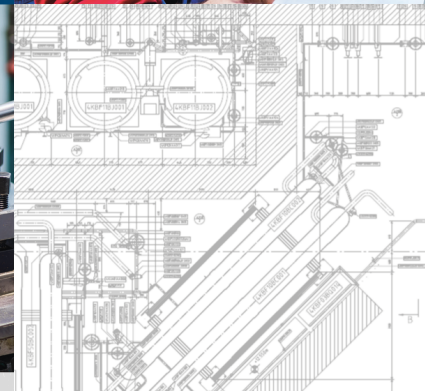
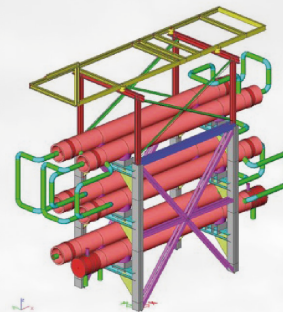


**ENSECO**



**KRÁLOVOPOLSKÁ  
STRESS ANALYSIS GROUP  
s.r.o.**





# Engineering

Assistance with the decision-making process concerning your investments by preparing conceptual design feasibility studies and front-end engineering design.

Complete design documentation for all stages of the project (technological, electrical, I&C parts)







## Mechanical and process engineering

- + Elaboration of technical designs and descriptions with equipment parameters, while taking into account the environmental protection, occupational health and safety and economic efficiency of the project;
- + Design of technological process management systems;
- + Piping and Instrumentation Diagrams (P&ID);
- + Design of pressure and non-pressure vessels, tanks, apparatuses and individual piping parts;
- + Machinery and equipment lists and specifications;
- + Layouts, dimensional diagrams;
- + Pipeline designs including supports and steel structures;
- + Isometric drawings;

## Electrical part

- + Design of artificial lighting, internal heavy-current distribution systems, lightning conductors, external electrical distribution systems (also in explosive environment).

## I&C part

- + Design of visualization and control of individual technological processes;
- + Customized software development;
- + Design of database systems (ORACLE, MySQL);
- + Designs of measuring circuits.

## Coordination

- + Coordination of interfaces and assurance of the project completeness; including coordination with the civil part.

## Mastered Software

- + Process calculation: CHEMCAD, PIPE-NET
- + CHEMCAD is used for thermal validation and Pipe-net for fluid flow and hydraulic analyses
- + Autodesk AutoCAD
- + Autodesk Inventor
- + Autocad Plant 3D
- + PDMS
- + Ansys Fluent
- + SWs for protection dimensioning and lighting designing
- + WinCC OA (previously the software was called "PVSS")
- + TIA portal
- + ORACLE
- + PHP, JAVA
- + Etc.

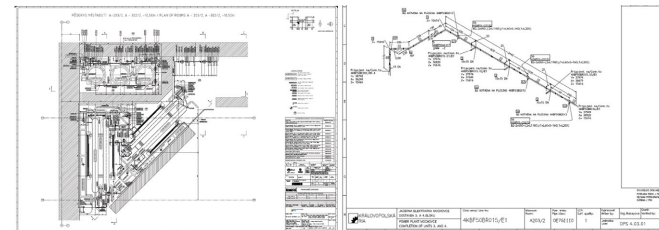
## Standards

- + EN
- + ASME
- + ANSI
- + RTM, PNAE, GOST

# PDMS – Plant Design Management System 3D

- + The PDMS program is a tool that incorporates graphics into database systems to create an objective model of a building – including technologies;
- + The system provides all the comfort for modelling of pipeline systems, steel structures, technological equipment and civil structures, including cable routes and air-conditioning technologies;
- + From PDMS are; thereafter, exported isometric drawings, piping layouts, equipment layouts etc.

## Example of an isometric drawing and a piping layout exported from PDMS



# Aveva engineering tags

- + The PDMS AVEVA Tags is a tool for export of databases from PDMS 3D model, mainly used for management of individual interfaces (interfaces for the civil part, electrical part and I&C part).







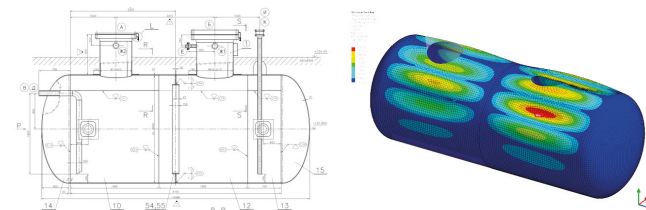
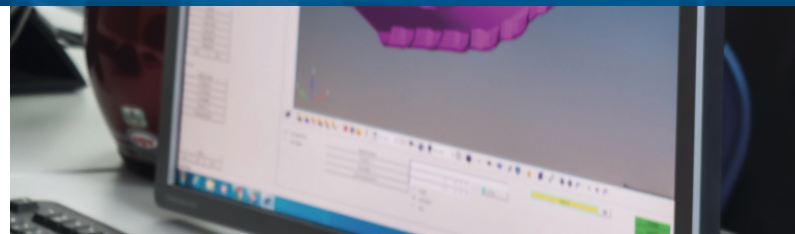
# Calculations and Stress Analyses

## Scope of strength calculations:

- + Stress calculations for designing of dimensions according to different standards;
- + Stress calculations for stress assessment – from basic calculation calculated in compliance with the standards, to the most complex control calculations (most often FEM).

## Strength calculations and dynamic analyses of technological equipment, including supporting steel structures for the following areas:

- + Nuclear power industry;
- + Chemical and petrochemical industries;
- + Power engineering;
- + Water management facilities.



KPS, A. S. – NOVOPOLOCK (BELARUS) – BURIED TANK E15



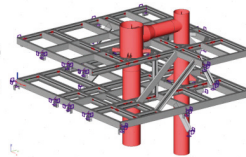
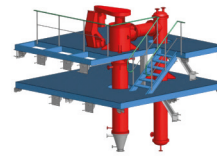


## Stress-strain analyses of:

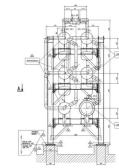
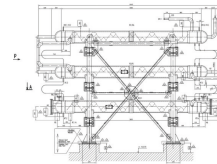
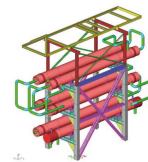
- + pipeline systems including supporting parts and supporting steel structures;
- + apparatuses (pressure vessels, heat exchangers, reactors, columns, etc.) of any shape, type and size - including anchorage;
- + tanks of any size and shape (cylindrical, multi-cylindrical, spherical, angular) - including anchorage;
- + water towers of any size and shape;
- + steel structures of any type and size (technological platforms, supporting steel structures of apparatuses and piping, steel structures of halls, crane runways, etc.) including anchorage;
- + cranes of any type, hoisting facilities and assembly aids;
- + pumps;
- + fittings;
- + flange joints - elaborated on the basis of detailed stiffness analyses for all the types of flange connections and sealing
- + etc.



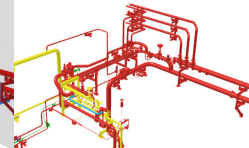
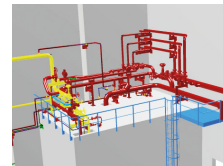
DIAMO, S.P - RECONSTRUCTION OF THE ND 6 TECHNOLOGY - TANK CONSTRUCTION INCLUDING STEEL STRUCTURE ASSEMBLY



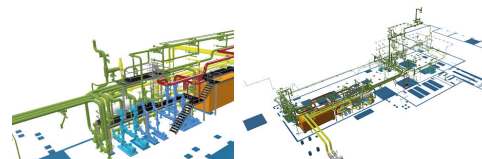
ČEZ, A. S. - NPP DUKOVANY - RECONSTRUCTION OF A ROTARY EVAPORATOR



SLOVENSKÉ ELEKTRÁRNE, A. S. - NPP MOCHOVCE - REGENERATION EXCHAN-



VYNCKE, S. R. O. - VAN DE WEIJER - TURBINE PIPING



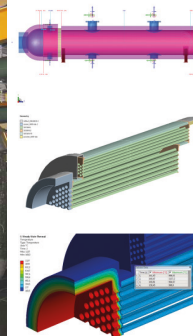
VYNCKE, S. R. O. - ENECO - HOT WATER PIPELINE

## Stress-strain analyses with the following loads:

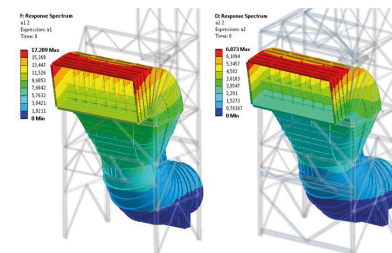
- + static (of any force and deformation character);
- + dynamic (of any force and deformation character; including special loads like wind, seismicity, operational vibrations, etc.);
- + thermal fields (steady or unsteady, including shocks).

## Stress-strain analyses of various types

- + static linear and nonlinear (geometric or material non-linearity);
- + dynamic (Eigen values and modes even in complex range, harmonic vibrations, expansion according to Eigen modes, direct integration for linear or nonlinear systems);
- + seismic for any defined excitations including the method of spectra response (mono and multi-spectral analyses) and HCLPF factor calculations;
- + calculations of thermal fields and thermomechanical calculations (steady, unsteady, linear, non-linear);
- + fatigue;
- + stability;
- + various special problems like: interaction problems between fluid and elastic substances, fracture mechanics, vibration of tall, slender stacks in the wind



ČEZ, A. S. – NPP DUKOVANY – STORAGE POOL COOLER



Výsledné vektory posuvů na kouřovodu – odezva na testovací buzení - před vyztužením vlevo (17mm), po vyztužení vpravo (7mm)

TENZA, A.S. – PP OPATOVICE – FLUE GAS DUCT





## Mastered Software

### + Pressure vessels:

- PVElite – SW for both tall, vertical (chimneys, columns, reactors) and horizontal (exchangers) pressure vessels' stress analysis according to ASME, Section VIII, Div. 1 a Div.2, PD-5500
- PVESS

### + Piping:

- JAPAR + APEG – SW developed inside the company for stress analysis according to the Russian standards
- STAPAR
- Caesar II
- ROHR2

### + Steel structures:

- SCIA Engineer – Nemetschek Group
- IDEA STATICA

### + FEA software:

- ANSYS
- SYSTUS

### + Specialized SW:

- VVD – Visual Vessel Design, Ohm Tech a. s., Pressure Vessel Design Code
- SEINV
- SEINH

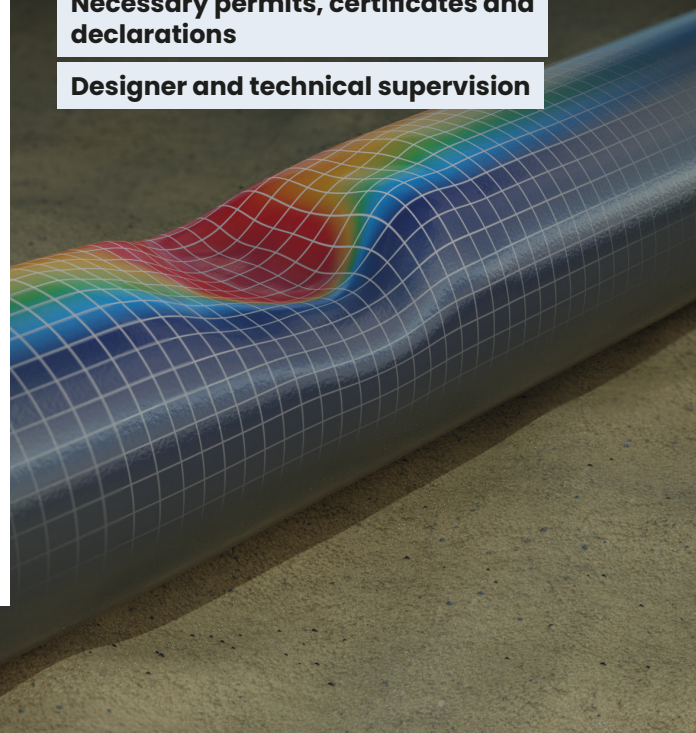
## Energy audit

## Construction organization project

## Occupational health and safety plan

## Necessary permits, certificates and declarations

## Designer and technical supervision





## Human resources

- + **Total resources for designing and engineering activities: 62 persons in Brno and 20 persons in Mochovce**
- + **Design management, designers (mechanical specialists for static equipment, mechanical specialists for rotation equipment, mechanical specialists for valves, mechanical specialists – piping/3D modelling, specialists for the process calculations, specialists for the civil part, specialists for the electrical part, specialists for the I&C part)**
- + **Total resources for calculation engineering activities: 23 persons in Brno and 2 in Mochovce**

## References from the field of chemical industry

ENSECO employees cooperated with the employees of our subsidiary company KP SAG to perform engineering works and to elaborate project documentation for the following projects in the field of chemical industry:



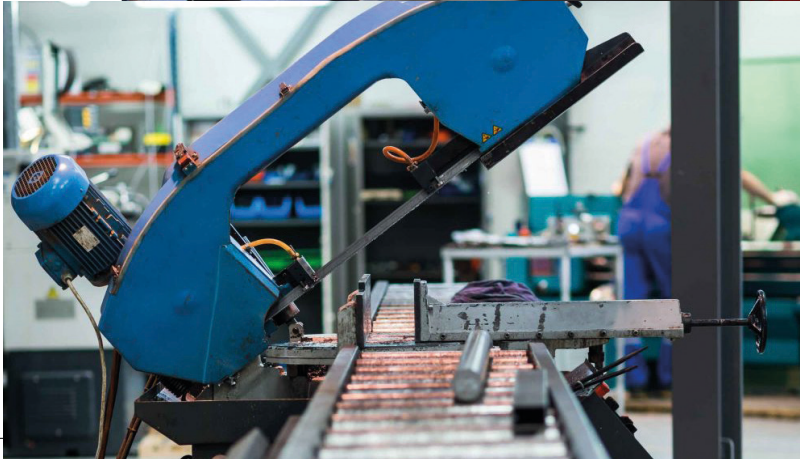
2017	Diamo NDS 6	Stráž pod Ralskem, CZ	Reconstruction of neutralizing and decontamination station NDS6 (turn-key project).
2015	Česká rafinérská, Technological breaks: 2015 – 2016	Litvínov, CZ	Realization of individual investment projects at the time of regular shutdown of the complex in the form of a turnkey delivery.
2014	Motorpal Jihlava – Reconstruction of Neutralization and Deemulsification Station	Jihlava, CZ	Reconstruction of neutralization and de-emulsification station of the company MikroChem LKT, production facilities Jihlava, within the premises of the company MOTORPAL Jihlava. Removal of the existing equipment, delivery and installation of the new WWTP technological equipment and piping, delivery and installation of the electrical equipment and instrumentation; putting the wastewater treatment plant into operation.
2014	Synthesia, a. s. –Reconstruction of the HP Steam Distributors and HP Piping in the Boiler and Machine Hall – Phase II	Pardubice, CZ	Reconstruction of the steam distributors and piping in the boiler and machine halls. The Project was executed on a turn-key basis.
2014	Diamo NDS 6 – Design Works – Reconstruction of NDS 6 Technology	Stráž pod Ralskem, CZ	Preparation of the design documentation for Building Permit and Detail Design; design supervision in the course of the reconstruction of NDS 6 neutralisation and decontamination station.
2013	Lovochemie – Calcium nitrate, “Complex Innovation of Production Process”	Lovosice, CZ	Delivery and installation of the mechanical and technological equipment for the production of a granulated fertilizer – calcium nitrate. The Project was executed on a turn-key basis, including preparation of the documentation and putting the equipment into operation.
2013	Lovochemie – Construction of Limestone Lumps Storage Facilities	Lovosice, CZ	Delivery and installation of the mechanical and technological equipment for the limestone lumps storage; construction of the roads and engineering networks. (Turn-key project)
2011	Diamo NDS 10, PS 104 – Ammonia stripping, PS 114 – Steam source	Stráž pod Ralskem, CZ	Preparation of the design documentation, guarantee test performance and start-up of the elementary systems: PS 104 – Ammonia stripping and PS 114 – Steam source; within the construction of the neutralisation and decontamination station NDS 10 in DIAMO company. General delivery.
2010	Diamo NDS 10, PS 101 – Neutralization	Stráž pod Ralskem, CZ	Preparation of the design documentation, guarantee test performance and start-up of the elementary system PS 101: Neutralisation; within the construction of the neutralisation and decontamination station NDS 10 in DIAMO company. General delivery.





# Technical preparation of Construction, Mounting, Machining and Installation Works

We schedule, coordinate and execute the installation. Our expert welders and workshop fitters are at your disposal.



Even though we have established our market position as a company specialized in testing and commissioning of nuclear facilities, our portfolio contains also activities associated with construction and manufacture preparation, as well as manufacturing and installation. We offer these activities also as a stand-alone service in any engineering sector (also outside the scope of energy sector). We provide installation and manufacturing schedule, as well as logic sequencing and coordination of individual works with links to functional and complex testing within the frame of the applicable legislation and client's requirements.



## Services within the scope of technical preparation of construction

- + Price quotations, time and material calculations, time schedule preparation;
- + Technological procedures and safe work practices in compliance with the Decree no. 124/2006, Coll. and 147/2013, Coll.;
- + Welding documentation in compliance with ISO 9000:2015, STN EN 3834, STN EN 14731 – pWPS, WPS;
- + Classified equipment installation, refurbishment and repair procedures in compliance with the Decree no. 430/2011, Coll.;
- + Selected technical equipment installation, refurbishment and repair procedures – pressure, gas and lifting equipment – in compliance with the Decree no. 508/2009, Coll.;
- + Welding procedures for manufacturing and installation activities;
- + Post-installation cleaning operation programmes for technological equipment, circuits and units of the selected technical equipment – pressure and gas – in compliance with the Decree no. 508/2009, Coll. and of the classified technical equipment in compliance with the Decree no. 430/2011, Coll.;
- + Pressure test programmes for technological equipment, circuits and units of the selected technical equipment – pressure and gaseous – in compliance with the Decree no. 508/2009, Coll. and the classified technical equipment in compliance with the Decree no. 430/2011, Coll.;
- + Welding coordination according to STN EN 3834 – EWE/IWE and EWT/IWT;
- + Internal surface inspection of equipment, circuits and units by an industrial videoscope;
- + Liquid medium flow rate measurement by a portable ultrasonic flow meter for DN15 – DN700;
- + Technical supervision for manufacturing, installation, refurbishment, repairs and testing activities.

## Assembly management and performance

- + Workshop based welding, metal-working and pipe-fitting;
- + Manufacturing of piping insulation by in-house machines and its subsequent installation;
- + Machining of metallurgical products and components, class 1-9: parting, cutting, bending, lathe-turning, milling, drilling, grinding;
- + Semi-products and components manufacture for power, chemical and food processing industries;
- + Plasma cutting, autogenous cutting;
- + Pre-assembly fabrication of technological equipment, units and steel structures according to the technical documentation;
- + Technological equipment repairs and refurbishment for power, chemical and food processing industries;
- + Designing, manufacturing, installation, dismantling, certification and servicing of pressure vessels according to the Decree no. 508/2009 and PED 2014/68/EU;
- + Pressure and gas equipment installation and dismantling;
- + Design, manufacture, refurbishment and dismantling of pipelines made of carbon and stainless steel;
- + Design, installation, dismantling and servicing of gas and pressure equipment (regulation stations, gas boilers, heat exchanger stations);
- + Manufacture, installation and dismantling of steel structures, load platforms and roofing – including civil activities;
- + Orbital welding.

ENSECO



## Manufacture and installation of piping insulations

For this purpose, we procured a high quality machine for the production of sheet metal parts for thermal insulation. This machine has all the attributes of the latest technology. A dedicated team was trained to work with this special equipment and improve its expertise:

- + We offer complex sheet metal working services including surveying, bidding, consultancy, material supply and installation of sheet metal systems plus warranty and post-warranty services.
- + We manufacture thermal insulation, cold insulation, HVAC distribution systems including surface finish with heat saving, environmental protection, as well as health and safety measures to prevent burn injuries.
- + In sheet metal insulation manufacturing, we use the latest technology, specifically, the Swiss-made MABI Bingo 16-Z EVO, MABI Logo, MABI 4B and MABI 4QS.
- + Further sheet metal parts processing is done using METALKRAFT® equipment and equipment procured from První hanácká BOW, spol. s r. o., Bři Švarcové, s. r. o., SEMET, s. r. o., etc.



## Services related to valves, operation, maintenance and repair of rotating machines

- + Preparation of sealing programmes, torque calculations, designing of NOVADISC 7 gaskets;
- + Manufacture of novaphit®MST flat gaskets up to ø1450, larger dimensions by waterjet cutting;
- + Diagnostics of rotating machines, valves and bearings – CMMS®CHECKER 2, SONAPHONE Pocket (workers are certified by DIAGO Brezno), vibration diagnostics by VIBER X2, LUTRON VT-8204;
- + Alignment and mounting of rotating machine frames by means of digital levelling instrument, inspections of alignment of rotating machines conducted by Fixturlaser EVO I-0934;
- + Reconditioning of mechanical seals, sealing faces of valves – planar and conical (DN8 – DN150), gate valves, check valves, flanges (DN40 – DN350 and DN200 – DN700);
- + Repairs, reconditioning and maintenance of rotating machines and equipment, replacement of gaskets, oil and bearings;
- + Technical support and expertise during commissioning of new and reconditioned rotating machines and equipment, trial run and functional tests.





## We have our own fully equipped shop

Preparatory, pre-assembly, manufacturing and machining works are carried out at our own manufacturing site by highly qualified, certified and multilingual employees. Our services include manufacturing of thermal insulations for technological equipment and subsequent installation of the insulation by our in-house fitters. The thermal insulation is manufactured by our own technology, directly at our manufacturing sites.

## Human resources

- + 12 Project Managers for coordination of particular projects
- + 15 assembly, service and testing coordinators
- + 20 qualified and highly experienced welders
- + 35 experienced pipefitters
- + 8 steelworkers
- + 4 valve specialists
- + 4 pump specialists
- + 8 workshop workers for metal processing
- + 8 thermal insulation workers
- + 8 workers for technological support (for flushing, pressure testing, commissioning)





# Quality Control

Execution, documentation and supervision

We control the performance and supplied material, so that you get a top quality project or technology. In addition to works supervision and relevant inspections, we prepare complete quality documentation, starting with inspection and test plans, through WPS, WPQR, to classified equipment quality plans and accompanying technical documentation. Based on the certificates obtained by our inspection technicians, we are authorized to supervise manufacturing and installation of pressure and gas equipment, as well as conduct pressure tests and revisions. We provide our services both in the EU, as well as in third countries; always in compliance with local standards and legislation.



## Certified welding engineers, technologists and welders

One of the core services is welding, where we adhere to national, European and international standards. We provide not only welding, but also complete welding documentation, welding supervision and all the necessary testing of weld joints, equipment and structures. We are ready to provide our welding activities both as a part of a service package, as well as a separate service.

## PMI using in-house spectrometer

For the purposes of PMI (Positive Material Identification) we have procured our own mobile optical emission spectrometer (OES) – a portable laboratory instrument that provides quick and accurate classification of materials and accurate analyses of metallic materials' chemical composition, and that is directly under operational conditions. The spectrometer is equipped with a top quality ZEISS optical system with excellent resolution, allowing accurate measurements of individual elements. Our employees have been specially trained for its operation.



### Furthermore, we specialize in:

- + **Non-destructive testing of weld joints: visual examination (VT), penetrant test (PT), X-ray test (radiographic) (RT), ultrasonic volume test (UT), ultrasonic thickness testing of the material (UTT), leak test of welds (LT).**
- + **Coordination and quality supervision of works and processes.**
- + **Configuration, creation and enhancement of quality control processes.**
- + **Inspections of lifting equipment and elevators; verification of equipment functionality and safety.**
- + **Inspections of electric equipment; proof of safety.**

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## Human resources

- + European and international welding engineers – 7 persons.
- + European and international welding technologists – 5 persons.
- + Personnel qualified for execution of VT (Visual testing of welds) – Level 2 according to EN ISO 9712 and PED 2014/68/EU – 20 persons.
- + Personnel qualified for execution of PT (Penetration testing of welds) – Level 2 according to EN ISO 9712 and PED 2014/68/EU – 20 persons.
- + Personnel qualified for execution of LTB Level 2 (Leak test) according to EN ISO 9712 and PED 2014/68/EU – 4 persons.
- + Personnel qualified for execution of RT-R Level 2 (Radiographic film interpretation) according to EN ISO 9712 and PED 2014/68/EU – 5 persons.
- + Personnel qualified for execution of UTT (Ultrasonic thickness measurement) according to EN 14127 – 11 persons.
- + Personnel trained for execution of non-destructive PMI tests (positive material identification) – 4 persons.
- + Supervision personnel for pressure tests of pressure and gas equipment and pipelines – 12 persons.
- + Supervision personnel for lifting equipment – 1 person.





# Technological Units/Systems Commissioning

System commissioning breathes life into the installed equipment. These activities can be carried out only by a narrowly specialized group of employees, capable of organizing the commissioning of these complex systems and making important technical decisions in the commissioning process. We know how to test and start up any technological system, regardless of whether it is a nuclear facility, non-nuclear power facility, or another technological equipment.

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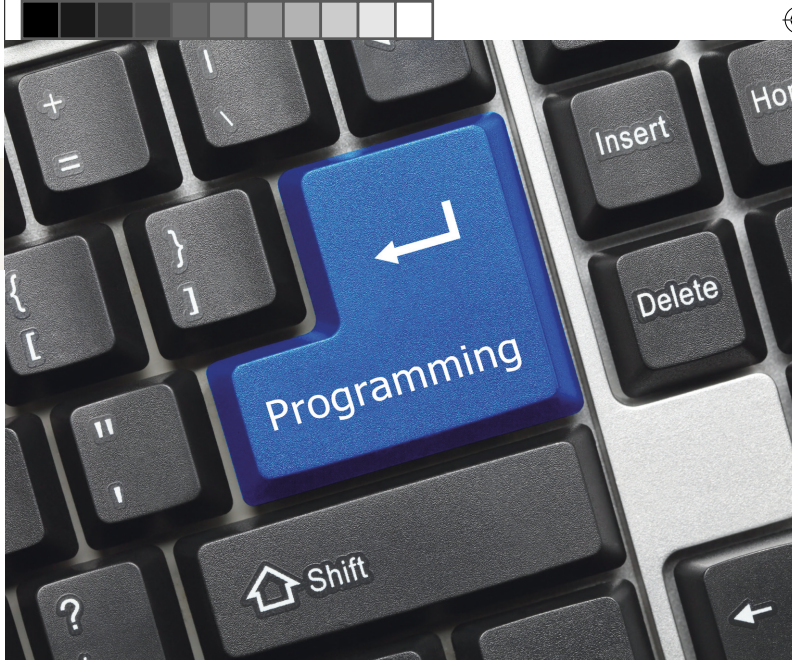
### **We provide:**

- + **Management of installation completion at the commissioning stage.**
- + **Development of post-installation cleaning operation programmes for piping systems.**
- + **Development of pressure test programmes required by SR and EU legislations.**
- + **Management and execution of post-installation cleaning operations.**
- + **Management and execution of piping systems and equipment pressure tests.**
- + **Development of individual test programmes for individual technical equipment classified into a technological unit/system: mechanical, electro and I&C.**
- + **Development of functional test programmes for technological units/systems across the professions.**
- + **Management and coordination of functional tests execution across the professions.**
- + **Development of commissioning time schedule taking into account all inputs and sequences.**

### **Human resources**

- + **Commissioning specialists – 11 persons**





- + Our IT services complete the entire process of our work on your order. The idea takes shape of an application or a system in compliance with your requirements. We also offer our experience in database systems operation, as well as consulting and assistance in finding optimal solutions. We provide these services also individually.
- + Programming is the final phase of the development and assembly of the ordered technology, going hand in hand with the commissioning and supporting the control of all its functional processes. Our clients appreciate that the IT part of their project is handled by the same company that planned, installed, tested and launched the project. Another indisputable advantage is time efficiency, as well as streamlined problem solving.

# IT Services

## IT programming activities include

- + Visualization and control of technological processes via WinCCOA (Windows, Linux);
- + Customized software development (Windows, Linux);
- + Web apps;
- + JAVA applications;
- + Design and implementation of database systems: ORACLE, MySQL (Windows, Linux);
- + Installation and configuration of workstations and servers (Windows, Linux).

## Other services

- + Design of corporate networks, namely: LAN/WAN hardware networking, logical division design of LAN/WAN networks;
- + Design and configuration of company servers, designing and implementing software server configurations, management of domains, mail servers, etc.;
- + Administration of information systems;
- + Delivery of customized hardware.



# Important References

## **Artificial Lighting and Heavy-current Distribution Systems, Lightning Conductor and Grounding at CS 801/1-02, Mochovce NPP, Units 3 and 4**

**Key features of the project:**

- + **Designing, supplying, engineering, coordination, installation, tests, commissioning of the artificial lighting and heavy-current distribution systems**





## **Completion of Mochovce NPP, Units 3&4 – Design, Delivery, Assembly and Tests of the Respective Elementary Systems– Mochovce NPP, Units 3 and 4**

### **Key features of the project:**

- + Elaboration of the detail design documentation; provision of deliveries;**
- + Assembly/installation;**
- + Performance of tests (PICO – Post-Installation Cleaning Operations, POT – Pre-Operational Testing, CT – Commissioning Testing) of elementary systems at Mochovce NPP: PS 03,11,14 and 54;**
- + Quality assurance and quality control documentation; accompanying technical documentation;**
- + Time schedules; documents concerning safety and health protection introduced within STC (Safety and Technical Conditions of Performance) and provision of all other materials, works and services concerning the Unit 3 and common systems of the Units 3&4**

## **Investment Project (IPR) EBO 9000 – Units' Power Output Increase at Jaslovské Bohunice NPP, V2**

### **Key features of the project:**

- + Management of functional tests in the course of the general overhaul performance;**
- + Management of pre-operational testing (POT) and commissioning testing (CT) in the course of the general overhaul;**
- + Management of pre-operational testing (POT) and commissioning testing (CT) in the course of the units start-up and physical & power escalation tests;**
- + Provision of organizational managers of POT and CT;**
- + Management of the agenda for tests control and performance;**
- + Completion and evaluation of the documentation necessary for POT and CT initiation; and**
- + Cooperation coordination of the operation, administration and maintenance departments of SE EBO and individual supplying organizations (contractors) during test preparation.**





## **Technical Support during the Reconstruction of the Turbine Generator and its Accessories – Nováky NPP, Unit 4**

### **Key features of the project:**

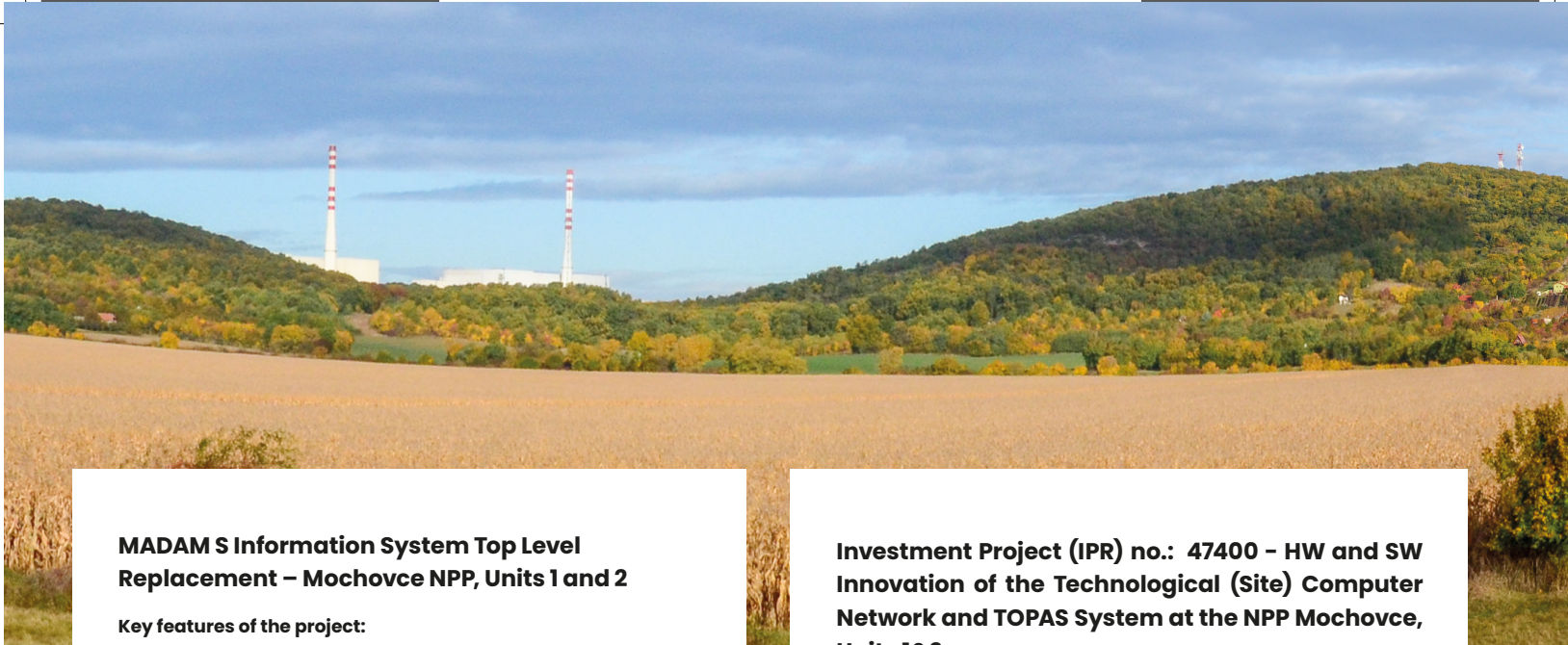
- + Machinery technology (elaboration of time schedules, coordination and control of assembly, construction tests, pressure tests, post-installation cleaning operations, control and performance of POT (pre-operational testing) and CT (commissioning testing), protocol-based evaluation);
- + Instrumentation and Control (coordination and control of disassembly & assembly – TG turbine hall, static exciter set, nitrogen system, inspection of the measuring circuits incl. the respective SW, tests of protections and blockades, control and performance of POT and CT, RP (radiation protection) optimization);
- + Electro-part (civil readiness, design documentation, project of excitation transformer protection, assembly procedure, setting, testing of the excitation transformer protections, testing of couplings, inspection of current and voltage circuits of protections and measurements after cabling replacement, preparation for and performance of primary tests incl. phases linkage into the electric network, organization of tests regarding the turbine operation – into the power system; POT and CT programmes.

## **Technical Support for the General Supplier of the Technological Part by Commissioning of Temelín NPP, Units 1&2, Czech Republic**

### **Key features of the project:**

- + Supervision over the monitors' installation completion with reference to PP/t (Operating Instructions/ technology) dPP/t (Partial Operating Instructions/ technology) and respective contractors' documentation;
- + Coordination of reference/background materials for elaboration of initial revisions;
- + Examination of the accompanying technical documentation; inspection of monitors' connection and functioning;
- + Professional supervision over POT (pre-operational testing) and CT (commissioning testing) of the Radiation Monitoring Systems regarding: MRB (Main Reactor Building), NAB (Nuclear Auxiliary Building), MRB stacks, NAB stacks and waste water of elementary subsystems (DPS) of both units at Temelín NPP.





## **MADAM S Information System Top Level Replacement – Mochovce NPP, Units 1 and 2**

### **Key features of the project:**

- + First launching of PVSS system (WinCC OA) at NPP Mochovce – i.e. at both NPP units and the simulator;
- + Complete design of the system HW;
- + Design and configuration of the network elements – collapsed ring topology;
- + Hot-standby type of servers; switching to backup server in 1s;
- + Long-term data archiving; currently exceeding 14-year time;
- + Development of custom communication drivers to connect to diverse systems;

## **Investment Project (IPR) no.: 47400 – HW and SW Innovation of the Technological (Site) Computer Network and TOPAS System at the NPP Mochovce, Units 1&2**

### **Key features of the project:**

- + Utilization of WinCC OA, v. 3.12 software;
- + Utilization of the database system ORACLE for data archiving;
- + Development of a custom application for presentation of technological data (WEPAS);
- + Utilization of JAVA language.
- + Approx. 250 visualization schemes included in the hierarchical topology.





## **Replacement of the Top Level regarding the Control and Information System for HVAC and Auxiliary Systems – Mochovce NPP, Units 1&2**

### **Key features of the project:**

- + SW PVSS 3.8 used, not only for visualization, but also for technology control;
- + Complete design of the top level system;
- + More than 35k of input/output signals;
- + Long-term archiving of data and commands from operators;
- + Object-oriented data model of equipment in technology;
- + More than 350 visualization schemes for the management.

## **Investment Project (IPR) no.: 925 05 – Completion of the Network for Data Transfer to the Emergency Control Centre of NPP Mochovce**

### **Key features of the project:**

- + Development of a custom-designed web application for technological data displaying;
- + Switching between real and simulated data for the needs of ERO (Emergency Response Organization) training;
- + Utilization of the database system: ORACLE, development of a custom redundancy in ORACLE.







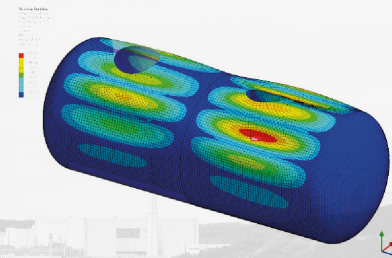
**Investment Project (IPR) no.: EMO49000 – Execution of thermal and technical balances of ROVE systems– Automated Control System of the Manufacturing Process at Mochovce NPP, Units 3&4**

**Key features of the project:**

- + The original system: SINAUT SPECTRUM replaced by the system: WinCC OA 3.14;
- + Thermal, technical and balance calculations of the units' efficiency;
- + Hierarchical system of calculations according to the defined priorities and input parameters;
- + Development of a custom communication module for connection to the PICS system in NPP Mochovce, Units 3&4 (XU protocol).

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