailing structures. So there's certainly been a trigger for ongoing auditing and monitoring that government is required to sort of keep track of the
30 tailings and the stability of those and the – any of the issues that have been seen with seepage as well. I mean for example TSF5 was also aligned within the centre to prevent or minimise the amount of seepage, keep it to an acceptable level.

35 COMMISSIONER: So the problem was an issue with engineering more than anything else?

MR BELLIFEMINE: I think the details, I mean Gabrielle might have a bit more detail but some of it was around the walls being constructed and
40 engineered around some of the dunes, the natural dunes in the area. So that was sort of dealt with in the subsequent tailings that were developed.

COMMISSIONER: So the lessons learned are reinvested in to the next - - -

45 MR BELLIFEMINE: Yes. Certainly, yes.

MS WIGLEY: Yes, it's specifically an engineered sort of (indistinct) whether they are stable.

5 MR HANDSHIN: You mentioned that there's a lining in the centre of one of the tailing storage facilities. Why is it that the lining is confined to the centre of the pond?

10 MR BELLIFEMINE: Well, I guess the way the tailings are managed is that the water is collected towards the centre to allow for evaporation, so it's more relevant operationally to have that lining in the centre of the pond.

15 MS WIGLEY: And they want to reduce the pond amount, they don't want it sort of – they don't want a thin layer over the whole of the tailings dam, it's more stable if you've got that pond in the middle and less chance of wildlife and stuff like that getting stuck.

20 MR HANDSHIN: Perhaps it's not much of an issue given the location but what sort of tolerances need to be built in for unexpected rainfall events for example? And are they adequately accommodated at the moment?

25 MR BELLIFEMINE: I believe that there is a – that has been built in to the tailings – was factored in to ensure that the evaporation ponds which complement the tailings dams are managed in such a way that if there is unexpected rainfall, that they have got that contingency there, so that they can manage the amount of water within the tailings and that they're not affecting the strength of the walls around those tailings dams.

30 MS WIGLEY: That's one of the things we look at in the mining lease proposals. We look at – for significant rainfall events and whether they've been appropriately estimated.

35 MR HANDSHIN: Perhaps on the other side of the coin, given the generally arid conditions in the area, how is dust mobilisation managed?

40 MR BALDRY: The issues for BHP Billiton can – with dust tend to be operational in the sense that the people most affected are the people on site. So they have a programme for managing the dust principally to control that with – if you were looking at wider dust issues, the nature being an underground operation, the nature of the operation is that regionally if there is dust storms they are going to arise from dust arising from very large and widespread area, not from the mine site itself.

45 MR BELLIFEMINE: They do have the carts to wet down the roads periodically to prevent dust and again, as Keith mentioned that is more for

occupational than for impacts to the broader environment. We have dust monitors at the Roxby Downs township and certainly that, as well as radon monitors are demonstrating that doses to member of public well below the one millisievert limit and in fact, it was magnitude below that.

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COMMISSIONER: Might be a good time to get on to personal radiation safety and your responsibilities. How you monitor it? What processes are in place for that since you introduced the subject, you might as well close it?

10 MR BELLIFEMINE: Yes. I guess so with the broad framework is that the Radiation Protection Control Act, mining and all processing is licensed – a licensed activity. As part of that licence we require compliance with the code of practice for radioactive waste management which was an Australian
15 ARPANSA published code. So we adopt that to ensure that there is national uniformity across radiation protection management within Australia. Part of that mining code requires a radiation management plan and within that plan we – that requires identification of radiation source pathways to work with and requires a description of how those pathways are controlled and how they're
20 able to get periodic quarterly reports on occupational monitoring. The programme is set up and developed to ensure that those areas with the highest potential for exposure are monitored.

25 COMMISSIONER: And those areas in a typical uranium mining and milling operation are where?

MR BELLIFEMINE: Principally the areas that are handling product tend to have the highest potential doses, so most of the focus is on those particular areas. For example, the doses we might see work groups around tailings
30 facility, at Olympic Dam are still within the 1 millisievert range. A dose limit for a radiation worker who is someone handling or working around radioactive material is 50 millisieverts in one year or 20 millisieverts, the 50 being averaged over five years. It needs to be averaged to be 20. So, I mean, we obviously have seen that with an order of magnitude below that level.

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MR HANDSHIN: In relation to the reporting requirement, does the EPA have a role of auditing or verifying data that's received?

40 MR BELLIFEMINE: The data is collected by the operator, but we do have a radiation monitoring laboratory and that is - I guess the value in having that is that we have a good understanding of radiation dosimetry and measurement techniques. Our role in verification is we do conduct it, but it's a component of what we do, and our inspections are also include activities like auditing and
45 general inspections of workplace safety.

MR HANDSHIN: And in what circumstances do you generally do inspections?

MR BELLIFEMINE: Well, for the uranium mines we generally conduct an inspection quarterly, irrespective of whether there's a trigger or not. There may
5 be additional inspections if there's infrastructure or a change to process which needs to be investigated. We may do inspections where we look at, say, a spill if that had occurred.

COMMISSIONER: Can you just walk us through what a typical inspection
10 would be, if there is such a thing?

MR BELLIFEMINE: Yes. The inspections follow a general sort of format. If there's an area that we're going to focus on, we will sort of discuss that with the operator. I guess part of the reason for that is to ensure that our workers are
15 able to conduct an inspection in a safe manner. Mines are by nature - you know, have safety requirements. So often there's a requirement for inductions and that. So we generally have the radiation management plan. It's a radioactive waste management plan. So we might focus on a component of that. It tends to be anything from talking to the radiation safety staff. That's a
20 requirement for each mine site to have a radiation safety officer.

But we also might discuss and determine that the staff that are actually implementing the radiation management plan have an understanding of what their roles and responsibilities are on site. And then that's normally followed
25 up with an inspection report and you're able to continue engagement with the operators for any improvements or things that might need to be looked at further.

COMMISSIONER: So it's quarterly?
30

MR BELLIFEMINE: Yes. Generally the inspections are quarterly, yes.

COMMISSIONER: And duration on site?

35 MR BELLIFEMINE: Well, that varies as well. So the inspections might last from one to two days given that the sites are remote. We tend to sort of stay up for prolonged periods. By contrast, an inspection for one of our industrial licences in the metropolitan areas might only take one or two hours.

40 MR HANDSHIN: Putting radiation to one side and looking at compliance issues more generally, does the EPA have a practice in supervising compliance with licence conditions, for example, or general environmental safety?

MR BELLIFEMINE: Keith has already mentioned that we do work closely
45 with the Department of State Development, so where possible our inspections

are conducted jointly with that department. So we have a range of regulatory tools that are available to us if there is a non-compliance. DSD being the lead regulator, we have an administrative arrangement with them. So if there is a non-compliance noted, then we would generally discuss that jointly and
5 determine who the lead agency might be there, and then we'd select the most appropriate regulatory tool.

MR BALDRY: We have a role in the regulation of human health impacts from radiation, but other safety aspects the EPA does not have a role in. So
10 DSD and SafeWork, per se, would the principal regulators in that area.

COMMISSIONER: Who has the responsibility of transport?

MR BALDRY: The transport of radioactive material is the regulator. The
15 regulations are administered by the EPA. They are regulations under the Radiation Protection Control Act.

COMMISSIONER: That's what I thought.

MR BALDRY: So those would be in addition to any other transport
20 regulations that would be regulated by the police or the Department of - - -

COMMISSIONER: So you're concerned with the safe radiation protection of
25 the convoys - - -

MR BALDRY: Yes.

COMMISSIONER: - - - down to the egress site or to the port (indistinct)

MR BALDRY: Yes.
30

COMMISSIONER: This mine has been operating now for quite some time. Have we had any incidents of transport issues, to your knowledge?

MR BALDRY: To my knowledge, there have been no instances where the
35 actual road transport has had an incident that threatened, for example, loss of containment. There have been incidents on rail to the port of Darwin, which didn't result in a significant loss of containment, and we've had containers damaged at Port Adelaide, again, which didn't result in a loss of containment
40 from a container.

COMMISSIONER: Okay. So you use rail and road.

MR BALDRY: Yes. It's road transport to Port Adelaide on all occasions and
45 then it's either shipped either from Port Adelaide or then railed from there to a

port at - - -

COMMISSIONER: To another port.

5 MR HANDSHIN: Can I perhaps shift the focus a little bit to down-the-track considerations, and one of those relates to decommissioning or closure plans. Is it right that uranium mining operators have to have a closure plan in place as part of their licensing or approval conditions?

10 MR BALDRY: Yes. So the permit for environment protection and rehabilitation would include the closure requirements.

MR HANDSHIN: And do they currently extend the provision of financial assurances for site remediation and place closure?

15 MR BALDRY: Yes. It certainly is the case for - Olympic Dam is a special case because of the particular legislation that applies to the indenture that applies to Olympic Dam. For other then - the Department of State Development has a process in place for assessing appropriate financial
20 assurances of bonds and for reviewing those, I think, every two years to make sure that it covers the continual ongoing cost of remediation should the operator, you know, not fulfil their obligations.

MR HANDSHIN: And do you know whether that involves money being held
25 on trust or by some other arrangement, or is it just an assurance that's given by the operator that funds have been allocated for those purposes?

MR BALDRY: No, it's either cash or a bank bond. So there's no access to the money by the operator until they've met their obligations to close and
30 remediate the site.

MR HANDSHIN: Can I just perhaps clarify a couple of matters that I overlooked when discussing the tailings issue, and this was part of my question in relation to dust mobilisation that I might not have made sufficiently clear. Is
35 there a concern of dust from the tailings storage facilities being generated into the surrounding community given the conditions that generally prevail at Olympic Dam?

MR BALDRY: The nature of the construction of the tailings is that they're
40 accumulated and drying in the process, and if there was a concern that there was dust being generated because they were too dry, then they would need to be re-wetted in order to prevent that happening. As Daniel mentioned, the nearest community at Roxby Downs we do monitoring for both dust and radionuclides. We'd be surprised if there was a dust issue that reached there,
45 but there'll be an expectation on the tailings system being effectively managed

that it did not occur.

COMMISSIONER: Presumably we'd also be concerned about the workforce.

5 MR BALDRY: Yes. Yes, in terms of radiation protection the principle routes of exposure to radiation are from dust and from radiation emissions, so there's pretty low residual reactivity in the tailings, but, yes, it would be something that would need to be – protection of workers is obviously very important.

10 MR BELLIFEMINE: One of the controls for workers around the tailings is to limit the time spent around the tailings because of the gamma radiation is one of the sort of more prominent pathways for workers in that area. As I said the doses are within the one to two millisievert range in any case, so they're well below the dose limits, but they still do implement that control.

15

MR BALDRY: Actually in terms of radiation doses there's an Australian National Radiation Dose Register to which all of the uranium miners in Australia report to and shows the results and that's managed by the Australian Radiation Protection and Nuclear Safety Agency and so there is a national depository of all doses to uranium workers and in addition there's the United Nations (indistinct) that collects radiation doses worldwide from all activities involving radiation, including uranium mining, and makes assessments of risks associated with those activities.

25 COMMISSIONER: If we were to think forward to having a nuclear industry, and we're not there yet, what sort of development would you think EPA would need to undergo to manage that sort of environment? We're talking about an environment with potentially expanded mining, potentially conversion enrichment of fuel fabrication. Do you see a different sort of structure than the one you have at the moment? I know I'm putting you on the spot here because
30 it's not something we've discussed previously, but we do have to turn our mind to that sort of issue.

MR BALDRY: Yes. I think there's a difference between an expansion in
35 mining and an introduction of new activities such as conversion enrichment and that is potentially nuclear power. I think that we have the structure and capabilities for an expansion of mining and it would be a resource capability that would need to be addressed then. If there was more mining in more
40 locations we would need a greater capability to look at the amount of new activities that are occurring, but the regulatory structure is suitable and the skills and the type of organisation we are is suitable to manage that sort of activity. When you're looking at the conversion enrichment, and the same applies to high level waste management and certainly to nuclear power, is that there's a different sort of approach to regulation of those and it's around the
45 assessment of safety cases. That's a capability that we don't have a significant

amount of within the EPA because it's generally not part of the sort of regulation that we do, that would be different and would need to be addressed, but I don't think that the legislation as it is – the legislation prohibits some of these activities, but other than that change I think that there would need to be a
5 review of the legislative framework such that you could approach this sort of safety case way of assessing and controlling activities. I think if it was appropriately structured around that. It's certainly possible because there's plenty of places where it happens and I think in South Australia we've got a stable government, a stable economy, so with the right approach it certainly
10 can be done here, but I think for those new activities it certainly would require different capabilities within an organisation like the EPA, a review of the legislation to see if it adequately did address those activities.

15 COMMISSIONER: Do you think that organisation or structure might be a commonwealth led organisation or a bit of both? Do you see any benefit in a national structure as opposed to a state-wide investment?

20 MR BALDRY: I think for any regulatory structure it needs to be effective and efficient, so there's probably a number of options and it would be crazy not to use the commonwealth experience of, for example, the regulation of facilities at Lucas Heights and its other licensees. I think that the other aspect of conversion enrichment you start then getting into the uranium safeguards territory then there's definitely a role for the Australian Government in that, so you couldn't go it alone in South Australia without at least forming really good
25 partnerships with the commonwealth bodies. As far as what the structure of an organisation looks like, whether it's a commonwealth body or a state body, yes, as I say, you want to make it the most effective and efficient to deal with the operations you have.

30 COMMISSIONER: Thank you. Thank you very much for your time on both days.

MR BALDRY: Thank you.

35 COMMISSIONER: We'll adjourn now until 1400 when we'll have BHP.

ADJOURNED

[12.16 pm]