BBC documentary reveals government reckless in drive for nuclear weapons

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In a recently aired documentary, "Windscale: Britain's Biggest Nuclear Disaster," the BBC investigated the history of the first British nuclear power station and its role in the development of nuclear weapons. It presented strong evidence that the Windscale fire of 1957—the first fire in any nuclear facility—was caused by the flagrant abandonment of safety measures. This took place because of pressure from the British government to produce bomb-making material. The programme explained how the 1957 fire brought Windscale to the brink of a major nuclear disaster, in which many of the people working there could have been killed and a wide area around the site left contaminated for decades.

There were interviews with key scientists and operators from the time, such as Tom Tuohy (Windscale deputy general manager), Terence Price (reactor physicist) and John Harris (scientific officer). Previously undisclosed material was used, including taped interviews conducted directly after the fire.

There was a "heady" mood when the Windscale project was in its infancy in the late 1940s. The nearby village of Seascale suddenly became "the brainiest place in Britain." Most of the newcomers were young graduates and postgraduates, hailed in the media as "atom men" who would bring in a new age of scientific and technological achievement in which people would have better lives. In contrast to the image created for Windscale by the media, the programme showed that its real purpose was "to make bombs."

After the nuclear bombing of Hiroshima and Nagasaki by the US at the end of the Second World War, Winston Churchill was determined to establish a "special relationship" between the "British Commonwealth and Empire" and the United States. He believed this was justified by the role of British scientists in the development of the atom bomb at Los Alamos, but the US government did not agree. "You helped, but we did it," said a US nuclear historian. In 1946, the US passed a law making it a capital offence to pass nuclear secrets to any other nation, even to former allies.

This threw the post-war Labour government, led by Clement Attlee, into a crisis. Labour ministers Stafford Cripps, Hugh Dalton and others advised Attlee that Britain could not compete with the US and had nothing to gain by trying. However, Foreign Secretary Ernest Bevin was determined to preserve Britain's imperial might. "We have got to have this thing whatever it costs and we have got to have the bloody Union Jack flying on top of it," he declared.

Labour's aim was to shore up Britain's position on the world stage by the development and use of high-technology weaponry so as to persuade America that Britain was its natural nuclear ally.

To do so, the UK had to repeat—"at enormous cost"—the experiments already done in US. Three men were appointed to drive the work forward: John Cockroft, to lead the team at the Harwell Atomic Energy Research Centre; Christopher Hinton, to build a nuclear reactor at Windscale; and William Penney (who had played a key role at Los Alamos), to build the bomb at Aldermaston.

The Soviet Union was expected to have developed an atomic bomb by 1952. In view of this, the British government imposed 1952 as the deadline for the Windscale project. This meant overriding the timescale set by Hinton, who was mindful of the project's experimental nature and wanted to ensure that the reactor would be safe**.** Thus, building work began at Windscale before the research work at Harwell had been completed.

A nuclear reactor requires constant cooling to avoid the danger of fire, because of the quantity of heat produced by nuclear fission. To be kept cool, the uranium has to be placed inside aluminium rods, housed in hundreds of channels drilled through a graphite core. The US used a constant stream of water to keep the rods cool. However, if the water supply failed, it could lead to an uncontrollable chain reaction, similar to an atomic bomb. In the US, the reactor was built in an uninhabited desert region with a 30-mile long escape road and it was considered an acceptable risk.

No such isolated site existed in Britain. Instead a cooling system was devised that used huge fans to drive air up through the reactor and out through an enormous chimney. Using this design, it was considered acceptable to build the reactor near the village of Seascale on the Cumbrian coast in the northwest of England. Work began there on Britain's largest engineering project.

A year into the design and construction of the plant, Terence Price (working at Harwell) asked the crucial question, "What would happen if a uranium rod set on fire?" The BBC programme explained that a burning fuel rod could fill the air with radioactive particles, which the powerful cooling system would discharge through its 400-foot chimney. Price proposed the installation of filters to reduce this danger. This was initially rejected, and Price was told, "Don't be silly lad! Two tons of material is going to go up through the chimney every hour, how can you filter that?"

However, his arguments were taken up by Cockroft, and massive concrete filters were built and positioned on top of tower. Until the time of the fire, they were known as "Cockcroft's follies."

In 1951, after five years of work, the Windscale project was completed just 10 days behind schedule. It was now a big producer of plutonium, but not enough for an atomic bomb. The only way to increase production was to allow the uranium to become even hotter by clipping off all the fins from the aluminium rods. John Harris, a scientist employed at Windscale, explained that while some scientists thought it "great that we were getting enough plutonium" for "Queen

and country," there was a substantial group who considered it an unacceptable risk. Nevertheless, the entire half million fins were clipped off.

In August 1952, the first plutonium left Windscale for Aldermaston, and later that year, the first British atomic bomb was tested in the Montebello Islands, off the northwest coast of Australia. The political elite declared it to be a "triumph of British engineering." But within weeks, the US had tested a new and even more deadly weapon—the hydrogen bomb (H-bomb)—with 10 times the destructive capacity of the British bomb. The trump card had been trumped. Worse still, the US was refusing to share the technology. Within two years, Churchill, who had become the head of a Conservative government the previous year, gave the order to make a British H-bomb—thereby setting Windscale on the path to a major fire.

The plant was now faced with producing tritium (a radioactive isotope of hydrogen) by further modifying the fuel rods in a now ageing reactor that had only been designed to produce plutonium. Despite the risks, magnesium/lithium isotope cartridges were added to the fuel rods.

For some time, the reactor core had been behaving unpredictably. The rods had been producing unexpected bursts of energy, leading to sudden heating and the danger of fire. The scientists and engineers on site were carrying out controlled releases of the stored energy known as "Wigner releases." This involved allowing the core to heat up for a limited period, in the expectation that the energy accumulating in the rods would convert to heat that could be released in a controlled way.

New problems occurred when some of the rods became fused into the back of the reactor, so that the operators had to dislodge them using scaffolding rods. Later, men had to use shovels to remove the radioactive material and were exposed to dangerous levels of radioactivity in the process.

On October 17, 1956, Calder Hall nuclear power station opened just a few yards from Windscale. It was hailed as the first nuclear power station in the world, which would produce electricity that was "too cheap to meter." What the public was not told was that Calder Hall was secretly helping Windscale to produce more of the material needed to meet the demands of the H-bomb programme.

Around this time, Frank Lesley, a research scientist at Windscale, recorded high levels of radioactivity around the village of Seascale. The government was informed, but issued an order that it was to be kept secret, even from those making decisions about the reactor's future.

In 1957, an international conference in Geneva proposed that 1958 should be the deadline for a Nuclear Test Ban Treaty. What followed was a scramble by the British government to speed up the drive for the H-bomb, so that it could be tested before the treaty came into force.

Britain's first H-bomb test was a failure.

To buy time, the new Tory prime minister, Harold Macmillan, decided to produce a much bigger version of an atom bomb called "Orange Herald" that would have almost as much destructive power as an H-bomb. The new bomb required massive amounts of plutonium and tritium, so the demand on Windscale was increased by 500 percent. To achieve this, aluminium was removed from the cartridges, making them even more likely to overheat.

Hinton, the chief scientist at Windscale, resigned within weeks of the Orange Herald test. The government then ordered Penney to carry out a second H-bomb test.

On October 10, 1957, Macmillan wrote to US President Dwight Eisenhower urging him to accept Britain as America's nuclear ally. On the same day, a serious fire broke out at Windscale.

Three days earlier, workers monitoring the temperature gauges had noticed that the reactor core was heating up, so they ordered a Wigner release to try and cool it down. The release did not have the expected result. A second Wigner release was ordered (a course of action that had been used before) and the air-cooling increased to take away the released heat. But the core heated up again unexpectedly, and high levels of radioactivity were detected. The view of the operators was that it was a badly burst fuel cartridge. In reality, one of the cartridges had caught fire.

The increased airflow following the Wigner release caused this fire to spread to many of the other fuel rods. A huge fire enveloped the reactor, "like setting a match to a piece of paper." It had become a "blazing inferno," with radioactive material being pumped out into the air.

There was no emergency plan for dealing with a fire situation. "Mankind had not faced a situation like this; we had to play it by ear," one interviewee said. The residents of Seascale village were completely unaware of what was going on, since no official warning was issued.

Knowing that any wrong move could precipitate a nuclear explosion, a number of approaches to putting out the fire were tried. All of them failed. The area around the reactor was cleared and water pumped in. When that also failed, as a last resort, the airflow used to cool the fuel rods was shut off. Within minutes the fire subsided and the temperature began to fall. Due to the actions taken by the scientists and operators, the danger of a major nuclear disaster had been averted.

The local inhabitants were assured that there was no danger of nuclear contamination because the wind was blowing it out to sea. One of the scientists interviewed questioned whether this was true. Nevertheless, all the cow's milk produced was poured away in an area of 200 square miles.

Immediately after the fire, the press hailed the Windscale men as heroes. However, only a few months later, the operators were being blamed for the fire occurring, as Macmillan tried to shift the blame away from the government and preserve the possibility of being accepted as a nuclear ally of the US. Even an official report, drawn up by Penney under Macmillan's direction, was considered too close to the truth, in attributing the cause of the fire to modifications made to produce tritium for the H-bomb. The report was suppressed, and instead, a government White Paper was issued that blamed the fire on the operators' "error of judgement" in carrying out the second Wigner release. On the day the White Paper was published, Britain's first successful H-bomb test was carried out in the South Pacific.