

COMMISSIONER: Good morning. It being 10.30 we will convene. Topic six is the environmental impacts, lessons learnt from past mining and milling practices in South Australia, case studies for Port Pirie Rare Earths Treatment Facility and Radium Hill. Might just start with a context statement about what we are attempting to achieve in this particular section. The commission's terms of reference expressly require it to give considerations to the environmental impact of the potential expansion of exploration and extraction activities. That much of the exercise is to be conducted by considering what has occurred elsewhere, largely overseas, and what might occur were those activities to be carried out in Australia. Our terms of reference expressly require us to give consideration to the lessons that can be learnt from past exploration and extraction activities in South Australia. The commission, before it considers any possible expansion of operations will examine South Australian history to see whether that might inform what we should do in the future. In short, the commission will pay heed to the past, lest mistakes be repeated.

The most significant of these past extraction activities was the radium and later uranium mine operated at Radium Hill in South Australia's north-east and the associated processing works operated here where we are today in Port Pirie. The question faced by the commission is what can be drawn from the way those activities were established, operated and closed, to better inform future practice. The commission already understands a number of the issues in the broad outline. It has already inspected the Port Pirie facility in April and the former Radium Hill mine site in August. Given that much time has elapsed between the closure of both the mine at Radium Hill and the facility at Port Pirie, it is necessary to understand what changes have already taken place in the practical planning development conduct and ultimate decommissioning of mining and processing activities. In conjunction with their contemporary regulation and licensing. The commission is not tasked by its terms of reference with an inquiry in to what ought to happen now at these particular sites, or whether more, if anything, should be done. That said, it must understand the complexity of any issues that now exist, to form a view as to what might be done during any expanded operations to avoid those issues in the future.

To discharge its functions, it will speak to those that were present when the Radium Hill mine was established and operated, those responsible for now managing the sties and also an independent expert that has undertaken a study at Radium Hill in the context of his work to understand the environmental impacts of closed mines. I now invite counsel assisting Mr Jacobi.

MR JACOBI: Mr Kevin Kakoschke worked at the Radium Hill uranium mine for nine years. Since that time has been a TAFE lecturer in mechanical engineering and a consultant to the manufacturing industry. He is the author of

several books concerning Radium Hill, including *We Were Radium Hill* and *Off The Barrier Highway*. He is the president of the Radium Hill Historical Association which seeks to preserve the cultural heritage of the Radium Hill site.

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COMMISSIONER: Can I suggest you come forward a bit. We won't bite I promise.

MR JACOBI: Sorry, just to repeat, he is the president of the Radium Hill  
10 Historical Association which seeks to preserve the cultural heritage of the Radium Hill site. The commission calls Mr Kevin Kakoschke.

COMMISSIONER: Kevin, welcome. Can we start – what we are trying to do  
15 here is to put in to context what happened at the mine at the time you were there, you were part of it and Mr Jacobi now will lead you through a bit of context, so that we can see what it was like during the time.

MR KAKOSCHKE: Mm'hm. Good.

20 MR JACOBI: Just wondering whether you could describe first, the period of time that you worked at Radium Hill?

MR KAKOSCHKE: Having just left school, turned 16, fortnight later I signed  
25 up at the University Life on the 3 March 1953 to work at Radium Hill as an apprentice fitter and turner. I progressed through the ranks and was there when it closed in December 1961 and involved with the mentors, my mentors who were the mining, mechanical, electrical, civil engineers and metallurgists.

MR JACOBI: How long after you commenced, had the – perhaps I should ask  
30 this, in terms of when you started, how much of the planning and other work had already commenced at Radium Hill?

MR KAKOSCHKE: When I commenced at Radium Hill, my quarters were a  
35 tent and the implementation of the building of the main mill area was commencing and I was a little bit involved in that on the periphery really. I didn't have anything to do with the design or anything like that but I was just one of the workers on the initial building of some of the aspects of the plant, the crusher house and some of the items in the mill.

40 MR JACOBI: In very broad outline, since the mines closure in the late – early 1960s, have you had a continuing involvement with Radium Hill?

MR KAKOSCHKE: Really I suppose I would have to say yes. More so in the  
45 last 14 years but initially after it closed, I had a close relationship, went up there a couple of times because a couple of my brothers were involved in the

clean up and my father-in-law was in charge of all the clean up immediately after it closed.

MR JACOBI: Did you make visits in the 1960s, 1970s, 1980s?

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MR KAKOSCHKE: Yes. So used to have to go up to Cobar, the Cobar mines at least once a year and generally would call in to Radium Hill just to see what's left there.

10 MR JACOBI: Perhaps if we can go to the – watching on the first slide and perhaps you can give us a broad indication of where the Radium Hill mine is located relative to the other geography in the area?

15 MR KAKOSCHKE: Yes. Well, Radium Hill, as you can see on the slide, is in the north-east of South Australia, southeast from Olary around about 12 mile, 18 k's off the main Barrier Highway and the railway line. It's in a land of mulga, saltbush and bindi eye and around about seven and a half inches of rainfall a year, but the evaporation rate is seven and a half feet, so we had a massive water problem right from the start.

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MR JACOBI: In terms of its distance from other main settlements, as the position stands now, how distant is it from other main settlements that are located nearby?

25 MR KAKOSCHKE: Basically because all the facilities that were built up over the period of time, the other settlements along the Barrier Highway and a lot of the station properties, we were the regional centre, north-east regional centre. They used to come in to Radium Hill because around about 1,000 people were living there. We had all facilities, eventually we had all facilities. You name  
30 it, we had it and the surrounding areas would come in, whether it be rifle shooting, tennis, football whatever.

MR JACOBI: Yes. Mr Kakoschke in terms of, as it stands at present, in terms  
35 of the main population centres, how distant are they from where the mine is now?

MR KAKOSCHKE: Well, the main population centres I tend to think would  
40 have to be Peterborough and Broken Hill. Olary, Mingary, Cockburn, Manna Hill and Yunta – well, Yunta's only got 58 people there, so that's the biggest. Olary's got six, so yes.

MR JACOBI: And in terms of the railway line in to New South Wales?

45 MR KAKOSCHKE: Railway line to New South Wales, that was used after the railway line in to Radium Hill was constructed and that was a narrow gauge

line of course but that was surveyed January 1953 and the first train called the Atomic Comet moved in to Radium Hill on the 3 October 1953.

5 MR JACOBI: But in terms of the distance from the standard gauge, as I understand it, the now standard gauge line going in to New South Wales, what is the distance of that relative to the Radium Hill mine site?

10 MR KAKOSCHKE: Well, a lot of the waste from Radium Hill was used as ballast in 1965, the line from Radium Hill into Cutana Siding was the first state government built standard gauge railway line in South Australia, and from then they branched east and west to do the railway line from Peterborough to Cockburn.

15 MR JACOBI: Approximately how far is it away from the mine?

MR KAKOSCHKE: The line is approximately 18 to 19 kilometres, about 12 mile.

20 MR JACOBI: Can I just come to the first phase of the mines operation, because I understand you have some expertise in relation to that. This is at a time about 50 or 60 years before your involvement at the site. I think the next slide picks that up. Can you just give a broad outline in terms of the first phase of the mine's life?

25 MR KAKOSCHKE: Well, the first mine was found by Arthur Smith there and that's his mate, Douglas Mawson. He pegged the claim on 20 March 1906. He thought he had a tin or wolfram deposit. Professor Bag and Chapman in Adelaide, they determined that it was radioactive and Douglas Mawson realised that it would be a new mineral and he named it davidite containing  
30 radium and uranium.

MR JACOBI: In terms of the first phase of the mine's operation – I think the next slide might pick that up in terms of the scale.

35 MR KAKOSCHKE: Well, as it turned out, the papers at the time eulogised over the enormous hype about radium. Forget about uranium at this stage. They mentioned that foreign nations will be obliged to seek from us the power with which to heat and light their cities. Then other articles really over themselves, its core value and resources should be exploited by the people for  
40 the people of Australia. That's how they eulogised about how critical it was for Australia's future. Also, samples of it were sent to Madam Curie in France for further investigation, research and commercial viability and also Lord Rutherford in England.

45 MR JACOBI: For how long did it operate?

MR KAKOSCHKE: The first mine operated with Arthur Smith up until approximately 1908 and then it was taken over. Mawson had a claim there but when he found the Antarctic the publican at Broken Hill jumped his claim. It then worked on till 1914 and some of the stuff was sent to Germany. In 1910 they were using the uranium element for hardening steel, which I thought was quite unusual at that early time.

MR JACOBI: Can we come to the next phase of the mine's development, the phase where you were there. I think we've got a circus plan in the next slide. I'm just wondering if you can give a broad overview of the layout of the mine site as it stood then.

MR KAKOSCHKE: Those letters that you see there, that is the line of load and the various shafts associated with them. The regional shafts were these just along here: Main, Whip, Brown and Smith shaft. With the facilities built up the old camp was down in here. That's the tent where I was first, a tent and a couple of cubicles, but then everything else was built in.

MR JACOBI: Just for the transcript I think you've pointed out the area south of the transformer station.

MR KAKOSCHKE: Yes. Down here this was later on the concentrate dam. When the mill got going this was the concentrate dam where the 20 per cent solid slurry from the milling process was pumped in there. The water was reclaimed and used back into the milling operations.

MR JACOBI: Can I just stop you there. In terms of the concentrate dam, that was used to store the product that was ultimately transported away from Radium Hill. Is that right?

MR KAKOSCHKE: Yes. The concentrate dam, that was the main one from the operations. From there after it got going with the railway line in, et cetera, then railway trucks would come in, an air-operated scraper would be used and they would fill the railway trucks with the concentrate. It would be wet down usually before they would load it. That was into 12-tonne railway truck.

MR JACOBI: Can I take you from there to the tailings dams which I think are further south. Are you able to describe their layout and the nature of the planning that was involved in them being laid out?

MR KAKOSCHKE: With the tailings dam, once again, the waste sands or fine – just like mud – from the flotation cells would be pumped out there and the pipe carrying that waste would have holes in it and where you wanted the slurry to go, those plugs would be taken out of the pipe and it would gradually

be built up into a mound, like a big dam, and the centre would be holding the water as a product of the medium from which it was used to get it out there.

5 MR JACOBI: Again for the transcript, the witness has indicated the two large rectangular tailings dams to the south of the transformer station. Were you present at the time that the tailings dams were constructed?

MR KAKOSCHKE: Well, that one in particular.

10 MR JACOBI: That's the southernmost one.

MR KAKOSCHKE: Yes, that's first. The first one, an experimental station, was called the pilot mill. That was built in 1952, just a little bit before me. They used a concentrate dam there. The product was put in 44-gallon drums and whipped back down to Thebarton for further research and analysis. The little tailings dams were alongside of that.

MR JACOBI: Could you describe the method of construction of the tailings dams, both the bases and the walls?

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MR KAKOSCHKE: The bases were the dirt that we walk on, no real pre-preparation of a base. The walls of the dam were the actual residue from the slimes or the concentrate being pumped in that area. It formed its own banks as such as it was built up, draining towards the inside from where the water was reclaimed.

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MR JACOBI: So I'm right in understanding that the waste material itself was used to construct the dam walls.

30 MR KAKOSCHKE: Yes, same as the concentrate dam. The concentrates were used to construct the dam walls of the concentrate dam.

MR JACOBI: So just to come to that particular dam, the walls there were not made of tailings; they were actually made of concentrates themselves?

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MR KAKOSCHKE: Yes, the walls were actually made of concentrates.

MR JACOBI: Was there any engineering design that you're aware of at the time that they were constructed as to how they were built or how they were designed?

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MR KAKOSCHKE: They were designed by the length of pipes that we reckon would be sufficient to let the slurries out to build up sections of the dam. So this is about right.

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MR JACOBI: I'm just interested in also at the time that the planning was done for the industrial operation. Were you aware of any discussion as it stood at the time of any environmental factors that were taken into account in its design?

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MR KAKOSCHKE: I can't recall anything being said about the environmental factors. That's my initial time there.

MR JACOBI: Over your time there in terms of the expansion or development of the industrial activities was there discussion of environmental considerations?

MR KAKOSCHKE: The environmental consideration was basically related to two points: (a), on the surface, the dust; and (b), on the ground, the humidity and also the smoke fumes, et cetera, from when you're blasting. It was quite warm.

MR JACOBI: I'll come back to the dust in just a minute. Perhaps we can go to the next slide. I'm just wondering whether you could identify the key aspects of the mine layout or the industrial areas that are shown in that slide.

MR KAKOSCHKE: The head frame, 131 foot and seven-sixteenths inches high or 42 metres high, that was the head frame. The wind house operating the skips to – the material from underground was located here. This was the Brown shaft head frame, the compressor house there. This just here was a fan and that was brought in from Wimmera, by the way.

MR JACOBI: Just for the sake of the transcript, the first object you've indicated is the large white V-frame and I think the fan that you're locating is located immediately beneath that in the centre of the image.

MR KAKOSCHKE: Yes. That's the fan here. That was to cool the compressors and, if necessary, these were an alternative power source.

MR JACOBI: Perhaps if we come to the next slide in terms of the township, how close was the township to the mine itself?

MR KAKOSCHKE: Basically the township was around about a good three K's away from the main industrial area. In the township there was 160 houses built and also there was 220 two-man cubicles which was just away to the left of that slide. The housewives used to complain that they were getting dusted lungs. So the project put in place procedures for bitumenising the street. The streets were bitumenised with waste finds from the mine area.

MR JACOBI: We might perhaps come back. I think you mentioned the dust

twice and I think the next slide picks some of the images of that up. What were the difficulties with dust in terms of working in the conditions as they stood then?

5 MR KAKOSCHKE: Well, in summertime you'd be wearing shorts and one of the problems with that is the dust and the sand - the wind would be blowing - it'd sting your legs and it was quite awkward really, and also if your single guy like I was first, you had to wash your clothes because they'd be sticky and grimy from the dust. In the town site there would be red dust. Down in the  
10 mind site area it'd be red, but it would mix with the bluish, greenish tinge from the waste materials from the mine area. So we had technicolour dust down in the mine area primarily.

MR JACOBI: I'm perhaps coming to that. In terms of the tailings themselves,  
15 did they remain wet or did they dry out?

MR KAKOSCHKE: Well, they dried out, because we reclaimed the water because water, to get it in from Broken Hill, was costing 23 shillings a thousand gallons. So every drop that you could save, you're saving a hell of a  
20 lot of money. And so the water, even though it may have been a salt content, about 2,735 parts per million, it was re-used back in the mill for the various operations requiring water. They dried out.

MR JACOBI: And so the bluish tinge that you've described, was that blow  
25 from the tailings themselves?

MR KAKOSCHKE: Blow from the tailings, and also some of the other spoil heaps right through that area, because of the mining and the dumps, were stretched for over a kilometre.  
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MR JACOBI: And perhaps relative to the mine layout, where were the spoil heaps located?

MR KAKOSCHKE: The spoil heaps. Generally from the early days they  
35 were located adjacent to the particular shaft or winze. Later on, when the mine was in full operation in my time, when we had a big mullock dump, of course rock, and from that also, from the mill, the finer crushed rock was in another area. So you had those two or three locations of waste rock and also crushed rock.  
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MR JACOBI: Yes. So we had spoil of both crushed rock and also the milled ore.

MR KAKOSCHKE: The milled ore and some that wasn't processed. It was  
45 just plain mullock.

MR JACOBI: And perhaps we can deal with the industrial safety as it applied within the mine, and I think that brings us to our next slide. I'm just interested, overall, perhaps without respect to the particular image, what were the main  
5 concerns with respect to the safety of those who worked within the mine?

MR KAKOSCHKE: The main aspect of safety was the personal harm through accidents, and great emphasis was put on through, firstly, dust. Everything had to be wet down so you didn't get dust. Boring was done with the wet. Boring  
10 into faces, you had the drilling going and also exhaust fans so they would drag away all the dust and all the fumes, and even though, in the early stage, I think if the gamma count were over - well, the readings were over 300 units, but later on, in 1954 they put a huge capacity exhaust fan in just near main shaft and that would take out 100,000 cubic feet of air a minute and that was exhausting  
15 all the fumes, et cetera, from down below.

Apart from that also is the person safety, and that ranged from personal gloves, et cetera, glasses, and also the battery from your battery acid, well, electrolyte. If you bent over, some of them damn batteries would leak and would come  
20 onto your back near your bum, sort of thing, and you wouldn't notice it until it started itching and it was too late.

MR JACOBI: Can I take you to the issue of discussions about radiation as a worker? To what extent was there any discussion or focus upon that in terms  
25 of safety?

MR KAKOSCHKE: It doesn't matter. Initially, radiation, it didn't matter, because we're getting good money. Later on, we had a bit of a check, but that was somebody else's problem. It wasn't our problem. It's unusual in that we  
30 didn't think of it that way.

MR JACOBI: Do you know to what extent measurements were made and related to workers?

MR KAKOSCHKE: Yes. We did have measurements laid. Before the big exhaust fan was put in, it was around about that 300, what, millisieverts. After that was put in down - less than 20. A dramatic difference, a drop-off. Also the radon gas, dramatic drop-off when the extra ventilation systems were put  
35 in. From the mine face venturi tubes everything was ventilated. Two reasons:  
40 (a) dust, (b) heat, and also the fresh air coming in, stale air going out.

MR JACOBI: Were there any limits on the time that you were permitted to work in the mine, bearing in mind radiation or other issues?

MR KAKOSCHKE: Our only issues of working in the mine was immediately

after firing, that you had to let the smoke, dust and everything clear before you went in. Usually it was a half hour.

5 MR JACOBI: And in terms of your principal work, were you principally working on the surface or down in the mine?

MR KAKOSCHKE: Yes. Well, principally on the surface, but when I was designing up the underground loading station and the main underground pump station and everything, I'd go down and I'd do spot checks on how much water 10 was being made in a mine or how the rock was rilling on the ore faces and so on like that, so, yes - primarily on the surface though.

MR JACOBI: And was there any difference in terms of discussions about radiation protection for you working on the surface?

15 MR KAKOSCHKE: No, very rarely mentioned really, because, as we thought, as we knew, it wasn't an issue.

MR JACOBI: Perhaps we can move to the slide beyond and deal with the nature of the conditions working within the mine itself. In terms of the main method for extracting the ore, how was that done?

MR KAKOSCHKE: Yes. The ore and the stope averaged about a 6-degree angle to the vertical, and also approximately 4 feet wide, climb up by a 1-inch 25 rope or a chain ladder up onto a stage which we had previously had nearby. You hook on and then you'd be working with that work drill which you lugged up there previously. That weighed approximately 60 pound. Air lines and also water lines to hold the operation. Each shift you would bore your holes. There's one around about there, I think. You'd bore your holes and each shift 30 you'd knock out on average about 20 tons of ore.

MR JACOBI: And perhaps if we can just come to one other slide inside the next one in terms of the way that the ore was removed, in terms of mechanical and human involvement?

35 MR KAKOSCHKE: Yes. Here are the human bidders. I didn't say that other word. Human bidders, and they are sinking a shift from one level to another and they would hand shovel, or bog, the broken material into a small skip to be hauled to the surface. You notice they are working in water, mainly because 40 there's nothing below and they were using water to suppress the dust when they're drilling, . So the water had to go somewhere and they would pump that out with an air (indistinct) pump so that - yes, and then they would drill, bog bore and fire. That was the procedure. Notice the safety aspects: no gloves, no shirt, no gloves. Yes.

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MR JACOBI: Was there any request to wear that sort of equipment at the time?

MR KAKOSCHKE: We're supposed to have worn safety boots galoshes.  
5 One guy, he'd go down - they used to call him Yank - but he'd go down and he had everything on to start off with. When he's down below (indistinct) to dry he'd strip everything off, even his boots, and he'd do - barefaced, no shirt, nothing, because he's tough. That's the way it was with some of the guys.

10 MR JACOBI: Now, perhaps we can come just to the means of shipping, and I think a couple of slides on we've got a slide that picks that up. Can you explain what is shown in that particular image there of the rail line and the rail tracks?

MR KAKOSCHKE: Yes. These were getting filled. This particular one was  
15 getting filled. It looks mine rubble and also the waste slimes where it was put through the thickener as waste finds like sand, and that was taken out generally for the roads, even on the Broken Hill highway between, I think, around about Manna Hill and Coburn. It was taken out and used for the highway. The concentrates was loaded up with the scraper into the trucks. Those trucks, that  
20 size there, held about 12 ton and the trains would be able to haul about 15 of those truckloads and - yes.

MR JACOBI: Were they covered?

25 MR KAKOSCHKE: No, no. Generally they were damp when they were loaded, but it depends how long they stood there. The trains went out on the Tuesday and the Friday evening. So if they were loaded on the Wednesday morning, then they drive out by the Friday evening. That's just the way it was.

30 MR JACOBI: If we come to the time of about 1961 when the facility was closed, I'm just interested in understanding, were you present at the time that it was shut down?

MR KAKOSCHKE: Yes. I worked there until the end and I got transferred  
35 down to the mine department in Adelaide in the design area. When it closed down, everything that was movable was removed. The equipment from the mining area, that was bought in some case from - by other mines, other bodies and some of that even went to Fiji, Emperor Mines in Fiji. The houses, they were bought by many private people and also by the State Government  
40 Housing Trust and put all around over the state. Everything was cleared up. If anything was rubbish, wasn't required, the big costeans and shove everything in there and then cover them off. A costean is like an oversized trench and they were put in there to be carted away - so they wouldn't have to be carted away, wouldn't be an eyesore. The only thing standing in the town site by the  
45 way, is the walls of the Roman Catholic Church and they were saved by divine

intervention.

5 MR JACOBI: Can I just take you to the tailings dams themselves and do you recall what was done as at the time of decommissioning with respect to the tailings dams?

10 MR KAKOSCHKE: Yes. The pipe was removed. The pipe at the top of the dam whereby the slurry was circulated around the top of there, that was removed and the dam itself was left to the elements.

MR JACOBI: Now I think we've got a slide that might pick it up in terms of – I understand you didn't take this photograph but I'm correct in understanding that you went there in the 1970s?

15 MR KAKOSCHKE: Yes. Yes, I used to call in on my way through to Cobar.

MR JACOBI: And are you able to describe the condition of the tailings dam when you saw it in the seventies?

20 MR KAKOSCHKE: In the early seventies it wasn't as bad as this photograph depicts but you could see in some sections the wind erosion was really blowing everything to the north-east and the south-east because there's nothing holding it together and you get some of them bloody winds there, they were really strong and that was dried and it just waiting for a wisp of a breeze to come  
25 along and it whip it away.

MR JACOBI: Now we've got – I think the next image, some works were done, as I understand the position, in the 1980s. This is a photograph taken by  
30 you?

MR KAKOSCHKE: Yes.

MR JACOBI: Are you able to describe the tailings dam after that work was done?  
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MR KAKOSCHKE: Yes. This is the tailings dam, the side of the tailings dam. They were consolidated. I have seen a (indistinct) cover with a two-metre thick fill but as you can see, the bloody colouring there, that's not two metres thick there to show the size of the dam. They dug great trenches or  
40 costeans along the side and from the fuel they carted that up and put it over the banks and on top of the dam and down this end is where the low-level radioactive waste site is.

45 MR JACOBI: In terms of other decommissioning activity, I think we've got an image that shows the head frame; I'm just interested to understand are you

aware of whether the nature of the plan for the decommissioning of the site, as it stood in the early 1960s?

5 MR KAKOSCHKE: The plan really was get out of it as soon as possible because it's costing money to be there because the contract has finished, there's no money coming in. That's the bottom line. I was nearly going to say another word. Now with the head frame, that's one of the last things to be removed from the industrial area. Reason why because it was a challenge how to bring it down and Jim Spears and Bill Paul(?) – Jim Spears had the salvage contract and he brought it down in sections and some of it's just out the road  
10 here at Bordertown here. So that was towards the end of the decommissioning, everything, the buildings as you can see, there's no building around. They'd already gone and somebody bought them, as bought most of the other movable items.

15

MR JACOBI: And do you recall there being any discussion about environmental considerations as it stood when the decommissioning occurred in the early 1960s?

20 MR KAKOSCHKE: No, no one was called in on the – give (indistinct) points on the decommissioning and environmental consideration, not at the beginning.

MR JACOBI: Perhaps we can move on to the second to last slide, which I think shows an aerial view, perhaps first of all you can identify the time that  
25 that was taken.

MR KAKOSCHKE: Yes, 1955. Bruce Webb, he's a geologist, he took this photograph. The town laid out, elements of the town, the single mens' two man cubicles and the industrial area. With the industrial area, just where I got  
30 the light there now, that would be the original pilot mill concentrates dam. Only a little thing.

MR JACOBI: But I think – can I just take you immediately to the bottom of the picture - - -

35

MR KAKOSCHKE: Yes.

MR JACOBI: - - - and you see a large, dark, almost I think smooth cone like  
40 pile.

40

MR KAKOSCHKE: Ye.

MR JACOBI: What is shown there?

45 MR KAKOSCHKE: This pile here in the centre there is the tailings of the

non-uranium bearing crushed rock. Over here on the left hand bottom corner is  
- - -

5 MR JACOBI: That's the rectangular object on the bottom left, yes.

MR KAKOSCHKE: Yes, that's the slimes dam that we're referring to earlier  
and inside you can see where the water has pooled. Up here, just in this spot  
here, that was the concentrates dam and the railway line went along past that  
for these trucks to get fuel.

10 MR JACOBI: Do you know recall how large the tailings dam was? The site  
coverage?

15 MR KAKOSCHKE: Not off hand but I would imagine it would be around  
about the five acres.

MR JACOBI: And I think we can show the relative difference now because  
we've got an image from 2006. I'm just wondering whether you could point  
out the main features again by reference to that image. I think if we go to the  
20 left of the large white object, which as I understand is one of the tanks, you can  
see a yellow patch to the immediate left of that.

MR KAKOSCHKE: Yes. That is the existing slime stand today, as you see it,  
well there's a dam there today anyway, as it is there. And as it shows up, I  
25 took this shot trying to emulate the one that was taken in 1955, so I can get the  
visual comparison from the air. So that is the slimes dam there. The ore bin  
there, that big 1,400 tonne ore bin and the head frame ore bin is there. Now the  
significance of this shot is that over in this area here, you see a bluish, greenish  
tinge - - -

30 MR JACOBI: Yes.

MR KAKOSCHKE: - - - predominantly there, that's downwind from the  
prevailing winds and that's blown from the heaps around the mine area here.

35 MR JACOBI: Sorry. Just so we're clear on the prevailing winds, are the  
prevailing winds - - -

MR KAKOSCHKE: Coming in from - - -

40 MR JACOBI: - - - essentially blowing from the left - - -

MR KAKOSCHKE: - - - this direction.

45 MR JACOBI: - - - or the right of that image?

MR KAKOSCHKE: Yes. South-west to north to north-west. They were the prevailing winds over that period of time and that's downwind from those. Another interesting point about that, if you don't mind Greg, February 1997, they had 13 inches of rain or 325 millimetres in one day in here. You'll see down in the bottom slide here, from that line along there to the bottom of the slide - - -

MR JACOBI: (indistinct)

MR KAKOSCHKE: - - - you'll see it nice and red - - -

MR JACOBI: Mr Kakoschke just stop for the transcript. I think you're indicating a line that runs in a darker passage in about the bottom third of the image.

MR KAKOSCHKE: Correct.

MR JACOBI: Yes. And what is the significance of that?

MR KAKOSCHKE: The floodwaters of that deluge swept all the surface area away including the surface dust and you'll note from there, it going back to the mine area, you get a gradual grading of colour and that indicates the dust blown from the mine area. It didn't reach up anywhere near the slimes dam is.

MR JACOBI: All right.

MR KAKOSCHKE: That area, it's quite safe.

MR JACOBI: So just so I can be clear about one thing and this is perhaps the last question, because I think we're running short on time, is that in terms of those – the waters, the waters in that event, how far do you say they reached? Are they – do they reach that boundary of that bottom third line, or did they go further up?

MR KAKOSCHKE: No, they – that's where they reached because it gradually rises to the mine area, so it's safe, as far as deluge is concerned, more so than any plain where something may be located.

COMMISSIONER: Mr Kakoschke, thank you very much for your evidence. We'll adjourn until 11.20 when we'll have representatives from the Department of State Development and also the Environmental Protection Authority with us.

MR KAKOSCHKE: Do you mind? I just mention, quite a bit of the

information we've gone through is contained in the latest book called *Off The Barrier Highway*, a whole chapter devoted to Radium Hill as such and other places right up to that area.

5 **ADJOURNED**

**[11.10 AM]**