PADKAV ENERGY

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Engineering Consultant Company

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Introduction

Iran and the world, on the path to sustainable development, above all, require a secure development perspective, comprehensive design adhering to natural resource conservation principles, and the latest engineering knowledge. Padkav Energy, leveraging expertise, experience, and an innovative approach in technical and engineering fields, is actively engaged in providing safe process solutions across various **oil, gas and petrochemicals industries**. With a dedicated and specialized team, the company is committed to enhancing safety and engineering standards in industrial environments.

By offering engineering consulting, design, execution, supervision, and procurement engineering services, the company strives to accurately identify client needs and align with global standards to establish a secure and efficient foundation for industries. We firmly believe that engineering is not merely a requirement but a long-term investment in the success and sustainable development of any organization.

Introduction to Padkav Energy

By choosing the name **"Padkav Energy"**, meaning guardian of peace and security in the industries, we aim to assist employers in achieving these goals by ensuring their development and progress with confidence. Padkav Energy was established as a limited liability company in Tehran at the beginning of 2013. The company was officially registered as a continuation of the activities of a specialized group in the design and engineering of oil, gas, and petrochemical industries.

The structure of Padkav Energy is based on utilizing dedicated, skilled, and diligent professionals, with a strategic plan focused on systematic organization of expert personnel and continuous updating of technical knowledge to enhance the company's capabilities in executing projects.

At its inception, the company focused on risk analysis, hazard identification, consequence assessment, and passive defense to enhance safety and develop engineering solutions that could be implemented in the design and operational phases of industrial processes. Over the past decade, through experience and technical expertise, Padkav Energy has become one of the leading companies in industrial safety risk assessment, utilizing methodologies such as HAZOP, HAZID, and SIL. Additionally, the company has successfully implemented Process Safety Management (PSM) based on OSHA’s 14-element standard and passive defense strategies across a wide range of industries, including oil, gas, petrochemicals, manufacturing, and metal industries.

Over time, in addition to conceptual and safety studies, the company expanded its activities based on the expertise of its human resources in areas such as design services, basic and detailed engineering, preparation of engineering documents, technical consultation for procurement, supply of process equipment, safety and firefighting equipment, as well as the design and engineering of flare systems and networks in various industries.

Currently, Padkav Energy operates in a 1,000-square-meter office in the Abbas Abad district of Tehran, utilizing its experts and specialists in process engineering, safety engineering, mechanical engineering, piping engineering, civil, structural, and architectural engineering, electrical engineering, and instrumentation engineering to execute engineering projects in the oil, gas, and petrochemical industries.

Goals and Vision

Padkav Energy Consulting Engineers, relying on its knowledgeable and experienced personnel, is committed to upholding employee rights and valuing their contributions to provide optimal technical and engineering consulting services to its clients. With continuous effort and determination, the company pursues the following objectives:

- Training and developing specialized, diligent, and committed human resources

- Providing engineering and technical services based on the latest scientific advancements and national and international standards
- Establishing dynamic and constructive interactions with clients based on mutual respect to advance project goals
- Adhering to and maintaining professional engineering principles in service delivery
- Expanding the company's range of services in domestic and international markets
- Applying a practical approach to modern management and engineering sciences, with continuous on-the-job training

Certifications and Approvals

Padkav Energy holds consulting service qualifications for oil, gas, and petrochemical refinery units, issued by the Management and Planning Organization of Iran, as well as passive defense consulting qualifications. Additionally, by implementing and establishing an Integrated Management System (IMS) in compliance with relevant standards, the company has obtained the following certifications:

- ISO 9001:2015 (Quality Management System)
- ISO 14001:2015 (Environmental Management System)
- ISO 45001:2018 (Occupational Health and Safety Management System)

Padkav Energy, with its extensive experience and collaborations, is recognized and approved by major industry organizations, including:

- National Petrochemical Company (NPC)
- National Iranian Oil Company (NIOC)
- Iranian Passive Defense Organization
- Mahshahr Free Zone Organization

Additionally, the company is listed as a **qualified vendor** in **the Ministry of Petroleum, SEMTA, TAPICO, and PIDMCO**.

ISO 9001

CERTIFICATE of REGISTRATION

Certificate Number: QMS0512140225

Padkav Energy Co.

No. 10, Doust Mohammadi Alley, North Mofateh St., Beheshti St., Tehran, Iran

Assessment of the management system demonstrates evidence that the organization conforms and thus we validate to the requirements of ISO 9001:2015. This certification – instrument is not transferable and remains the property of BRS Certification Body .

Scope of Activities: Engineering Design (Conceptual, Basic and Detail), Study (Process Solution, Safety, Risk Analysis and Passive Defense), Procurement (Technical Services and Supply) and Managing Consultant in Oil, Gas and Petrochemical Industries

Date of Effectiveness: 14 February 2025

Date of Renewal: 14 February 2028

Bikaran Rahkar Sadat is accredited by Iranian governmental national accreditation body (NACI) in defined scopes

Annually approval of the surveillance assessment provides validation of annual certification-registration

BRS Chairman of Board

www.avaudit.ir

14 February 2025

Date

Accredited Certification Body

Reg No. NACI/119

ISO 14001

CERTIFICATE of REGISTRATION

Certificate Number: EMS0512140225

Padkav Energy Co.

No. 10, Doust Mohammadi Alley, North Mofateh St., Beheshti St., Tehran, Iran

Assessment of the management system demonstrates evidence that the organization conforms and thus we validate to the requirements of ISO 14001:2015. This certification – instrument is not transferable and remains the property of BRS Certification Body .

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14 February 2025

Date

Accredited Certification Body

Reg No. NACI/119

ISO 45001

CERTIFICATE of REGISTRATION

Certificate Number: OSHMS0512140225

Padkav Energy Co.

No. 10, Doust Mohammadi Alley, North Mofateh St., Beheshti St., Tehran, Iran

Assessment of the management system demonstrates evidence that the organization adheres to legal obligations and applicable Occupational Health & Safety requirements based on local applicable regulations for the purpose to protect communities and consumers through the ISO 45001:2018. This Non-Accredited certificate—instrument is not transferable and remains the property of the International Registration Body BRS. According to IAFMD 22 certification of an OSHMS against the requirements of the applicable OSHMS standard is not a guarantee of legal compliance.

Scope of Activities: Engineering Design (Conceptual, Basic and Detail), Study (Process Solution, Safety, Risk Analysis and Passive Defense), Procurement (Technical Services and Supply) and Managing Consultant in Oil, Gas and Petrochemical Industries

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سازمان برنامه و بودجه کشور
سازمان مدیریت و برنامه ریزی استان تهران

شماره ۲۳۳۷۷۱
تاریخ ۱۴۰۰/۰۵/۱۶

گواهینامه صلاحیت خدمات مشاوره

جناب آقای حسین خانفی

مدیر عامل محترم شرکت پادکاو انرژی

شماره ثبت ۴۳۸۰۹۶

با استناد به مصوبه شماره ۲۰۶۳۷/ت ۲۸۴۳۷ هـ مورخ ۱۳۸۳/۴/۲۳ هیات محترم وزیران و با توجه به احراز شرایط لازم و تایید صلاحیت آن شرکت در سامانه جامع تشخیص صلاحیت عوامل نظام فنی اجرایی به این وسیله صلاحیت آن شرکت برای انجام خدمات مشاوره از تاریخ صدور این گواهینامه تا پایان دوره ارزشیابی و حداکثر تا تاریخ ۱۴۰۴/۰۵/۱۶ اعلام می گردد.

شناسه ملی شرکت : ۱۴۰۰۳۴۴۷۱۱۱

خواهشمند است برای مشاهده جزئیات گواهینامه صادره به پایگاه

http://sajar.mporg.ir مراجعه فرمایید.

رعایت مفاد قانون برگزاری مناقصات به شماره ۱۳۰۸۹۰ مورخ ۱۳۸۳/۱۱/۱۷ آیین نامه های اجرایی مربوطه و ظرفیت کاری مجاز در زمان ارجاع کار توسط آن شرکت ضروری است.

مسعود شفیعی
رئیس سازمان

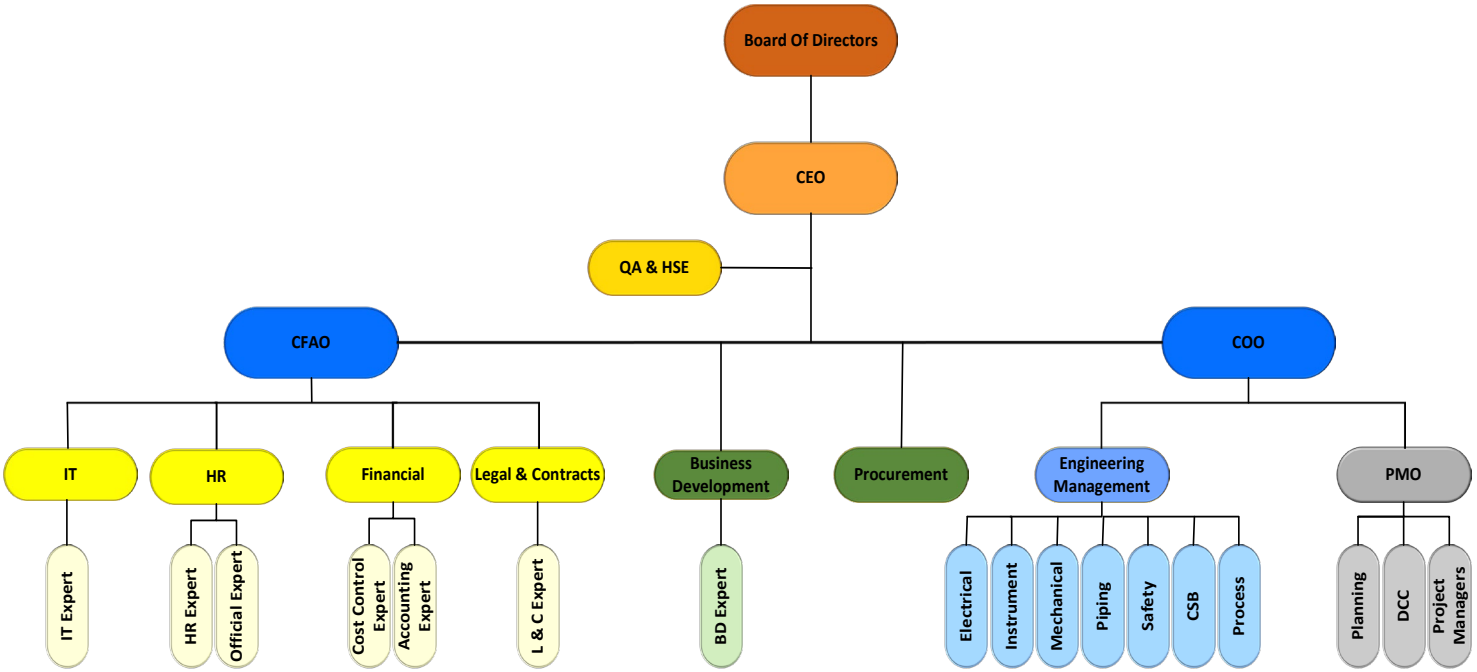
- هر گونه تغییر در ارکان و سهام شرکت و اطلاعات امتیاز آوران (مدیر عامل، هیات مدیره و کارکنان امتیاز آور)، باید حداکثر ظرف سه ماه در سامانه ساجات (*http://sajat.mporg.ir*) ثبت شود، در غیر اینصورت گواهینامه صادره فاقد اعتبار است.
- هر قرارداد جدید حداکثر ظرف سه ماه پس از انعقاد قرار داد و صورت وضعیت های جدید پس از تایید کارفرما باید در سامانه ساجات ثبت شود، تا امتیاز آنها هنگام تشخیص صلاحیت دوره بعد و آزاد سازی ظرفیت منظور شود.

در صورت مغایرت مطالب این گواهینامه با اطلاعات موجود در پایگاه *http://sajar.mporg.ir* اطلاعات پایگاه اصالت دارد.

به مندرجات پشت صفحه این گواهینامه توجه فرمائید.

Organizational Chart of Padkav Energy

The organizational chart of Padkav Energy represents the internal structure of the company, illustrating the relationships between departments, units, and employees. This structure is designed to ensure that all activities align with the company's goals, promoting coordination, efficiency, and systematic workflow.



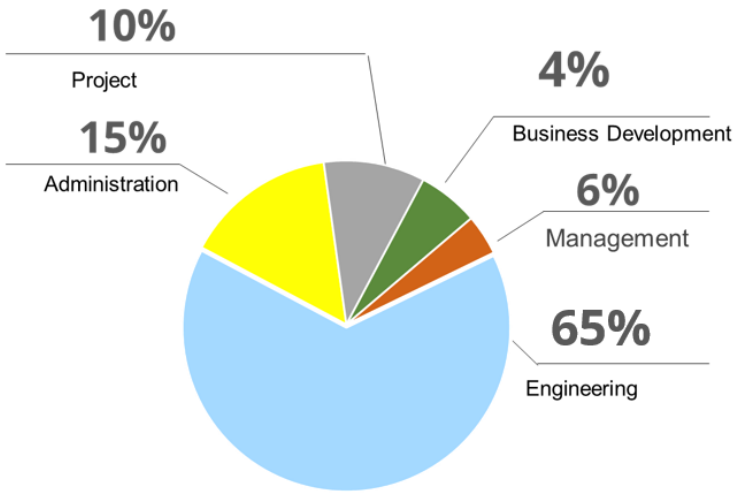


Diagram of Personnel Distribution Across Different Departments of Padkav

This structure enables the company to achieve its goals in delivering quality services to clients through collaboration and interaction among different units. With a workforce of more than one hundred employees, the diagram of personnel distribution across the various departments shows that the Technical and Engineering Units make up the largest percentage compared to other departments. The company's organizational chart includes the following key sections:

Board of Directors and CEO

Responsible for the overall leadership of the organization, overseeing the implementation of company strategies and goals, and making major decisions.

Quality Assurance, Safety, and Health Department

Responsible for evaluating, managing, and ensuring quality, safety, and health in the workplace and company projects. This department also focuses on implementing the Integrated Management System (IMS) based on the requirements of ISO 9001:2015, ISO 14001:2015, and ISO 45001:2018 standards, and has successfully obtained the relevant certifications.

Organizational Structure

To achieve greater efficiency and coordination, the structure is divided into two main sections: line units and staff units.

- Staff Units: These units provide support, guidance, and coordination for the line units. It includes Legal, Finance, Human Resources, and IT departments.
- Line Units: These units are directly responsible for carrying out the core operational tasks of the organization and are at the forefront of its activities. The line units of the company are divided into Project Management, Engineering Management, Business Development, and Commercial sections, each of which includes various sub-units and disciplines.

Project Management Department

This Department is responsible for overseeing the scheduling and quality control of project execution. It includes Project Management, Document Control, and Project Scheduling and Control departments.

Business Development Department

The Business Development is responsible for identifying and capitalizing on new opportunities for business growth and expansion. This department analyzes the market, identifies customer needs, and evaluates competitors to create effective strategies for entering new markets and increasing market share. Additionally, it focuses on building and maintaining strong relationships with clients, collaborating closely with other departments within the organization, and offering innovative solutions. The ultimate goal of the Business Development Department is to maximize profitability and create long-term value for the organization.

Procurement Department

Equipment Procurement Department is a key component of the organization responsible for managing the procurement of equipment for the company's purchase contracts.

Design and Engineering Department

These Departments are responsible for designing and preparing engineering documents, executing and supervising projects, and consulting on the procurement of process equipment with a focus on delivering specialized and innovative services. The design and engineering department consist of the following departments:

- Process Engineering
- Safety Engineering
- Mechanical Engineering
- Piping Engineering
- Civil Engineering
- Structural and Architectural Engineering
- Electrical Engineering
- Instrumentation Engineering
-

Padkav Energy Design and Engineering Deparment

Padkav Energy, leveraging experienced engineers with high academic backgrounds and significant involvement in large, medium, and small-scale projects across various industries, is well-equipped to advance diverse projects both domestically and internationally.

Utilizing the latest engineering software, creativity, a spirit of progress, and the value-added approach of its personnel, the company is able to prepare engineering documentation with maximum efficiency, in the shortest time, and with the least number of man-hours. New technical methods and guidelines have been successfully tested and stabilized in several projects, ensuring their reliable application in future projects.

Some of the key activities and services offered by the various units of Padkav Energy include:

Design and Engineering General Services

The design and engineering general services provided by Padkav Energy in its projects include:

- Preparation and delivery of all necessary drawings and technical documents for completing and handing over the work.
- Preparation of new MDR (Master Document Register) lists.
- Performing all engineering activities related to the procurement of project goods.
- Preparation of design, procurement, execution, and project management procedures in accordance with the MDR.

- Preparation of calculations, reports, technical specifications, data sheets, drawings, and other necessary documents for the work.
- Preparation of Engineering Dossiers.
- Review and approval of Vendor Documentation (Books Vendor).
- Preparation of As-Built Drawings.
- Preparation of Technical Purchase Packages (Requisition Material).
- Preparation of Material Take-Off (MTO) lists.
- Technical Evaluation of Vendor Proposals (TBE).
- Holding Technical Clarification Meetings with equipment vendors to discuss technical opinions and obtain client approval.
- Review of vendor documents and drawings for compliance with engineering documents provided to the vendors, including comments and approval (Vendor Documents Review and Approval).
- Incorporating Vendor Data into engineering documents.
- Preparation of spare parts lists for commissioning.
- Preparation of consumable material lists for piping system construction and implementation at the site, including items like electrodes, welding machines, torque wrenches, and test air supply.
- Preparation of two-year consumable material lists, such as oils, resins, chemicals, etc.
- Preparation and adjustment of monthly engineering progress reports, holding progress meetings, and preparing meeting minutes and reports.
- Preparation and submission of detailed schedules for detailed engineering services and procurement engineering.
- Preparation of Operation and Maintenance Manuals (OPERATING MANUAL).
- Preparation of engineering coordination methods for the project and obtaining client feedback for approval.
- Conducting studies and determining methods for controlling internal and external corrosion.
- Use of a web-based document management system approved by the client.
- Preparation of technical specifications for polishing and painting in manufacturing plants (SHOP PAINTING) and the site of the facilities (FIELD PAINTING), along with a paint schedule specifying paint types and characteristics.
- Compliance with environmental requirements according to the regulations of the Environmental Protection Organization, including landscape design as part of the consultant's scope of work.

Each unit also provides specialized consultancy, basic design, and detailed design services in projects, as detailed below:

Process Design and Engineering Section

The Process Engineering section is one of the key components in industry and production, focusing on the design, analysis, and optimization of industrial processes. This section works closely with other engineering disciplines to enhance overall industrial performance. Some of the production documents of this unit are as follows:

- Preparation of technical and economic feasibility reports
- Basic and detailed design of non-licensed units
- Detailed design of licensed units
- Reviewing manufacturer documents
- Simulation of industrial units and preparation of Heat and Material Balance reports
- Preparation of Process Flow Diagrams (PFD)
- Sizing of various process equipment, preparation of datasheets, and providing calculation reports
- Sizing of main and secondary process lines and utility lines
- Preparation of Piping and Instrumentation Diagrams (P&ID)
- Relief Load calculations for petrochemical units and refineries, and providing Relief Load Summary
- Simulation and design of flare network lines and equipment, preparation of relevant reports and drawings
- Sizing of industrial stacks based on Worst Relief Scenario and performing Radiation Study
- Depressuring analysis and providing Minimum Temperature reports
- RAM analysis in industrial units
- Utility consumption calculations and preparation of Utility Summary
- Chemical consumption calculations and preparation of Chemical Summary
- Preparation of control documents for units, including Cause and Effect, Alarm Set Point List, and Process Control Description
- Preparation of Operating Manual
- Reviewing licensor documents and preparing PDP Review reports
- Completing licensor documents during the Detail Design phase

Safety Design and Engineering Section

Safety engineering refers to the design and implementation of solutions aimed at reducing risks and preventing accidents in industrial environments and beyond. Safety engineers help maintain the health and safety of individuals and equipment by analyzing risks and promoting a culture of safety across various industries. Below is a summary of the activities of this unit:

- Design of a water-based fire extinguishing system, including network calculations, hydraulic calculations using related software (PIPENET and AFT IMPULSE), and determining the required water volume.
- Design of cooling systems for tanks and equipment water spray systems, including hydraulic calculations of cooling systems using related software (PIPENET) and determining the required water volume.
- Design of Deluge Systems.
- Design of foam-based fire extinguishing systems, including hydraulic calculations for foam networks and design of foam proportioning systems.
- Design of sprinkler systems, including design and layout along with hydraulic calculations.
- Design of pump houses and firefighting water tanks, including hydraulic calculations, and determining the type and capacity of pumps and firefighting water tanks.
- Design of automated gas flooding fire extinguishing systems.
- Design of passive fire protection systems.

- Design of fire and gas (F&G) detection systems, including identification and review of units and equipment, technical design, preparation of relevant diagrams, and preparing Cause & Effect documentation.
- Hazardous Area Classification, including identification and review of materials, flows, and equipment.
- Preparation of Source List for hazardous area classification maps.
- Design of fireproofing protection.
- Estimation of the number of safety and firefighting equipment and layout planning, such as hydrants, monitors, portable fire extinguishers, safety showers, and eyewash stations.
- Preparation of technical datasheets for the specification and purchase of firefighting equipment.
- Engineering procurement services (MRQ & TBE) and review of technical documents from manufacturers (VDR) for safety and firefighting equipment.
- Comprehensive services for automated gas flooding fire extinguishing systems:
    - Selection and design of a gas extinguishing system suitable for the protected area.
    - Hydraulic calculations for the gas extinguishing system using specialized software (VDS).
    - Preparation of technical datasheets for the gas extinguishing system's components and equipment.
    - Preparation and drafting of execution and construction drawings, such as P&ID and Piping Plan.

Mechanical Design and Engineering Section

Mechanical engineering is one of the broadest and most fundamental engineering disciplines that deals with the design, analysis, construction, and maintenance of both stationary and rotating mechanical systems. Mechanical engineers utilize principles from mechanics, materials science, and energy to develop practical solutions to various problems. Below is a summary of the activities of this unit:

- Consulting services for selecting the type of rotating and stationary equipment and their related auxiliary systems.
- Performing basic engineering for rotating equipment, including gas and steam turbines, gas and air compressors, process pumps, firefighting and general pumps, cranes, process packages (including chemical injection packages), and advising on the selection of equipment types and standards based on contracts, service requirements, and preparation of technical specifications covering these requirements.
- Performing basic engineering for stationary equipment, including pressure vessels, separators, heat exchangers, storage tanks, reactors, and advising on the selection of equipment types and standards based on contracts, service requirements, and preparation of technical specifications covering these requirements.
- Performing detailed engineering for stationary and rotating equipment, including preparing data sheets based on technical specifications while considering process, safety, electrical, instrumentation, piping, and structural requirements.
- Preparing mechanical data sheets based on calculations made for stationary equipment.

- Preparing purchase packages for rotating and stationary equipment to obtain technical and financial proposals from manufacturers.
- Performing technical clarifications, scope of work, and material supply specifications with manufacturers of rotating and stationary equipment, followed by preparing a technical evaluation report for ordering.
- Performing procurement engineering for rotating and stationary equipment, including monitoring design, procurement, construction, and testing of the main equipment and auxiliary systems after contract signing with the equipment manufacturer.
- Monitoring the equipment testing process and ensuring compliance with standards, from preparing test procedures to physically conducting tests and preparing reports by inspectors.
- Evaluating test reports and providing consulting on acceptable conditions for results, as well as recommending corrective actions for non-compliance issues.
- Providing technical support for the procurement of rotating and stationary equipment from the technical proposal stage through contract signing, testing, and commissioning.

Piping Design and Engineering Section

Piping engineering refers to the design, construction, and maintenance of piping systems in industries. This field includes hydraulic calculations, material selection, and ensuring safety conditions for the transportation of liquids and gases. Piping engineers need to be familiar with relevant standards and regulations in this field to create efficient and safe systems. Below is a summary of the responsibilities of this unit:

- Preparation of basic documents and design specifications for the piping section of the project.
- Preparation of the complete list of all lines, both process and non-process, based on the latest PID drawings.
- Preparation of all data sheets, including specific and general items.
- Creation of a 3D model of project equipment, including detailed engineering sections for mechanical, piping, electrical, instrumentation, and telecommunications, using software like PDMS, AVEVA, and E3D, at 30%, 60%, and 90% model stages.
- Stress analysis of piping lines using CAESAR II software, including reports on stress, displacement, and forces caused by the weight of the pipes at support locations.
- Generation of isometric drawings related to the stress analysis section.
- Design of piping from nozzle to nozzle, including the vent and drain systems.
- Design and preparation of layout drawings for underground piping.
- Review and validation of documents from other engineering sections and incorporating piping feedback into those documents.
- Preparation of a list of piping items and specific items for procurement.
- Preparation of a list of support items for procurement.
- Preparation of a list of items such as paints, insulation, etc., for procurement.
- Preparation, control, and review of as-built documents.
- Review, completion, and evaluation of technical documents from piping equipment manufacturers and suppliers (both local and international).
- Review and validation of contractor test packages at the site.

- Review and validation of contractor static tests at the site.
- Review and validation of destructive and non-destructive tests conducted by contractors at the site.

Civil, Structural, and Architectural Design and Engineering Section

Civil Section: Civil engineering is one of the main engineering disciplines that focuses on the design, construction, and maintenance of project infrastructure and structures. Below are some of the responsibilities of this unit:

- Determining the scope of work and estimating the volumes of earthworks for the project using CIVIL 3D software.
- Preparing specifications and criteria necessary for the detailed design of the project in accordance with international and Iranian standards.
- Defining the scope of work and specifications for borehole locations to prepare soil mechanics and seismic reports.
- Preparing the scope of work for hydrology and topography operations.
- Designing and preparing plans for gravity pipeline systems, including oil, chemical, and sanitary sewer lines.
- Determining the path for electrical and instrumentation trenches.
- Designing and preparing plans for stormwater collection and disposal systems.
- Designing and preparing plans for access roads.
- Designing and preparing grading plans.
- Finalizing the elevation codes and the placement of all buildings, equipment, and shelters in the project.
- Preparing the MTO (Material Take Off) for estimating the size and length of underground pipes, subgrade and pavement materials for roads and areas.
- 3D modeling of roads, trenches, underground gravity pipelines, stormwater drainage channels, grading of areas, manholes, and catch basins using E3D software.

Structural Section: The structural section is a key and vital section responsible for the design, construction, and maintenance of project facilities and structures. Structural engineers in this unit provide the following services:

- Preparing the scope of work and specifications for borehole locations to prepare soil mechanics and seismic reports.
- Preparing the scope of work for geotechnical and seismic studies.
- Preparing various specialized and general specifications and standard drawings for structures.
- Preparing MTO, including the weight of steel structures, rebar weights, volumes of concrete, earthworks, and backfilling, etc.
- Controlling shop drawings with Tekla Structure software.
- Performing structural calculations and preparing executive drawings for various steel and concrete structures commonly used in the oil, gas, and petrochemical industries, including:
    - Pipe racks, pipe bridges, and sleepers.
    - Structural supports and foundations for fixed and rotating equipment.

- Non-industrial buildings (offices, training facilities, guard houses, laboratories, fire stations, mosques or prayer rooms, restaurants, etc.)
- Industrial buildings (workshops and warehouses).
- Explosion-proof buildings (substations and control rooms).
- Various halls and shelters.
- Retaining walls and bund walls.
- Underground storage tanks.

Architectural Section: In addition to civil and structural engineering, architecture focuses on designing both interior and exterior spaces of industrial and non-industrial buildings. Architects create buildings that meet the project's needs and ensure safety, providing practical solutions for the client. Close collaboration between civil engineers and architects can lead to high-quality, sustainable projects. Below is a summary of the responsibilities of this section:

- Preparing the technical specifications for buildings in oil, gas, and petrochemical projects.
- Preparing the technical specifications for building materials and shelters in oil, gas, and petrochemical projects.
- Designing and preparing plans for industrial buildings and shelters such as control rooms, electrical rooms, laboratories, workshops, warehouses, fire shelters, compressor rooms, chemical storage areas, etc., including floor plans, roof plans, finishing schedules, elevations, and cross-sections in coordination with related engineering units.
- Designing and preparing executive drawings for non-industrial buildings such as office buildings, restaurants, guardhouses, mosques or prayer rooms, restaurants, security rooms, etc.
- Designing and preparing detailed executive drawings for buildings and shelters, including details of floors, roofs, walls, connections, railings, ladders, stairs, parapets, gutters, false ceilings, raised floors, thermal insulation, waterproofing, plinths, lintels, and other architectural details in accordance with national building standards for oil, gas, and petrochemical industries.
- Preparing and conducting calculations related to estimating the floor area of buildings and shelters along with the executive specifications in basic projects.
- Preparing volumes and quantities related to architectural works in detailed projects.
- Preparing cost estimates for architectural works in detailed projects.
- Reviewing and providing architectural technical feedback on documents submitted by contractors in MC projects.

Electrical Design and Engineering Section

Electrical engineering involves the study and design of electrical systems for the project. This unit handles the production, transmission, and distribution of electrical energy and the design of electrical circuits required for the project. Below is a summary of some of the responsibilities of this section:

- Preparation of engineering documents, including specifications for electrical and telecommunications equipment and the basic design principles of the project.

- Preparation of detailed engineering documents for electrical and telecommunications projects.
- Design of electrical cabling, lighting, and grounding systems.
- List of cables with complete specifications and required quantities for each.
- Classification of hazardous areas in terms of gases and explosive materials.
- Preparation of single-line electrical diagrams.
- Design of electrical substations.
- Performing electrical engineering calculations, including UPS, chargers, and cable sizing.
- Conducting network studies, load flow, short circuit, motor starting, and preparing relay protection setting documentation.
- Preparation of technical datasheets for main electrical and telecommunications equipment.
- Preparation of single-line diagrams for electrical distribution networks and schematic diagrams.
- Preparation of cabling, lighting, grounding system, and telecommunications system diagrams, including CCTV.
- Design of cathodic protection systems.
- Design of electrical heat tracing systems.
- Performing studies and calculations for the design of CCTV, Paging, and Radio systems.
- Design of perimeter protection systems (AISS) and fiber optic networks.
- Preparation of purchase requests for main electrical equipment, telecommunications, and bulk materials.
- Reviewing, completing, and evaluating technical documents from electrical and telecommunications equipment manufacturers and suppliers.

Instrumentation Design and Engineering Section

Instrumentation engineering focuses on the design and optimization of measurement and control systems in industries. This includes the use of sensors, transducers, and other measuring equipment to ensure processes are accurately controlled. Engineers in this field ensure that precise data is available for engineering and management decision-making. Below are some of the documents produced by this section:

- Preparation of instrumentation datasheets.
- Preparation of the overall control system block diagram.
- Preparation of instrumentation lists.
- Preparation of the control system block diagram for packages.
- Preparation of technical specifications for instrumentation equipment.
- Performing calculations for instrumentation devices.
- Preparation of control loop diagrams.
- Preparation of logic/interlock diagrams.
- Preparation of I/O lists for DCS and ESD systems.
- Preparation of instrumentation and cable routing diagrams.
- Preparation of control room layout diagrams.
- Calculation of cable, tray, ladder, junction box, gland, tube, pipe, and instrumentation fitting quantities.
- Preparation of junction box layout diagrams and other instrumentation devices.

- Preparation of hookup diagrams.
- Preparation of detailed installation drawings.
- Preparation of purchase requests for instrumentation equipment and technical correspondence with manufacturers.
- Technical evaluation of instrumentation manufacturers (TBA) and approval of approved manufacturers.
- Reviewing and approving technical documentation from instrumentation manufacturers and following up on technical issues until the equipment is received at the site.

The list of specialized software for each unit will follow:

Section	Software	Application
Process	Aspen Module	Process Simulation & Design
	Pro II	Process Simulation & Design
	HYSIS Refinery	Process Simulation & Design For Oil & Gas
	Pipe Phase	Hydraulic Calculation /Oil &Gas Pipeline
	Pipesim Suite	Process Line Design
	Olga & PVT Sim	Dynamic Process Line Simulation &Design
	HTFS / HTRI	Heat Exchanger Design
	DRUM	Vessels Sizing and Calculation
	FLARE NET	Flare Sizing and Calculation
	Pipenet	Firefighting Design /water-co2
	Phast 6.2	HSE & Consequence Analysis
Piping	Cad Pipe	Drafting and Drawing
	Cad works	Drafting and Drawing
	Auto Cad	Drafting and Drawing
	Auto Pipe	Stress Analysis
	Cessar II	Stress Analysis and Modelling
	PDMS	3D Modelling (Piping, Elect, Instrument)
	Auto Plant	3D Modelling (Piping, Elect, Instrument)
	Pipe net	Firefighting Design / Co2-Water
Mechanical	Compress	Pressure Vessels & Towers (Strength Design)
	PV-Elite	Strength Design
	Key to Steel	Specification and Application of Steel
	Nozzle Pro	Pressure Vessels & Heat Exchangers (Nozzle Design)
	Aspen B-Jac	Heating & Cooling Load Calculations
	Mechanical Desk Top	3D Modeling
	Auto Plant	3D Modelling

Section	Software	Application
	ANSYS	Finite Element Analysis
	Carrier (E-20 II)	HVAC
	Tank	Tank Design and Calculation
	PUMP	Pump Design and Calculation
	HTSF/HTRI	Heat Exchanger Design
	Hex tran	Heat Exchanger Design
CSB	Sap	Structure Design
	Staad Pro	Structure Design
	Etabs	Structure Design
	Safe	Foundation Design
	Mat 3D	Foundation Design
	Section Builder	Structure Design
	Surfer	Earth Design
	X-Steel	Shop Drawing App.
	Massir	Road Design
	Auto Cad	Map Drawing
Electrical	HTD-STAD	Load Flow Short Circuit
	ETAP	Load Flow Short Circuit
	Eplane 8	Electrical Circuits Design
	Power Word	Lighting
	Calculu	Lighting
	Victor	Cathodic Protection
	Cath	Electrical Design
	Ecabinet	Electrical / Instrument Panel 3D Design
Instrument	Intools 6.2	Instrument and Control System Design
	Firstvue (Fisher)	Control Value Sizing (windows xp)
	Size Master (Farris)	PSV Valve Sizing (windows xp)
	Dpcalc (Rototherm-Termocuple)	Flow Element Sizing (windows xp)
General	PCS	PADKAV Central System for Data/Information Management
Management and Procurement	Sure Trak	Managing
	Primavera	Planning
	MS-Project	Scheduling
	Primavera Expedition	Cost Control

Capabilities of Padkav Energy

Padkav Energy, relying on the power, experience, and expertise of its technical engineering team, is ready to offer consulting and engineering services in the following areas across various energy and manufacturing industries:

1. Providing basic and detailed design services, as well as preparing engineering documents.
2. Providing safety engineering services and conducting conceptual studies, hazard identification, risk analysis, and consequence assessment.
3. Designing and engineering flare networks and systems.
4. Technical consulting and engineering for purchasing and supplying special process packages and safety equipment.

1. Basic and Detailed Design Services and Preparation of Engineering Documents

Padkav Energy, leveraging the capabilities and technical knowledge of its ever-growing human resources, has played a significant role in engineering consultancy projects, basic and detailed design, and preparation of the necessary engineering documents in various processes of the oil, gas, and petrochemical industries in recent years. These services are carried out in various units such as process, safety, mechanical, piping, civil, structural and architectural, electrical, and instrumentation. The important and ongoing projects of the Padkav Energy Design and Engineering Unit are as follows:

Base Design and FEED Engineering for Compression Facilities of South Pars Gas Field

Client:	Client of Padkav Energy: Nargan Amitis Energy Development Main Client: Pars Oil and Gas Company (POGC)
Project Location:	South Pars Gas Field, (PARS1 and PARS2), Persian Gulf, Iran
Project Description:	From 2023, the South Pars Gas Field has faced a decline in gas production. To maintain production rates, the design, construction, and installation of compressor stations for pressure boosting (On-Shore/Off-Shore) have been defined. All engineering teams at Padkav Energy are involved in the project.
Contract Date:	01/06/1402 (Persian Date)
Total Man-hours:	90,000
Total Documents Produced:	640

Detailed Engineering Services for the Design of Zone C at the Makran Petro-Refinery

Client:	Bakhtar Group Company
MC:	HEIDCO (Hormozan Energy Industry Development Company)
Project Description:	The goal of this project is the redesign and detailed engineering of the existing units in Zone C of the First Makran Refinery, located in the Jask region of Hormozgan Province. In this project, Padkav Energy Company is providing services in mechanical, piping, civil, and structural Sections.
Contract Date:	19/04/1403 (Persian Date)
Total Man-hours:	88,000
Total Documents Produced:	800

Basic Design and FEED for the Onshore Section of the North Pars Gas Field Development Project

Client:	Client of Padkav Energy: Nargan Amitis Energy Development Main Client: Pars Oil and Gas Company (POGC)
Project Description:	The project involves basic design and FEED (Front-End Engineering Design) services for the onshore facilities and overall development program of the North Pars Gas Field, which includes four phases. Each phase of the project involves the following facilities: • Offshore Platforms: These include 12 wellheads, producing sour gas with water separation and purification. • Subsea Pipeline: Transports gas from the offshore platforms to the onshore facilities located in Pars 2. • Onshore Gas/Condensate Separation Facilities: These facilities process sour gas from the South Pars gas refineries in Pars 2. The engineering sections involved in this project (onshore section): Civil, Structural and Architectural, Piping, and Instrumentation.
Contract Date:	01/04/1402 (Persian Date)
Total Man-hours:	45,000
Total Documents Produced:	247

Detailed Design of Process and Utility Off-Site Lines for the Qeshm Gas Condensate Refinery Project

Client:	Client of Padkav Energy: Naragan Company Main Client: Javid Energy Parto Company (JEPCO)
MC:	PEMC (Pasargad Energy Mehr Management Company)
Project Location:	Qeshm Island, Hormozgan Province, Iran
Project Description:	The detailed engineering design of off-site activities (detailed design of process and utility transfer lines between the Qeshm Gas Condensate Refinery (QCR) and adjacent complexes, including Qeshm Mowaled (QM), Pars Behin Refinery, and the Qeshm Oil Jetty). All engineering teams from Padkav Energy are involved in this project.
Contract Date:	01/02/1403 (Persian Date)
Total Man-hours:	50,000
Total Documents Produced:	257

Engineering Design and Procurement Services for the Olefin 14 (Firoozabad) Project and its Adjacent Facilities

Client:	Client of Padkav Energy: Naragan Company Main Client: Firoozabad Petrochemical Company (FIPC)
Project Location:	Assaluyeh, Bushehr, Iran
Project Description:	This project involves detailed engineering design and procurement engineering services for the Olefin 14 (Firoozabad) petrochemical unit. All engineering teams at Padkav Energy are involved in the project.
Contract Date:	01/10/1401 (Persian Date)
Total Man-hours:	320,520
Total Documents:	3792
Produced Documents:	417

Basic Engineering Services - Tankage Area of the Propylene Production Unit (Polymer Grade - PDH) Pars Petrochemical

Client:	Client of Padkav Energy: Panah Sanat Part Co. Main Client: Pars Petrochemical
Project Description:	Executing the basic engineering design for the Tankage Area of the PDH Project of Pars Petrochemical Plant, 600,000 tons per year propylene. All engineering teams at Padkav Energy are involved in the project.
Project Location:	Pars Petrochemical Plant, Assaluyeh, Bushehr, Iran
Contract Date:	1403.08.19
Total Man-hours:	8,500
Total Documents Produced:	150

Other notable engineering and design projects by Padkav Energy include:

- Preparation of engineering documents for feedstock and product tanks in the Kangan PDH Unit, for Alay Mahestan Kangan Co.
- Engineering supervision services (MC) for the Bandar Abbas Refinery Development Project, for Farab Company
- Preparation of safety and process documents for the Detailed Engineering Phase of the OVM Project, for Bakhtar Petrochemical Company

- Revision of data sheets and calculations for the Qeshm Gas Condensate Refinery Project, for Nargan Company
- Structural engineering services for buildings in the Qeshm Gas Condensate Refinery, for Nargan Company

2. Safety Engineering, Conceptual Studies, Hazard Identification, Risk and Consequence Analysis

Design and engineering of safety systems across various industries require thorough hazard identification studies, implementation of risk analysis methods, and effective safety management within industrial processes. Padkav Energy, with comprehensive expertise and proficiency in safety engineering and studies across different sectors, has successfully fulfilled these requirements and earned the satisfaction of its clients.

The company's key activities and areas of specialization in the field of safety studies include:

2-1- Studies and identification of hazards, risk analysis, and consequences in processes:

- ✓ (HAZOP) Hazard and Operability
- ✓ (HAZID) Hazard Identification
- ✓ (PHA) Preliminary Hazard Assessment
- ✓ (FMEA) Failure Mode and Effect Analysis
- ✓ (CA) Consequence Analysis
- ✓ (SIL) Safety Integrity Level
- ✓ (QRA) Quantitative Risk Assessment
- ✓ (RAM) Reliability, Availability and Maintainability

2-2- Safety design and engineering based on risk analysis and consequences:

- ✓ Risk Based Hazardous Area Classification
- ✓ Risk Based Fire Proofing
- ✓ Blast Protection Study

2-3- Implementation of the Process Management System (PSM) based on CCPS/OSHA requirements.
2-4- Passive defense studies (conceptual/basic/detailed design/obtaining organizational approval).

Padkav Energy, since its establishment, has completed over one hundred study projects in various industries, including oil, gas, petrochemical, and steel. In general, the schematic map of Padkav Energy in safety studies across different sectors has been demonstrated in upstream oil and gas industries, including wellhead operations, pipeline transmission, compression stations, refineries, petrochemicals, downstream industries, and even steel.

The schematic map of the study projects of Padkav Energy Company in various regions of the country

In addition, by leveraging its experience in the field of safety, the company has expanded its activities into the design and engineering of safety projects, fire suppression systems, and firefighting units for oil, gas, and petrochemical industrial facilities. Some of the most notable safety engineering and study projects include the following:

- Safety design and engineering services for the Sulfur Coated Urea Petrochemical Project in Kermanshah, including the basic and detailed design of active and passive fire protection systems, and preparation of procurement documents.

- Safety design and engineering services for the Damavand Utility and Offsite Project, including the basic and detailed design of active and passive fire protection systems, and preparation of procurement documents.

- Safety design and engineering services for the Gachsaran Petrochemical Offsite Project, including the basic design of active and passive fire protection systems.

- Safety design and engineering services during the basic design phase of the Petrochemical Storage Tanks Project in Assaluyeh, including the basic design of active and passive fire protection systems.

- Safety design and engineering services during the detailed engineering phase of the Abadan Refinery Compressor Station Project, including the detailed design of active and passive fire protection systems, preparation of procurement documents, and purchase of safety and firefighting equipment.

- Safety design and engineering services during the detailed design phase of the new storage tanks project at the Persian Gulf Star Refinary, including the basic design of active and passive fire protection systems.

- Safety design and engineering services and firefighting for the Pars Khavarmianeh Methanol Project, including safety design periods, design of the firefighting building, and procurement services for safety and firefighting items.

- Preparation of safety and firefighting documents during the basic and detailed engineering phase of the PP Project, Alay Mahestan.

- Safety and firefighting design documentation for the detailed engineering of the HPU unit at the Bandar Abbas Refinery.

3- Flare network and system design and engineering projects

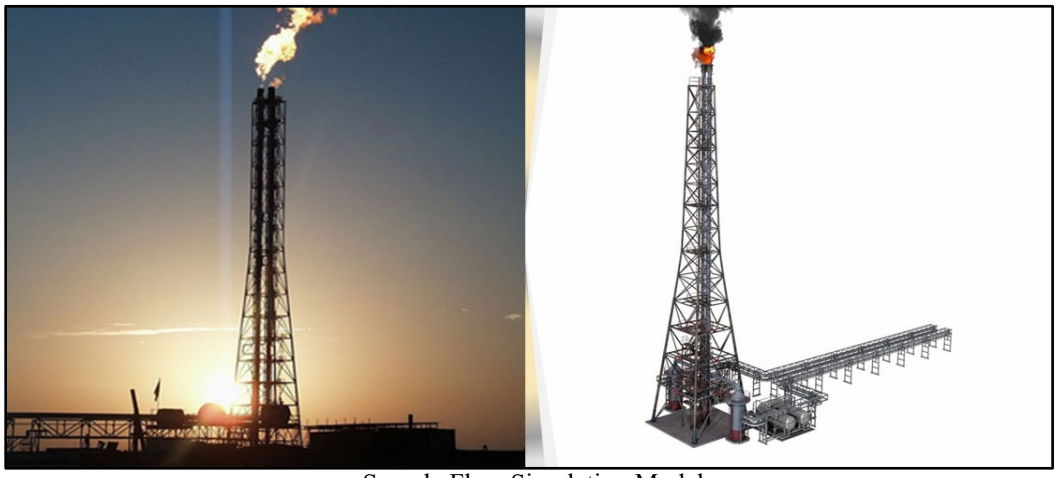
One of the most prominent services that Padkav Energy Company, based on its experiences and expertise, is capable of providing is related to flare systems in various oil, gas, and petrochemical industries. The most significant actions in this area include:

3-1- Conducting Flare Radiation studies using engineering software such as FLARESIM.

3-2- Design and simulation of flare networks and related equipment.

3-3- Procurement consulting regarding flare system-related equipment and packages.

3-4- Design and procurement consulting for systems related to the recovery of gases sent to the flare.



Sample Flare Simulation Model

Some of the most notable flare design and engineering projects of Padkav Energy Company include:

- Preparation of flare system documents for the Shanoul and Serkhun gas compressor stations.
- Preparation of flare system documents for the Star Hormoz Gas Condensate Refinery.
- Flare calculations for the storage tank units of the Takht Jamshid Petrochemical Feedstock Storage.
- Evaluation of the impact of capacity increase at Takht Jamshid Petrochemical on the flare network and flare stack.
- Investigation of the causes of acid flare issues and providing practical solutions to resolve the existing faults at Lavan Refinery.
- Emergency discharge time analysis at Parsian Gas Refinery, including calculating the emergency discharge rate, evaluating the possibility of simultaneous or step-by-step discharge in the flare network, and providing discharge instructions based on flare network load.
- Analysis of the impact of reduced feed flow rate and pressure on safety valves, including simulating process units, sizing safety valves, simulating flare networks, and calculating influential parameters on the flare network at Serkhun Gas Refinery.
- Conceptual design and technical-economic feasibility study for separating flare networks at Parsian Gas Refinery 2, including network simulations, separator vessel and stack calculations, and technical and economic analysis of flare network separation and layout for high-pressure flares.
- Design and engineering of the flare network and unit for the Makran Petrochemical Storage Tanks Project, including flare rate calculations and discharge to flare, flare network design, and equipment calculations.
- Conceptual design and technical-economic feasibility study for flare reduction solutions at Parsian Gas Refinery, including network simulations, providing flare reduction solutions, designing conceptual flare reduction systems, and technical and economic calculations of proposed plans.
- Engineering consulting services and studies for the flares at the Qeshm Oil Project, including sizing stacks and safety calculations related to pollutant emissions and stack radiation.
- Engineering consulting services for the flare network design at Bandar Abbas Gas Condensate Project, including network simulation and calculation of ancillary facilities.

4- Technical and Engineering Consulting for the Purchase and Supply of Specialized Process Packages and Safety Equipment

Given Padkav Energy's expertise in the design and safety of oil, gas, and petrochemical projects, the company provides its clients with access to the most accurate and cost-effective equipment options required. This is particularly possible in the field of safety equipment for firefighting, personal protection, and specialized process packages. Fire safety products and firefighting equipment maintenance can be obtained by direct orders to suppliers at more favorable conditions and prices.

The Equipment Procurement and Supply Unit, which is responsible for the procurement contracts of the company, offers the following services to its employers and clients:

- **Client Communication:** Collaboration and communication with clients to identify needs and ensure timely delivery.
- **Requirements Analysis:** Analyzing client requirements for optimal equipment procurement.
- **Specialized Consulting:** Providing expert consulting to clients with the help of experienced engineers in all engineering branches to select the most suitable products from reputable manufacturers.
- **Supplier Selection:** Evaluating and selecting suitable local and international suppliers based on criteria such as quality, price, delivery time, and reputation.
- **Negotiation and Contracts:** Negotiating with manufacturers to determine contract terms, including product specifications, price, payment conditions, and delivery times.
- **Delivery and Supervision:** Considering the delivery schedules of equipment and monitoring their quality after delivery.

Padkav Energy's Activities in the Field of Procurement Services and Supply of Equipment Include the Following:

4-1- Design and Supply of Various Process Packages

Process packages consist of a set of equipment designed to perform specific tasks in industrial processes. These packages include distillation units, purification systems, heat exchangers, and other chemical processes. The aim of designing these packages is to improve efficiency, reduce costs, and enhance the quality of the final products.

4-2- Firefighting Equipment and Systems

Firefighting systems are crucial for protecting facilities and personnel from potential fires. These systems include water sprays, gas systems, foam systems, and other advanced technologies that can automatically detect and extinguish fires. The design of these systems must comply with safety standards and meet the specific needs of each facility.

4-3- Safety and Personal Protection

Safety and personal protection encompass all tools and protocols that help reduce the risks and potential injuries to workers. This includes the use of protective clothing, helmets, safety glasses, and other safety equipment. Continuous training and safety culture among employees also play a vital role in enhancing workplace safety.

4-4- Gas and Fire Detection and Alarm Systems

These systems are designed to detect and alert the presence of hazardous gases or fire. Typically, these systems include gas sensors, audible and visual alarms, and communication systems to notify

employees and emergency services. The accuracy and responsiveness of these systems are crucial in preventing serious incidents.

Some of the equipment supply projects of Padkav Energy Company include the following:

- Supply of the Total Flooding system for the PDH Alay Mahestan project.
- Supply of deluge valves for the tanks at the Petro-Refinery Kangan project.
- Supply of safety and firefighting equipment for the wellhead facilities and Nargesi manifold, including engineering and procurement of all safety and firefighting items.
- Design, procurement, and construction of the Mobile Test Separator package, including the basic and detailed design, procurement, and construction of a mobile oil separator for wellhead testing.

Mobile Test Separator Package

People, Knowledge, Earth

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