

Aditnow go to Boulby

3rd September 2008

7 members showed up on the day

Simonrl, Spartylea, Col Mustard, Mountain Penguin, Mike Moore, Ben88800, Robbie Neilson and Mountain Penguin's mum filled in at VERY short notice so we had a full complement.

Our host for the day was Neil Rowley who was until recently the mines safety officer. We began with a short presentation on the geology and history of the mine, some slides showing the operation of the company's other potash mine in Spain, a look at the products and a summary of what they are used for before a quick sandwich and moving over to the pithead to get changed for our underground visit. Sadly the mine does sometimes hit pockets of coalfield gases, including methane and so nothing which could cause a spark is allowed underground this includes anything with a battery in it, watches, car keys, cameras etc, so no photography allowed.

Boulby provide everything needed for a trip underground and we were handed a large black sack containing boots, socks, shinpads, hi-vis vest, a choice of orange shorts and shirt or overall, safety glasses, gloves and ear plugs and a towel!!

Once suitably dressed we headed to the lamp-room for a belt loaded with lamp, self-rescuer and a holster for a bottle of water, something we were all grateful for later on. We all then signed ourselves in, Neil handed over our tokens and we headed for the cage.

There are two shafts close together at Boulby, sunk in 1969-72, the man-riding shaft is also the downcast shaft where air is forced into the mine by a large fan. This means that to preserve the air pressure there are airlocks to negotiate to get access to the cages. There are two cages in the shaft which counterbalance each other, as one comes up the other goes down. The larger of the two has three decks with 26 persons allowed per deck, we descended in the smaller which only takes 12.

The shaft is about 1100 meters deep and the ride down takes about five minutes, rope guides make for a smooth and relatively quiet descent.

At the shaft bottom it seems a different world, there is a howling gale blowing out of the shaft, despite this the increased temperature is already very noticeable and the air tastes of salt. The roadway leaving the shaft seems huge and as we walk a short distance to where the personnel carriers are parked the roar of the wind from the shaft subsides and the smell of diesel fumes is added to the salty tang in air.

Personnel are carried around the mine in converted Ford Transit vans, the bodywork is stripped and an open-topped metal cage with seating down either side installed. We climb on board and Neil fastens a chain across the back before we set off for the working face about 7km away to the north under the sea.

The deposit they mine at Boulby is the remains of a shallow sea after evaporation. About 291 million years ago in the Permian period the UK was at a similar latitude to where the Sahara is now and a large shallow sea extended over what is now Northeast England, the North Sea and much of Germany. The area was subject to repeated cycles of evaporation and inundation forming thick beds of evaporite minerals with the least soluble at the bottom and the most soluble above. At Boulby there are gypsum/Anhydrite beds below the mine workings followed by salt in their lower workings and potash above the salt. Immediately above the potash is a layer of poorly consolidated clay marl formed when seawater flooded back over the evaporites bringing muck with it. This is an extremely weak layer and will not stand as a roof, it is therefore necessary to leave a 2 meter beam of potash in the roof of the workings throughout the mine.

All the permanent roadways in the mine are driven in the salt beds beneath the potash. Although potash is a far more valuable product the engineering properties of the bed are poor compared to salt and roadways soon crumble. The floor heaves, pillars spall to nothing and the roof sags to meet the floor which means that they are obliged to mine salt two days out of seven so that they can have permanent road and airways. When they find a district where the depth and grade of potash is worth mining they simply put a ramp up into the potash bed and start driving twin headings. In each working place they will have a continuous miner working in one heading while a roof bolting crew work in the other one.

Once the bolters have finished one section then they change places so that the miner extends the newly bolted heading while the bolters fix the roof where the miner has come out.

All the roadways are driven in pairs, one for vehicular traffic and the other for the rock conveyors, also to accommodate outward and return airflows. While they are driving these roadways it's necessary for them to be connected at intervals so that rock (salt or potash) can be loaded onto the conveyor from both. Once the workings move forward however it is important that the two are separated well to keep outward and return air from mixing. To plug the gaps they use huge polystyrene building blocks and then spray them with sealant.

In the north end of the mine there are currently three continuous miners working different faces; all of them need a fresh air supply and a return airway. There is only one working the South part of the mine, as these workings are deeper and even hotter than the north with rock temperatures of 45degrees C. We were driving along the main route for the outward air and our first stop was to see how the return air from one of these districts was directed across our tunnel. It came through in a boxed off section straight across the top of the road and through to the main return airway in the conveyor tunnel alongside.

Next on the agenda was a look at an exploration drilling rig. This is set up in the salt bed, it's a longhole coring rig and drills horizontal cored holes of about 2km length arranged in a fan shape so as to test the ground ahead of the working faces. At regular intervals the coring bit is deflected up through the potash bed to test the thickness and grade of the deposit. The geologists log the cores and establish which areas are economical to mine.

The rig basically spins a hollow bit and rods and the cores are flushed back down the middle by injected water, they are caught in a metal basket then arranged on a core rack for the geologist. Once they've been logged the cores are waste and we were allowed to pick up some interesting pieces for ourselves.

Our next stop was one of the working districts, we could tell we were getting close by the banks of transformers and huge batteries lining the roadway. Each district has a meeting point with a bait table and this was our first call. Due to the extremely hot working conditions there is enough slack in the crews so that the guys can take a break and get some iced water to cool down so there is usually someone at the meeting points. This is also where the first aid kits are stored. These are pretty comprehensive since regular medical attention is a long way off and each box has a defibrillator, and entonox for painkilling as well as the usual plasters and bandages.

From the meeting point we walked up to where the continuous miner was working. This huge machine has a rotary cutting head on the front, four meters wide and studded with sharp spear-pointed tungsten cutting tips, we were told around 30 of these tips may need to be replaced each shift. The rock that's ground off by the head falls down onto a scoop at the front of the machine, is drawn through the body and dropped out of the tail either into shuttle cars which transport it to a fixed conveyor or, in this case onto a flexible, mobile conveyor which then links up with the fixed conveyors.

As we arrived they were preparing to add in another section to advance the fixed conveyors and track up the mobile one. They were using the miner to 'gently' take a bit more from the sidewalls in preparation.

The operator stands behind his machine and operates it by remote control, it's powered electrically so two other guys were looking after the trailing power cables to ensure they didn't get damaged as it manoeuvred.

We watched the continuous miner for a while then walked alongside the mobile conveyor to the point where it joined the fixed conveyor. This was in the return airflow and it was surprising the difference in air quality and temperature in just a few yards, especially since the miner wasn't actually working full out and not producing much dust at all.

We returned to the vehicle and set off back in the direction of the shaft, our last call was to take a look at one of the 6 safe havens which have been established in case of underground fire. Although the mine itself in salt and potash is not combustible, unlike a coalmine, one of the occasional methane pockets or a vehicle or equipment fire could still pose a significant risk. The self rescuers are only a very short term protection against carbon monoxide so these rooms are equipped with various mechanisms to provide breathable air in case the mine fills with smoke and/or gas. Once the doors are closed a piped air supply can be turned on which provides positive pressure to prevent smoke entering.

The air pipeline is plastic however and in case of a fire destroying the pipeline there is also bottled air available in the room itself to feed the line. Once that runs out then there are also individual oxygen bottles with smoke hoods available. Each room cost in the region of £20,000 to fit out and they are moved periodically so as always to be within a short distance of the working areas.

On our return to surface we headed for the winder room. The winders for the two shafts are in adjoining halls and the control room for them is situated overlooking both halls. We were allowed into both halls for a closer look at the winders and their motors and climbed up onto a gantry above the winding drum for the rock shaft to watch as the cables wound and unwound onto the drum. When installed this was the largest winder in the northern hemisphere and it is truly massive.

From the winder hall we went across to the rock shaft to see loads of potash being discharged into hoppers. There are again two skips running in the shaft one to counterbalance the other. These travel much quicker than the personnel cages and it only takes two minutes to haul the rock up and a mere 14 seconds for discharging/loading. The winding runs automatically but with a winderman overseeing, and unless equipment is being taken into the mine or repairs etc being done then this operation carries on 24/7.

All in all a fascinating visit to a very impressive mine. Our thanks go to Neil and to Cleveland Potash Ltd for their hospitality and for a great day.