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## Interview: Dr. Edward Obryk

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# Poland needs the MHTGR

*Dr. Edward Obryk, a nuclear physicist with the Institute for Nuclear Physics in Krakow, Poland, was interviewed Nov. 29 by Marjorie Mazel Hecht, managing editor of 21st Century magazine. Dr. Obryk testified Oct. 12 before the House Committee on Science, Space, and Technology's subcommittee on International Scientific Cooperation on his support for a joint U.S.-Polish effort to develop the modular high-temperature gas-cooled reactor.*

**EIR:** Please say a little about your background.

**Obryk:** I am a physicist. I used to work in several branches of physics including high-energy physics, and almost 15 years ago—in the middle 1970s—I decided to switch to energy problems. I studied the problem of energy in broad perspective, including so-called alternative energies, and I came to the conclusion that the main—I would say the driving—force of the world energy system in the coming decade is going to be nuclear fission and coal. I believe that proper use of both of them in a synergetic way is the best solution. . . .

And we have a really enormous pollution problem in Poland. Especially here in the south—the Krakow and Silesia region—are really on the verge of ecological catastrophe. . . . I believe that we have no other option but nuclear, and that the best is the MHTGR.

**EIR:** I am very glad to hear you say that. . . .

**Obryk:** This [use of both fission and coal] is not only for Poland, but for many other countries. Nuclear energy itself now doesn't offer many very important final energy carriers. I mean liquid fuels, for example, gas fuels. These are fuels that are very easy to store, very easy to transport, and very convenient for final energy users. If you make proper use of nuclear energy and coal, you can produce clean final energy carriers and at the conversion state you can eliminate almost completely any pollution. You can make the system environmentally benign.

**EIR:** So you would use nuclear to gasify coal.

**Obryk:** Yes, you would liquefy and gasify it. This is not for the immediate future. The technology is not completely developed. For example, in the Polish situation, we have a very—how to say it?—we have a very inefficient energy system. Our energy system is 80% dependent on coal. Eighty percent of primary energy use in Poland is coal, and a lot of this coal, almost 30%, is burned as a final energy carrier, and this creates enormous pollution problems. . . . In densely populated areas of Poland, in the big cities, the pollution problem in high degree is connected with district heating of houses, not just industry or power generation.

**EIR:** Is the district heating using steam produced by coal-burning plants?

**Obryk:** Not only. In Krakow, for example, we have still a quarter-million stoves that are burning coal with a very low efficiency and no cleaning, no emission control. You have not only sulfur, not only gases, but unburned hydrocarbons, which are considered carcinogenic. And on top of that, this way of burning is considered very inefficient. These are very old stoves, and very often they have an efficiency of 10 and at most 15%.

We need to develop district heating and use more gas for particular areas where central district heating is not very appropriate. So, we consider the MHTGR as the best nuclear technology for the near future for co-generation of electricity and [steam for] district heating. For co-generation, the plant must be located near the population centers. The technology must be safe, and from that point of view, the MHTGR is absolutely the best choice.

On top of that, the MHTGR produces high-temperature steam, so the efficiency of co-generation is very high. So, [in terms of safety] the MHTGR can be located near densely



*A view of Krakow's Old Town. "We have a really enormous pollution problem in Krakow. . . . I believe that we have no other option but nuclear, and that the best is the MHTGR."*

populated areas, and the problem of transport of its low grade steam heat is not important; therefore, the overall efficiency can be very high.

In the immediate future, we need a lot of this sort of power station, lots of units for co-generation. In the more distant future, we need them to produce—using our coal, liquid, and gas fuel—for coal gasification and liquefaction. It is a unique technology because for these purposes we need quite high temperatures, and no other technology can offer such levels of temperature for conversion of coal to gas and liquid fuels.

**EIR:** What temperature is required?

**Obryk:** It is still not quite clear, because if you want to gasify lignite, the temperature is about 850°C. But for hard coal, a higher temperature may be needed—or maybe not. People are working on catalytic coal gasification, and catalytic coal gasification can be done at a lower temperature level. Definitely a range of 900°C, even slightly higher, would be needed not only for coal but also as an energy source for the chemical industry. For example, for the production of fertilizer, or the production of hydrogen for industry.

This is a swell way to save a lot of natural gas, because you can supply nuclear heat for steam methane re-formers, without burning part of the methane. So I believe that MHTGR is a really very promising technology from many points of view—safety and versatility of applications.

**EIR:** Have you studied how many MHTGR units you would need, how much it would cost, and where you would site them? Have you developed a plan for this?

**Obryk:** We were discussing this topic last month in Washington. It would be very appropriate to have a joint U.S.-Polish feasibility study to get more reliable information on these questions, mainly economic questions. It is very difficult for us to make the proper assessment as far as the economics are concerned.

From the point of view of our needs, we are self-sufficient, we *know* what we will need in the near future. But from the point of view of our assessment of the ability of Polish industry to participate in such projects, some things are more or less obvious. For example, [the more obvious participation is] outside the nuclear island. The MHTGR is divided into the nuclear island, and the rest of it, the energy conversion part [steam turbine], is standard, classical. The energy conversion plant engineering in the MHTGR is exactly the same as in a fuel-burning power plant.

**EIR:** So, you are saying that Polish industry could build the conventional, steam-generating part of the reactor.

**Obryk:** Yes, definitely we can. Maybe we will be as well able to participate in some part as far as the nuclear island is concerned. It needs more careful analysis and expertise from American experts.

**EIR:** What was the response of Congress when you presented this?

**Obryk:** Frankly speaking, I don't know. The subcommittee on International Scientific Cooperation was favorable. After the hearing they proposed to include half a million dollars for a feasibility study, but I don't know what happened afterwards. . . .

Generally speaking, my philosophy about Western assistance to Poland is stark. There are some areas which are absolutely crucial for the main purpose. The main purpose for our economy is to attract Western capital and to attract, I would say, honest businessmen. Not people who come for a couple of months to make money on some trade and go away, but businessmen who will be interested in investment in the long term, who will have a long-term interest in the Polish economy.

We have to fulfill some requirements: Legislation is

## 'Support for East European Democracy Act of 1989'

*These are excerpts from the statement for the record presented by Linden S. Blue, vice chairman of General Atomics, Oct. 12, 1989 before the Subcommittee on International Scientific Cooperation of the House Committee on Science, Space, and Technology.*

. . . I am pleased to have the opportunity of appearing before you today to discuss how we, through international cooperation on emerging modular high-temperature gas-cooled reactor (MHTGR) technology, can assist Poland in their efforts to provide for economic growth while addressing their most difficult environmental issues.

During the past three years, I have participated in several discussions with my Polish colleagues concerning energy, economic growth, and the environment. The recurring theme of these discussions has been the need to increase energy production to support economic growth in Poland while reducing the environmental damage being done by the current coal-fired facilities. More specifically, my Polish colleagues tell me that they must find means to increase their electrical generating capacity and metallurgical process heat production and simultaneously reduce the SO<sub>2</sub>, NO<sub>x</sub>, and heavy metals being released to the atmosphere. Generally, countries which face such a task

obvious and the most easy one to do, but there are some technical requirements. I consider two to be most important. One is a telecommunications system, as you know.\* If you would be here, you would even understand better.

Second, is energy. We have to have a *reliable* energy system. And we must do it by ourselves. We can't rely on foreign investment. We have to make a national effort, because it is a long-term investment. We hope to be able to get some credit, but we must—the government must—take care of it.

**EIR:** Do you have government support for this nuclear project?

**Obryk:** I think so. But you see, still there is no formal decision about nuclear energy development. I had written a letter to the government earlier this year, and a committee on the economy, a part of the government, has been consid-

ering this letter. They asked me to provide some tables on this topic. I should hope by the end of next month to supply more details.

**EIR:** Things are moving very quickly now in Eastern Europe. . . .

**Obryk:** History is rushing. It is very hard to say what will be the final outcome of it, but one thing is obvious about what is happening: Now, children will learn this in school in the future. . . . I was speaking in June at the 11th international conference on the HTGR, and I said that the 4th of June is a historical day. We have elections [in Poland] and there was the Chinese massacre. I said that I hope the world will never be like before, in our part of the world.

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\*It took the interviewer six hours to get a phone call through to Poland.

feel compelled to take the steps necessary to improve food supplies, industrial output, and standard of living, and view environmental concerns as a luxury which they currently cannot afford. Unless improved technology can offer other options, Poland has little alternative but to increase its domestic coal use, in spite of the environmental consequences.

U.S. assistance to Poland must recognize this dilemma and endeavor to provide future alternatives to the current energy and environmental practices. My assessment of the energy situation in Poland has led me to the conclusion that the MHTGR is a very attractive energy option for Poland. . . .

General Atomics suggests that a joint, one-year U.S./Poland study of an MHTGR application in Poland be included as a part of the Fiscal Year 1990 assistance program which is now under consideration. . . . The objectives of such a study would be: 1) Selection of a potential site. . . . 2) Completion of a site-specific conceptual design. . . . 3) Determination of Polish and U.S. scopes of supply. . . . Because of the conventional energy conversion area and the ability of Poland to fabricate large metal forging, I would anticipate that Poland might indigenously supply components and services which represent 50-70% of the total costs of the facility. U.S. vendors would probably supply the core, fuel, and other components in the nuclear steam supply system. . . . 4) Evaluation of resulting economics. . . . 5) Quantification of pollution reduction. . . .

The proposed . . . study can be completed employing only the information available in the open literature and will not require access to GA's commercially proprietary information or the Department of Energy's Applied Tech-

nology. All information transfer will be in accordance with the applicable international requirements. I would recommend that the International Atomic Energy Agency be invited to monitor the study for applicability in other countries which face similar choices between limited energy resources and mounting environmental problems.

I estimate that the proposed study will require approximately \$500,000, with approximately one-half being spent on the U.S. technical support. . . .

I believe this conceptual study will indicate that a very substantial economic and environmental benefit is available from successful MHTGR deployment in Poland. If my belief is borne out, we would hope that subsequent years will see a formalization of this international scientific cooperation in the form of a government-to-government technology exchange agreement and subsequent commercial agreements. Optimistically, Poland might eventually participate in the initial commercial MHTGR project which I expect to include Bechtel, as well as General Atomics. Such an international consortium would then be well positioned to proceed with follow-on MHTGR deployment in Poland after the turn of the century. This type of international consortium could also provide a vehicle for our Western allies to also assist Polish economic development. . . .

The proposed joint MHTGR study has advantages for both countries. By providing an energy option other than coal, the MHTGR could allow economic development without increased air pollution and CO<sub>2</sub> loading of the atmosphere. It could also provide the U.S. with a new technology export to replace the early power plant components which are now being produced by many other countries.