

Arman Behin Sanat Eng. Co.
(ABS)

COMPANY PROFILE

Arman Behin Sanat Company (ABS Eng. Co.) was founded at 2001 in as an engineering group with capacity of working in the field of Engineering, Procurement and Construction of industrial projects, especially in Power and Petrochemical Plants. **ABS has been qualified by Iran Management and Planning Organization in fields Industry and Utilities/Equipment.**

A) GENERAL INFORMATION:

1) Company Name: **Arman Behin Sanat Compnay**

2) EPC Activities

Civil

y

Mechanical

y

Electrical / I&C

y

Insulation

y

Painting

y

3) Completed Addresses:

- Head Office: **4th floor, No.25, Poonak Bakhtari Blvd., Shahrake Gharb, Tehran**
- Phone / Fax: **0098-21-88097573, 88578177-9**
- Legal Dept. **As above**
- Commercial Dept. **As above**
- E-Mail - info@absengco.com

4) Legal Form - **Registered No. 178915** **Capital: 100,000,000 Rls**

B) ACTIVITIES

Our team can provide their services in EPC form for the following systems which are most usual in following fields:

SYSTEMS LIST:

- 1- CHEMICAL INJECTION SYSTEM
- 2- GLYCOL INJECTION SYSTEM
- 3- DIESEL OIL SYSTEM
- 4- HYDRAULIC POWER SYSTEM
- 5- COMPRESSED AIR SYSTEM
- 6- ELECTRICAL POWER GENERATION SYSTEM
- 7- SERVICE SEA WATER SERVICE SYSTEM
- 8- FRESH WATER SYSTEM
- 9- OPEN DRAIN SYSTEM
- 10- CLOSED DRAIN SYSTEM
- 11- OILY WATER TREATMENT SYSTEM
- 12- SANITARY WATER TREATMENT SYSTEM
- 13- NITROGEN SYSTEM
- 14- **HVAC and Plumbing System**
- 15- FIRE AND GAS DETECTION SYSTEM
- 16- NAVIGATION AIDS SYSTEM
- 17- WATER/FOAM FIREFIGHTING SYSTEM
- 18- DRY CHEMICALS FIREFIGHTING SYSTEM
- 19- UPS & DC POWER SYSTEM
- 20- ELECTRIC POWER DISTRIBUTION SYSTEM
- 21- LIGHTING SYSTEM
- 22- LIGHTNING SYSTEM
- 23- AUXILIARY BOILER AND AUXILIARY STEAM SYSTEM

EXECUTION PROCEDURE:

We will provide our engineering services as the following procedure considering requirements of each project. These steps can change according to actual needs of project.

1-ENGINEERING STEP

1-1- Receiving of the PFD, P&ID, PLOT PLAN, System Description, Basic design, General Layout and Reference Standards List from client. And review of them.

1-2- MECHANICAL SECTION:

1-2-1- Preparation of piping & equipment arrangement drawing.

- 1-2-2- Isometric drawings.
- 1-2-3- piping layout drawing.
- 1-2-4- As built drawings.
- 1-2-5- HVAC calculation and hydraulic calculation for piping.
- 1-2-6- Preparation of equipment list.
- 1-2-7- Preparation of specification and Material Requisition for Mech. Equipment that will be issue for Bid stage.
- 1-2-8- Support design for piping and equipment.
- 1-2-9- Preparation of M.T.O. for Piping (i.e. fitting, pipes, valves)
- 1-2-10- Preparation of M.T.O. for Insulation.
- 1-2-11- Preparation of M.T.O. for Painting.
- 1-2-12- Evaluation of vendors offers.

1-3- ELECTRICAL SECTION :

- 1-3-1- Finalizing of single line diagrams.
- 1-3-2- Design and preparation of diagrams for distribution panels/MCC.
- 1-3-3- Design and preparation of lighting system for buildings and outdoor area.
- 1-3-4- Preparation of specification and Material Requisition in Bid stage for Cables, electric panels, cable trays & ladders, conduits, junction box, cable accessories such as lugs, cable shoes,.....
- 1-3-5- Preparation of Cable Trays arrangement drawings.
- 1-3-6- Preparation of M.T.O. for electrical section.
- 1-3-7- Evaluation of Vendor offers.

1-4- INSTRUMENT & CONTROL SECTION :

- 1-4-1- Finalizing of P&I Diagrams.
- 1-4-2- Preparation of logic diagrams.
- 1-4-3- Preparation of cable trays arrangement drawings.
- 1-4-4- Preparation of specification for I&C cables.
- 1-4-5- Preparation of junction box specification.
- 1-4-6- Preparation of instrument list.
- 1-4-7- Preparation of cable list.
- 1-4-8- Preparation of conduits specification.
- 1-4-9- Preparation of hook up diagrams.
- 1-4-10- Preparation of M.T.O. for instrumentation.
- 1-4-11- Preparation of data sheets for instrumentations.
- 1-4-12- Preparation of Material Requisitions for above mentioned items.
- 1-4-13- Evaluation of vendor offers for I&C system.

2- PROCUREMENT STEP

- 2-1- Vendor evaluation and visit of vendor shop or site.
- 2-2- Inquiry from vendors for material requisitions.
- 2-3- Collection of technical offers and submission to Engineering Department for technical evaluation.

-
- 2-4- Evaluation of commercial offers and negotiation for commercial points such as time schedule, delivery time, payment conditions, delivery points, PBG,APG and etc.
 - 2-5- Preparation of vendors comparison tables and selection of contractors.
 - 2-6- Preparation of contracts.
 - 2-7- Expediting of contract for following items
 - Time Schedule
 - Test procedure and inspection
 - Expediting of contracts in site/shop.
 - Preparation of progress reports, critical issues and pending issues and arrangement of meeting with contractors, client and consultant for solving of problems.
 - Packing list
 - Shipment
 - Accounting of contracts.
 - Evaluation of contractors invoices.

3- CONSTRUCTION AND ERECTION STEP

- 3-1- Erection of mechanical equipment such as pump, vessels, expansion bolts and etc.
- 3-2- Erection of piping and pipe supports.
- 3-3- Erection of electrical components such as cables, cable trays and ladders, cable accessories, wiring, electrical panels, lighting materials, Earthing system and etc.
- 3-4- Erection of Instruments and instrument fitting.

C) QUALITY CONTROL & GENERAL CONSTRUCTION EXECUTION PLAN

- 1) General Construction Execution Plan
- 2) Quality Assurance & Control Plan (Not attached)

GENERAL CONSTRUCTION EXECUTION PLAN

GENERAL

Scope of this document is to provide a general information relevant to ABS construction's approach to the typical normally included in the construction contractor scope of work.

ABS Construction site organization is conceived so that each construction activity can be managed and subcontracted work are under strict control and supervision.

Quality, time schedule and client's satisfactions are ABS Construction goals in taking part in a project.

SITE ORGANIZATION

Site organization can be divided into the following areas of responsibility:

Construction

The overall project responsibility is entrusted to the project manager who runs the project from the site office.

The construction, however, is direct responsibility of the site manager that, through the construction superintendent, keeps it under his direct control. Furthermore site manager is appointed to keep every-day relations with the client's representative.

Management and maintenance of equipment and site facilities, which are strictly related to construction, are under construction superintendent's control supported in the supervision by the area superintendents.

Technical services

Site organization is conceived to afford and solve all technical problems that might arise during project execution. The technical staff guarantees all the services needed for a qualified and satisfactory performance. The following areas of responsibility can be identified:

Technical office engineers and draftsmen are responsible, supported by home office Technical Department, for:

- Revision of construction drawings;
- Detail engineering works and technical studies;
- As built drawings.

Planning and cost control will be managed by home office technical department and is in charge for the field engineering control procedure and monitoring of man-hours during work execution.

He is responsible for project manpower workload planning, physical progress control and rescheduling of construction activities. He is supported in his specific software.

Quality control manager ensures that the executed work complies with ABS construction's quality manual and with the requested quality standard. He reports directly to home office quality assurance.

Safety engineer is responsible for field safety. He guarantees that the works are executed in accordance with ABS construction's safety manual and/or additional safety procedures.

Materials take-over, good status, registration, storage and traceability is ensured by material control responsible. Material control is performed with means of an integrated procedure on personal computer and main frame, so that all the phases of material flow are kept under control.

Particular attention is to be reserved to material control, since the planning activities, the erection sequences and the relevant requirement of personnel and equipment are based on information concerning material availability. Therefore detailed stocking, checking and identifying procedures are implemented.

MOBILIZATION PLAN

Upon contract award, a detailed mobilization plan and program, which the scheduled time will be prepared. The plan is based on the contractual requirements, on the information collected on site, and in any other way available, on the long worldwide experience of the contractor to perform similar works.

The plan will cover:

- Authorization by purchaser / Client and entry permits
- Temporary camp accommodation facilities
- Temporary site offices
- Temporary lay down and workshop area
- Utilities and facilities for construction
- Finalization of the list of construction equipment required for work implementation and definition of the relevant mobilization plan
- Finalization of the required construction manpower and relevant mobilization plan.
- Communication services to be set-up

TEMPORARY FACILITIES

Personnel accommodation

An area close to the plant is normally utilized for camp facilities and personnel accommodation. Otherwise, lodging our senior staff in town apartments or houses and transport them to site can be easily managed by ABS construction. A typical lodging strategy is the following:

- Senior staff in single rooms with private bath
- Other staff and supervisors in single room sharing one bath by two persons

Site Facilities

ABS construction usually provided the site temporary facilities in an area close to the plant equipped with the necessary utilities such as:

- Construction power (power generator for emergency situation are normally provided)
 - Construction water
 - Potable water
 - Yard and road lighting (if required)

SITE INSTALLATIONS

Shall be considered as “ site installation “ all installation, temporary or permanent works, whatsoever being required for execution, completion and maintenance of the works.

Site installation shall include as well all necessary installation required for boarding and loading employees and laborers.

ELECTRICAL AND INSTRUMENTION WORKS

Electrical and instrumentation works are planned taking into account civil and mechanical activities in order to avoid interference and to optimize the resources.

Usually the first activity to be carried out is the lying down of underground cables jointly with the primary earthing system and the peripheral lighting system.

In co-ordination with mechanical progress is then started the cable trays and conduit installation. A second step of laying cable takes place as soon as the mechanical cable ways are completed.

Electrical connection and testing are the last activities to take place.

The major electrical equipment is to be installed compatibly with civil works completion; the mechanical teams involved in the mechanical equipment installation supports the electrical crews in handing and lifting heavy items (i.e. heavy panels, transformers, etc.).

All site activities are assisted by mechanical workshop, where all prefabricated pieces are performed.

As far as instrument work is concerned, almost all activities are carried out simultaneously with the electrical job. A specific laboratory is equipped for instrument calibration.

SEQUENCE AND DETAIL OF ELECTRICAL INSTALLATION ACTIVITIES

In general the sequence of the installation activity shall be defined by area.

In buildings

Activity shall start in strict sequence with civil work and shall develop with raceway installation, equipment installation, wiring and cabling respectively.

Sub-Station, Control Rooms, Cabinets and panels shall be done when progress on civil work activities does not affect the environment with dump or other polluting agents.

In process areas

Installation activities shall start when both on civil and mechanical are well progressed.

Duct banks, concealed conduits, ground grids, cathodic protection bonds shall be laid in sequence with civil work progress.

The major activities on electrical installation can split as follows:

- Conduit installation
- Cable tray installation
- Laying of cables of the following methods:
 1. Direct buried
 2. In cable tray
 3. In conduit system
- Cables termination
- Grounding
- Equipment installation: switchgears, transforms, panels
- Control boxes / junction boxes installations

CONDUIT INSTALLATION

This applies both to rigid galvanized steel and PVC conduit.

All conduit thread shall be made with oxide inhibiting compound to minimize rust and Corrosion and to ensure grounding continuity of the metallic system.

Conduit feeding equipment that is subject to vibration shall terminate in flexible conduit. Breathers and drains shall be provided at high and low points of the conduit system to prevent the accumulation of the condensed water.

All conduits shall be leveled, plumbed and installed in a neat and workmanlike manner. Conduit shall be made up strap wrench tight, with at least five full threads engaged.

Bends in the conduit shall be made with equipment designed specifically for the type of conduit being bent or by using prefabricated elbows or condulets . Bending shall comply with applicable codes.

When joining rigid metallic conduit, all joints shall be made with standard couplings. A union shall be provided in all conduit runs, adjacent to each device or enclosure, to allow easy removal.

CABLE TRAYS INSTALLATION

The trays shall have suitable strength and rigidity to provide adequate support for all contained cables.

Trays shall be preferred means for routing and supporting cables in buildings, trenches and tunnels.

Power, control and instrumentation cable trays shall be off the ladder type or the perforated channel type.

Ladder or perforated cable tray type shall be chosen depending on location, installation type, pollution or sunlight exposure.

Trays, covers, fittings and supports shall be normally steel, hot dip galvanized after fabrication. In special cases, aluminum, stainless steel or fiberglass - reinforced - plastic - type trays are used.

Trays shall be supported at maximum spacing indicated by the supplier and exceeding three meters and all change in direction.

Cable trays arranged one above the other should have 250mm minimum separation space

All changes in tray direction shall be accomplished by proper fitting, providing ample support and bending radius for the cables.

Connecting hardware shall be corrosion resistant and shall present a smooth surface to the cables.

The cables tray system shall be tested on site after installation, to verify conformity with the requirements.

CABLE INSTALLATION

Direct Buried Cables

During the installation the following principles shall be observed in order to extent cable life:

- Rocks and other rough material must be kept away from the cables.

- A bedding and covering of rock-free sand should be packed around the cable to prevent stone bruises and assist in heat dissipation.

Cables shall be unreeled, whenever possible, directly into the trench. The cable shall not be pulled into a trench from a stationary reel or pushed over the side of the trench.

Cables shall be laid in trenches in a single horizontal tier without crossings except for rearrangement at transitions to multi-tier duct banks or at entry points underneath elevated substations.

The route of cable trenches shall avoid above ground and below ground obstructions as to maintain a reasonable access to the buried cables. A minimum clearance of 30 cm shall be maintained between underground runs and parallel runs of underground piping a minimum 30-cm clearance shall be maintained.

Power and associated control cables may be laid adjacent to each other. A spacing of 30 cm. is recommended between all 3-phase power circuits in order to achieve a reasonable derating factor.

Where dual, redundant, power feeders are being laid, adequate separation of the feeders shall be maintained to prevent accidental damage occurring to both feeders.

Where cables cross under main roads, concrete slabs, paved areas, railroads, or any areas that would require extensive or impractical excavations to replace, then they shall be run in pipes.

Direct buried cable stubbing up and through asphalt or concrete slabs shall be protected by conduit depending upon the type of cable and the electrical area classification.

Cables installed in cable tray

Each run of cable tray shall be complete before the installation of cable. Cables shall be continuous in length, without splices, from source to utilization equipment. If splices are unavoidable the tray shall be deep enough to contain the splice within the side rails of the tray, or, if needed, a supplementary section of tray located above and on the main cable tray run may be used to contain the splices.

Cables shall be laid or pulled into tray runs. When pulled, cable rollers and sheaves shall be utilizing the maximum pulling tensions and side wall pressures defined by the Manufacturer.

Care shall be exercised to prevent cable from bending below its minimum allowable bending radius. In pulling cables abrasions shall be avoided by spacing max 3 Mt. proper rollers.

Sharp points such as bent or burred metal and reversed bolts shall be carefully removed or corrected before any cable is placed in a tray.

Cable installed in conduit system

In general same rules shall be applied as far as direct buried cables or for cables installed on trays. No conductors or cables shall be pulled into conduits with damaged or repaired insulation, nor shall any conductor be taped or spliced in conduit or conduit fitting.

An approved conduit seal shall be installed in the conduit at all area classification boundaries and an approved sealing compound shall be poured in the annulus between the cable sheath and the seal.

In classified area, at each conduit run entering an enclosure for switches, circuit breakers, fuses, relays, pushbutton stations, resistors, or other apparatus which may produce arcs or high temperature, an approved seal shall be installed within 50 cm of the enclosure.

CABLE TERMINATION

Cable terminators shall be made in a neat, workmanlike and approved manner by specialized in this class of work.

Before any cable terminal connection is made, conductors shall be rung out. Connections shall be made according to wiring diagrams. Polarity of phasing or rotation shall be made as necessary.

Control cables connections shall be made in accordance with wiring diagrams, using color codes or wire numbering established by drawings for the various control circuits. Terminal lugs for control wiring conductors shall be compression type, with insulated sleeve, which also clamps over the wire insulation, and with ring tongue or locking fork. Suitable crimping tools in accordance with recommendations of manufacturer of the connector shall be employed.

The armor of armored cable shall be connected to the ground system. All splices and connections shall be accomplished with pressure - type connectors installed with the tool recommended by the pressure connector manufacturer.

Connectors of MV shielded cable shall be made with stress cones Manufacturer's recommendations.

LIGHTING

Lighting includes lighting panels, transformers, fixtures, lamps, switches, receptacle and junction boxes. Lighting fixtures shall be installed in the location shown on the construction drawings.

Fixtures shall be carefully and neatly installed, complete with all necessary accessories. Receptacles shall be installed as shown on the construction drawings, all receptacle ground terminals shall be checked to ensure connection to the ground grid, and receptacles shall be checked for proper polarity.

GROUNDING

The complete grounding system shall be installed in accordance with drawings and specifications. Ground cables connections shall generally be made by compression type

connectors. Connections of buried or embedded ground cables shall generally be made by the thermo-weld process.

All metal structures, fencing, conduits, equipment frames, piping, tanks and similar objects shall be suitably grounded.

Where clamp connections are used, the contact surface shall be cleaned, coated with anti oxidising paste, and drawn up immediately, using proper size of torque wrench or other approved means to attain correct contact pressure.

The grounding system shall be tested after installation as described elsewhere in this procedure.

EQUIPMENT INSTALLATION

Equipment shall be bolted or otherwise mounted in a workman like and approved manner on level foundations or structures. Equipment shall be installed so that it is leveled, plumbed, squared and properly aligned and oriented.

The manufacturer's recommendations shall be followed in handling and setting switchgears and panels and care shall be exercised in handling to avoid distortion of stationary structures, or damaging of delicate instruments.

Shipping sections shall be bolted together after alignment is complete. Power bus, ground bus and splices shall be cleaned and bolted together using a torque wrench. Tape or compound shall be applied where called for drawings.

All circuit breakers and other removable elements shall be inserted and tested for proper operation during commissioning & per-commissioning phases.

All cubicles, panels, control centres, enclosures, shall be blown out with air or vacuum cleaned to remove dust and dirt.

CONTROL BOXES- JUNCTION BOXES INSTALLATION

Boxes shall be installed so that they are leveled, plumbed and properly aligned, and so that they will present a pleasing appearance. Boxes will require support other than that provided connecting conduits. Supports for boxes shall generally be made of steel plates or auxiliary standard or special steel shapes for surface mounting of boxes on masonry walls appropriate anchors shall be used.

SITE TESTS

The following testes shall be made on electrical equipment during the course of construction erection. When required, tests shall be witnessed by the owner's Representative.

Site tests for electrical installation

They shall include:

- Visual check for completeness of plant
- Check of tightening for electrical connections
- Insulation tests for cables
- Hi- Pot test on MV cables
- Dielectric strength on transformer oil
- Insulation resistance measurement on motors
- Check for correctness of control circuits
- Check for rotation of motors
- Check for continuity and resistance values measurement on grounding systems

Pre operational and commissioning tests

Pre-operational and commissioning tests include the following activities:

- Operation test on switchgear control and equipment to assure the connections are correct and that all interlocking follows the sequence indicated in specifications , instruction books and wiring diagrams
- Relay and protective devices calibration and test
- Primary injection test for MV and L.V. panels
- Calibration and testing on alarm and shut-down devices including actual activation of sensing devices(temperature, pressure, level switches)

All date and pertinent information, including relay setting, shall be recorded copies of this record, shall be given to the owner Representative.

APPROACH TO INSTRUMENT INSTALLATION & COMMISSIONING

The distributed control system includes input/output devices, control devices. Installation activities include field instrumentation installation. Testing and calibration as well as electronic cabinet installation, system cabling between signal conditioning / marshalling cabinets / electronic cabinets, fiber optic data highway cable, field cabling between marshalling cabinets and junction boxes and from junction boxes to each instrument.

Upon receipt the electronic cabinets can be stored in indoor area, preferably packed in order to keep as long as possible the original packing and drying provisions. Only when suspect of shipping damages occur, the equipment shall be uncharted for inspection, then resealed.

Only when civil works are well progressed, doors and floating floor installed, ceiling, air conditioning, lighting, painting completed, installation of cabinets can occur.

As soon as possible the air conditioning system shall be put in operation. At this stage all shipping protective material can be removed from the electronic cabinets, system cabling can be completed as well as inverters power supply and the system can be loaded with a running program.

Signals from / to the field shall be connected by field cabling to the marshalling cabinets but they shall be kept isolated (normally by isolating links integral with terminal blocks).

After that instrument and field cabling are completed all signals can be checked and recorded in an I/O list.

INSTRUMENT INSTALLATION AND TESTING PROCEDURE

Upon receipt the instrument shall be calibrated as soon as possible .The indoor storage takes place in a clean area and instruments are protected from damages.

Only after both mechanical and civil works are well progressed in process area, instrumentation installation can take place.

Installation of piping shall be neat in appearance, convenient to maintain and have all necessary shall be supported in a substantial and manner, rigidly enough to prevent vibration from any cause and anchored sufficiently to prevent undue strain or connected equipment.

All tubing shall be supported in a substantial and safe manner, rigidly enough to prevent vibration from any cause and anchored sufficiently to prevent vibration from any cause and anchored sufficiently to prevent undue strain or connected equipment.

All piping and tubing shall have burrs removed by reaming and shall be cleaned of loose dirt or scale before installation. All piping and tubing joints shall be made perfectly squared and tight.

Tubing bends shall be made with tube benders without excessive metal thinning. Open ends of piping and tubing shall be sealed temporary covers, caps or plugs to prevent entry of dirt or foreign material. Cloth covers or plugs are not allowed. Covers or plugs shall be of a design, which required their removal prior to joint makeup.

All valves shall be located and oriented to allow convenient operation from the from of Cabinets or from platforms, as appropriate. Instrument shall be identified in accordance with an instrument tag number system.

Suitable metal tag with embossed characters shall be securely attached to a non-removable part of the instrument or device. Valves shall be identified by their tag number on a metal tag permanently attached to a non-pressure part such as the yoke.

SITE TESTS

The following tests shall be made on instrument equipment during the construction or erection. When required, tests shall be witnessed by the owner representative.

Site tests for instrument installation

They include the following activities:

- Instrument calibration

-
- Hydro-test on process lines ; pneumatic test on impulse lines
 - Check for correctness of electric and electronic circuits

Pre operational and commissioning tests

They include:

- Check of actuator stroke
- Loop - checking
- Filling of seal pots with separating fluids
- Test on logic and alarm sequences

All data and pertinent information, including instrument calibration and setting, shall be recorded. A copy of the record shall be given to owner representative.

D) WORK EXPERIENCE

We can mention following activities as some of our activities:

- 1- Engineering, procurement and construction of water supply pump station and tele-metry system for **Ilam Gas Refinery Project**.
Client: NIGC/Hirbodan Co.
This project is finished and provided APC, and total amount of contract is 30,183,030,000 Rls. + 380,727 €.
- 2- Erection of 4 units gas turbine generator model V94.2 in **Sanandaj Gas Turbine Power Plant** (4x 159MW)
Client: MAPNA/TNC
- 3- Basic design for whole of Zanjan Gas Turbine Power Plant and preparation of technical tender documents for EPC contract of B.O.P. of electrical and erection of GTG.
Client: TAVAN GROUP/IARAN SOCIAL SECURITY ORGANIZATION
- 4- Basic and detail design of aux. boiler room for mechanical, electrical and I&C portion , Kerman Combined Cycle Power Plant.
Client: SIGMA GROUP/MAPNA
- 5- Erection of turbo compressors for gas pressure increasing station for **Nour Abad Fars**.
Client: IRAN ARVIN Co./ NIGC
- 6- Supply and construction of an elevated water storage tank for **Parand Gas Turbine Power Plant**.
Client: ISTAFAR Co./MAPNA Co.
- 7- Preparation of technical and commercial proposal for tender of for **Shanoul/Varavi Gas Field Sludge Catcher Plant**.
Client: BEHIN SAMAN SARZAMIN Co./ NIOC
- 8- Engineering, Procurement and Construction of HVAC system, all piping & utility system, civil works for **British School/Tehran**.
Client: BRITISH SCHOOL TEHRAN/ SHELL DEVELOPMENT CO.
- 9- Detail engineering and supply of material and construction of 2 set Pig Launcher and Receiver 30"x 36", D.P.= 1050 psi , API 5L x 65".
Client: NIGC/DELHAM Co.

10- Detail engineering and supply of material and construction of 2 set Pig Launcher and Receiver 20"x 24", D.P.= 1050 psi , API 5L x 42".

Client: NIGC/T.N.SEHAT Co.

11- Detail engineering and supply of material and construction of 4 set Pig Launcher and Receiver 12"x16", D.P.= 1150 psi , API 5L x 42".

Client: NIGC/DELHAM Co.

12- Detail engineering and supply of material and construction of 2 set Pig Launcher and Receiver 10"x16", D.P.= 1152 psi , API 5L x 42".

Client: NIGC/DELHAM Co.

13- Detail engineering and supply of material and construction of 4 set Pig Launcher and Receiver 8"x12", D.P.= 1050 psi , API 5L Gr. B

Client: NIGC/T.N.SEHAT Co.

14- Engineering and construction of 5 gas skid scrubber for **phases 4,5 of South Pars** project including of stainless steel piping and erection.

Client: Nouvo Pignone Co./Hyundai Eng. Co.

15- Procurement of piping materials for "Fajr Power and Steam Generation Pant"

Client: Alstom Power Italia.

16- Conceptual and basic design of Gas Supply System for **Tavanir Maintenance factories** in "Karaj-Fardis".

17- Supply of workshop equipment such as gauges, transmitters, machine tools, grinding machine, etc.

Client : MAPNA/ 6CC POWER PLANTS

18- Preparation of technical and commercial proposal for Lavan Crude Oil Tanks System, It is include of all Civil work, remote control system, electrical system such as earthing, lighting, cathodic protection, cabling, electrical and controls panels, All crude oil piping and pump house, All instrument system such as metering system, radar leveling system, Fire fighting and alarm system, etc.The P&ID ,PFD and piping routs have been designed in bid stage.

Client : Machine Sazi Arak Co.

19- Preparation of technical and commercial proposal for a 15 ton/hr auxiliary steam generation plant for Kazeroun combined cycle power plant. The P&ID, PFD , equipment layout and piping arrangement , cabling and cable tray arrangement and process design have been done in bid stage.

Client : Machine Sazi Arak Co.

20- Preparation of technical and commercial proposal for an auxiliary steam generation plant with two boiler in total capacity 60 ton/hr for a petrochemical plant in Esfehan. The P&ID, PFD, equipment layout and piping arrangement, cabling and cable tray arrangement and process design have been done in bid stage.

Client : Machine Sazi Arak Co.

21- Preparation of technical and commercial proposal for an auxiliary steam generation plant with two boilers in total capacity 30 ton /hr for Ilam Gas Refinery Plant. The P&ID , PFD ,equipment layout and piping arrangement , cabling and cable tray arrangement and process design have been done in bid stage.

Client : Machine Sazi Arak Co.

22- Preparation of technical and commercial proposal for an auxiliary steam generation plant with three boilers in total capacity 45 ton /hr for Ghadir Petrochemical Plant. The P&ID , PFD , equipment layout and piping arrangement , cabling and cable tray arrangement and process design have been done in bid stage.

Client : Machine Sazi Arak Co.

23- Preliminary design for Sangan Iron Ore project and preparation of basic design and piping routs for utilities and preparation of material and equipment list for utility systems such as auxiliary boiler and steam system, Air compressed system, Fuel oil forwarding system, Slurry system, HVAC system, Earthing system, Lighting system, Lightning system, Work shops equipment, Water supply system and etc.

Client: DANIELI Co. / TNC