

THE AGENCY'S TECHNICAL CO-OPERATION ACTIVITIES IN 1990

Report by the Director General



INTERNATIONAL ATOMIC ENERGY AGENCY

THE ISLAMIC REPUBLIC OF IRAN

A. CONTRIBUTIONS TO AND PARTICIPATION IN TECHNICAL CO-OPERATION ACTIVITIES

Year	TACF share	TACF pledged	Extrabudgetary funds	In-kind support	Experts from country	Persons trained in country
	\$	\$	\$	\$		
1986	171.0	0.0	0.0	0.0	4	0
1987	210.8	0.0	0.0	0.0	2	0
1988	235.6	0.0	0.0	0.0	3	0
1989	260.4	0.0	0.0	0.0	5	0
1990	309.4	390.4	0.0	0.0	9	0

B. ASSISTANCE APPROVED AND PROVIDED

Year	Assistance approved from TACF				Total assistance provided from all sources					
	CC	NCC	Total	Region	TACF	TACF	budgetary	UNDP	In kind	Total
	\$	\$	\$	%	CC\$	NCC \$	\$	\$	\$	\$
1988	41.4	0.0	41.4	0.9	174.4	4.4	0.0	91.4	0.3	270.5
1987	241.7	40.0	281.7	5.3	283.3	8.8	245.0	263.7	19.4	820.2
1988	347.1	110.0	457.1	8.6	288.0	24.8	5.3	84.0	0.5	382.4
1989	429.7	120.0	549.7	7.4	502.7	60.2	0.0	47.5	14.3	624.7
1990	537.1	125.0	662.1	8.7	808.0	150.0	0.0	-2.0	58.4	1014.4

221.The Islamic Republic of Iran became a Member State of the Agency in 1958, but until the early 1980s, most requests for technical co-operation comprised primarily expert advice, particularly in respect of the planning of nuclear laboratories or facilities. Since that time the programme has developed on a broad front.

222.The Atomic Energy Organization of Iran (AEOI) is the body responsible for nuclear activities in the country. It operates three nuclear centres in the country, the Nuclear Research Centre in Tehran, where a research reactor is situated, the Nuclear Research Centre for Technology in Esfahan, and the Nuclear Research Centre for Agriculture and Medicine in Karadj, at present under construction. A high priority is being given to the nuclear power programme: the construction of the Bushehr Nuclear Power Plant had had to be suspended, but it is intended to redevelop the infrastructure and re-start construction. Priority is also being given to identifying economically favourable uranium resources to be used in support of the nuclear power programme.

223In the present atmosphere of strong national socio-economic development, the Government has placed a particular emphasis on manpower development. A national project with this title was approved for the 1991-92 biennium, with planning to 1994. The TACF funds allocated will provide fellowships for training abroad in the various fields of the peaceful uses of atomic energy, the Iranian authorities covering the travel costs of their fellows and scientific visitors.

224Planning for nuclear power commenced in the mid-1970s, and an Agency expert assisted in this activity during 1977. It was foreseen that two 1 200 MW(e) PWRs would be erected at the Bushehr site. Construction was halted in 1980, and subsequently some damage was caused to the main and auxiliary buildings by military action. The growing need for electricity to support economic development led to a decision to revivify the programme, and the Agency was called on to provide experts to assess the safety of the concrete structures and to evaluate the damage. Criteria for rehabilitation of the plant and site have been drawn up and are being implemented.

225The Government also foresees exploitation of national uranium resources; the country is among the few in the world with a relatively strong exploration programme. About 40% of its territory has been surveyed by airborne gamma-ray spectrometry since 1974. Follow-up work on favourability has led to the discovery of some interesting uranium deposits, several of which are associated with polymetallic sulphide mineralizations. The Agency has been providing technical assistance since 1985 under a long-term project on the processing of the airborne data, preparation of maps and interpretation of the geology. Support is expected to continue for a comprehensive exploration programme which should lead, after evaluation, to a feasibility study on the mining and processing of uranium ores. To prepare the infrastructure and introduce the technology, a supplementary project was approved from 1991 on ore dressing and leaching of uranium ores, with the objectives of setting up a properly equipped dressing laboratory and determining the feed and leaching parameters that permit optimum uranium recovery. In addition, in a project approved for 1992, advice will be provided on effluent treatment and on the design of the liquid waste treatment and tailing disposal systems for safe operation of the pilot uranium ore processing plant.

226The 5 MW(th) pool-type research reactor at the Nuclear Research Centre was put into operation in 1967. The original high-enrichment fuel is still in use, and this now limits operation to a few hours per day at a power level below 2 MW(th). The Research Division at the Centre is currently engaged on core conversion to a low-enrichment uranium fuel, which has been purchased from Argentina. Work on modernizing the reactor instrumentation is under way, and the new safety analysis report is being prepared. The Agency has assisted by facilitating procurement of the fuel and it will be sending experts to advise on reactor safety and operation.

227The Esfahan Centre was established in the mid-1970s with co-operation from France. Its original tasks were to support the national nuclear power programme, in particular providing technical and scientific support for the Bushehr plant. It was to be responsible for the training of operators, covering aspects such as waste management, in-service inspections, and non-destructive testing of the nuclear power plant components and systems. To aid the work of the Centre, the Agency will be sending an expert to assist in setting up and commissioning a radioactive waste incinerator, in line with the recommendations of a WAMAP mission, and will advise on a nuclear power plant training simulator for operators. It has also been assisting with the design and commissioning of a sub-critical assembly and a zero-power reactor, this last project being seen as providing practical experience of reactor physics and safety calculations, thereby helping to build up trained manpower.

228The Government has placed considerable emphasis on the local production of radioisotopes and radiopharmaceuticals, and the Agency has been a major partner in this activity since 1982. The national programme aims to make the country to a large extent self-reliant in the production of the commonly used radiopharmaceuticals. At the Nuclear Research Centre in Tehran, a Radiopharmaceutical Laboratory has been established to produce, primarily, the two principal radioisotopes used in medical diagnostics, namely technetium-99m and iodine-131. The technetium isotope is being derived from technetium generators using the fission product molybdenum-99, which is being imported in bulk; the iodine-131 is to be locally produced in the research reactor.

229Agency support has consisted of provision of the in-cell equipment for isotope handling: the cell frame, shielding and support structures were fabricated by the Centre. The Agency also provided items of essential equipment such as a large freeze-drying machine (for the preparation of in-vivo kits), and assay and quality control instruments. Agency experts advised on the various aspects of radioisotope and radiopharmaceutical production and on quality control. The generator production line was commissioned in December 1990, and trial production is under way. The iodine-131 production facility is expected to be commissioned in July 1991.

230A related project foresees the installation of a variable-energy cyclotron, purchased with Government funds, at the National Research Centre for Agriculture and Medicine. It is to produce short-lived isotopes for positron-emission tomography studies on patients. The Agency will supply expertise, as well as some laboratory and interface equipment needed for the cyclotron, and will provide training for local specialists. Advice on the selection of the cyclotron and on project planning has already been provided.

231. In 1982, a US\$1.5 million UNDP project on radiation technology was instituted for which the IAEA was executing Agency. A Gamma Irradiation Centre was established under the auspices of the Nuclear Research Centre, Tehran, and a 200 kCi irradiation facility has been installed and commissioned. It is already being used to sterilize disposable medical supplies, while research and feasibility studies into different applications of radiation technology, such as food irradiation, are being undertaken. The irradiator and part of the source costs were covered by Iranian funds-in-trust. An Agency expert assisted with planning, the vendor undertook installation, commissioning and training of operators, and other Agency experts provided instruction in various aspects of radiation technology, including process control and microbiological safety. Several fellowships and scientific visits were provided.

232 The use of isotope tracer techniques and nucleonic control systems in industrial applications is being furthered by a group at the Tehran Centre. There is particular interest in developing thickness and density gauges using sealed radioisotope sources. The Agency is supporting the group by providing expertise and equipment. It is envisaged that the techniques will, inter alia, have application in the chemical, mineral, petroleum, steel and paper industries.

233 A further activity that supports various sectors of the national economy is elemental analysis, in particular that concerned with precise determination of trace quantities. The team at the Tehran Centre operating a 3 MV Van de Graaff accelerator is to receive Agency support from 1992 to upgrade their analytical services through the introduction of proton-induced X-ray emission and Rutherford backscattering as standard techniques.

234. There was, in the past, little interest shown by the Government in the application of nuclear techniques in agriculture, and the only topic supported by the Agency to date has been the improvement of wheat production through a project initiated in 1987. Isotopes are being used to improve management of fertilizer and irrigation water, and trials of induced mutants are showing promise after some three years of field experiments. It is believed that this type of activity will be extended to other crops in the future. Indeed, the greater interest shown in such activities is evinced by the fact of the establishment of the Nuclear Research Centre for Agriculture and Medicine itself.

235 A UNDP-funded project is concerned with strengthening the Water Resource Research Institute to enable the Government to plan the management and use of scarce water resources. Activities in this sector have included studies to determine the site of leakage from a reservoir dam in karstic terrain so that action could be taken to halt the water loss.

236 The range of nuclear activities in the country require concomitant activities in the field of radiation protection and environmental monitoring. The AEOI has established national regulations, procedures and the technical infrastructure needed for a nationwide radiation protection service. Its National Radiation Protection Department (NRPD), as competent authority, is responsible for all radiation protection matters. The various activities include the personnel monitoring service, internal dosimetry, environmental monitoring and meteorology, radiation surveillance at nuclear research centres, and training and education on radiation protection. The NRPD also carries out the functions relating to licensing and inspection. At the Government's request, a RAPAT mission visited the country in 1989; the recommendations included the

up-grading of NRPD facilities and equipment. Under a project approved from 1991, the Agency will be assisting the country by providing a range of radiation monitoring and related equipment and by assisting in the establishment of an early warning environmental monitoring system. There will also be support for environmental monitoring, in particular in connection with potable water, under a project initiated in 1985.

IRELAND

A. CONTRIBUTIONS TO AND PARTICIPATION IN TECHNICAL CO-OPERATION ACTIVITIES

Year	TACF share	TACF pledged	Extrabudgetary	In-kind support	Experts from country	Persons trained in country
	\$	\$	\$	\$		
1986	54.0	30.0	0.0	0.0	0	0
1987	61.2	61.2	0.0	0.0	1	0
1988	68.4	0.0	0.0	0.0	0	21
1989	75.6	0.0	0.0	0.9	4	25
1990	81.9	0.0	0.0	1.2	6	0

ISTANCE APPROVED AND PROVIDED

Year	Assistance approved from TACF				Total assistance provided from all sources					
	CC	NCC	Total	Region	TACF	TACF	budgetary	UNDP	In kind	Total
	\$	\$	\$	%	CC \$	NCC \$	\$	\$	\$	\$
1986	0.0	0.0	0.0	0.0	5.2	0.0	0.0	0.0	0.0	5.2
1987	0.0	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	4.5
1988	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1989	33.1	0.0	33.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0
1990	0.0	0.0	0.0	0.0	37.8	0.0	0.0	0.0	1.5	39.3

237. Ireland became a Member State of the Agency in 1970. There is only a limited use of radiation sources in the country, primarily for cancer therapy and medical diagnosis, and in industry where radioisotope sources are used for thickness gauging and similar nucleonic process control systems. Agency assistance through the Technical Co-operation Programme has only been sought in respect of internal contamination monitoring and to establish a standardization laboratory for low-levels of ionizing radiation. The Nuclear Energy Board set up a Secondary Standards Dosimetry Laboratory (SSDL), with Agency assistance in the form of a dosimetry system that comprised radiation detectors, calibration sources, and calibration stands with related equipment to make possible high precision measurement. About one quarter of the funds disbursed were provided as trust funds by Ireland. The SSDL supports, inter alia, the country-wide personnel dosimetry service for which the Board is responsible, as well as environmental radioactivity measurements.