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IAEA/UNDP-TUR/87/016-TR
Terminal Report

DEVELOPMENT OF NON-DESTRUCTIVE TESTING

TURKEY

TERMINAL REPORT

Report prepared for
the Government of Turkey

by

the International Atomic Energy Agency
acting as Executing Agency for
the United Nations Development Programme

UNITED NATIONS DEVELOPMENT PROGRAMME
INTERNATIONAL ATOMIC ENERGY AGENCY

VIENNA 1991

**United Nations Development Programme
Government of Turkey
International Atomic Energy Agency**

**Development of Non-Destructive Testing
Within the Nuclear Research and Training Centre of the
Turkish Atomic Energy Authority**

Project TUR/87/016

Terminal Report

Vienna, 5 November 1991

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Summary Sheet

- a) Country: Turkey
Project Title: Development of Non-Destructive Testing in the Nuclear Research and Training Centre of the TAEA
UNDP Project No.: TUR/87/016
- b) Government Contribution (in-Kind): T.L. 500,000,000
Government Cost-Sharing: US \$ 39,000
UNDP Contribution: US \$ 200,000
- c) Executing Agency: International Atomic Energy Agency (IAEA)
- d) Title of Report: Terminal Report
Number of Volumes: 1
- e) Party responsible for preparing the report: Project Management and IAEA
- f) (i) Objectives:
The objectives of establishing the National Scheme for Qualification and Certification of NDT personnel harmonized with current international practise (based on ISO standard) as well as development of local training capabilities in NDT methods have been achieved.
- (ii) Outputs sought and produced:
- The introduction and implementation of a National Co-ordinating Body for NDT, National Standards for Training, Qualification and Certification of NDT personnel and the National Scheme for qualification and certification of NDT personnel.
 - Well-equipped NDT laboratories and training facilities, standard training programmes and manuals for basic NDT techniques standard test pieces for practical examinations and training, standard set of questions for examinations
 - Number of well-trained and qualified NDT personnel who will instruct on NDT methods at future national training courses,
 - Long-term programme for the development of new standards and codes.

(iii) Findings and Recommendations:

A National Scheme for the qualification and certification of NDT personnel in various methods has been established as the first stage of implementation. Systematic training in such methods as radiography (RT), ultrasonics (UT), magnetic particles (MT), liquid penetrant (PT) and eddy currents (ET) at levels I, II and some at III has been initiated and should be continued. Direct link with the industry and continuous effort to extend practical applications is strongly recommended.

(iv) Lessons learned:

Response of the national organizations and industry to the systematic introduction and implementation of the project was very positive and resulted in the above-mentioned outputs. The number of participants varied from course to course due to the shortage of adequate persons from industry for training. In some cases language proficiency was a problem. However, the long-term programme for the training in NDT methods should be elaborated, taking into account local needs of specialists to ensure that enough specialists are trained in particular methods.

(v) Vienna, 5 November 1991

Number of copies:

Language: English

(vi) Transmitted to the recipients: 1991

(vii) Derestriction was not requested.

A. Development Problem and Immediate Problems Tackled

Industrial development in Turkey was negatively effected due to the lack of adequate quality assurance and quality control (QA/QC) in the country and at the same time no capabilities existed for advanced technologies and for national participation in the future nuclear power programme. Significant improvement and up-grading of QA/QC standards were required according to the real needs and future plans of the Turkish industry. Sectors effected were the energy, the petrochemical and the metal working industries, civil engineering and construction, transportation and others. The problems to be tackled were as follows:

- Lack of co-ordination of NDT activities due to lack of unified codes and standards.
- Lack of national specialist trained in NDT methods due to the lack of an adequate training centre.
- Lack of sectorial structure for qualification and certification of NDT specialists.

At the beginning of the project a review held in 70 cities of Turkey, revealed that there was no discipline at the implementation of NDT methods in the organizations. In some organizations, although there were devices for NDT, there was a lack of staff using them. The users of most of the organizations that implemented NDT methods were not sufficiently qualified. Some organizations authorized university professors to perform the implementation of NDT methods but the results were inadequate. There were not any national standards related to the implementation of NDT therefore these activities were being held due to the code and standards of various countries. Standards of various countries were applied to qualify and certify most of the NDT users with no co-ordination in the country.

B. Outputs Produced and Problems Encountered

The National Co-ordinating Body (NCB) was established which includes representatives of 22 organizations and companies from all sectors of Turkish industry as well as research and training centres (see annex 5). In this way co-ordination of QA/QC activities in the country was achieved.

The National Special Committee (NSC) for the preparation of NDT standards was appointed within the Turkish Standards Institute (TSI) and national standards for implementation of NDT methods and sectorial qualification and certification of the personnel were prepared and submitted (see annex 6).

The National Qualification and Certification Committee (NQCC) was established and the first sectorial qualification and certification examination took place between 24 and 26 January 1991.

The National NDT training centre was organized, a new building for the centre was constructed in the Cekmece Nuclear Research and Training Centre (CNR&TC), laboratories of the centre adequately equipped, NDT national training courses and seminars initiated and were held under the guidance of international experts in accordance with the elaborated standards (see annexes 1.2.3 and 8).

Although the construction of the new NDT building was completed in November 1988 and all the necessary equipment was delivered, it was not possible to move in the new building in due time because of some management problems. One of the serious problems was the lack of heating in the new building due to poor infrastructure. Nevertheless, these problems were resolved in the course of the project implementation and national training courses in radiography (RT-level I, II and III), ultrasonics (UT-level I, II and III), magnetic particles (MT-level I and II), liquid penetrant (PT-level I and II), eddy current (ET-level I and II) were organized on a regular basis.

The Middle East Technical University and the Istanbul Technical University (ITU) integrated into the national scheme as the other basic training centres also their training activities are being supported in the national scheme.

The total number of participants registered at 20 training courses in the above-mentioned NDT-methods is 175. The majority of whom though are the same persons participating in training of various methods, and on subsequent levels I, II and III, thus the real number of persons trained does not exceed several dozen and reflects some difficulties to get more interest from the industry for an increase in the number of QA/QC specialists. Nevertheless, a dozen or so of national specialists in NDT methods has been trained at the level adequate to qualify some of them to be instructors at the training courses and to continue training activities initiated with the help of the external experts. Training at national training courses were supplemented by some fellowships and scientific visits for selected persons. In this way shortage of local NDT specialists were overcome and local capabilities in training in NDT methods developed (see annex 8).

The above-mentioned outputs have been integrated into the National Scheme for Qualification and Certification of NDT personnel in accordance with current international practices based on the ISO standard (see annex 7).

C. Objectives Achieved or Likely to be Achieved in the Near Future

Five intended immediate objectives were defined under the project and all were achieved as follows:

1. Immediate Objective 1

The national centre for Non-Destructive Testing withing the Cekmece Nuclear Research Centre was established. The centre is fully equipped and running by the qualified personnel.

Output 1

The NDT laboratories and training facilities (premises, equipment, teaching aids) for radiography, ultrasonics, eddy currents, magnetic and liquid penetrants testing have been established. Equipment provided is specified in annex 3.

2. Immediate Objective 2

The capability of the Centre to provide training of NDT personnel in accordance with draft International Standard ISO 9712 and IAEA-TECDOC-407 at three levels of competence is basic NDT methods was created. A lot of specialists were trained at the NDT training centre and some of them at a level which qualifies them to be trainers and instructors at the national training courses in the future (see annexes 2 and 7).

Output 2

The IAEA standard syllabi for NDT training was translated into Turkish and used in the training courses. Standard training programmes and manuals for basic NDT techniques and levels of competence (Five basic methods/techniques and three levels of competence were addressed).

Output 3

Standard test pieces for training and practical examinations have been provided under the project and/or prepared locally. But still new test pieces are still being processed.

Output 4

Standard sets of questions for examination has been translated into Turkish and adopted for the training courses. The standard questionnaires for examinations were prepared. A library was established in the secretariat of the NCB for these questionnaires. The NDT questionnaires are being produced for this library by all the sectors.

Output 5

Systematic training in the basic NDT techniques has been initiated. Training courses and seminars have been organized. According to the project adviser's recommendations (6/88) many changes had been done in the programme of training courses at the beginning. Organization of level 3 courses as specified in the project document has been postponed after more level 1 and level 2 courses are arranged to accumulate the students experience. Therefore, training activities have been modified and implemented accordingly. Twenty-three national training courses and seminars were organized (see annex 2) and fifteen field experts were involved as lecturers (see annex 1). A total number of 175 participants were registered (see annex 2). Number of persons who successfully completed level II or III and can be considered as trainers/instructors for various NDT methods is as follow: PT-five, MT-six, RT-three, ET-four and UT-four persons. More training has been provided under the fellowship component as well as three scientific visits have been organized (see annex 4). Also fellowship training in NDT techniques has been provided under the regular Agency programme under project TUR/8/008 and five persons were trained in this respect.

3. Immediate Objective 3

The Centre's capability to serve the industry and to develop new applications of NDT techniques, codes and standards was strengthened. Some research work in the field of NDT initiated but being rather restricted due to lack of manpower.

Output 6

Long-term programme for research and development of new applications, standards, codes, requirements for NDT techniques related to NPP and associated QA/QC programme have been identified. National standards are being prepared for NDT techniques which will be required in the Quality Assurance Programme related with NPP.

4. Immediate Objective 4

The National Scheme for Qualification and Certification of NDT personnel was developed and introduced into practice in accordance with draft International Standard ISO 9712.

Output 7

Recommendation on the setting-up of a National Co-ordinating Body for NDT comprised of representatives from the TAEA, the Turkish Standards Institute, TUBITAK etc. has been achieved (see annex 5). The organization of NCB had been established by specifying the organizations which are related to NDT. Integration of related governmental and non-governmental organizations had been achieved in accordance with the requirements. The requirements of the national scheme had been defined in the NCB meetings. NQCC had been authorized NCB for implementation of qualification and certification activities.

Output 8

National standards for training, qualification and certification of NDT personnel have been prepared. Translation and promotion of ISO 9712 standard for qualification and certification of NDT personnel has been done and TS 7477 "General Standard for Qualification and Certification of NDT Personnel" was prepared and submitted (based on ISO 9712) as a national standard.

Output 9

National scheme for certification of NDT personnel has been established (see annex 7).

9.1 Authorities for implementation of national scheme (see annex) have been established such as:

- The National Co-ordination Body (NCB)
- The National Qualification and Certifying Committee (NQCC) and authorized by the NCB for qualification and certification activities.
- The Secretariat of NQCC had been integrated to the organization TSI by the protocol on April 25, 1988.
- National Special Committee for preparation of NDT standards was established in the organization of TSI.
- National NDT basic training centres were defined and authorized by NQCC.
- National NDT examination centres were defined.

9.2 Procedures for qualifying examinations have been set up. Standards and procedures of the qualification examinations had been prepared.

5. Immediate Objective 5

Planning of the Hydrostatic and leakage test, metallurgical and Material Testing, Welding Laboratories was deleted from the UNDP project and as agreed at the Tripartite Review Meeting on May 22, 1989 transferred to the IAEA regular programme.

Output 10

IAEA TC project TUR/8/008 was approved for the 1989/90 programme cycle and implemented with the following achievements: In particular, with the aim of using local manufacturers to supply components for Turkey's nuclear energy programme, the Çekirgece Nuclear Research and Training Centre of the Turkish Atomic Energy Authority sought to broaden its quality control activities by adding other firms of non-destructive testing (NDT) for its gamma-radiography capability. Seven experts in ten missions advised on planning for national NDT activities, radiographic, ultrasonic and eddy current testing, and quality assurance. Various items of related test equipment were provided. A committee for NDT and a national certification body were established, while capabilities for the certification of NDT personnel were developed. Systematic training is being continued under a UNDP project. All the objectives specified in the ProDoc have been in the above described way achieved and contributed significantly to the improvement of standards of the industrial quality control in Turkey. In the long term, the improvement of QA/QC activities through the NDT standards that are prepared and submitted will lead to an increase at the level of industrial development at the same time with the nuclear power programme of Turkey. NDT methods (RT, UT, MT, PT, ET) have unlimited fields for using. The qualification and certification of the personnel who will use these methods will solve the problem of qualified in the industry. Holding the qualification and certification activities in a national scheme will provide discipline and standardization to the certification studies. The employment of qualified and certified personnel will lead to a control on the import contract specification and will provide expert contract specifications.

D. Findings and Lessons Learned

The integration of various organizations, institutes and industry into a National Scheme for the Qualification and Certification of NDT personnel was successful through a systematic approach and strengthening of existing interests in QA/QC. The establishing of NCB, NSC, NQCC and of the NDT Training Centre was successful and a proper basis for future activities.

External experts in UT, MT, PT and ET used as lecturers and advisers made possible to overcome shortage of local instructors and as the result of the initiation of systematic training at level I, II and III a group of national instructors was trained. Some serious problems have been however identified which effected the efforts to establish direct and close links with the industry. At first the industry was reluctant to accept in practise the necessity of improvement of QA/QC standards as a condition for the industrial development and improvement of the quality of products. In the process of learning it was very useful the experience and involvement of the existing institutes such as TSI, CNR&TC, ITU and others which resulted in the improvement of co-operation and the establishment of a National Scheme for Qualification and Certification. The second main problem was identified as finding sufficient number of qualified participants for NDT training. The tendency to nominate trainees mainly from the research institutions was not overcome in full. The number of participants varied from course to course due to the shortage of adequate persons from the industry for training. In some cases language proficiency was also a problem.

The Political situation in the region (the Gulf War) jeopardized the progress of the training in the beginning of 1991 due to difficulties to arrange expert missions at that time.

E. Recommendations

Taking into account that the improvement of QA/QC activities through the NDT standards that are prepared and submitted will lead to an increase at the level of industrial development at the same time with the nuclear power programme of Turkey. NDT methods (RT, UT, MT, PT, ET) have unlimited fields for using. The qualification and certification of the personnel who will use these methods will solve the problem of qualified personnel in the industry. Holding the qualification and certification activities in a national scheme will provide discipline and certification standard for the studies.

The employment of qualified and certified personnel will lead to a control of the imported product contract specification and will provide conditions for the observation of the contract specifications of the products for export. It is therefore recommended:

1. To proceed intensively with the manpower development efforts in the field of NDT, enlarging the current infrastructure and facing new challenges as they appear. It is recommended to continue the training of NDT personnel in basic NDT techniques. To improve the functions of the National Centre for NDT by establishing of special status of the Centre for industrial tasks and to strengthen linkage and co-operation of the Centre with all interested institutions in the country.

2. Improvement of the direct link with the industry and continuous effort to extend practical applications of NDT methods in main industrial sectors is strongly recommended. Spreading of information on the NDT training and service activities by all available means should be improved (advertising the activities, publishing information materials and technical papers in technical journals).

3. Long term programme of training in NDT methods should be elaborated taking into account local needs of specialists to assure that enough specialists are trained in all basic methods.

4. Further UNDP assistance would be highly desirable and beneficial to the national industry, in particular directed towards assisting national specialists in training, qualification and certification of NDT personnel at levels II and III of competence. Eddy current (ET) and Surface methods (MT, PT) level III courses should be arranged in the future.

After familiarizing with the five basic NDT techniques it is recommended to support advanced NDT techniques (real time radiography for continuous production, small samples, etc., leakage tests for pressure vessels) and computerized NDT.

5. Experience and capabilities already achieved under the project in the introduction of the national scheme for training and certification of the NDT specialists should be shared with other countries of the region strengthening co-operation between developing countries (TCDC approach).

Annex :1

EXPERTS MISSIONS

TASK	TITLE	NAME AND NATIONALITY	ASSIGNMENT		DURATION MM/DD
			START	END	
1101	QUALIFICATION AND CERTIFICATION OF NDT PERSONNEL	BESWICK, CIFFORD KENNETH (UK)	87-09-28	87-10-02	05
		FEDDERSON, AKSEL (DEN)	87-09-30	87-10-03	04
		BETTINI, VIRGILIO (ITO)	88-09-18	88-10-02	15
					24
1102	NDT SEMINAR	NOSSAGK, EBERHARD (GFR)	88-12-02	88-12-15	14
			89-03-25	89-03-31	07
			89-05-05	89-05-26	22
		MARTINKO, MIJO (YUG)	88-11-25	88-11-30	06
			89-02-04	89-02-11	08
			89-06-17	89-07-08	22
		LALOY, PAUL A.(FRA)	88-11-27	88-11-30	04
			89-05-28	89-06-03	07
			89-08-27	89-09-09	14
		BETTINI, VIRGILIO (ITA)	89-01-22	89-01-29	08
			89-04-16	89-05-05	20
			90-01-07	90-01-22	16
					4/28
SUB TOTAL (1)					5/22

TASK	TITLE	NAME AND NATIONALITY	ASSIGNMENTS		Duration
			START	END	MM/DD
1106	PROJECT ADVISER	ROSSI, OSWALDO JR. (BRA)	88-05-18	88-06-11	25
			89-05-06	89-05-23	18
		ZATLOKIN, BORIS (SSR-IAEA)	89-11-26	89-12-03	08
					<u>1/28</u>
1107	QUALITY CONTROL	-	-	-	-
1108 (011-002)	NDT IN WELDING/CASTING/ FORGING INSPECTING AND FILM INTERPRETATION	SAKAMOTO, AKIRO (BRA)	90-03-28	90-04-24	28
1109 (011-002)	TRAINING COURSE ON TESTING PROCEDURES AND TESTING PIECES	ROSSI (BRA)	-	-	-
1110 (011-002)	TRAINING COURSE ON RT-3	DOBROWOLSKI, MAREK (POL)	90-09-02	90-09-20	19
1111 (011-002)	TRAINING COURSE ON UT-3	DEPUTAT, JULIAN (POL)	90-10-14	90-11-03	21
1112 (011-002)	TRAINING COURSE ON TRAINING THE TRAINERS	ROSSI (BRA)	-	-	-
1113 (011-002)	TRAINING COURSE ON SURFACE METHODS-L3	HARDING, NORMAN (CAN)	90-12-02 91-11-29	90-12-21 91-12-21	19 23
			SUB	TOTAL(2)	5/18
			TOTAL :(1)+(2)		11/10

Annex : 2

UNDP/TUR/87/016 PROJECT
COURSES AND SEMINARS

DATE	TYPE	NUMBER OF PARTICIPANTS	REMARKS
1988			
19-30 SEPTEMBER	SM-1	9	FOREIGN EXP (ENGLISH)
17-28 OCTOBER	UT-1	19	TURKISH LECTURERS (TURKISH)
07-18 NOVEMBER	ET-1	7	FOREIGN EXP (ENGLISH)
28-29 NOVEMBER	SEMINAL AND EYHIBITION	130	IN ANKARA
05-12 DECEMBER	RT-1	7	FOREIGN EXP (ENGLISH)
PARTICIPANTS FOR COURSES		42 (Except Seminar)	
1989			
17-21 APRIL	SM-1	6	FOREIGN EXP (ENGLISH)
24 APR-05 MAY	SM-2	6	" " "
9-26 MAY	RT-2	7	" " "
19 JUNE-07 JULY	ET-2	9	" " "
28 AUG-09 SEPT.	UT-2	10	" " "
25 SEPT-13 OCT	UT-2	7	TURKISH LECTURERS (TURKISH)
23 OCT-03 NOV	RT-1	16	" " "
06-17 NOVEMBER	SM-1	8	" " "
28-30 NOVEMBER	SEMINAR	30	IN ANKARA
04-15 DECEMBER	EC-1	9	FOREIGN EXP (ENGLISH)
PARTICIPANTS FOR COURSES		78 (Except Seminar)	
1990			
08-19 JANUARY	SM-2	6	FOREIGN EXP (ENGLISH)
28 MARCH-24 APRIL	WELDING/CASTING/ FORGING INSP. AND FILM INTERPRETATION	15	" " "
05-16 MARCH	UT-1	6	
30 ARP-18 MAY	RT-2	11	
03-19 SEPTEMBER	RT-3	5	
15 OCT-02 NOV	UT-3	6	
28-30 NOVEMBER	SEMINAR	11	
03-21 DECEMBER	SM-3	6	
NUMBER OF PARTICIPANTS FOR NDT COURSES		55 (Except Seminar)	
TOTAL		175	

ANNEX 2 - continued -

6 - 21 December

SM2 2

SM3 4

Number of Participants for
NDT Courses

6

TOTAL 181

Annex : 3

040 EQUIPMENT				
041	Expendable Equipment	Received	Purchase Order	Costs \$
	Miscellaneous	89-07-28	88P599A	2.815
	Expandable Equipment Cost		SUBTOTAL	2815
042	Non-expendable Equipment,	Shipped	Purchase Order	Cost \$
	Radiographic Equipment,	88-02-22	87P437A	44.060
	-NDT Equipment (ultrasonic)	"	"	
	-NDT Equipment(Radiography Co60)	"	"	
	-Magnetic Particle Unit	"	"	
	NDT Equipment	89-01-10	88P697A	12,591
	Magnetic Particle Testing Unit	89-04-04	89P038A	15,313
	NDT Equipment (MT)	89-12-15	89P481	168
	NDT Equipment (RT)	90-11-16 (Received)	90P932A	36.129
	Non-Expandable Equipment Cost	SUB	TOTAL	108.261
	Expendable and Non Expandable Equipment Cost		TOTAL	111.076

Annex : 4

<u>FELLOWSHIPS</u>		<u>START</u>	<u>END</u>	<u>COUNTRY</u>
TUR/9003	SEÇKİN, HİKMET	11.11.90	15.2.1991	GFR
TUR/9010	ALAT, ALİ	ACCEPTED		BRA

SCIENTIFIC VISITORS

TUR/8824	AKGUN, FADIL	88-09-14	88-09-17	GFR
		88-09-18	88-09-20	ITA
		88-09-12	88-09-13	SPA
TUR/8825	TORUN, HAYRI	88-09-14	88-09-17	GFR
		88-09-18	88-09-20	ITA
		88-09-12	88-09-13	SPA
TUR/8835	ALAT, ALI	89-03-12	89-03-17	BRA
		89-03-05	89-03-11	ARG

Annex : 5

NATIONAL COORDINATING BODY

1. PETKIM-PETROCHEMICAL INDUSTRIES
2. TURKISH ELECTRICITY AUTHORITY (TEK)
3. BOTAŞ-TRANSPORTATION BY PIPELINES
4. TDCI TURKISH IRON AND STEEL COMPANY
5. TURKISH SUGAR INDUSTRY. (MACHINERY PRODUCERS)
6. TURKISH SCIENTIFIC AND TECHNICAL RESEARCH INSTITUTE-TUBITAK
7. TMMOB- UNION OF THE TURKISH ARCHITECTS AND ENGINEER CHAMBER
8. TAEA-TURKISH ATOMIC ENERGY AUTHORITY
9. TSE-TURKISH STANDARDS INSTITUTE
10. TURKISH RAILWAYS INDUSTRY-TDDY
11. TURKISH SHIPPYARDS INDUSTRY
12. THY-TURKISH AIRLINES
13. UNION OF TURKISH CHAMBER OF TRADE AND INDUSTRY
14. SMALL AND MIDDLE SCALE INDUSTRIES DEVELOPMENT ORGANIZATION
15. TURKISH, LLOYD
16. TURKISH MECHANICAL AND CHEMICAL INDUSTRY AUTHORITY (MKEK)
17. PRESSURE VESSELS UNION
18. NATIONAL DEFENCE GENERAL SECRETARY
19. ISTANBUL TECHNICAL UNIVERSITY (ITU)
20. MIDDLE EAST TECHNICAL UNIVERSITY (METU)
- *21. TEKFEK
- *22. ÇİMTAŞ

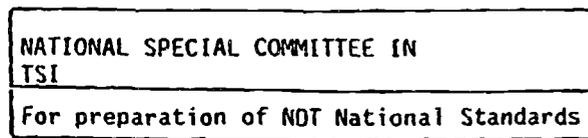
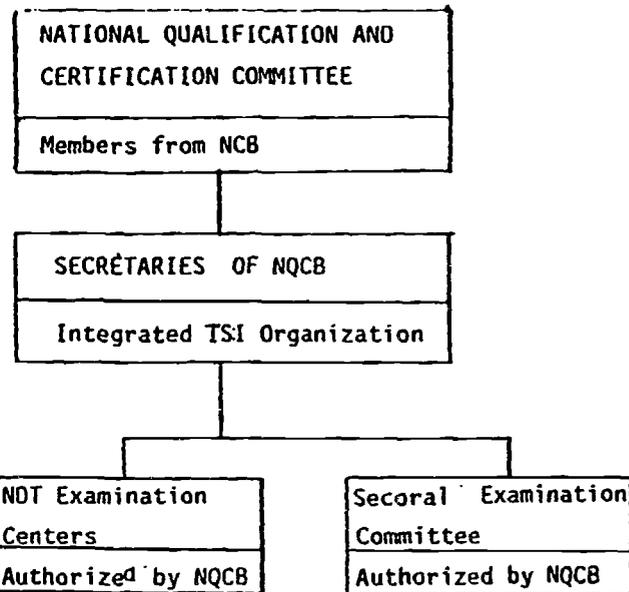
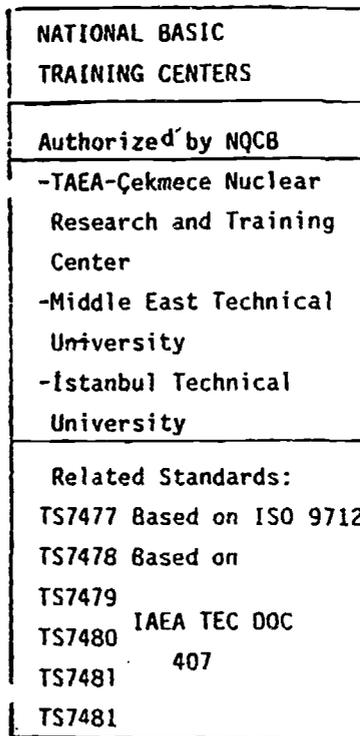
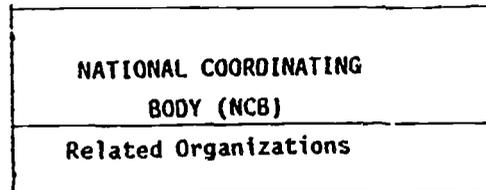
*They applied to NCB for Integration.

Annex : 6

SECTORIAL STRUCTURE
OF NDT CERTIFICATION

1. THE SECTOR OF AEROSPACE INDUSTRY
2. THE SECTOR OF METALLIC MATERIAL AND JOINT ELEMENTS
INDUSTRY
 - 2.1. Steel construction material elements
 - 2.2. Pressure vessels
 - 2.3. Ferrous or steel; plate, profile, pipe and joint elements.
 - 2.4. Non-ferrous metals; plate, profile, pipe and joint elements
 - 2.5. Mechanical manufacturing
 - 2.6. Automotive (railway, Road, e.g.)
 - 2.7. Forging and casting
3. THE SECTOR OF NON-METALLIC MATERIAL AND JOINT ELEMENTS INDUSTRY
 - 3.1. Petrochemical and chemical industry
 - 3.2. Civil engineering and construction material elements
 - 3.3. Forging
4. THE SECTOR OF NUCLEAR TECHNOLOGY
5. THE SECTOR OF ELECTRIC AND ELECTRONIC INDUSTRY

NATIONAL SCHEME



Annex : 8
29 November 1990

-21-

TAEA
NUCLEAR RESEARCH AND TRAINING CENTER
Endüstriyel Applications Division

Personnel Qualification Levels

*L - Lecturer

NAME	Radiography (RT)	Ultrasonic (UT)	Magnetic Particles (MT)	Liquid Penetrant (PT)	Eddy Current (ET)
Dr. Şinasi Ekinçi (L*)	I,II,III	II,III	I,II	I,II	I,II
Neşet Baş (L*)	I,II	I,II	I,II	I,II	I,II
Mehmet Aksu (L*)	I,II,III	I,II	I.	I.	I.
Abidin Yıldırım	I,	I,II	I,II	I,II	I
Nihat Karalncı (L*)	I,II	I,II	I,II	I,II	I,II
Ülkü Bulubay. Ms. (L*)	I,II	-	I, II	I, II	I
Mustafa Doğruöz	I	I	-	-	-
Murat Bingöldağ	I	I	I	I	-
Tekin Kurtcebe (L*)	I	I	I, II	I, II	-
Necatî Yılmaz (Tech.)	I	-	I,II	I,II	I.
Ahmet Fadil Akgün (Head of Dept.) (L*)	I,II	I			

Annex: 9.

English translation of this protocol is as follows, but in case of disputes arising from the interpretations, the attached Turkish original text of the protocol shall be taken as the valid text

CO-OPERATION PROTOCOL BETWEEN TAEA AND TSE

ARTICLE 1- SUBJECT

The subject of this protocol is related to establishment of a co-operation between Turkish Atomic Energy Authority (TAEA) and Turkish Standards Institute (TSE) for the "Development of Non-Destructive Test (TUR/87/016/B/01/18)" project activities defined in article 6 of this protocol.

ARTICLE 2- PARTIES

The parties in this protocol are Turkish Atomic Energy Authority (TAEA) and Turkish Standards Institute (TSE) which are shortly specified in the text as TAEA and TSE respectively.

ARTICLE 3- GENERAL

In the scope of "Development of Non-Destructive Test (NDT) in the Nuclear Research and Training centre of TAEA "project, supported by United Nations Development Programme (UNDP) and issued on Official Gazette no:19717 and dated 6 February 1988, followings are the immediate objectives:

- Introduction of a National Scheme for Qualification and Certification of NDT personnel in accordance with the current international practice based on ISO standard (ISO N35 E)
- Establishment of linkage with organizations operating in the field of Industrial Quality Control applied Non-Destructive Test (NDT) techniques.
- Incorporation of NDT usage capacity of TSE and other related institutions.
- Extension of the NDT certification programme benefits to cover personnel of these institutions.
- Recommendations on the setting-up of National Coordinating Body for NDT, comprised of representatives from TAEA, TSE and all other interested

organizations, in order to introduce a national scheme for the qualification and certification of NDT personnel.

ARTICLE 4- SUBJECT OF WORK

In the following subjects, the co-operation will be established between TAEA and TSE:

- Organization of a National Coordinating Body for NDT, comprised of representatives from TAEA; TSE and other interested organizations,
- Preparation of a National Standard for NDT personnel training, qualification and certification.
- Application of NDT techniques in the field of Industrial Quality Assurance and control,
- Use of the currently available NDT capacity
- Giving service as needed to TSE by TAEK laboratories
- Training of TSE personnel.

ARTICLE 5- PURPOSE

The application of NDT techniques properly, in equipment, construction and operation of industrial facilities, industrial production, repairing, import and export of produced products, and inspection and control, will provide increase in quality and reliability.

In our developing country, it is necessary to establish an appropriate national scheme for certification and qualification of NDT personnel.

In the framework of the national scheme, staff whose qualifications are developed in accordance with internationally acceptable standards and are able to use NDT techniques according to these standards, will be tried to employ by means of the project.

With this protocol, the subjects stated in article 4, will be tried to accomplish by the parties with the activities stated in article 6

ARTICLE 6- ACTIVITIES

6.1- In the scope of the NDT National Coordinating Body establishment, following activities will be carried out:

- The secretariat of the Body will be executed by TSE
- All other interested organizations in the Coordinating Body will be specified.

- The basis for the establishment of the Body will be determined.
- The meeting of the Body will be organized by getting informed the interested organizations.
- The duties and working methods of the Body will be specified.
- Feasibility studies for establishment of NDT coordinating Body will be prepared to submit to the Body and executive organizations for National certification will be determined.

6.2- TSE will prepare a Turkish Standard parallel to ISO N35E-(draft) standard for qualification and certification of NDT personnel and push to use of it.

6.3- In the project related subjects, joint seminar and meetings will be organized and both parties will provide each other for personnel and equipment as needed.

6.4- Joint-co-operation will be established in the subjects of TAEA's laboratories service to TSE and training of TSE personnel.

ARTICLE 7- ENFORCEMENT DATE

This protocol has been prepared as two copies and signed on 25 April 1988 and enforced on the date of signature.

TAEA and TSE are responsible for the protocol activities and guarantee this by their signatures.

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