

The Path towards Strengthened Safeguards: Experiences in Iraq, South Africa, and North Korea

This video series is a collection of dialogues centered on the immense role played by the IAEA, and in particular how the Agency supports nuclear nonproliferation through the practice of safeguards. This current update is a chronicle of events during the 1990s, Iraq, South Africa, and North Korea, that led to the development of the Additional Protocol.

7.21 Estimating HEU Production in South Africa

Rich: But trying to assess, or estimate, the amount of 90% enriched uranium that they could've reasonably produced is - you couldn't do any U235 balance, and the reason is that almost all the material is in the tails, they simply attached no value to it at all. They hauled it away. You needed some other way to approach it.

It was extremely fortunate that the South Africans had retained very detailed records of the operating history over 15 years, and so with the access to those records, which we only had in SA, we were able to reconstruct the operating history of that plant over a 15 year period, come up with various estimates of losses, and at the end, say, this is how much they could have reasonably produced. And this is how it was done. And I did not know what the declaration was, up until the time I said this is how much they could've reasonably produced. So it was an intellectually honest exercise.

The weapons part of the thing that Dmitri described earlier, I had nothing to do with. I was strictly there to address the enrichment part of the problem.

I was detailed on one Saturday, was transported by the South African air force to the Kalahari desert, to observe the rendering harmless of some test shafts. That was one of the most entertaining days I had had in my life up to that time. Because the people from Armscorp¹, from the South African side, that had gone down to render the shaft harmless, could not get the local community contractor support that they had expected to get. So they kind of had to jerry rig this whole thing. What they attempted to do – they had a very large front loader, with a capacity of something like 12 cubic meters in one bite, is that they wanted to dump sand down these very large one meter wide shafts. They would dump sand, and then they had 50 gallon barrels filled with concrete, and they would layer them – sand, barrel, sand, barrel, and in that way, they'd render these shafts so that it'd be more expensive and difficult to recover the shaft than to just drill a new one. Unfortunately, as they dumped this large quantity of sand, as it's falling down the shaft, it can't displace the air fast enough. So what happened was, the air that was displaced comes roaring up this hole under a lot of pressure and carries sand with it. Well then, the sand that is down there is sitting on a layer of compressed air. So as they continued to dump sand down there, this compressed air is put under greater and greater pressure. So then, when they realized what's happening, they managed to find a very large air compressor, and they hook the compressor up to lengths of pipe, and with the air coming up through the pipe they hope to be able to push the sand out of the way, feed lengths of pipe down, and eventually hit this layer of compressed air and allow it to come up. It didn't work. But it was a fun day. At the end of it, when they gave up – well, eventually the air leaked up and they were able to do it as they advertised. But at that day, they were making a film, and on their film, they wanted a picture of an IAEA staff person going up to the hole and looking in the hole. There was loose sand all around it,

¹ South African government-supported arms company. <http://www.armscor.co.za/>

and who wants to walk up around that hole? Eventually they tied me to the bumper of a pickup, and I have this picture of me walking up to the edge of this hole with a rope tied around my waist.

Without the kind of cooperation, particularly with understanding the enrichment process and the various attempts they made to solve this radiocatalytic problem with the chlorine, we would've had no chance. So not only did they make people available who had worked in that plant, and learned in an empirical way what was happening in the plant, but to the scientists who had worked hard to solve the problem, so it made a really huge difference.