

WINDSCALE REACTIONS

By **RON SWINDEN**,
Industrial Television Unit

OUR INDUSTRIAL Television Camera has been very busy of late. It has watched furnace fuel burning, looked at boiler water gauges for the remote control of power generating stations and has been demonstrated in a factory for making plastics. It has even been used for the remote viewing of documents.

Recently, however, I was called away on a rather special mission. The Operations Branch of the United Kingdom Atomic Energy Authority's plutonium factory at Sellafield in Cumberland asked for the services of our equipment. They wanted to investigate the interior of one of their piles or nuclear reactors which had been shut down at the end of

a cycle. The job was urgent too, as they did not want to keep the pile out of action any longer than was necessary. When I arrived at Windscale I went through a lot of security formalities and was then taken to the pile area.

The equipment was whisked out of the van and I coupled it all together in working order. The whole of the equipment, except the camera lens, but including the cables, was then encased in plastic sheeting to protect it from contamination by radioactive dust.

I was then dressed in a nylon boiler suit and cap, rubber boots and rubber gloves, and issued with three small tin-plate lockets. These contained film which was afterwards processed to assess the amount of radiation to which I had been exposed. I pinned one on my hat, waist and sleeve. I was also given an aluminium cylinder about six inches long and three-eighths in diameter. This was in fact a gold-leaf electroscope, and on looking through it the piece of leaf showed against a scale so that when charged it showed "O". As the radioactivity discharged it, so the actual level of radiation in "Rontgens" was indicated.

All photos Crown Copyright



LEFT: *Rigged for action in a nylon suit and carrying regulation safety lockets and electroscope is Ron Swinden of this Company's Industrial Television Unit. The entire equipment, with the exception of the camera lens, was covered with protective plastic sheeting*

RIGHT: *The two piles at the Windscale plutonium factory at Sellafield in Cumberland. The pile cooling air is exhausted up the 400 foot chimneys which prevent the escape of radioactive matter*



I entered the huge pile building by an air lock. This, I discovered, ensured that the pile ventilating system drew air from the surrounding building, preventing radioactive dust from working back. Nevertheless, judging from the way I was dressed up it was clear that the utmost safety precautions are enforced, even when the pile is not reacting.

I was then taken up on the lift to the pile charging hoist. The pile itself is a huge block of pure graphite made up of smaller blocks and pierced by horizontal channels running from front to back. Rods of uranium sealed in aluminium cans are fed into the channels and cause the pile to react. The central graphite core becomes intensely radioactive. Around it, therefore, a wall and roof is built of solid concrete, many feet thick. The wall is lined with steel to protect the concrete from the heat which would otherwise destroy it. To cool it purified air is blown through the interior by giant fans; the air is exhausted up a 415 foot high ventilating shaft or chimney stack.

The charging hoist that I was on is constructed on the lines of an aircraft carrier lift and is a floor about sixty feet long and thirty feet wide. The whole thing moves up and down the fifty feet high charging wall and is the means of feeding the pile with uranium. The cartridges are inserted through small holes in the pile's enormous concrete shield. Each time a cartridge enters, another which has passed through the pile falls out at the back. The falling cartridges are caught in deep water, which acts as a

radioactive shield, and are carried in submerged trucks to a deep pond and allowed to "cool" in the radioactive sense. After this the irradiated cartridges pass through a separation plant where the plutonium is extracted from them. This is the fissile material which is needed as fuel for atomic power stations.

The only means of access to the core of the pile is by means of one of the eight inch charging channels in the wall. The camera was bolted to a mounting plate at the end of a long pole, pushed through one of these holes and used to examine the walls inside the pile under the direction of an engineer. Photographs were then taken from the monitor screen.

After we had examined both sides of the front of the pile we moved to the top where the camera was lowered through a similar hole.

The job was very successful. Having started at two in the afternoon we finished at three in the morning. Whereupon the pile was immediately restarted.

The Operations Branch was satisfied with the results obtained and accordingly we were asked to do the same on the second pile a few weeks later.

A complete equipment has now been ordered by the Authority.

Space man? Not yet! This is a maintenance man at Windscale, dressed in his protective clothing. Men who work in radioactive areas wear protective clothing and are equipped with radio. They are carried from one section to another on insulated trolleys to avoid the spread of radioactive dust

