NUCLEAR POWER
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Czech nuclear accidents reveal contempt for safety

The Prague syndrome

THE NUCLEAR POWER establishments in Eastern Europe and the Soviet Union have not had to face the same critical opposition as their Western colleagues. Unencumbered by a free press, they have managed to suppress news of serious nuclear disasters, including two major accidents in Czechoslovakia. Details of these accidents, and the way in which the East European nuclear industry operates, are spelt out in a document from the Charter 77 human rights group, which has recently become fully available in Britain.

The history of Czechoslovakia's first power-producing nuclear reactor – until recently it's only one – is among the worst in the world. Started in 1958, it was due to operate by 1965 but did not in the event 'go critical' until December 1972. It was not producing power until 1973 – 15 years after work started, and almost 8 years behind schedule. This alone is a world record of a sort. It did not however produce very much power, nor for very long. In 1976, and again in 1977, there were major accidents, the last one of which has almost certainly left the reactor permanently defunct. During the 26 months in which it did run uninterrupted by major accidents, it was 'shut down more often than not'.

The reactor concerned is at Jaslovske Bohunice north of Bratislava in western Slovakia. Bohunice is a major nuclear site, with two large Soviet-designed reactors now being completed. Two other major nuclear power sites are also under construction elsewhere in Czechoslovakia. The Bohunice A1 reactor was designed jointly by Soviet and Czech specialists. Its design was not dissimilar to many western projects started at the same period, nor, say the Charter writers, were its safety standards. But thereafter, institutional pressures began to take their effect. Not infrequent design changes meant that sometimes 'the complete documentation needed to construct the reactor did not exist', while 'elementary (construction) regulations were not observed'.

Working safety standards suffered similarly. Reactor operators worked 16 hour shifts, and were told to operate the reactor outside the safety limits provided they didn't actually cause an accident. Any shutdown for safety reasons was resisted by the plant's management for 'moral and financial reasons', and a similarly lax attitude taken towards workers' safety. 'Czechoslovak radiation regulations are among the strictest in the world, but in practice they are the least observed', the Charter specialists note.

Like most other countries, these regulations meant that workers who went into high radioactivity zones quickly received their maximum dose for the year, became 'burnt out' and could no longer work in radiation zones. Because of the 'frequent accidents', all the available radiation zone workers soon exceeded their safety limits. Staff working in other areas were then put under 'direct orders' to do the jobs concerned; anyone refusing was penalised, such as by loss of bonuses.

BOHUNICE A1's operating record up to 1976 was poor enough, with frequent stoppages and a maximum power output of 100 Megawatts (out of a planned 150) being the best ever achieved. In January 1976, it suffered the first of the two major accidents, both of which released radioactivity to the environment. Yet, until the Charter information leaked out, neither the Czech public nor the international scientific community had heard a word about them.

Because the subject of nuclear accidents is treated to critical scrutiny by protagonists and opponents of nuclear energy alike, it is necessary to examine the Charter data in the light of the not inconsiderable technical data available in the West. The details of the reactor and its cooling and operating systems in the Charter document do accord with its published specifications; there is some confusion involved in the exact description of the mechanism of the accidents, but no difficulty in identifying the likely accuracy of the description of the consequences.

THE FIRST ACCIDENT, on 5 January 1976, appears to have happened during the refuelling of the reactor, when new uranium fuel elements were being inserted into long pipes leading down to the operating core of the reactor. This is in any circumstance a critical operation, and is especially difficult if the reactor is operating at the time. While the reactor operates, a massive flow of cooling liquid or gas is neccessary to remove the heat of the nuclear reactions and convert it eventually into electrical power. At Bohunice, this cooling was done by circulating carbon dioxide gas, at a pressure 60 times greater than normal atmospheric pressure. Its flow was controlled by safety valves in each of the pipes containing the uranium fuel.

In January 1976, one of these valves became obstructed by a 'pad', according to the official enquiry. As a result the new fuel element was 'ejected from the reactor' by the gas pressure, and the hot, radioactive gas flowed at high pressure into the working spaces surrounding the reactor. An evacuation alarm was given, but two of the workers in the area were suffocated by the gas because the emergency exit they made for was locked shut 'to prevent the frequent thefts'. The reactor had some provision for dealing with escaping gas, by placing it into four emergency 'decay tanks' which would allow radioactivity to reduce before releasing it to the atmosphere. But the capacity of the tanks was insufficient to deal with a leak of this magnitude and radioactive gas was discharged directly into the atmosphere. The public was not warned of any hazard, apparently, while the workers in the plant itself were not allowed to know the level of radiation that they had absorbed. The extent of the atmospheric discharge on this occasion remains a strict secret.

The reactor was apparently repaired after this accident and operations continued. The second accident, on 24 February 1977, was even more serious and probably put the reactor permanently out of operation. On this occasion, the fault was again due to 'negligence' in the installation of a new uranium fuel element, and a mistake in loading it into the reactor. With the ractor in operation, the new fuel element overheated and became damaged. This damage extended to the tube containing it in the core of the reactor, and as a result the gas began to mix with the heavy water 'moderator' of the reactor. The whole of the cooling gas circuit thus became contaminated with a variety of radio active substances from the reactor core, including tritium gas. The same overheating caused damage to the secondary cooling circuit, where heat from the carbon dioxide gas was transferred to steam (used for powering electrical turbines) inside steam generators.

But the accident caused a seal of the steam generator to rupture, according to the Charter report, with the radioactive contamination now spreading into the water and steam of the pipes to the turbines. There were now, it seems, damage and cracks between every part of the cooling circuit and the reactor core, and considerable contamination would have been likely. During the shutdown of the reactor, contaminated steam was emitted into the atmosphere. Radioactive tritium gas escaped into the operating areas of the reactor. The incident also left a considerable quantity of contaminated water to be disposed of: during chemical operations to clean the radioactive material from the water, some of it was accidentally flushed into the local drainage system, and ended up *inter alia* in a stream passing through the nearby village of Zlovec. The stream was temporarily fenced off.

Amid this display of accidental and wilful carelessness, there was one scene wholly reminiscent of the cynicism of the *China Syndrome*: during one of the accidents, with the station shut down, a TV crew visited the station to make a film. In order to pretend that the reactor was nevertheless operating well, film crew members went behind the control panel and flashed pocket torches through the control lights to simulate operations. The A1 reactor has not operated since February 1977, as the damage caused would necessitate refitting inside the reactor core – an enormously expensive, complicated and dangerous operation. Given the reactor's obsolescence, any attempt to re-use it is most unlikely. In the meantime, the authorities are maintaining a stony silence on the subject of its future.

Incidents like this have at least persuaded the Soviets to abandon some of their more unusual nuclear policies. For example, until recently no Soviet reactor was provided with 'containment', which is a solid shell around the reactor intended to protect it from external damage and contain any serious internal accident. This was viewed in official circles as a capitalist trick for raising prices: Soviet reactors, moreover were deemed to be the safest in the world. The Charter specialists who prepared the discussion paper on nuclear power describe the spectacle so far as 'horrifying' and reasonably wish to raise the 'totally inadequate' level of public discussion on the subject. They do not wholly oppose the further development of nuclear power – only the cynical contempt for workers and public safety shown so far by the Czech and Soviet authorities.

*Charter Document No. 22, available in the UK from Palach Press.