Interview: Hubertus Nickel

The high cost of Germany's phase-out of nuclear energy

Professor Hubertus Nickel has a chair at the Rhine-Westphalia Technical University at Aachen, Germany, and was director of the Institute of Materials for Energy Technology at the Research Center in Jülich. He was for many years active in the reactor safety commission of the federal government, until it was closed down by the new federal Environmental Minister, Jürgen Trittin. This interview was conducted by Michael Vitt.

EIR: What effect will the nuclear phase-out policy of the red-green government have for Germany?

Nickel: The demands of the Environmental Ministry and the draft change of the nuclear legislation, the consensus discussion of the Chancellor and the energy producers, and the statements of the Economics Ministry, are not compatible. Therefore, your question cannot be clearly answered. What cannot be disputed is that the goal of the federal government is to write into law the phase-out of nuclear energy and to stop the shipments of spent fuel to Cape La Hague and Sellafield [European reprocessing facilities in France and England].

The direct shipment of waste to a depository would serve as a "proof of disposal" for the nuclear plant operators after the ban on processing. The energy producers in the concensus talks accepted the political mandate to end reprocessing and direct disposal of spent fuel, on the condition that in the coming negotiations there would be an agreement about the acceptable time allotted to run the existing plants. The government proposed two phase-out strategies. The first is a "fast track" version, designed to hamper the operation of the plants, and the other is a "legislative" version, with prescribed lifetimes for the plants. What appears from the first consensus talks is a desire to go the second way. It is indisputable that with a "fast track" approach, financial damages will be incurred, because of the destruction of capital; in the case of the power plants, this alone will amount to hundreds of billions of deutschemarks. Secondly, Germany's business relations will be called into question with our partners in Great Britain and France and internationally, as well as the relations between the energy producers and the large customers, and the relations of the German nuclear industry and their international customers and partners.

But also with the slow phase-out option, an extremely competitive branch of industry with high productivity will be lost. Secondly, a substantial number of valuable jobs will be lost. That concerns the plant manufacturers as well as the utilities. And thirdly, Germany's commitment to CO_2 reduction can not be achieved.

EIR: The center of the new Bonn nuclear policy is the question of what to do with spent fuel. Can you explain this?

Nickel: Because of radioactive decay, the spent fuel elements must be temporarily stored for several decades before they can finally be disposed of. This can be easily done with the so-called Castor containers. At Gorleben and Ahaus, there is enough capacity for this intermediate storage. [Gorleben and Ahaus are the sites for this in Germany; Gorleben has also been researched as a long-term facility.] But the federal government does not want to use these facilities for this purpose, in order to avoid transport of the waste in Castor containers [which has been the target for huge demonstrations, with many casualties and millions in damages in the past]. They are demanding that the energy producers themselves erect such facilities on their premises. Because that is not technically feasible in the time frame demanded by the Environmental Ministry to end reprocessing, this deadline is also not tenable. Concerning the question of final disposal, the current federal government does not wish to continue to operate the planned site at Konrad, as well as the recently finished facility at Morsleben, which had been intended for low-heat-producing waste (comprising 95% of the volume with 1% of the radioactivity).

The extensively investigated site for high-heat-producing waste (5% of the volume and 99% of the radioactivity) in the salt deposit at Gorleben will not at this time be further tested. Here the phase-out policy also leads to a dead end, because without the final depository, all of the waste will be inherited by future generations.

An additional problem is posed by international agreements with France and Great Britain, by which the entire amount of highly radioactive waste in the form of glass blocks, that is, fuel elements that are no longer processed, must be sent back to Germany and stored in intermediate and then in final disposal facilities.

EIR: A little while ago, Trittin said in a newspaper interview that "we have now, as we have had before, surplus capacity

that greatly exceeds the power produced by nuclear power plants." For that reason, we can shut them down "without causing a real problem."

Nickel: A statement like this does not take into account that for the total amount of electricity produced, the same amount is not available to be used, because the possible duration of use is dependent on the maximal output of the plants. Nuclear power plants are capable of producing 8,000 hours per year, while sun or wind can produce 1,000 to 2,000 hours per year. Taking just the necessary capacity for average use, that means one must install four or eight times as much capacity to replace the same amount of electricity produced from nuclear. An additional problem is that one cannot expect the necessary capacity to be available when it is needed from solar and wind. The 19 nuclear power plants in Germany produce together 22,000 megawatts (MW), which is 36% of the entire electricity produced. If one wanted to replace that with wind or solar power, this would require either a surface of 2,000 square km — one-fifth the area of Saarland — or 180,000 windmills with a capacity of 500 kw each. The current overcapacity is calculated at 10,000 MW, not including old plants that have been shut down due to environmental problems. For a secure energy supply, the maintenance of such reserve capacity is absolutely necessary. I find Trittin's statement therefore untenable.

EIR: What does the dissolution of the reactor safety commission mean?

Nickel: First, let's look at the facts. In a communication dated Dec. 21, 1998 from State Secretary Rainer Baake from the Ministry for Environment, Protection of Nature, and Reactor Safety, all former members of the commission were informed that the reactor safety commission had been dissolved and that, as of Dec. 22, 1998, a new statute for the reactor safety commission would go into effect. The new commission would consist of just 12 members, with different areas of expertise. They should represent a variety of opinions, as had been the case. The decisions should be more transparent, and their reasons more clear.

My comment on Mr. Baake's statement is that there is nothing wrong with bringing in new personnel to a body like the reactor safety commission. It is, however, bad form, when the members of the commission have to find out about the decision from the media. Above all, the political orientation of the members should not be put above competence. The reactor safety commission was established by the federal government 40 years ago, as an independent body. Since then, the commission has advised all governments in matters pertaining to the peaceful use of nuclear energy, and has helped officials by its recommendations in safety-related decisions. The commission takes exclusive responsibility for the safety of all nuclear facilities — the reactors as well as the fuel cycle and the transport and storage of waste. The decisive criterion for membership was technical competence and not political orientation.

Today the relative international availability of the equipment is proof of the high security standard of German nuclear plants. Not least of all, it is the tireless striving of operators, systems engineers, inspectors, and officials, and their mostly positive interaction, which accounts for sustaining and continuously upgrading the necessary level of safety. The reactor safety commission, since its inception, has played a pivotal role in the safety technology of today's nuclear power plants, through the establishment of guidelines, through comprehensive safety technology evaluations of individual systems, as well as the continued development of safety technology. Not least in this effort was the continual intensive exchange of experience between the commission and sister organizations in the U.S.A., France, Japan, and Switzerland, in the area of nuclear safety. A successful continuation of this cooperation with the foreign organizations will not be possible with the new commission, if it adheres to the phase-out policy of the new government.

EIR: You recently visited China and India. Many of your students have taken leading positions in the scientific and the energy sector. What do they think about the energy discussion in Germany?

Nickel: First, a word about China, which I have regularly visited in the last ten years. I was there primarily to give lectures at the renowned Tsinghua [Qinghua] University in Beijing, at the Institute of Nuclear Energy Technology (INET), where I was guest professor. In addition, by invitation, I visited a series of universities in different cities, gave lectures, and had intensive discussions about energy generation, development of nuclear power, and the environmental situation.

The current installed power generation capacity in China is about 250 gigawatts for 1.25 billion people, of which about 70% is coal-fired and a little less than 30% is hydroelectric. Nuclear energy is only about 1.3% of the mix. There are extensive programs to expand the nuclear power technology, including with France and Russia.

Next to the development of light and heavy water reactors, there is a considerable effort to develop the fast breeder and helium-cooled high-temperature reactor, using the design of the German pebble-bed configuration. A 10 MW test reactor of this type is being built at Tsinghua University. There is currently no acceptance problem in China, although, according to experts at several of the nuclear sites, there is more opportunity to discuss the issue, due to the recent liberalization there. The per-capita energy consumption in China is about one hard coal unit per year. In Germany it is about six hard coal units per year. With a gross rate of growth of 8.8% in 1997 and inflation of only 2.8%, there is a concerted effort to cover energy needs. Environment naturally does not play a primary role.

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Because they cannot judge the political situation, their comment is: Germany is too rich! The answer of Indian colleagues is similar. The country has currently available only about 90 GW of installed electrical generating capacity for about 950 million people, which is less than one hard coal unit per capita. A construction program of 10 GW per year is planned (mostly coal). India today has an installed nuclear capacity of about 1,700 MW in ten blocks, mostly of the heavy water CANDU type of reactor. That is about 2.3% of the capacity. There is not only an extensive R&D program for the heavy water reactors, but also, in cooperation with Russia, the light water reactors and the Indian fast breeder technology.

EIR: Does the deregulation of the European energy sector make sense?

Nickel: The liberalization of the energy market is a reality. Since February 1997, the internal market guidelines for electricity have been in force. The consequence, as a result of market pressure on the individual producers, is a stiff price competition and a current fall in prices. That is certainly a positive development for the consumer. Partial overcapacity and the generation of electricity from combination gas and steam plants based on natural gas, set new standards in price. Here, one should not forget the question of security, in terms of price monopoly and delivery capacity, because of dependence on the natural gas-supplying countries. The requirement of the electricity generators that the mix be maintained of brown coal, hard coal, and nuclear, should be respected, on grounds of supply security and price stability.

EIR: What does the phase-out mean for German science?

Nickel: Naturally the decision is disastrously negative for the entire area of nuclear research, both for basic research and for applied research. That pertains to the German universities and the national labs, and includes the industrial research facilities; it does not exclude the loss of international cooperation. That has been the experience on the state level, where there has been a drastic reduction in chairs at the universities, most often by reorienting the department or not renewing the contracts of departments that contribute to the education of engineers in nuclear technology.

The general discussion in the media and in politics in our society about nuclear technology, often with negative tones in comparison with the past, has naturally contributed to insecurity among young people, and thereby to a drastic reduction in the number of students in these departments. Especially negative has been the reduction of project financing at the universities and research centers. A cut-off of state financing for nuclear safety or contract research, in the context of international projects, would lead to an unacceptable loss of knowledge in the medium term. Considering the phase-out policy of the federal government and the medium- to long-term lifetime of the existing plants, or in connection with the necessary transport and storage of waste and the risks this poses for society, a loss of such know-how is not tolerable or acceptable.

EIR: The high-temperature reactor (HTR), a child of the research program at Jülich, is praised around the world. Will this inherently safe reactor ever find a place in Germany?

Nickel: I personally worked for 20 years on the materials and fuel element development of this inherently safe helium-cooled reactor, and deeply regretted the decision at the end of the '80s to stop its development. I am not speculating, when I say that, at least for the medium-term, there is no chance for the HTR in Germany. As I understand the phase-out policy of the federal government, there is no chance for *any* reactor.

Because of its potential, the HTR is being developed in the following countries:

In Japan, a 30 MW HTR module test reactor for helium temperatures of 950°C is going into operation. In addition, advanced fuel elements are being developed, a reactor ring core is being developed, as well as the concept of coupling a 10 MW gas turbine with the HTR.

I have already mentioned the construction of a test reactor in China. In China, they are expecting criticality on the 10 MW module test reactor with the pebble-bed of German design at INET at Tsinghua University in Beijing, by the year 2000.

There is a currently a great deal of effort in the Republic of South Africa to build HTR reactors. The South African utility ESCOM is working on the German module concept, formerly developed by the company HRB. The idea here is to build a pebble-bed module of 100+ MW for economic reasons, and to couple that with gas turbines.

In Russia, they are trying to maintain their HTR know-how intact; among others, there is a Russian-American project for development of an HTR module which could be used with weapons-grade plutonium. Contracts were signed between General Atomics and the Russian Energy Ministry in 1995.