PERSONNEL HIRING AND ORGANIZATION FROM THE ATTEMPTS MADE TO INTRODUCE A NUCLEAR PROGRAM IN TURKEY

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ELECTRICITY GENERATION CO.TURKEY
ABU DHABI, UNITED ARAB EMIRATES
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ELECTRICITY GENERATION CO.
TURKEY
FORMULATING A POLICY FOR A NPP ORGANIZATION

ISSUES ARE:

• CONSIDERING A NUCLEAR POWER PROGRAMME AS A NATIONAL ENERGY AND A NATIONAL DEVELOPMENT POLICY,
• ESTABLISHING LEGAL REQUIREMENTS AT THE NATIONAL LEVEL AND AT THE INTERNATIONAL LEVEL BY LAW,
• ESTABLISHING AN INDEPENDENT REGULATORY AUTHORITY (REGULATORY AUTHORITY BE CLEARLY SEPARATED FROM THE OPERATING ORGANIZATIONS),
• TAKING A DECISION UPON THE POWER RATE AND THE TYPE OF THE NUCLEAR POWER PLANT AND CONTRACTUAL APPROACH,
FORMULATING A POLICY FOR A NPP ORGANIZATION

- CHOICING OF FUEL FORM FOR PLANNING AND ESTABLISHING WHETHER A DOMESTIC FUEL SUPPLY AND FUEL PRODUCTION TECHNOLOGY,

- THE NEED FOR TRAINED PERSONNEL AND HOW THE TRAINING IS TO BE PROVIDED

- THE NEED TO GAIN PUBLIC AND POLITICAL ACCEPTANCE.
THE ORGANIZATIONAL PLAN AND STRUCTURE FOR A NUCLEAR POWER PLANT PROJECT MANAGEMENT

THE MAIN FACTORS ARE:

- AVAILABILITY OF QUALIFIED PROJECT MANAGEMENT PERSONNEL, AND CO-ORDINATING AND ENGINEERING PERSONNEL.
- EXISTING ENGINEERING AND INDUSTRIAL INFRASTRUCTURES IN THE COUNTRY.
- CAPABILITY TO BUILD LOCAL SUPPORTING INFRASTRUCTURE, INCLUDING LICENSING AUTHORITY,
- NUCLEAR FUEL HANDLING, O&M, RADIOACTIVE WASTE HANDLING/STORAGE AND DECOMMISSIONING.
- ABILITY TO SET AND RIGOROUSLY MAINTAIN A BIS PREPARATION AND BID EVALUATION.
- DOMESTIC PARTICIPATION.
ENTITIES INVOLVED IN THE NUCLEAR PROJECT AND THE NECESSARY PLANNING WORK AND CO-ORDINATION OF THE DIFFERENT FIELDS OF INTEREST

- GOVERNMENT DEPARTMENTS
- REGULATORY & INSPECTION AGENCIES
- ENGINEERING COMPANIES
- FINANCE INSTITUTIONS
- COMPONENTS MANUFACTURING
- CONSTRUCTION COMPANIES
- NSSS SUPPLIER
ENTITIES INVOLVED IN THE NUCLEAR PROJECT AND THE NECESSARY PLANNING WORK AND CO-ORDINATION OF THE DIFFERENT FIELDS OF INTEREST

- TG SUPPLIER
- FUEL SUPPLIER
- OPERATING UTILITY
- PROJECT AND CONSTRUCTION MANAGEMENT
- R&D ORGANIZATIONS
- UNIVERSITIES
- GENERAL PUBLIC
PLANNING WORK AND CO-ORDINATION

- The necessary planning work and co-ordination of the different fields of interest, will be done on a long term basis.
- This work can only be carried out successfully by the necessary staff.
- This personnel for all of the various areas of a nuclear programme must be recruited and trained, a process which can take many years.
- The universities or technical high schools would have play an important role in the education programme of those persons needed in the planning, licensing, engineering, operation and maintenance of the nuclear power plants.
THE OWNER OF A NUCLEAR POWER PLANT HAS THE FULL RESPONSIBILITY FOR THE NUCLEAR POWER PLANT PROJECT MANAGEMENT. THE OWNER/OPERATOR HAS TO ACCEPT HIS RESPONSIBILITIES WHICH CANNOT BE SHARED EITHER WITH THE PLANT DESIGNER OR CONSTRUCTOR OR WITH THE AUTHORITIES.

PERSONNEL DEVELOPMENT PROGRAMS SHOULD BE ESTABLISHED AT AN EARLY STAGE IN THE PREPARATIONS FOR PROJECT IMPLEMENTATION AND FOR POWER PLANT OPERATIONS AND MAINTENANCE.

THE EXACT PERSONNEL REQUIREMENTS WILL DEPEND UPON THE CONTRACTUAL ARRANGEMENTS FOR THE PROJECT.
RESPONSIBLE GROUPS IN THE NUCLEAR POWER PLANT PROJECT ITEMS

- PRELIMINARY FEASIBILITY
  POLICYMAKERS; PLANNERS, ECONOMISTS, ENG., EXECUTIVES
- PRE-PROJECT ACTIVITIES
  PROJ.GRP.LEADER; PLANNERS, ECONOMISTS, ENG., EXEC., E/A
- PROJECT IMPLEMENTATION
  PROJECT MANAGER; SENIOR MANAGER, ENGINEERS, E/A, TECHNICIANS CRAFTSMEN
- PLANT OPERATION
  STATION MANAGER; OPERATORS, MAINTAINERS, TECHNICAL SUPPORT, CONSULTANTS
MANPOWER REQUIREMENTS IN THE NUCLEAR POWER PLANT PROJECT ITEMS

- **PRE-PROJECT ACTIVITIES:** 25-35 PER.
- **PROJECT MANAGEMENT:** 50-60 PER. 8-12 TECH.
- **PROJECT RELATED ACTIVITIES**
  - **PLANT CONSTRUCTION:** 70-100 P, 280-400 T, 2,000 C
  - **QA/QC ENFORCEMENT:** 15-25 P, 10-15 T
- **PLANT OPERATION:** 40-55 P, 110-180 T, 20-35 CONS.
RESPONSIBLE GROUPS IN THE NUCLEAR POWER PLANT PROJECT ITEMS

- RESPONSIBLE GROUPS IN THE NUCLEAR POWER PLANT PROJECT ITEMS CHANGE TYPICALLY IN THE ALL PHASES.

- THEY NEED TIMELY TRAINING AND SUPPLY HIGHLY QUALIFIED MANPOWER

- A/E AND CONSULTANT(S) SET UP A DETAILED TRAINING PROGRAM THROUGH THE SUPPLY CONTRACT
WITHIN THE PLANNING PHASE

- PREPARE THE OVERALL FEASIBILITY STUDIES AND THE BID INVITATION SPECIFICATION (BIS) TO GET THE STRONG GOVERNMENT SUPPORT FOR THE NPP PROJECT.
- ESTABLISH A BASIC ORGANIZATIONAL UNIT WHICH IS IN CHARGE OF THE PREPARATION OF THE FEASIBILITY REPORT AND BIS.
- SELECT COMPETENT PERSONS FOR THIS UNIT.
WITHIN THE PLANNING PHASE

- THE INTERNAL STRUCTURE OF THIS UNIT: A PROJECT MANAGER, AN ASSISTANT PROJECT MANAGER AND A TEAM OF 15-25 COMPETENT PROFESSIONALS WITH EFFICIENT ADMINISTRATIVE SUPPORT.

- TO PREPARE BIS AND PROJECT IMPLEMENTATION NEED THE ASSISTANCE OF WELL QUALIFIED FOREIGN CONSULTANTS OR ARCHITECT/ENGINEERS (A/E). (CONSULTANTS OR A/E ALWAYS HAVE AN ADVISORY FUNCTION. AT THE SAME TIME THE OWNER FIRST HAS TO).
WITHIN THE PLANNING PHASE

ANY CONSULTANT FIRM SHALL NOT:

- BEING ONE OF THE CONSORTIUM MEMBERS OF THE POTENTIAL BIDDERS,
- HAVING PARTNERSHIP OF ANY CONSORTIUM MEMBER OF THE POTENTIAL BIDDERS,
- HAVING BUSINESS ENGAGEMENT TO PROVIDE CONSIDERABLE AMOUNT OF SERVICES OR WORK TO ANY CONSORTIUM MEMBERS OF POTENTIAL BIDDERS
CHOOSING THE STAFF WITHIN THE PLANNING PHASE

CHOOSE THE STAFF FOR THE ORGANIZATIONAL UNIT FROM TWO GROUPS:

1-PRACTICE-ORIENTED PROFESSIONALS WITH EXPERIENCE IN THE PREPARATION OF BID INVITATION SPECIFICATIONS FOR CONVENTIONAL THERMAL POWER PLANTS OR LARGE INDUSTRIAL PLANTS, AND

2-PERSONS WHO HAVE BEEN INVOLVED IN THE FEASIBILITY STUDY FOR THE NUCLEAR PROJECT AND WHO HAVE RECEIVED SPECIALIZED TRAINING IN SUBJECTS RELEVANT TO NUCLEAR POWER.
CHOOSING THE STAFF WITHIN THE PLANNING PHASE

THE CORE OF THE TEAM SHOULD PREFERABLY BE FORMED BY PERSON SELECTED FROM THE OWNER’S STAFF.

THE OVERALL EFFORT REQUIRED FOR PREPARING THE BIS FOR A NUCLEAR POWER PLANT UNDER A TURNKEY CONTRACT IS OF ORDER OF 10-20 PROFESSIONAL MAN-YEARS (INCLUDING THE BASIC TEAM AND OUTSIDE ASSISTANCE) AND

THE TIME NEEDED IS ABOUT 6-8 MONTHS.
MANPOWER DEVELOPMENT

ESSENTIAL CONDITIONS FOR QUALIFIED MANPOWER DEVELOPMENT:

• EARLY AND FULL AWARENESS OF THE NEED FOR MANPOWER,

• CAREFUL AND DETAILED PLANNING OF A MANPOWER DEVELOPMENT PROGRAM,

• EFFECTIVE IMPLEMENTATION OF THE PROGRAM,

• APPLICATION OF AN APPROPRIATE PERSONNEL MANAGEMENT POLICY.
A SUCCESSFUL IMPLEMENTATION OF A NUCLEAR POWER PROGRAM NOT FEASIBLE WITHOUT SUFFICIENT NATIONAL MANPOWER

MANPOWER DEVELOPMENT TO BE A LONG-TIME ACTIVITY THAT IS PROGRAM ORIENTED RATHER THAN PROJECT ORIENTED

A REASONABLE DEGREE OF OVER-STAFFING ADVISABLE IN CRITICAL AREAS

MEASURES TO BE TAKEN TO ENSURE THE AVAILABILITY OF SUFFICIENT NUMBERS OF THE QUALIFIED TECHNICIANS

NATIONAL UNIQUE CHARACTERISTICS TO BE TAKEN INTO ACCOUNT
MANPOWER REQUIREMENT

MANPOWER REQUIREMENT FOR PRE-PROJECT AND EARLY IMPLEMENTATION PHASE:

- ESTABLISHED RELATIVELY A SMALL PROJECT TEAM WHICH WAS RESPONSIBLE FOR VARIOUS STUDIES CARRIED OUT IN THE

- PRE-PROJECT ACTIVITIES

- THE TEAM CONSISTED OF SENIOR AND EXPERIENCED PLANNERS AND ENGINEERS WHO HAVE BEEN ENGAGED IN LARGE PROJECTS LIKE CONVENTIONAL POWER PLANT PROJECT
MANPOWER REQUIREMENT

- The team will be supplemented by a few nuclear experts who were familiar with nuclear reactor engineering and nuclear power systems.

- The size of this team is not very large (25 to 40 professionals), but is carefully selected and is of the highest available quality, competence and experience.

- The team represented the main core of the organization of the whole nuclear power program.
EDUCATION AND TRAINING

• SELF-STUDY

• PARTICIPATION IN IAEA TRAINING COURSES

• LEARNING FROM CONSULTANTS

• INTERNATIONAL COOPERATION
NUCLEAR ACTIVITIES IN TURKEY

• ESTABLISHMENT OF ATOMIC ENERGY COMMISSION (AEC) IN 1956, LATER REESTABLISHED AS THE TURKISH ATOMIC ENERGY AUTHORITY (TAEK)

• BECAME AN IAEA MEMBER STATE IN 1957

• ESTABLISHMENT TURKISH ELECTRICITY AUTHORITY (TEK) IN 1970

• ESTABLISHMENT NUCLEAR POWER PLANT DEPARTMENT IN TEK IN NOVEMBER 1971.
TURKISH ELECTRICITY GENERATION AND TRANSMISSION CO.

- BOARD OF DIRECTORS
  - BOARD OF SECRETARIAL OFFICE
    - GENERAL MANAGER
      - PRIVATE OFFICE
        - DEPUTY GENERAL MANAGER
          - DEPUTY GENERAL MANAGER
            - DEPUTY GENERAL MANAGER
              - DEPUTY GENERAL MANAGER
NUCLEAR POWER PLANT DEPARTMENT
IN APRIL 1981

HEAD

FIRST DEPUTY HEAD

SECRETARY

TECH DRAWING

SECOND DEPUTY HEAD

LIBRARY

SITE MANAGER A

SITE MANAGER B
NUCLEAR POWER PLANT DEPARTMENT ORGANIZATION IN APRIL 1981

- SECOND DEPUTY HEAD
  - ENVIRON. PROTECTION AND PUBLIC ENLIGHT. DIV.
  - SAFETY AND LICENCING DIV.
  - QUALITY ASSURANCE AND QUALITY CONTROL DIV.
NUCLEAR POWER PLANTS DEPARTMENT LATER 1981
NUCLEAR POWER PLANTS DEPARTMENT LATER 1981

PROJECT GROUP DIVISION
AKKUYU

DEP.PRO.GR.DV. PLANING&COORD.
DEP.PRO.GR.DV. CIVIL
DEP.PRO.GR.DV. MECHANIC
DEP.PRO.GR.DV. ELECTRIC
NUCLEAR POWER PLANTS DEPARTMENT LATER 1981

FIRST DEP. HEAD

ADM.AFF.DIV.
Commercial & Fin.
Docu. Archives, Coord.

PLAN.&COORD.DIV.
Bid Prep., Purchasing & Customs Aff.
Cost Analysis, Proj. Planning
Project Management

R&D DIV.
Geology & Sismo. Civil & Expropriation
Computer Services

FUEL DIV.
Prep. In-Core Fuel Manag.
Disposal Technology

ELEC.MECH.DIV.
Electromech., Electronic Aff.,
Control & Instr. Electric Facility
Mechanical Aff., Control & Measure

OPERATION DIV.
O&M Manpower Development,
Commissioning, Tests & Fuel Handl.
NUCLEAR POWER PLANTS DEPARTMENT LATER 1981

SECOND DEPUTY HEAD

ENV.PROTEC.&PUBLIC RELATION DIV.
External Hazards Anal.,
Public Rela.,Site Related Measures
Prepa.Env..Ass.Report

SAFETY & LICENSING DIV.
Licensing of a NPP,NPP Safety Analy.
Industrial Safety,

QA & QC DIVISION
Archives and Distribution Cont.
Prepa.QA&QC Manual
Statistical Analy.
THIRD DEPUTY HEAD

CONSTRUCTION DIVISION
Civil Affairs in Akkuyu Site, Constr. Temporary Office Buildings
Site Prepar., Facilities, Infrastructures
Access Roads, Harbour, Fences
ORGANIZATION DIAGRAM OF THE AKKUYU NPP PROJECT GROUP IN EARLY 1993
THE ORGANIZATION DIAGRAM OF THE AKKUYU NPP PROJECT IN 1997
NUCLEAR POWER PLANTS DEPARTMENT IN NPP PROJECT EXECUTION PHASE

- NPP DEPT. HEAD
  - DEPUTY HEAD
    - SECRETERIAL OFF.
    - COMPUTER OFF.
    - LEGAL ADVISOR
    - ADMINISTR. OFF.
    - AKKUYU SITE MAN.
    - SINOP NPP PROJ. DIV.
    - ENGINEERING DIV.
    - SAFETY & LIC. DIV.
    - QA & QC DIV.
    - OPE. & TRAINING DIV.
    - ECON. & COMM. DIV.
    - PUBLIC RELA. DIV.
INTRODUCTION

TURKEY HAS TRIED TO LAUNCH A NUCLEAR POWER PLANT PROJECT IN AKKUYU FOURTH TIMES, GIVE BRIEF INFORMATION ON THE TURKISH EXPERIENCES, LESSONS LEARNED AND THE SURROUNDING PROBLEMS OF THE FOUR ATTEMPTS ON THE BIDDING PROCESS AND SUMMARIZING PROBABLE FUTURE PROBLEMS
POLICY AND STRATEGY OF TURKEY

TURKEY IS STRONGLY LINKED EACH OTHER WITHOUT ANY DIFFERENCES

• PRODUCING, TRANSMITTING AND DISTRIBUTING ELECTRICITY TO CONSUMERS.

• INTERNATIONAL COMPETITIVE MARKET PRICES.

• IMPROVED ENERGY INDEPENDENCE

• SECURITY OF ELECTRICITY SUPPLY

• ENVIRONMENTAL PROTECTION
INTEGRATION OF THE NUCLEAR POWER PLANTS INTO THE GRID SYSTEM OF TURKEY WILL BRING THE FOLLOWING PROFITS:

• LONG-TERM RELIABILITY OF THE PLANT (AROUND 40 YEARS OF LIFE-TIME)

• INTRODUCING A DIVERSE FUEL INTO THE TURKISH ELECTRICITY PRODUCTION SYSTEM BESIDE FOSSILE FUELS LIKE COAL, NATURAL GAS AND FUEL-OIL.

• WITH ONLY ONE FUELLOADING, MONTHS OF RELIABLE OPERATION FROM THE ASPECT OF FUEL,

• DURING OPERATION, ENVIRONMENTAL FRIENDLY BEHAVIOUR OF THE PLANT.
SHORT, MEDIUM AND LONG-TERM NUCLEAR POLICY:

• ENERGY PURCHASING CONTRACT FOR THE BEGINNING,

• REALIZATION OF NUCLEAR PROJECTS IN “TURN-KEY” BASIS BY KNOW-HOW AND TECNOLOGY TRANSFER,

• IN THE SECOND PHASE, TO REALIZE NUCLEAR POWER PLANTS IN “PACKAGES” AUGMENTING INDIGENOUS SHARE,

• MAXIMIZING THE LOCAL SHARE AND MANAGING THE PROJECT ON “COMPONENT” BASIS.
TO BE SUCCESSFUL IN THE ABOVE STEPS,

KNOW-HOW AND TECHNOLOGY TRANSFER ARE OF HIGH IMPORTANCE.

TO GET ACQUINTED WITH NUCLEAR PROJECT MANAGEMENT METHODS AND RIGHT ORGANIZATIONAL STRUCTURE SHOULD BE REACHED AND APPLIED.

TO INCLUDE THE STRONG CONFORMITY TO ALL SIGNED TREATIES AND AGREEMENTS BY THE COUNTRY AND IN ADDITION,

TO RESPECT ALL SAFETY AND ENVIRONMENTAL STANDARDS ACCEPTED.
TURKEY HAS EXPERIENCED FOUR INTERNATIONAL BIDDINGS FOR AKKUYU PROJECT.

THESE TOOK PLACE IN YEARS:

• 1976-1980,
• 1983-1986
• 1993-2000
• 2008-2009
FEASIBILITY REPORTS

- **FIVE FEASIBILITY REPORTS HAVE BEEN PREPARED EXTENSIVELY ON THE FIRST NUCLEAR POWER PLANT PROJECT OF TURKEY WHICH WAS GOING TO BE REALIZED ON AKKUYU SITE.**


- **THE FEASIBILITY REPORTS HAVE BEEN PREPARED IN YEARS 1969 AND 1973 GENERALLY WITHOUT HAVING ANY SITE LICENCE BUT THE OTHERS CONSISTS OF SITE LICENCE.**
THE FIRST ATTEMPT : 1976-1980 PRESTUDY BEFORE BIDDING

BEFORE THE BIDDING ANNOUNCEMENT, TEAŞ’S (FORMERLY TEK) ISSUES WERE OVERCOMED:
STRUCTURING THE ORGANIZATIONS OF NUCLEAR POWER PLANTS DIVISION AND STAFFING IT,
TRAINING OF THE STAFF,
SELECTING A FOREIGN CONSULTANT PREPARATION OF THE BID SPECIFICATIONS,
SITE SELECTION AND OBTAINING THE SITE PERMIT,
BID EVALUATION AND CONTRACT NEGOTIATIONS TO OBTAIN THE REALIZATION OF THE CONTRACT
THE FIRST ATTEMPT: 1976-1980 MANPOWER DEVELOPMENT

TO STRUCTURE AND TO DEVELOPE MANPOWER AND THE ORGANIZATION OF THE NPP DIVISION:

- A NUMBER OF HIGHLY QUALIFIED TECHNICAL TURKISH STAFF WAS INVITED FROM ABROAD,
- AN EFFECTIVE TECHNICAL TRAINING PROGRAM WAS APPLIED ON THE REST OF THE STAFF,
- THE TRAINING WAS REALIZED WITH THE HELP OF THE UNIVERSITIES IN TURKEY INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA), ELECTRICITE DE FRANCE (EDF) AND KRAFTWERK UNION (KWU) EITHER AS COURSES OR ON THE JOB TRAINING
PREPARATION OF THE BID SPECIFICATIONS

AN ENGINEERING CONSORTIUM COMPOSED OF FOUR COMPANIES UNDER THE LEATHERSHIP OF SUISELECTRA FROM SWITHZERLAND,
*GAAA-LATER NOVATOME-(FRANCE),
*EMCH-BERGER ( SWITZERLAND
*BASSLER-HOFFMANN ( SWITZERLAND)
WAS ENGAGED INTO THE PROJECT.

THIS CONSORTIUM HAS PREPARED THE BID SPECIFICATIONS UNDER CLOSE COLLABORATION OF TEK’ PERSONNEL.

A SET OF VOLUMES CREDITED INTERNATIONALLY FOR A “PACKAGE TYPE” BIDDING WAS READY
THE FIRST ATTEMPT: 1976-1980 SITE SELECTION

- A number of site locations were considered at the beginning,
- Akkuyu location was selected,
- Environmental investigations; seismic, tectonic, geologic, meteorological, hydrological, socio-economic and others have been completed by Turkish governmental institutions, universities and by the consortium’s technical staff as well as the personnel of Nuclear Power Plants Division,
- The application including the reports were found satisfactory by TAEK,
- The site permit was granted on 11th June 1976.
BID EVALUATION AND CONTRACT NEGOTIATIONS

THE INTERNATIONAL BIDDING WAS ON THE BASIS OF PACKAGES CONSISTING OF:

- NUCLEAR ISLAND WITH THE FIRST FUEL LOADING,
- TURBINE–GENERATOR AND BALANCE OF PLANTS INCLUDING THE SWICHGEAR.
- PACKAGES FOR CIVIL WORKS AND LONG-TERM FUEL SUPPLY WERE LEFT FOR THE CONSEQUENT BIDDINGS.

THIS TYPE OF BIDDING’S AIM WAS MAXIMIZE THE LOCAL SUPPLY WITH MAXIMUM TECHNOLOGY TRANSFER EFFORTS.
BIDDING WAS MADE IN 1977, SELECTED FIRMS ARE:

- ASEA ATOM, FOR THE NUCLEAR ISLAND AND ELECTRO-MECHANICAL SYSTEMS,
- STAL-LAVAL FOR THE TURBINE-GENERATOR AND BALANCE OF PLANT
- SPIE-BATIGNOLL FOR CIVIL WORKS (DURING NEGOTIATION).

DISCUSSIONS WERE HELD WITH EACH OF THESE COMPANIES SEPARATELY WITH THE GENERAL ATTENDANCE OF THE ENGINEERING CONSORTIUM MEMBERS ON DIFFERENT DISCIPLINES
MAJOR DIFFICULTIES DURING CONTRACT NEGOTIATIONS

MAJOR DIFFICULTIES:

- THE LIMITED EXPERIENCE OF THE DIVISION’S STAFF ON A BIG SCALE NUCLEAR PROJECT CONTRACT REALIZATION,
- HIGH-LEVEL BUREAUCRATICAL AND POLITICAL ANXIETIES ON THE PROJECT
- 100% FINANCE REQUIREMENT OF TURKISH GOVERNMENT

APPROVAL OF THE CONTRACT COULD NOT TAKE PLACE UNTIL SEPTEMBER 1980 AND DISCUSSIONS CEASED TO CONTINUE AFTER 12TH SEPTEMBER 1980 MILITARY ACTION.
GAINED EXPERIENCE DURING NEGOTIATION

- SELECTING AKKUYU SITE AND OBTAINING THE SITE PERMIT,

- TRAINED STAFF TO PREPARE THE BID SPECIFICATIONS, TO HANDLE THE EVALUATIONS AND PROCEED IN CONTRACT NEGOTIATIONS,

- GENERAL INFORMATION ACCUMULATION ON NUCLEAR POWER PLANT PROJECTS.
THE SECOND ATTEMPT: 1983-1986

PREPARATION OF BID SPECIFICATIONS BY THE DIVISION’S STAFF ON TURN-KEY BASIS,

OPENING AN INTERNATIONAL BIDDING,

RECEIVING OFFERS FROM SEVEN BIDDERS,

DELIVERANCE OF LETTER OF INTENDS TO:
- AECL(CANADA), 665 MWe, AKKUYU
- KWU(GERMANY), 990 MWe, AKKUYU
- GE(USA), 1185 MWe, SINOP
THE SECOND ATTEMPT: 1983-1986

UNTIL 30TH AUGUST 1984 THE GREAT MAJORITY OF CONTRACT SCOPE WERE FINALIZED WITH BOTH AECL AND KWU.

BOTH COMPANIES HAVE BROUGHT THE FULL AMOUNT OF CREDITS FOR EXPORTS AND ADVANCE PAYMENT WITH A PART OF THE CREDIT NECESSARY FOR LOCAL EXPENDITURES.


BEGINNING OF YEAR 1986 DISCUSSION COLLAPSED DUE TO:
- FINANCIAL STATE GUARANTEES AND
- PARTLY THE CHERNOBYL ACCIDENT
THE SECOND ATTEMPT: 1983-1986
EXPERIENCE GAINED BY TURKEY

THE CAPABILITY OF PREPARATION OF BID SPECIFICATIONS FOR A NUCLEAR POWER PLANT ON TURN-KEY BASIS,

THE EXPERIENCES OF FORMING AND FINALIZING THE CONTRACT AND ITS ANNEXES BOTH IN CONVENTIONAL AND BOT MODELS,

FORMING THE STRUCTURE OF ORGANIZATION FOR BOT MODEL BEING THE FIRST TIME ON THE WORLD FOR SUCH A BIG SCALE PROJECT.
DISTURBING THE ADVANCE OF THIS PROJECT:

- CHANGING THE CONTRACT APPROACH COMPLETELY FROM CONVENTIONAL TO BOT MODEL.
- TO CHANGE THE CONTRACT APPROACH AND MODEL WAS THE MOST RISKY ACTION DURING NEGOTIATIONS CAUSING A DEFINITE NEGATIVE EFFECT ON EFFORTS.

MOREVER IF THE BOT MODEL WAS INTRODUCED AT THE VERY BEGINNING BEFORE INTERNATIONAL BIDDING ANNOUNCEMENT OR WITH LETTERS OF INTEND, THE SUPPLIERS MIGHT BRING SOUND SOLUTIONS TOGETHER WITH TEK TO GO ON.
THE THIRD ATTEMPT: 1993-2000

REFRESHED TEAŞ NUCLEAR PROGRAM,
STARTED BY INTEGRATING THE AKKUYU PROJECT INTO THE FIVE YEARS INVESTMENT PLAN IN 1993,
SELECTED KAERI AND GAMB, KOREAN AND TURKISH ENGINEERING COMPANIES,

- TO PREPARE A GENERAL REPORT ON WORLD’S NUCLEAR SITUATION AND RECOMMENDATIONS FOR REALIZATION OF AKKUYU PROJECT
- TO PREPARE BID SPECIFICATIONS BY USING THE ONE USED FOR 1983 TURN-KEY BIDDING
- AN INTERNATIONAL BIDDING WITH 100% FINANCE PRE-CONDITION OPEN TO ALL TYPES WAS ANNOUNCED ON 17TH DECEMBER 1996.
THE THIRD ATTEMPT: 1993-2000
STEPS OF THE AKKUYU NPP PROJECT

RECEIVING THE OFFERS ON 15TH OCTOBER 1997 FROM

- AECL(CANADA),
- NPI(FRENCH-GERMAN)
- WESTINGHOUSE(USA)

SELECTING ANOTHER CONSULTANT, EMPRESARIOS AGRUPADOS (EA) (SPAIN) AND THEIR SUBCONTRACTOR SERDULA SYSTEM.CO.(CANADA), 09 FEBRUARY, 1998

STARTING TECHNICAL EVALUATION ON MARCH 1998

START OF POSTPONES ON 15TH OCTOBER 1998

FINALIZED BOTH TECHNICAL AND ADMINISTRATIVE, COMMERTIAL AND ECONOMICAL EVALUATIONS BY TEAŞ’S EVALUATION COMMITTEE ON MAY 1999.

SUSPENDED THE PROJECT FOR AKKUYU ON 24TH JULY 2000.
THE FOURTH ATTEMPT: 2008-2009
STEPS OF THE AKKUYU NPP PROJECT

- ENERGY PURCHASING CONTRACT TO BE EXECUTED BETWEEN THE CONTRACTING ENTITY AND THE CONTRACTOR.
BIDDERS, ORGANIZATIONS AND QA IN BID EVALUATION

BID EVALUATION
<table>
<thead>
<tr>
<th>CONSORTIUM</th>
<th>MEMBERS OF CONSORTIUM</th>
<th>BIDS</th>
<th>NET OUTPUT MWE</th>
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</thead>
<tbody>
<tr>
<td>NPI</td>
<td>Siemens, Framatom</td>
<td>Alternative I (Main Bid)</td>
<td>1482 (Single Unit)</td>
</tr>
<tr>
<td></td>
<td>Gec Alsthom, Camponen Bernard, Garanti-Koza A.Ş. (Turkish), Tekfen A.Ş. (Turkish)</td>
<td>Alternative II</td>
<td>2964 (Two Units)</td>
</tr>
<tr>
<td>AECL</td>
<td>AECL, Hitachi, Gama (Turkish), Güriş (Turkish), Bayındır (Turkish)</td>
<td>Alternative I (Main Bid)</td>
<td>1339 (Two Units)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alternative II</td>
<td>2678 (Four Units)</td>
</tr>
<tr>
<td>W</td>
<td>Mitsubishi Heavy Ind. Ltd., Westinghouse, Raytheon Eng., Mitsubishi Corp.</td>
<td>Alternative I (Main Bid)</td>
<td>1218 (Single Unit)</td>
</tr>
<tr>
<td></td>
<td>Nominated: Subcontractors: Duke Eng., Enka İnş. (Turkish), Günal Const. (Turkish)</td>
<td>Alternative II</td>
<td>2436 (Two Units)</td>
</tr>
</tbody>
</table>
BID EVALUATION PROCESS

- SUBMISSION OF BIDS
  - TECHN. BID EVAL. INCLUDING FUEL EVAL.
  - COMMERCIAL&CONTRACTUAL AND FINANCIAL BID EVAL.
  - TOTAL CAPITAL INVESTMENT COSTS
  - LEVELIZED GENERATION COSTS
  - ELECTRICITY GENERATION
  - ECONOMIC RANKING OF BIDS
  - QUALITATIVE EVALUATION
  - FUEL COSTS
  - O&M COSTS
THE SCHEMATIC DIAGRAM FOR ORGANIZATIONAL SET-UP
OF THE BID EVALUATION IN TEAŞ

- TEAŞ HEAD OF NPP DEPARTMENT
- TEAŞ HEAD OF EVALUATION COMMITTEE
- TEAŞ DEPUTY HEAD FOR TECHNICAL EVALUATION
- TEAŞ DEPUTY HEAD FOR ADMI.&COMM.AND ECO.EVAL.
- COMMITTEE FOR TECHNICAL EVALUA.
  - NUCLEAR ISLAND
  - TURBINE ISLAND AND BOP
  - ELECTRICAL& AUTOMATION
  - CIVIL WORKS & ARCHITECT
  - ENVIRONMENTAL MATTERS
- FUEL EVALUATION
THE OTHER EVALUATION GROUPS

- TURKISH ATOMIC ENERGY AUTHORITY (TAEK); NUCLEAR SAFETY AND LICENCING
- INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA); NUCLEAR SAFETY AND LICENCING
- CONSULTANCY GROUP (EA-SERDULA SYST.); TECHNICAL, O&M AND FUEL
- KAERI CONSULTING COMPANY; TECHNICAL AND FUEL FOR PHWR
- ELTEM-TEK (TURKISH CONSULTANCY GRP.); TECHNICAL
- TWO TURKISH PROFESSORS; ONE OF THEM IS ADVISOR FOR MINISTRY OF ENERGY AND THE OTHER ONE IS ADVISOR FOR GENERAL MANAGER OF TEAŞ; RESPONSIBLE AND ENABLE TO CARRY OUT THE WHOLE BID EVALUATION PROCESS
DIAGRAM OF THE COMPLETE BID PROCESS FOR A NPP

PREPARATION OF BIDS

DISTRIBUTION OF BIS TO SUPPLIER(S)

PREPARATION OF BIDS

TECHNICAL BID INCL. FUEL

FINANCIAL AND COMMER. BIDS

TECH. BID EVAL.

FINANS & ECONO. EVAL.

RANKING OF PREFERRED BIDS

RANKING OF PREFERRED BIDS

EVAL. OF THE DIFFERENT REPORTS

RECOMMENDATION FOR FINAL DECISIONS

POLITICAL & ECON. GOALS

OTHER ASPECTS

FINAL SELECTION OF PREFERRED BID
INTERFACE DIAGRAM OF THE ECONOMIC BID EVALUATION

SUBMISSION OF COM.BIDS

CHECK THE BIDS FOR COMPLIANCE IN ACORDANCE WITH THE BIS

BASE COSTS AND SUPPLEMENTARY COSTS OF OFFERED S.S.

EVAL. OF ECO. PARAMETERS
- Project time, Economic life, Escal.
- Discount rate, Exchange rate, Com.
- Ope. Date, Payment plan, IDC

EVAL. OF FINANCIAL PARAM.
- Source of financing, Financ. conditions,
- Leasing, Joint venture

EVAL. OF CONTRACTUAL TOC
- Price adjustment formula, Contract structure and content

ECONOMIC ADJUSTMENTS

BOP AND FUEL CYCLE COSTS

OWNER'S COSTS AND O&M COSTS

TOTAL PLANT COSTS
- LDEGC

SENSIVITY ANALYSIS

TOTAL PLANT COSTS BAND
- INCL. THE EFFECT OF RISKS
- LDEGC BAND
CHOOSING THE STAFF IN THE EVALUATION PHASE

- TO BE EQUITABLE IN THE EVALUATION PROCEDURE
  - TO RESPECT ABSOLUTELY THE BID SPECIFICATIONS,
  - TO APPROACH TO THE BID OF EACH OF THE BIDDERS BY PRESERVING THE OBJECTIVITY IN THE EVALUATION PROCEDURE,
  - TO ATTRIBUTE TO EACH BID ITS DUE,
  - NOT TO PERMIT ANY BID TO BE UNJUSTLY FAVORED WITH RESPECT TO THE OTHERS BY THE MEANS OF TRICKS OR RUSES.
WORK BREAKDOWN AND BASIC RESPONSIBILITIES OF GROUPS INVOLVED IN THE BID EVALUATION

THE EVALUATION COMMITTEE COMPRISING OF:

- TECHNICAL EVALUATION COMMITTEE
- ADMINISTRATIVE, COMMERCIAL AND ECONOMICAL EVALUATION COMMITTEE

THE MEMBERS OF THE EVALUATION COMMITTEE NOMINATED BY THE BOARD OF DIRECTORS OF TEAŞ,
THE HEAD OF NPPD CAN AT THE SAME TIME BE NOMINATED AS THE HEAD OF EVALUATION COMMITTEE,
THE DEPUTY HEADS FOR TECHNICAL AND ADMINISTRATIVE, COMMERCIAL AND ECONOMICAL COMMITTEES (ONE OF EACH) SELECTED THE BOARD OF DIRECTORS OF TEAŞ.
WORK BREAKDOWN AND BASIC RESPONSIBILITIES OF GROUPS INVOLVED IN THE BID EVALUATION

- THE ENGINEERS RESPONSIBLE FOR CARRYING OUT THE DETAILED BID EVALUATION HAVE A GOOD WORKING KNOWLEDGE OF ENGLISH.

- COMMENTS GIVEN UP SHOULD PREFERABLY BE IN THE ENGLISH LANGUAGE.

- EFFORT OF THE OWNER AND CONSULTANT COMPANY SHOULD PERFORM EQUITY IN THEIR RESPONSIBILITIES AND NOT TO FAVOR SUBJECTIVELY ONE OF THE BIDDERS.
WORK BREAKDOWN AND BASIC RESPONSIBILITIES OF GROUPS INVOLVED IN THE BID EVALUATION

- DURING EVALUATION PERIOD, ONCE IN EVERY TWO WEEKS, COORDINATION MEETINGS BETWEEN TECHNICAL AND ADMINISTRATIVE, COMMERCIAL AND ECONOMICAL COMMITTEES HELD FOR INFORMATION EXCHANGE.

- STATUS REPORT PREPARED BY EACH GROUP SUBMITTED TO THESE MEETINGS AND ALL THESE MATTERS KEPT IN WRITTEN DOCUMENTS AS “MINUTES OF MEETING”.

- MEETING AGENDA FIXED AT LEAST ONE DAY BEFORE BY BOTH DEPUTY HEADS OF THE TWO COMMITTEES.
PERFORMING THE TECHNICAL EVALUATION EVALUATION GROUPS

- TEAŞ’S STAFF, ELTEM-TEK, KAERI, IAEA, TAEK AND ADVISORS (TWO PROFESSORS) INVOLVED IN EVALUATION PROCESS

- IAEA GROUP IS CONTRIBUTING ON SAFETY AND LICENCING ASPECTS,

- OTHER TECHNICAL OR ECONOMIC MATTERS AS DEEMED NECESSARY BY TEAŞ DEPARTMENTS,

- TAEK GROUP ON SAFETY AND LICENCING,

- THE FOREIGN CONSULTING ENGINEERING COMPANY ON THE TECHNICAL ASPECTS (EA+SERDULA SYSTEMS),
EXECUTIVE SUMMARY OF THE TECHNICAL EVALUATION REPORT PREPARED BY THE FOREIGN CONSULTING ENGINEERING COMPANY’S GROUP TRANSLATED INTO TURKISH.

FINAL TECHNICAL REPORT WITH FINAL COMMENTS OF TEAŞ GROUP SUBMITTED TO THE HEAD OF THE EVALUATION COMMITTEE BEING THE FINALIZED “TECHNICAL EVALUATION REPORT”.

PHYSICAL SEPARATION AMONG TEAŞ, TAEK AND CONSULTANCY GROUPS UTILIZED DURING TECHNICAL EVALUATION FOR NOT GIVING AN ADVERSE AFFECT ON THE HEALTH OF EVALUATION.

ASKING QUESTIONS TO FOREIGN CONSULTING ENGINEERING COMPANY’S GROUP MEMBERS BY TEAŞ STAFF PERMITTED.
ADMINISTRATIVE, COMMERCIAL AND ECONOMICAL EVALUATION SHALL BE AS FOLLOWS:

TOGETHER WITH BID SPECIFICATIONS AND SUBMITTED BID DOCUMENTS, THE TECHNICAL EVALUATION REPORT AND ITS ATTACHMENTS COMPRISED THE REFERENCE INPUT DOCUMENTS FOR ADMINISTRATIVE, COMMERCIAL AND ECONOMICAL EVALUATION.


FINALLY, THE OUTFORING DOCUMENTS WOULD BE THE “ECONOMIC EVALUATION REPORT” WHICH WAS SUBMITTED TO THE VIEW OF THE HEAD OF NUCLEAR POWER PLANT DEPARTMENT
THE LAST STEP IN EVALUATION PROCESS IS THE “FINAL EVALUATION” STEP:

- THE BASIC REFERENCE DOCUMENT FOR PERFORMING THIS EVALUATION STEP WAS THE “ADMINISTRATIVE, COMMERCIAL AND ECONOMIC EVALUATION REPORT” WHEREAS THE BID SPECIFICATIONS AND SUBMITTED BID DOCUMENTS TOGETHER WITH THE “TECHNICAL EVALUATION REPORT” CAN ALSO BE USED AS QUICK REFERENCES.

- THE FINAL EVALUATION PERFORMED BY THE HEAD OF EVALUATION COMMITTEE, DEPUTY HEADS OF TECHNICAL AND ADMINISTRATIVE, COMMERCIAL AND ECONOMIC EVALUATION COMMITTEES AND MEMBERS OF THE EVALUATION GROUP.
PREPARATION OF THE FINAL EVALUATION REPORT


- THE BASIC CONTENTS OF TECHNICAL EVALUATION REPORT, ADMINISTRATIVE, COMMERCIAL AND ECONOMICAL EVALUATION REPORT, AND FINAL EVALUATION REPORT ARE GIVEN IN AN ADMINISTRATIVE PROCEDURES APPLIED IN TEAŞ.
THE DISCIPLINES OF GROUPS WHICH WILL BE INVOLVED IN THE EVALUATION (EXCEPT TEAŞ)

THE DISCIPLINES OF FOREIGN CONSULTANT ENGINEERING COMPANY’S GROUP IS STATED BELOW:

1. EXPERT FOR NUCLEAR ISLAND (ALSO PROJECT MANAGER) INCLUDING NSSS, SAFETY, CONTAINMENT,
1. EXPERT FOR NUCLEAR BALANCE OF PLANT SYSTEMS INCLUDING NUCLEAR AUXILIARY SYSTEMS AND WASTE SYSTEMS.
1. EXPERT FOR TURBINE ISLAND INCLUDING CONVENTIONAL AUXILIARY SYSTEMS,
1. EXPERT FOR INSTRUMENTATION AND CONTROL SYSTEMS,
1. EXPERT FOR ELECTRICAL SYSTEMS,
1. EXPERT FOR NUCLEAR FUEL
1. EXPERT FOR ECONOMICS,
1. LEGAL ADVISOR.
THE DISCIPLINES OF GROUPS WHICH WILL BE INVOLVED IN THE EVALUATION (EXCEPT TEAŞ)

FOR ELTEM-TEK CONSULTING THE STAFF WILL BE COMPRISED OF:
1  EXPERT FOR NUCLEAR ISLAND
1  EXPERT FOR INSTRUMENT AND CONTROL SYSTEMS
1  ARCHITECT FOR CIVIL WORKS
1  EXPERT FOR ENVIRONMENTAL MATTERS.
THE STAFF OF TAEK WILL BE COMPRISED OF:
2  EXPERTS FOR NUCLEAR ISLAND
1  EXPERT FOR NUCLEAR SAFETY
1  EXPERT FOR LICENCING
3  IAEA EXPERTS FOR SAFETY AND LICENCING
CONCLUSIONS FOR THE FOUR ATTEMPTS
EXPERIENCE GAINED BY TURKEY

- SITE SELECTION CAPABILITY. THERE IS ONE SITE ALREADY HAVING THE SITE PERMIT.

- EXPERIENCED STAFF TO PREPARE THE BID SPECIFICATIONS BOTH IN PACKAGE-VICE, IN TURN-KEY AND IN PURCHASING ELECTRICITY BASIS.

- TECHNICAL, ADMINISTRATIVE, COMMERCIAL AND ECONOMICAL EVALUATION EXPERIENCE.

- CAPABILITY OF CARRYING OUT CONTRACT NEGOTIATIONS, AND PREPARATION OF CONTRACT DOCUMENTS IN PACKAGE-VICE, IN TURN-KEY BASIS AND IN PURCHASING ELECTRICITY FOR CONVENTIONAL TYPE CONTRACT.
CONCLUSIONS FOR THE FOUR ATTEMPTS EXPERIENCE GAINED BY TURKEY

- EXPERIENCE IN BUILT-OPERATE-TRANSFER TYPE CONTRACT NEGOTIATIONS.
- TRAINED AND EXPERIENCED TECHNICAL STAFF TO START AND CARRY THE PROJECT
- DEVELOPED HER OWN NUCLEAR REGULATORY REQUIREMENTS.
- SIGNED BILATERAL NUCLEAR AGREEMENTS BETWEEN TURKEY AND NUCLEAR MATERIAL EQUIPMENTS SUPPLIERS’ COUNTRY.
- PUBLIC ACCEPTANCE TO THE TARGET PEOPLE
CONCLUSIONS FOR THE FOUR ATTEMPTS
LOSSES FOR COUNTRY

- THE NUCLEAR PROGRAM COULD NOT START EFFECTIVELY ALTHOUGH THERE HAVE BEEN FOUR ATTEMPTS,
- TURKEY HAS LOST SOME OF HER INDUSTRIAL PRODUCTION CAPACITY FROM TIME TO TIME BECAUSE OF ELECTRICITY INSUFFICIENCY,
- KNOW-HOW AND TECHNOLOGY TRANSFER IN HIGH AMOUNTS HAVE BEEN DISRUPTED SINCE THE PROJECT COULD NOT BE STARTED,
- INVESTED MONEY ON THE SITE AND ON THE STAFF HAVE PARTLY BEEN LOST,
- LAST BUT NOT THE LEAST, THE ENERGY PROBLEM OF THE COUNTRY IS STILL IN THE AGENDA AND SEEMS TO CONTINUE.
CONCLUSIONS FOR THE FOUR ATTEMPTS

LOSSES FOR COUNTRY

- LOSTED ENERGY AMOUNT TO BE PRODUCED DURING THE FOUR ATTEMPTS ON THE BIDDING PROCESS FOR FOURTY YEARS OPERATION PERIOD AND

- LOSTED ENERGY PROFIT OR IMPORTING THIS MUCH ENERGY PAYMENTS
CONCLUSIONS

WHEN THE DECISION WILL BE TAKEN TO PREFER ONE OF THE BIDDERS, IT WILL BE THE DAY OF RIGHT ECONOMICAL CONDITIONS FOR BOTH THE PROJECT AND THE TURKISH ECONOMY.
THANKS FOR YOUR PARTICIPATION