

letters

Argentina—the real story?

The Du Temple-Hennelly report on the Latin American nuclear situation (*NN*, September 1979, p. 59) greatly overestimates the Argentine accomplishments, probably because the authors had to rely upon official sources for information.

The Atomic Energy Commission of Argentina was created in 1950 and, after a quite vigorous early period, suffered repeatedly from lack of financial support in its research and development programs. Despite this, its scientists and technicians managed to pursue activities in the principal fields related to nuclear energy, and a good—and sometimes excellent—level was attained in nuclear science, while engineering development was somewhat weaker.

After 1976, the military government purged the AEC of many people of well-known democratic convictions, in some cases by means of physical elimination, and this destroyed some groups and seriously damaged many others.

Presently, no heavy-water pilot plant exists at Atucha, only a small upgrading unit included by Siemens at the station.

The 480 fuel elements produced yearly must be understood to be fuel rods and not fuel bundles. They correspond to some 13 bundles, and Atucha needs roughly 300 fuel bundles yearly, i.e., about 55 tons of UO_2 .

A production of 110 tons of UO_2 —ceramic grade?—in 1978 looks like an exaggeration. It might be the Argentine production of yellowcake at that time. The hot cells project has practically been stopped, and the only facilities for spent-fuel checking are those for nondestructive testing existing at the Atucha fuel pool.

Briefly, all the activities leading to the local development of technology have decayed to very low levels, and the government is applying to nuclear matters its general policy of importing everything—know-how, equipment

or facilities—and discouraging all local participation, except for conventional, already existing capabilities, that must compete, under very difficult conditions, with large foreign suppliers.

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Response

Santiago Morazzo's letter has prompted me to check my facts and the current status of the Argentine nuclear program with Dr. Jaime Pahisa, President of the Argentine Nuclear Technology Association. I shall comment on the following:

- *Heavy-water production.* Early in 1979, Argentina started construction of a pilot plant for heavy water with a capacity of about three tons per year. The plant is reportedly of Argentine design, based on technology known. In 1980, construction will start on Atucha-2, a 685-MWe plant scheduled to come on line in 1987. Also beginning construction in 1980 will be a heavy-water plant known as the Arroyito plant (Neuquen), with a capacity of 250 tons per year.

- *Research with accelerators.* In 1980, construction began on a heavy ion accelerator known as Project Tandar at the Constituyentes Nuclear Center.

- *Yellowcake production.* In 1978, production was 132 metric tons. In 1979, production was 159 tons instead of a planned production of 220 tons. Current plans in Argentina call for a production of yellowcake in 1984 of approximately 1000 tons per year.

- *Fuel rod production* was 480 in 1978.

- *Local development of nuclear technology.* One must recognize that Atucha-1 (367 MWe) has had an excellent operating history as to both continuous production and safety of operations. For the future, one must

look to the agreement still being discussed and negotiated with Kraftwerk Union (KWU). The agreement with KWU provides for the creation of a joint KWU/Argentine Corporation with shares to be held by both Argentina and Germany. German personnel will predominate at first and are to be gradually replaced by Argentine engineers and scientists, so that the Argentines will have total responsibility for the design and construction of their fourth nuclear plant. In addition to Atucha-2, there are plans for three additional power plants, of approximately 600 MWe each, to come on line in 1991, 1994–5, and 1997. Facilities for developing the fuel cycle at all stages are planned. A plant for manufacturing fuel elements and Zircaloy tubes is now under construction.

- *The political situation as it affects the Argentine nuclear scientists and engineers.* One should review the Argentine Atomic Energy Commission (AEC) since its creation in 1950. The Argentine program grew rather vigorously at first and, of course, was subject to the economic ups and downs and inflation, which was serious. At the end of 1972, there were in Argentina several research reactors entirely designed and built in Argentina, critical facilities and a reactor for radioisotopes production with its adjacent production plant, several uranium mines in full exploitation, and two factories producing 29 tons of yellowcake per year. The nuclear power plant at Atucha was in its final stage of construction. Bids had been asked for a second nuclear plant at Embalse (Cordoba).

In 1973, a political change took place in Argentina, and for the first time since its creation, the AEC was deeply affected. A considerable number of scientists and technicians emigrated or reverted to other activities. Some of the top level staff went into exile in such countries as Iran, Belgium, Spain, and Austria, or were demoted to inferior positions. In many cases, their duties were overtaken by people not known for their scientific or technological capabilities, but rather for their unflinching support of the political regime that dominated in Argentina until 1976. After the fall of that government, which reportedly favored terrorism, a period of reconstruction began for the Argentine AEC. Most exiles have now returned, and activities are going back to normal. According to the Argentine AEC at this time, the only persons withdrawn from their posts were those connected with terrorism in the former government.

I have noted in the last three years that there are considerably more contacts between Argentine scientists and scientists in the United States and

Europe. These are occurring at the International Atomic Energy Agency meetings, at ANS meetings, at meetings of the Inter-American Nuclear Energy Commission, and other informational meetings. In 1981, Argentina will host the second International Conference on the Transfer of Nuclear Technology. In May 1980, Argentina will participate actively in the meeting on small reactors to be held by the Inter-American Nuclear Energy Commission in Montevideo, Uruguay. Plans are also under way for the exchange of information concerning nuclear standards and their applications with selected members of the ANS Standards Committee. In all of Latin America, Argentina is still the only country that has a nuclear power plant in operation.

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Confused and inept?

It has been a year since the TMI-2 incident, and the bloodletting continues. The public perception of a confused industry and an inept regulatory process remains. The world's most complex mechanism for assessing safety—the NRC licensing process—is stagnant. The industry is apprehensive, and everyone seems frustrated. We don't seem to be able to generate momentum.

For all the rhetoric, to quote a good friend from NUS Corporation, "We're still focused on the wrong problem." Our current process of conforming to regulatory guides, standards, codes, etc., provides a step-by-step reasoning—cookbook—approach to the development of civilian nuclear power. Unfortunately this is no substitute for clear technical insight. It is the fundamental concepts that are important; e.g., what is embodied within the philosophy of containment?

Our current approach to design, construction, operation, and regulation of nuclear facilities has tended to obscure the thought processes from which components and systems, regulations and guides, codes and standards, procedures, etc., evolved. This has made it increasingly difficult for designers, construction coordinators, operators, etc., to paint mental pictures of systems or components, and fortuitous action, or response by rote, poses very real dangers.

Regulations and standards are not substitutes for technical understanding. The margin for error is as great as the failure to comprehend. The seemingly simple process of listing concerns, ignoring those which don't matter, and

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