
Adamas Gemological Laboratory



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De Beers Consolidated Mine's Premier Mine (A Five Star Mine)

Courtesy of the Jewelry Council of South Africa Diamond Certification Laboratory and De Beers Consolidated Mines Ltd, we were given an underground tour of the Premier Mine, located in Cullinan, South Africa. The Premier mine, a diamondiferous kimberlite pipe that yielded the world's largest cut diamonds, the 530.2ct Great Star of Africa and the 317.4ct Lessar Star of Africa, is located about 50km north-east of Pretoria. Since 1902, beginning as an open pit mine, to today, where mining operations are being carried out from the access shafts at the 763 meter (2503ft) level, where we were taken, the Premier Mine has been yielding surprises, the most recently notable being the 353.9ct Premier Rose, discovered during operations in 1978.

The Premier Mine, from the rim, appears lifeless, a big hole in the ground. Holes showing in the mine's rim are old, unused access shafts, once used as the current 763 meter level is, as access to extract the kimberlite, in what is termed Cone, Grisley or Transfer level tunnels. The hole measures approximately 200 meters by 800 meters at the rim, in a kidney shape of sorts.

On the upper left rim of the first picture you can see one of two huge ventilation building, continuously feeding fresh air to the working levels of the mine.

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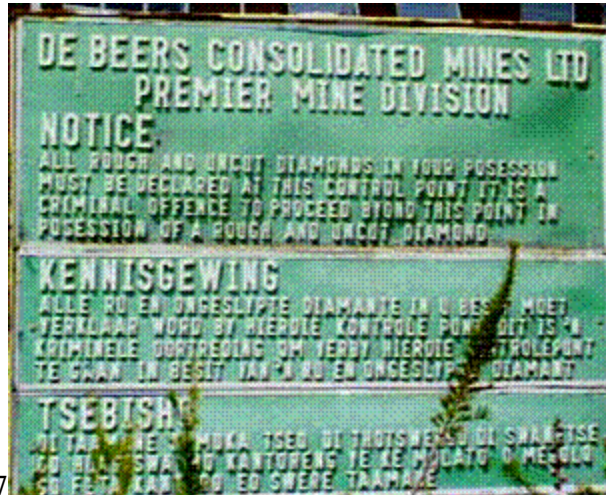


Before we were allowed into the mine we had to put on protective clothing, waterproof boots, and the ubiquitous hard hat. We were supplied with a belt pack weighing probably 20 pounds or more, containing a battery pack with reserves for 12 hours or more as well as required emergency breather packs. Canaries are no longer used in the mines to detect dangerous gases, but our guide carried, attached to his lighting system, a detector which checks for buildups of methane gases and whatever. As a continuous monitor, it would make a very loud noise if gases were detected.



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Even though our garments had pockets we were very gently warned that rockhounds were not tolerated at the mine, and being 10,000 miles from Boston, I decided against any collecting on this trip. To bad, no samples.



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Anyways, after a very long elevator ride, with ears popping due to the pressure change, we arrived at the working level of the mine, 763 meters from the surface. I was immediately struck by the cleanliness of the mine.

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And the reason for the apparent cleanliness, is that after all the safety mesh, and retaining rods are applied to the access tunnels wall, the whole thing is whitewashed.. as evidenced by the store of whitewash bags, which I initially thought were explosives..

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Speaking of explosives, we did pass a mine train carrying ammonium nitrate, etc to the kimberlite pipe, I decided against lighting up.

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There were also explosives lockers scattered throughout the tunnels.



Okay, explosives, methane gas, 2500 ft of not so stable rock over your head, where do you go if there is a problem? They call it a refugebay where you go and wait for help, and of course we we shown the nearest one.



Okay, we saw railroad tracks, real narrow guage, and an array of Toyota Land Cruisers, modified to carry workers and equipment.. so we also had to have a maintenance bay, voila! Here the mine maintenance personell are repairing one of the little tilting mine cars that carry the ore to the Grizzly.



Okay, on with the show.

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Here we see the drilling operation for a special tunnel running accross the whole pipe from which special test borings will be made to determine if the mine will be taken deeper than the 763 meter level. That, we were told will involve new elevator shafts and considerable investment in time and money.



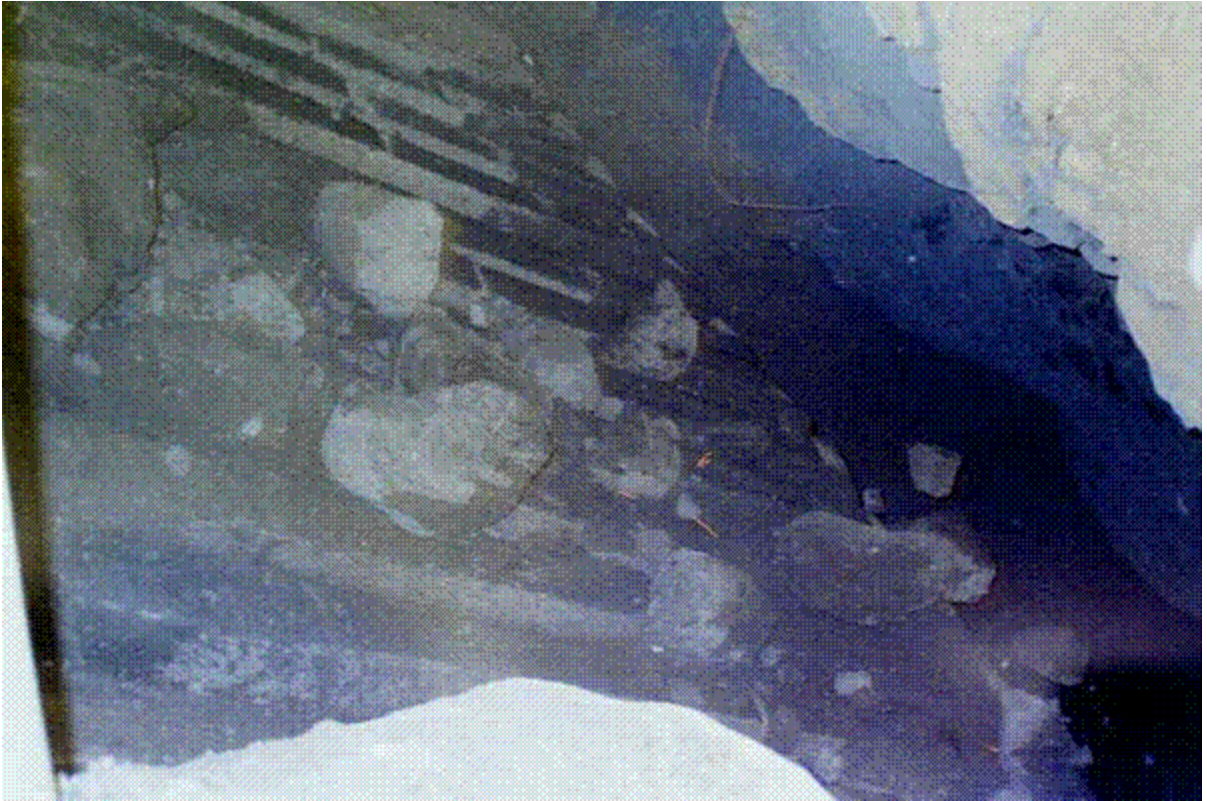
All the tunnels we were in were set back from the rim of the mine, the ore in the pipe is extracted and flows from the Cone level to a railroad line on the periphery of the mine where it is poured into the small tilting hopper cars. We were not allowed in the pipe area of the mine, as it is too dangerous.

The small hopper cars are unloaded at one of the Tilts into the grizzly where it is broken down to sizes under approximately 6 inches.





Into the grizzly..



The special cars are tilted by a ramp on one side of the track, here shown in a retracted position.



Well, now the ore has gone below us into the grizzly, and what goes down has got to come up.....



To a very long conveyer belt...



The conveyor system brings the ore to the hoist level where it is brought to the surface by a huge automatic elevator system.



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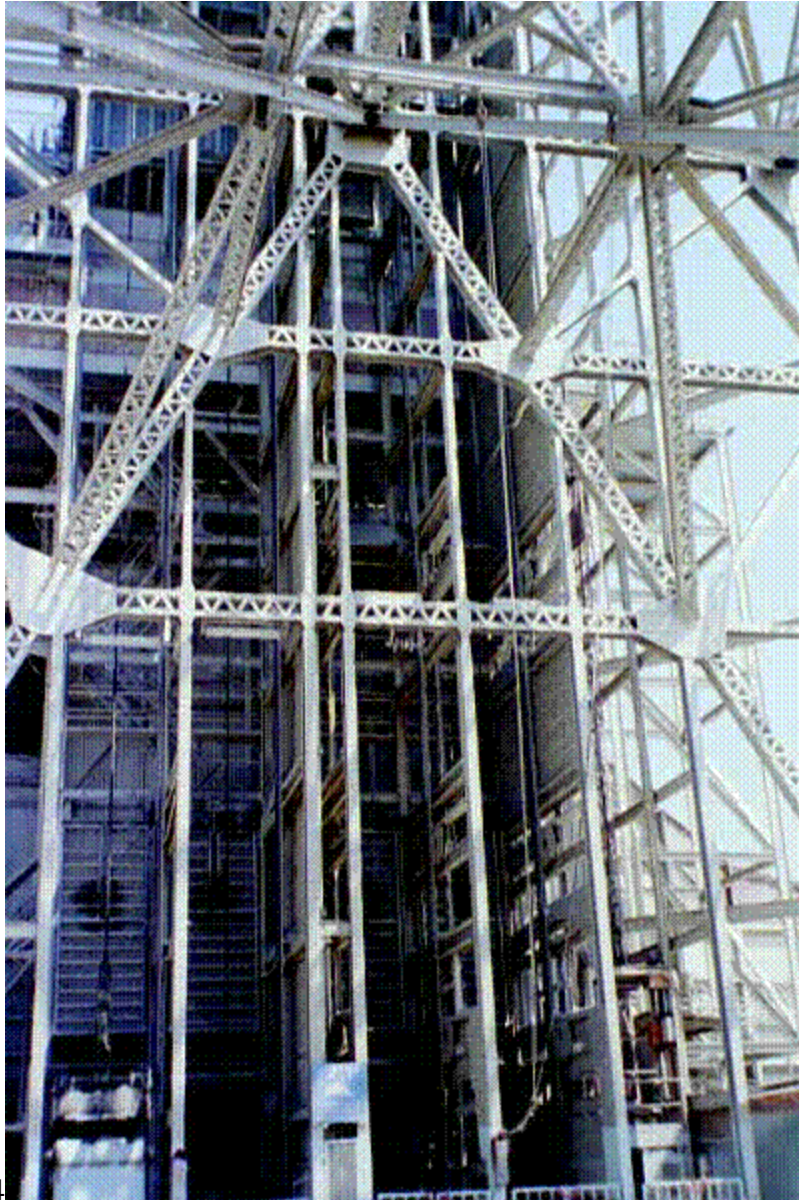
p25



p23



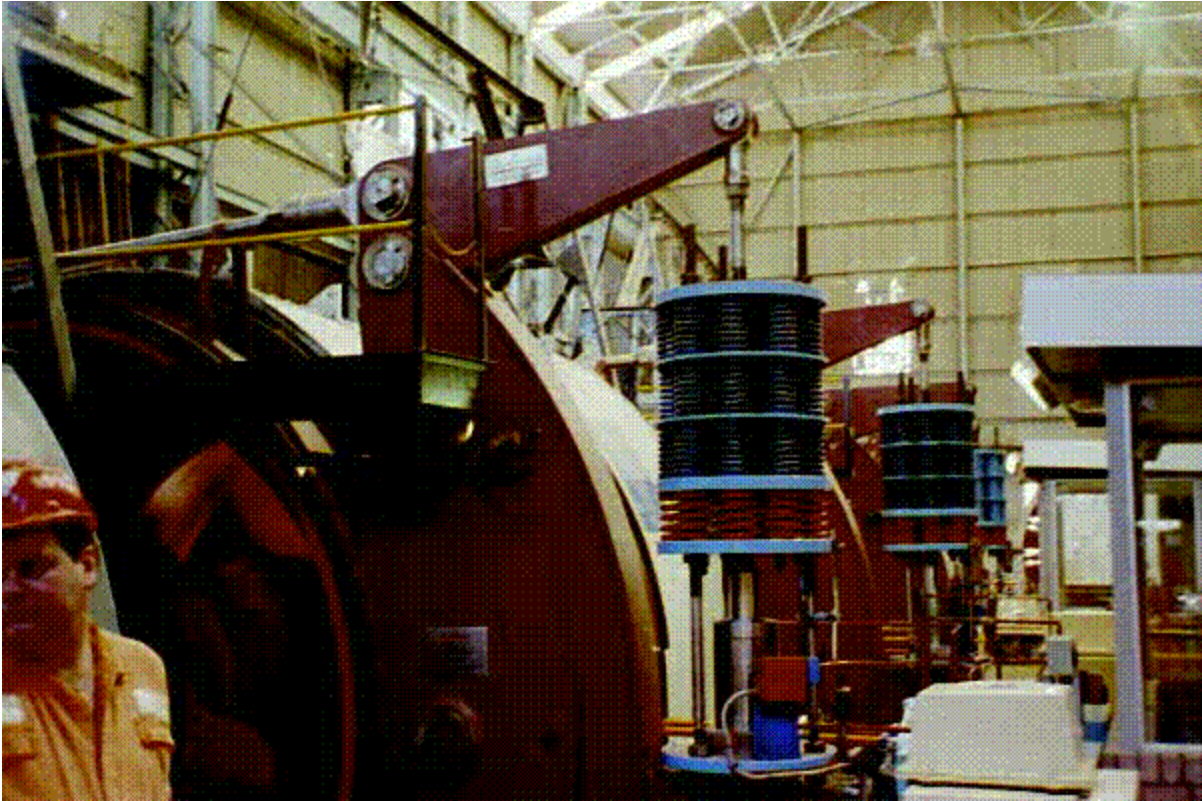
To the surface... where the automatic hoists supply the separators.... we were not taken there, something about security or the like..





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The electric hoist room is all automatic, no one pressing any buttons.



Some of the ore is stockpiled to be processed when the hoist is down..there are processing quotas at the mine..I believe they were on the order of 20,000 tons a day.... Oh... according to a 1979 book 230 million tons of ore has yielded 15 tons of diamonds (20% gem quality) . Thats a diamond yield of 0.000000065.. One ton yields 0.29cts...Large rough, over 10cts account for only 3% of total production.



Some more pics from the small museum near the mine.. showing old time mining..circa 1902..



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