

# IMPROVEMENT OF NON-DESTRUCTIVE TESTING FOR INDUSTRY (BOH/8/002) F5

New

MODEL PROJECT

## CORE FINANCING

YEAR	Experts		Group Activity	Equipment	Fellowships		Scientific Visits		Group Training	Sub-Contracts	Misc Comp.	TOTAL
	m/d	US \$	US \$	US \$	m/d	US \$	m/d	US \$	US \$	US \$	US \$	US \$
1997	0/15	6,600	0	65,000	0/0	0	2/0	19,200	0	0	0	90,800
1998	0/0	0	0	62,000	0/0	0	2/0	20,400	0	0	0	82,400
1999	0/0	0	0	60,000	0/0	0	0/0	0	0	0	0	60,000
2000	0/0	0	0	60,000	0/0	0	0/0	0	0	0	0	60,000

First Year Approved: 1997

**OBJECTIVES:** The major development goal of this project is the reconstruction of vital civil and industrial infrastructure damaged or destroyed by acts of war. The project aims specifically to establish the capability for non-destructive testing that this reconstruction effort requires in order to achieve quality levels commensurate with international standards and practice.

**BACKGROUND:** Non-destructive testing (NDT) is an essential tool for the quality control of engineering materials, manufacturing processes, reliability of products in service, and maintenance of systems whose premature failure could be costly or even disastrous. Much vital infrastructure including factories, technical institutions and power generation plants, gas pipelines, and land communications were destroyed or seriously damaged during the war. NDT capabilities need to be re-established to support reconstruction and economic recovery, and to revitalize and develop the country's traditional strengths. Engineering, mining, metallurgy and metalworking were previously important local industrial activities with some of the largest companies of the former Yugoslavia based in Bosnia and Herzegovina, including the main counterpart, the Institute for Materials and Quality, ENERGOINVEST. This engineering company, which was founded in 1951 initially for design and manufacture of power plant components, extended its activities to the production of electrical and mechanical equipment and an NDT department was established. At its peak, the company had 55,000 employees, but today it has about 2000. Local NDT specialists still exist but need to be recertified and assisted initially to conduct local training for other NDT personnel. Once these industries are redeveloped, it will be necessary to work according to international standards and in correspondence with ISO/EN certification in order to open trade with other countries. Products of acceptable quality will be able to compete in European and world markets. More immediately, quality, safety and efficiency will be required domestically for major construction and civil works. One example is a 40 cm diameter high pressure steel pipeline, which has been constructed from the Bulgarian

border near Zvornik to Sarajevo and Zenica, supplying gas from Russia for domestic and industrial use. Interruptions in supply would render 500,000 people in and around Sarajevo without heating, which would be particularly hard in winter. The main pipeline feeds into the planned 210 km polyethylene pipeline distribution system for Sarajevo which is under construction. Within the next two years, about 20,000 welded joints will have to be made and tested. The distribution system will provide about 280 million cubic metres of gas in 1996, rising to 300 million cubic metres by the end of the project. Because the work has started and because of the urgent need to install a major part of a reliable supply system before winter, the Agency responded last year by providing ultrasonic testing equipment and an NDT expert to train local specialists to test the polyethylene piping. About 20,000 gas connections had already been made by the summer of 1996. Qualified testing will reduce the risk of breaks in the low pressure pipe system and considerably reduce the risk of gas explosions. The country is mountainous, and land communications by road and rail require bridges, many of which need to be rebuilt or repaired and recontrolled by NDT methods after being damaged or destroyed during the past few years. Foundries for steel, cast iron, iron and copper exist around Sarajevo and in towns such as Zenica and Tuzla. Therefore NDT for casting is required.

**PROJECT PLAN:** Immediate assistance was provided in 1996 to improve the safety and quality of construction of the Sarajevo gas distribution system. An NDT expert carried out ultrasonic testing and training on polyethylene pipes and pipe-weldings, and specialized ultrasonic testing equipment was provided. There are still some local NDT experts who had received high level training. This expertise will be re-established by recertification of a few key personnel. Through external assistance an outside organization will carry out the initial Level III examination followed by recertification. These key personnel will then carry out the local training of other NDT personnel at Levels I and II.

**NATIONAL COMMITMENT:** Existing NDT personnel will be selected to take the Level III examination, followed by recertification. They will organize and establish NDT training on a national scale. Some facilities and NDT equipment will be available. The X-ray and gamma-ray exposure rooms should be reconstructed. Three Ir-192 gamma-ray projectors will need maintenance, inspection and reloading. A World Bank credit for emergency district heating reconstruction of about US \$20 million is under negotiation and a further US \$60 million is expected through bilateral arrangements, which will be used to finance the Sarajevo gas distribution project and to reconstruct the main transmission pipeline.

**AGENCY INPUT:** External experts will organise locally the Level III examination and renewal of certification. The Agency will provide equipment for liquid penetrant testing, radiography and magnetic particle testing; training for four engineers in NDT applications in industry and advanced NDT methods and applications; training materials.

**PROJECT IMPACT:** The capabilities to conduct Levels I and II training locally in accordance with education standards EN 473, IAEA TECDOC 928, ISO 9712 or others will be re-established. Through renewal of basic equipment, the national capabilities to provide NDT services to local industry will be greatly enhanced. This will lead to greater assurance of safety and quality in reconstruction work and industrial production, and to financial savings related to product control and maintenance activities. Export opportunities will be improved through assured product quality and internationally recognized certification. For example, within two years, the Sarajevo gas distribution system will provide around 300 million cubic metres of gas to some 55,000 households in Sarajevo for heating and energy, and it will be possible to replace the home-made and unsafe gas connections in 34,000 flats in the city.