delta inženjering

2017 GODIŠNJI IZVEŠTAJ

ANNUAL REPORT

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Uvod

2016. godina je bila „naporna" godina, opterećena kreditnim obavezama, oslabljenom likvidnošcu i krizom top menadžmenta.

Ulaskom u 2017. godinu, ušli smo u godinu promena.

Sklopili smo velike dugoročne ugovore, izmirili smo sve kreditne obaveze i zaostale obaveze prema dobavljačima.

Ojačali smo. Postavljen je nov top menadžment koji se pokazao kao daleko spremniji da odgovara na izazove. U 2017. je izvršena vlasnička transformacija, odnosno, najveći deoničar je otkupio i sve ostale udele.

U 2017. godini smo se značajno kadrovski osnažili u sva tri projektna biroa, te je aktuelan broj zaposlenih 92.

U prethodnih godinu dana primljeno je 20 inženjera različitih struka koji su timski organizovani, stručni i ambiciozni.

Promet će biti oko 3.400.000 evra, a dobit 300.000 evra. Ono što je najvažnije je da u 2018. godinu ulazimo sa dugoročnim projektima, kao i sa onima koje nazivamo potencijalnim i za koje verujemo da će se realizovati.

U 2018. godinu ulazimo sa oko 10.000.000 evra obezbeđenih ugovora, što obezbeđuje na prvom mestu dvogodišnje fiksne troškove i sa druge strane razvoj i rast firme.

Introduction

2016 was a "hard" year, weighted with credit obligations, weakened liquidity and top management crisis.

By entering into 2017, we entered into a year of changes.

We contracted a large number of long-term contracts, settled all credit liabilities and expected liabilities to the suppliers.

We have strengthened. A new top management proved to be more willing to respond to challenges.
In 2017 the ownership transformation was made, the largest shareholder has bought out all other shares.

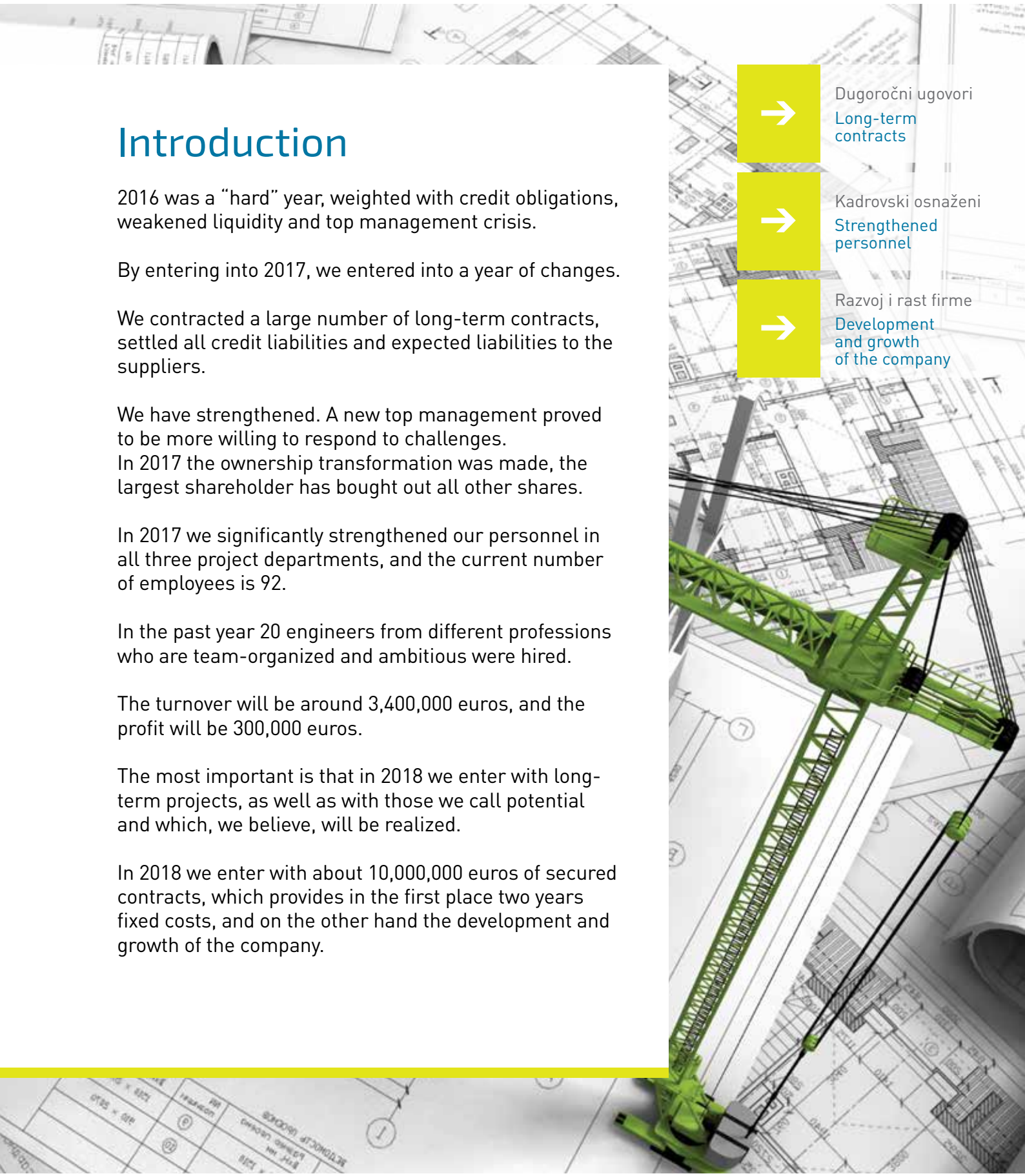
In 2017 we significantly strengthened our personnel in all three project departments, and the current number of employees is 92.

In the past year 20 engineers from different professions who are team-organized and ambitious were hired.

The turnover will be around 3,400,000 euros, and the profit will be 300,000 euros.

The most important is that in 2018 we enter with long-term projects, as well as with those we call potential and which, we believe, will be realized.

In 2018 we enter with about 10,000,000 euros of secured contracts, which provides in the first place two years fixed costs, and on the other hand the development and growth of the company.



Dugoročni ugovori
Long-term contracts

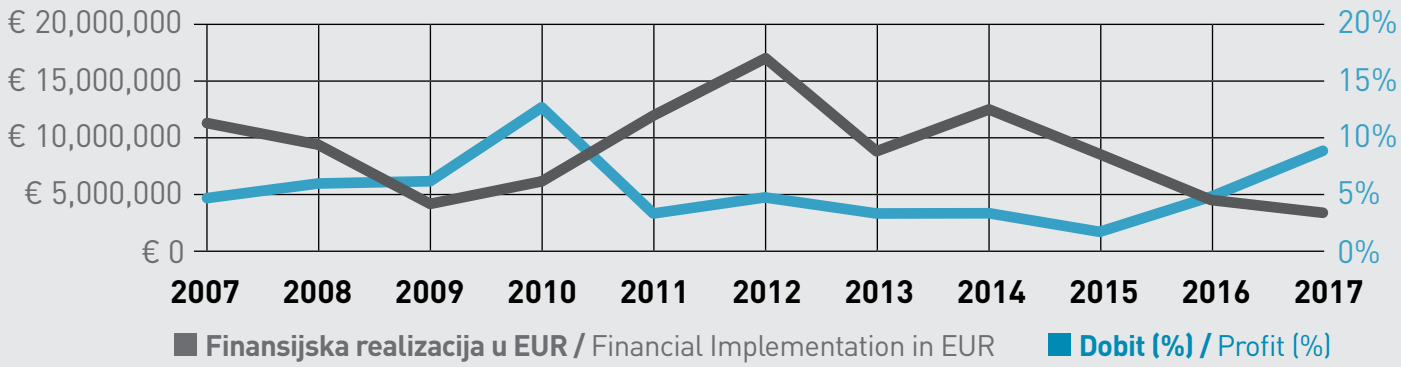
Kadrovski osnaženi
Strengthened personnel

Razvoj i rast firme
Development and growth of the company

01
Finansijski pregled
Financial Summary

Pregled realizacije i dobiti
Overview of the Implementation and Profit

Godina Year	**Finansijska realizacija u EUR** Financial Implementation in EUR	**Dobit u EUR** Profit in EUR	**Procenat %** Percentage %
2007	€ 11,351,600	€ 538,600	4.74 %
2008	€ 9,443,850	€ 562,066	5.95 %
2009	€ 4,142,354	€ 254,771	6.15 %
2010	€ 6,182,608	€ 778,260	12.59 %
2011	€ 12,014,345	€ 382,260	3.18 %
2012	€ 17,102,226	€ 800,000	4.68 %
2013	€ 8,851,000	€ 296,000	3.34 %
2014	€ 12,500,000	€ 420,000	3.36 %
2015	€ 8,600,000	€ 150,000	1.74 %
2016	€ 4,528,057	€ 219,370	4.85 %
2017	€ 3,400,000	€ 300,000	8.80 %



Analiza poslovanja u 2017. godini

Glavna obeležja Delta Inženjeringa protekle poslovne godine su:

1. Stabilizacija poslovanja i finansijska konsolidacija zahvaljujući sredstvima dobijenim od prodaje poslovne zgrade. Sredstva su iskorišćena za prevremenu otplatu kredita kod Erste banke, izmirenje svih dospelih obaveza prema dobavljačima, kao i otkup vlasničkog udela dvojice suvlasnika.
2. Akvizicija novih poslova što za rezultat ima preko pet miliona evra novougovorenih poslova u projektovanju i preko tri miliona evra poslova u izvođenju.
3. Kadrovsko ojačanje neophodno za realizaciju preuzetih ugovornih obaveza, kao i značajno uključivanje spoljne saradnje.

Delta Inženjering se, kao aktivni učesnik svih velikih projekata koji se trenutno rade u energetskom i industrijskom sektoru Srbije, potvrđuje kao nezaobilazan partner našim najvećim privrednim sistemima - EPS, NIS i Železara Smederevo (HBIS). Reference i kadrovski profil Delta Inženjeringa čine nas poželjnim partnerom i u svim ostalim granama industrijskog sektora.

Business Analysis for 2017

The main features of Delta Inženjering in the past business year were:

1. Stabilization of business and financial consolidation thanks to the funds obtained from the sale of a business building. The funds were used for the repayment of loans from Erste Bank, the settlement of all relevant obligations towards suppliers, as well as the repurchase of ownership share from two co-owners.
2. Acquisition of new jobs resulting in over five million euros of new contracted jobs in design and over three million euros of new contracted jobs in construction.
3. Personnel reinforcement necessary for the implementation of contractual obligations, as well as significant involvement of external associates.

Delta Inženjering, as an active participant in all major projects currently operating in the energy and industrial sector of Serbia, confirms itself as an indispensable partner to our largest economic systems - EPS, NIS and Železara Smederevo (HBIS). The references and personnel profile of Delta Inženjering make us the desirable partner in all other branches of the industrial sector.

3,400,000	Prihod u EUR Income in EUR
3,000,000	Rashod u EUR Expense in EUR
300,000	Dobit u EUR Profit in EUR

Pregled najvećih investitora u 2017. godini

Overview of the Most Important Investors in 2017

Naši najveći investitori u 2017. godini bili su: JP EPS, Johnson Electric, CB&I, Grundfos, NIS, Alumil, Energotehnika - Južna Bačka, Istrabenz Plini, Henkel, Impol Seval i drugi.

Our main investors in 2017 were: JP EPS, Johnson Electric, CB&I, Grundfos, NIS, Alumil, Energotehnika - Južna Bačka, Istrabenz Plini, Henkel, Impol Seval and many more.

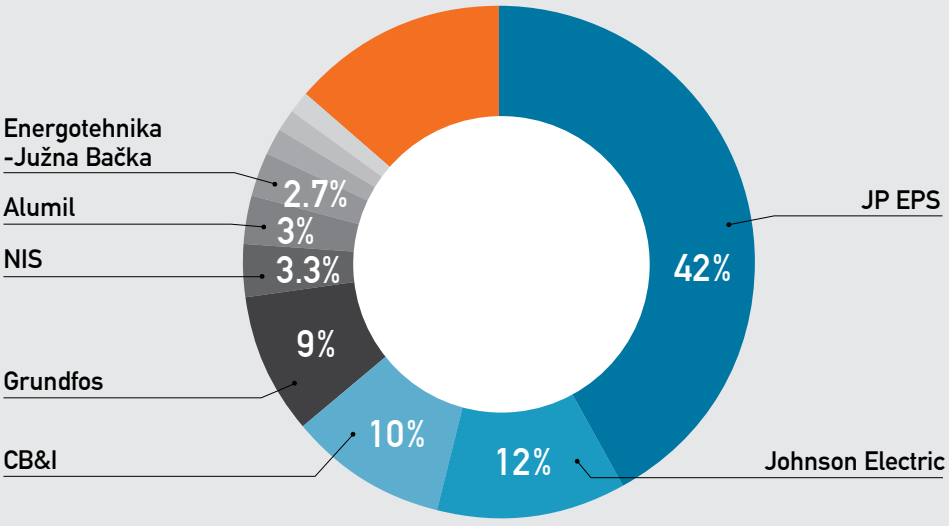
NAJVEĆI INVESTITORI / THE MAIN INVESTORS IN 2017

Investitor / Investor	RSD	EUR	%
JP EPS	176.552.372,73	1,490,236.76	42 %
Johnson Electric	50.443.535,07	425,781.93	12 %
CB&I	42.036.279,22	354,818.28	10 %
Grundfos	37.832.651,30	319,336.45	9 %
NIS	13.871.972,14	117,090.03	3.3 %
Alumil	12.610.883,77	106,445.48	3 %
Energotehnika-Južna Bačka	11.349.795,39	95,800.93	2.7 %
Istrabenz Plini	7.146.167,47	60,319.11	1.7 %
Henkel	6.305.441,88	53,222.74	1.5 %
Impol Seval	5.464.716,30	46,126.38	1.3 %
Ostali / Others	56.748.976,95	479,004.67	13.5 %
UKUPNO / TOTAL	**420.362.792,21**	**3,903,001.04**	**100 %**

JP EPS

Johnson Electric

CB&I



Kadrovi

Tim Delta Inženjeringa je organizovan u tri sektora: projektovanje, inženjering i ekologija.

Poseban tim je oformljen za akviziciju posla.
U sastavu tima su iskusni, cenjeni i vrsni poznavaoci tržišta.
Tokom 2017. godine primljeno je 20 inženjera različitih struka.
Broj diplomiranih inženjera nam omogućava da posedujemo veliku licencu izdatu od strane Ministarstva građevinarstva, saobraćaja i infrastrukture.
Licenca pokriva sve aktivnosti Delta Inženjeringa.

Delta Preving je član Delta grupacije i bavi se projektovanjem i izvođenjem protivpožarnih instalacija.
Delta Preving ima četiri licence Ministarstva unutrašnjih poslova i Ministarstva građevinarstva, saobraćaja i infrastrukture:
- rešenje o projektovanju posebnih sistema i mera zaštite od požara
- rešenje za izradu glavnog projekta zaštite od požara
- licencu za izradu tehničke dokumentacije i izvođenje
- rešenje za izvođenje posebnih sistema i mera zaštite od požara

Personnel

The Delta Inženjering team is organized in three sectors: design, engineering and ecology.

A special team was created for the jobs acquisition.
The team members are experienced, respected and excellent market experts.
During 2017, 20 engineers from different professions were employed.
The number of graduated engineers allows us to have licenses for the preparation of technical documentation and the construction of buildings for which the building permit is issued by the competent ministry of construction, or the competent authority of the autonomous province issued by the Ministry of Construction, Transportation and Infrastructure.
The license covers all Delta Inženjering activities.

Delta Preving is a member of Delta Group and deals with the design and construction of fire protection installations.
Delta Preving has four licenses issued by the Ministry of Interior and the Ministry of Construction, Transport and Infrastructure:
- Decision for designing special systems and fire protection measures
- Decision for the main fire protection project
- License for technical documentation and construction
- Decision for construction of special systems and fire protection measures

92	Ukupan broj zaposlenih Total number of employees
64	Diplomiranih inženjera Graduated engineers
10	Tehničara Technicians

02
Poslovi
Delta Inženjeringa

Delta Inženjering
Activities

EPS
RB Kolubara, Lazarevac

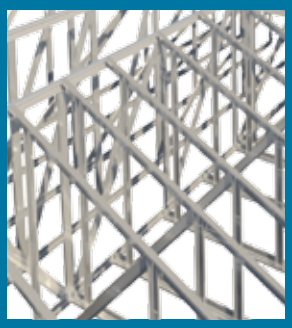
Ispitivanje čeličene konstrukcije građevinskih objekata postrojenja za pripremu uglja – Drobilana na pogonu Tamnava Istočno polje

Izvršena usluga pregleda obuhvata izradu elaborata o izvršenim pregledima sa detaljnim opisom izvršenih merenja i ocenom stanja svake konstrukcije. Elaborat sadrži potrebne mere za otklanjanja eventualnih nedostataka u pratećoj dokumentaciji elaborata koji sadrži sledeće:

- Tehničke opise objekata i izvršenih radova;
- Ocenu stanja konstrukcije sa jasnim instrukcijama i predlozima mera za uklanjanje nedostataka i oštećenja;
- Prikaz tehničkih lokacija pronađenih grešaka koje treba otkloniti;
- Izjavu da je na osnovu izvršenih pregleda i stručnih ocena objekat pogodan i bezbedan za dalju upotrebu;
- Crteže, skice i druge grafičke priloge sa izvršenim merenjima na licu mesta i
- Fotodokumentaciju svih objekata i konstrukcija.

Kao integralni deo elaborata pružalac usluga je u skladu sa svojim celokupnim znanje i iskustvom koje poseduje obezbedio sva obaveštenja investitoru o unapređenjima i poboljšavanjima, inovacijama i tehničkim dostignućima koja se odnose na predmetno postrojenje.

EPS
RB Kolubara, Lazarevac



Testing of the Buildings Steel Structure in the Coal Preparation Plant - Crushing Plant within Tamnava Istočno Polje

The performed inspection service includes the elaborate of the conducted inspections, with detailed description of the performed measurements and assessment of each construction condition.
The elaborate contains the necessary measures for elimination of possible deficiencies in the accompanying documentation of the elaborate, which contains the following:

- Technical descriptions of buildings and executed works;
- Assessment of the construction condition with clear instructions and proposals for measures to eliminate defects and damages;
- Display of technical locations of found defects to be eliminated;
- Statement that facility is suitable and safe for further use on the basis of the performed inspections and expert assessments;
- Drawings, sketches and other graphic attachments with on-site measurements and
- Photo documentation of all buildings and constructions.

As an integral part of the elaborate, the service provider has provided all information to the investor about improvements, innovations and technical achievements related to this plant in accordance with his overall knowledge and experience.

Termoelektrana Kostolac B

Ozakonjenje objekata termoelektrane Kostolac B

Delta Inženjering je kao nosilac konzorcijuma ugovorio izradu tehničke dokumentacije potrebne za ozakonjenje objekata termoelektrane Kostolac B.

Ugovor obuhvata sledeće aktivnosti:
1. Geodetsko snimanje objekata na terenu i izrada elaborata geodetskih radova;
2. Izrada izveštaja o izvedenom stanju objekata;
3. Izrada projekata za izvođenje za potrebe pribavljanja mišljenja Ministarstva unutrašnjih poslova - Sektora za vanredne situacije;
4. Izrada glavnih projekata za zaštitu od požara;
5. Izrada studije o proceni uticaja zatečenog stanja na životnu sredinu.

Navedene aktivnosti se sprovode sa ciljem ozakonjenja nelegalno izgrađenih objekata ili objekata koji su izgrađeni sa građevinskom dozvolom, ali za koje nije sprovedena procedura pribavljanja upotrebnih dozvola.

Thermal Power Plant Kostolac B

Legalization of Facilities at the Thermal Power Plant Kostolac B

As the leader of the consortium, Delta Inženjering has contracted the preparation of technical documentation necessary for the legalization of buildings at the thermal power plant Kostolac B.

The contract includes the following activities:
1. Geodetic survey of facilities in the site and preparation of the elaborate of geodetic works;
2. Preparation of reports on as-built state of facilities;
3. Preparation of projects for construction for the purpose of obtaining the opinion of the Ministry of Interior - Sector for Emergency Management;
4. Preparation of main fire protection projects;
5. Preparation of an environmental impact assessment study of the existing situation not been carried out.

The mentioned activities are carried out with the aim of legalizing illegally built facilities or facilities that were built with a building permit, but for which the procedure for obtaining the use permits has not been carried out.

Skladišta naftnih derivata- NIS-Blok promet

Ozakonjenje objekata skladišta naftnih derivata NIS-Blok promet

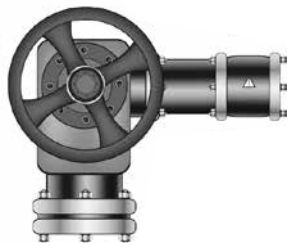
Delta Inženjering je ugovorio izradu tehničke dokumentacije potrebne za ozakonjenje objekata Skladišta naftnih derivata koja pripadaju Bloku promet Naftne Industrije Srbije.

Ugovor obuhvata sledeće aktivnosti:

1. Geodetsko snimanje objekata na terenu i izrada elaborata geodetskih radova;
2. Izrada izveštaja o izvedenom stanju objekata;
3. Izrada projekata za izvođenje za potrebe pribavljanja mišljenja Ministarstva unutrašnjih poslova - Sektor za vanredne situacije;
4. Izrada glavnih projekata za zaštitu od požara;
5. Izrada studije o proceni uticaja zatečenog stanja na životnu sredinu;
6. Aktivnosti vezane za pribavljanje odgovarajućih saglasnosti nadležnih organa.

Storage Buildings of Petroleum Products - NIS-Sales and Distribution Unit

Legalization for Storage Buildings of Petroleum Products – NIS Sales and Distribution Unit



Delta Inženjering has contracted the preparation of technical documentation necessary for legalizing of storage buildings for petroleum products belonging to the sales and distribution unit of NIS.

The contract includes the following activities:

1. Geodetic survey of facilities in the site and preparation of the geodetic works elaborate;
2. Preparation of reports on as-built state of facilities;
3. Preparation of projects for construction for the purpose of obtaining the opinion of the Ministry of Interior - Sector for Emergency Management;
4. Preparation of main fire protection projects;
5. Preparation of an environmental impact assessment study of the existing situation;
6. Activities related to obtaining appropriate approvals from competent authorities.

Lokacije za koje se obavlja proces ozakonjenja objekata:

1. Skladište naftnih derivata Novi Sad;
2. Skladište tečnog naftnog gasa Novi Sad;
3. Skladište tečnog naftnog gasa - sistem 7g Novi Sad;
4. Skladište naftnih derivata Subotica;
5. Skladište naftnih derivata Elemir;
6. Skladište tečnog naftnog gasa Elemir;
7. Skladište naftnih derivata Bezdan.

Locations for which the process of facilities legalization is carried out:

1. Warehouse of petroleum products Novi Sad;
2. Warehouse of liquefied petroleum gas Novi Sad;
3. Warehouse of liquefied petroleum gas - system 7g Novi Sad;
4. Warehouse of petroleum products Subotica;
5. Warehouse of petroleum products Elemir;
6. Warehouse of liquefied petroleum gas Elemir;
7. Warehouse of petroleum products Bezdan.

BTO sistem za površinski kop uglja Drmno

Cilj EPS-a je projektovanje, proizvodnja, postavljanje i puštanje u rad novog VI bager-transporter-odlagač sistema (BTO sistem) rudnika Drmno

sa sledećim kapacitetima:

- Paket 1: Rotorni bager sa kapacitetom od 6,600 m^3/h
- Paket 2: Četiri trakasta transportera sa širinom trake 2.000 mm
- Paket 3: Odlagač kapaciteta 8.500 m^3/h
  kako bi se povećao kapacitet površinskog kopa Drmno sa trenutnih devet miliona tona na 12 miliona tona uglja godišnje

EPS je potpisao ugovor sa podizvođačem CMEC-om (China Machineri Engineering Corporation) za idejno rešenje i idejni projekat, proizvodnju, postavljanje i puštanje u rad BTO sistema.
CMEC je angažovao kao podizvođače Thissen Krupp za paket 1, Goša FOM za paket 2 i FLSmidth (ranije Sandvik) za paket 3.

Ugovor je potpisan 20.11.2013. između EPS-a i CMEC-a prema pravilima žute knjige FIDIC-a.

Opšti ugovor sa kineskom stranom predviđao je angažman FIDIC inženjera - menadžera izgradnje za novi BTO sistem prema tzv. FIDIC žutoj knjizi. Delta Inženjering i DMT Consulting GmbH iz Esena u Nemačkoj izabrani su na javnoj nabavci.
Ugovor je potpisan 03.03.2016. godine, a započeo je 07.04.2016. godine između EPS-a i konzorcijuma Delte i DMT-a koji predvodi Delta Inženjering.

Tokom faza osnovnog i detaljnog inženjeringa, proizvodnje, montaže na gradilištu i puštanja u rad stručnjaci FIDIC inženjera vrše nadzor, testiraju, proveravaju kvalitet, preporučuju, potvrđuju, proveravaju usklađenost sa ugovorom i standardima, te proveravaju da li je oprema uopšte pogodna za svrhu.

Prema ažuriranom termin planu koji je predložio FIDIC inženjer, preuzimanje mašina će biti u junu 2019.

ECS System for Open Cast Mine Drmno

Delta Inženjering i DMT Consulting GmbH

Delta Inženjering and DMT Consulting GmbH

The objective of EPS is to design, manufacture, erect and commission the new VI Excavator - Conveyor - Spreader system (ECS system) of the Drmno Mine

with the following capacities:

- Package 1: Bucket wheel excavator with a capacity of 6,600 m^3/h
- Package 2: 4 belt conveyors with a belt width of 2,000 mm
- Package 3: Spreader with a capacity of 8,500 m^3/h in order to increase the capacity of the DRMNO open cast mine from the current 9 million tons to 12 million tons of coal annually

EPS has signed a contract with the Contractor CMEC (China Machinery Engineering Corporation) for the basic and detailed design, manufacture, construction, erection and commissioning of the ECS system. CMEC has subcontracted Package 1 to Thyssen Krupp, Package 2 to Goša FOM and Package 3 to FLSmidth (former Sandvik). Contract was signed on 20.11.2013 between EPS and CMEC under the FIDIC rules of the Yellow Book.

The General Contract Agreement with the Chinese side predicted the engagement of FIDIC engineer - the Construction Manager for the new ECS system according to the so-called FIDIC Yellow Book. Delta Inženjering and DMT Consulting GmbH, Esen Germany was selected on the public procurement. Contract was signed on 03.03.2016 and started on 07.04.2016 between EPS and the consortium of Delta and DMT, led by Delta Inženjering.

During the phases of basic and detailed engineering, manufacturing, assembly on site and erection and commissioning, the experts of FIDIC engineer inspects, supervises, tests, checks quality, recommends, certifies, checks compliance with contract and standards, and checks generally if the equipment is fit-for purpose.

According to the updated time schedule proposed by FIDIC engineer takeover of machines will be in June 2019.

Upravna zgrada i projektni biro NIS-a u Zrenjaninu

Delta Inženjering uspešno nastavlja saradnju sa NIS-om, te je u decembru 2017. godine sklopio ugovor sa NIS NAFTAGAS - Tehničkim servisima u Zrenjaninu o adaptaciji upravne zgrade i projektnog biroa koji se nalaze u okviru istog kompleksa.

Radovi na eksterijeru podrazumevali su kompletnu sanaciju krova, kao i utopljavanje fasade sa zamenom fasadne aluminarije u skladu sa važećim energetskim propisima i standardima. Adaptacijom unutrašnjeg prostora i enterijerskim uređenjem, oba objekta su dobila savremeni izgled.

Radovi na objektima upravna zgrada i projektni biro su obuhvatili uslugu po sistemu ključ u ruke. Prilikom adaptacije objekata korišćeni su savremeni materijali renomiranih proizvodjača, a enterijersko uređenje je obuhvatilo kompletno opremanje prostora nameštajem u skladu sa namenom.

U definisanom roku su završeni radovi koji su trajali dva i po meseca. Objekat je predat 05.03.2018. kako je i određeno ugovorom.

Administrative Building and Design Office of NIS in Zrenjanin

Delta Inženjering successfully continued cooperation with NIS and in December 2017 signed a contract with NIS NAFTAGAS – Tehnički servisi in Zrenjanin for adaptation of administrative building and design office located within the same complex.

Works on the exterior meant complete roof repair, as well as warming up of the facade by replacing the aluminium joinery in accordance with the current energy regulations and standards. With adaptation of the interior space and with interior decoration both buildings got a modern look.

Works on administrative building and design office included the turnkey service. During the adaptation were used modern materials of renowned manufacturers, and the interior decoration included complete furnishing in accordance with the purpose.

Works were completed within the defined deadline, that lasted 2.5 months. The building was handed over on 05.03.2018, as determined by the contract.

Postrojenje za mlevenje fosfata – Elixir Prahovo

Za potrebe investitora ELIXIR PRAHOVO, INDUSTRIJA HEMIJSKIH PROIZVODA D.O.O. PRAHOVO urađena je projektna dokumentacija za izvođenje radova na izgradnji postrojenja za mlevenje fosfata koji se koristi za proizvodnju mineralnih đubriva.

Postrojenje za mlevenje fosfata se sastoji od transportera sa gumenom trakom za dopremu sirovine, objekta u koji je smeštena oprema za mlevenje i sistema pneumatskog transporta samlevenog fosfata.

Transporter za dopremu sirovine, dužine 28 m, projektovan je kao rešetkasta čelična konstrukcija koja ima pešačke staze sa obe strane transportera. Transportna traka, odnosno materijal na traci zaštićen je od atmosferskih uticaja lučnom pokrivkom od profilisanog lima. Prijem nesamlevenog fosfata na traku je obezbeđen tako što je rekonstruisano presipno mesto postojećih transportera i ugrađena dvokraka šipka sa automatskom promenom toka materijala. Kapacitet transportera je 180 t/h.

Objekat u koji se smešta oprema za mlevenje fosfata je čelične konstrukcije sa ispunom od siporeks blokova, dimenzija u osnovi 23,8 m x 9,3 m, visine 26,5 m. U njega su smešteni: prijemni bunker za nesamleveni fosfat, oprema za mlevenje sa sistemom za otprašivanje, bunker za samleveni fosfat i oprema za pneumatski transport samlevenog fosfata do postrojenja za dalju preradu. U objektu je predviđena jednošinska dizalica za manipulaciju opremom prilikom održavanja i remonta.

Ključni uređaj opreme za mlevenje je mlin sa kuglama kojim se postiže kapacitet mlevenja

20 t/h i velika finoća samlevenog fosfata. Sirovina za mlevenje se u mlin doprema iz prijemnog bunkera pomoću dozirnog transportera sa automatskom regulacijom kapaciteta. U mlinu samleveni fosfat se strujom vazduha nosi ka ciklonu u kome se odvaja od vazduha i pada u bunker. Na tom putu prolazi kroz dinamički separator sa lopaticama u kome se izdvajaju čestice veće krupnoće od zahtevane, koje se vraćaju u proces mlevenja. Otprašivanje procesa se vrši pomoću filtera sa vrećama, opremljenog sistemom za automatsko otresanje vreća komprimovanim vazduhom.

Iz bunkera gotovog proizvoda samleveni fosfat se putem cevovoda, pomoću komprimovanog vazduha, transportuje do postrojenja za dalju preradu.

Phosphorus Grinding Plant - Elixir Prahovo

For the needs of the Investor ELIXIR PRAHOVO, INDUSTRY OF CHEMICAL PRODUCTS D.O.O. PRAHOVO has been prepared project documentation for the execution of works on the construction of grinding plant for phosphates which is used for the production of mineral fertilizers.

The phosphate grinding plant consists of a conveyor with rubber feeder for feed of raw material, the facility where the grinding equipment is located and the pneumatic transport system of grinded phosphate.

28 m long feeding conveyor for raw materials is designed as a latticed steel structure with pedestrian trails on both sides of the conveyor. The conveyor belt, i.e. material on the belt is protected from atmospheric influences by arch covering made of profiled sheet metal. The reception of non-milled phosphate on the belt is ensured by the reconstruction of the transfer point of the existing conveyors and built-in a double-skinned rod with automatic change of material flow. The conveyor capacity is 180 t/h.

The facility in which the phosphate grinding equipment is located is a steel structure with a filling of syphorex blocks, dimensions are at the base 23.8 m x 9.3 m, height 26.5 m. In it are located: reception bunker for non-grinded phosphates, grinding equipment with dedusting system, bunker for grinded phosphate and equipment for pneumatic transport of grinded phosphate to the plant for further processing. In the facility is planned a single rail crane for equipment manipulation during maintenance and repair.

The key device for grinding is a mill with balls by means of which is achieved the grinding capacity of 20 t/h and the high fineness of the grinded phosphate. Raw material for grinding is delivered to the mill from the receiving bunker using a dosing conveyor with automatic capacity control. In the mill, grinded phosphate is carried by the air stream to the cyclone in which it is separated from the air and falls into the bunker. On this path it passes through a dynamic separator with blades in which the particles larger than the required are separated and they return to the grinding process. Process dedusting is carried out using a bag filter equipped with a system for automatic shake of the bags with compressed air.

From the finished product bunker, the grinded phosphate is transported to the plant for further processing through a pipeline using compressed air.

Alumil - Anodizacija

Krajem 2017. godine nastavljena je dugogodišnja uspešna partnerska saradnja sa proizvođačem aluminijumskih profila Alumil iz Grčke.

Delta Inženjering je izradio kompletnu tehničku dokumentaciju za dobijanje dozvola i izvođenje radova (idejna rešenja, idejni projekat, projekat za građevinsku dozvolu, projekat za izvođenje) na dogradnji postrojenja za anodizaciju aluminijuma.

Objekat je površine 5.840 m^2, građen prefabrikovanom betonskom konstrukcijom, obložen prefabrikovanim betonskim fasadnim panelima i krovnim termoizolacionim panelima sa ispunom od kamene vune.

Unutar objekta je šest kranova nosivosti 5 t, kao i postrojenje za prečišćavanje otpadnih voda.

Izvođenje radova u prvoj fazi je u toku, a Delta Inženjering je glavni izvođač radova.
U drugoj fazi je planirana instalacija opreme za anodizaciju.

Alumil - Anodization

A long-lasting successful partnership with aluminum profiles manufacturer Alumil from Greece was continued at the end of 2017.

Delta Inženjering prepared the complete technical documentation for obtaining permits and execution of works (conceptual design, basic design, project for the construction permit, project for construction) on the additional construction of aluminum anodizing plant.

The building has surface of 5.840 m^2. It is built with precast concrete construction, covered with precast concrete facade panels and roof thermal insulation panels with stone wool fillings.

Within the building there are 6 cranes with load capacity of 5 t, as well as a wastewater treatment plant.

Works in the first phase are in progress, and Delta Inženjering is the main contractor. In the second phase is planned the installation of anodizing equipment.

Toplana Istok u Novom Sadu

Za potrebe investitora J.P. Novosadska toplana u Novom Sadu izrađen je Projekat rekonstrukcije i dogradnje objekta toplane Istok u Novom Sadu.

Toplifikacioni sistem grada Novog Sada čini pet gradskih toplana i toplotnih izvora – TO Jug, Istok, Sever, Zapad i Petrovaradin.

Toplana Istok je izgrađena i puštena u pogon 1970. godine, instalisane snaga kotlova 76,6 MW i služi za proizvodnju toplotne energije za snabdevanje gradskog područja toplotnog konzuma od 196 MW. Deo objekta sa namenom pumparnice, hemijska priprema vode, aneks sa komandnom salom, kuhinjom i sanitarnim čvorom je rekonstruisan i dograđen 2015. godine.

Drugi deo postojećeg objekta sa namenom kotlarnice, ventilatorski prostor, dimnjak, aneks – radionica i ostava u prizemlju, svlačionica i kancelarija na spratu su predmet ovog projekta.

Za potrebe modernizacije i dogradnje ove toplane predviđena je rekonstrukcija kotlarnice i to: izbacivanje dotrajalog kotla K1 i njegova zamena kotlom K4. Treći postojeći kotao K3 nalazi se van objekta, tako da je izložen vremenskim uticajima što ubrzava njegovo propadanje. Zbog takve lokacije kotla povećani su gubici energije, povećani troškovi održavanja, povećan je nivo buke koji se emituje u okolinu. Iz tih razloga postojeći gabariti objekta se proširuju tako da se smesti K3 i obezbede dovoljna rastojanja kotla i zidova i krova kotlarnice.

Heating Plant Istok in Novi Sad

For the needs of the Investor PUC Novosadska toplana in Novi Sad has been prepared the project for reconstruction and additional construction of the heating plant Istok in Novi Sad.

The heating system of the city Novi Sad consists of five city heating plants and thermal sources – heating plants Jug, Istok, Sever, Zapad and Petrovaradin.

The heating plant Istok was built and put into operation in 1970, with installed capacity of boilers 76.6 MW and serves for the production of heat for the supply of the urban area with the heat consumption of 196 MW. Part of the building for the purpose of pumping station, chemical preparation of water, annex with control room, kitchen and sanitary block was reconstructed and additionally constructed in 2015.

The second part of the existing facility for the purpose of the boiler room, ventilation room, stack, annex - workshop and storage on the ground floor, locker room and offices on the floor are the subject of this project.

For the needs of modernization and additional construction of this heating plant, the reconstruction of the boiler room is planned as follows: removal of the worn out boiler K1 and its replacement by the boiler K4. The third existing boiler K3 is located outside the building, so it is exposed to weather influences, which speeds up its decay. Due to such location of the boiler are increased energy losses, maintenance costs, increased noise levels emitted into the environment. For these reasons, the existing dimensions of the facility are expanded to accommodate K3 and provide sufficient distances between the boiler and the walls and roof of the boiler room.

JKP Beogradske elektrane - Toplana Voždovac

Kogeneratorsko postrojenje za JKP Beogradske elektrane na lokaciji Toplana Voždovac

Delta Inženjering je izradio kompletnu investiciono-tehničku dokumentaciju za izgradnju kogeneratorskog postrojenja za investitora JKP Beogradske elektrane u okviru kompleksa Toplane Voždovac. Projektom je predviđeno povezivanje opreme kogeneratorskog postrojenja za redni rad sa postojećim sistemom za pripremu grejanja, odnosno redni rad sa kotlovima. Sprovedena je analiza rada i efikasnosti postrojenja za kogeneraciju, a sve na osnovu izvršenih merenja potrošnje toplotne energije za pripremu sanitarne tople vode u zimskom i letnjem periodu po mesecima na nivou cele godine.
Na osnovu ove analize izvršen je i odabir opreme za postrojenje za kogeneraciju toplote.

Predviđena je ugradnja tri gasna generatora, kompletno sa svom pripadajućom opremom, kao što su gasne rampe, prigušivači buke, katalizatori za smanjenje azotnih oksida i ugljen monoksida, utilizatori toplote dimnih gasova, rashladne kule, komandno energetske table za povezivanje opreme i sinhronizaciju rada (međusobno i sa spoljnom mrežom) i softverom za upravljanje radom kogeneracionih modula pri prioritetu proizvodnje toplotne energije vođene zahtevom toplotnog konzuma.

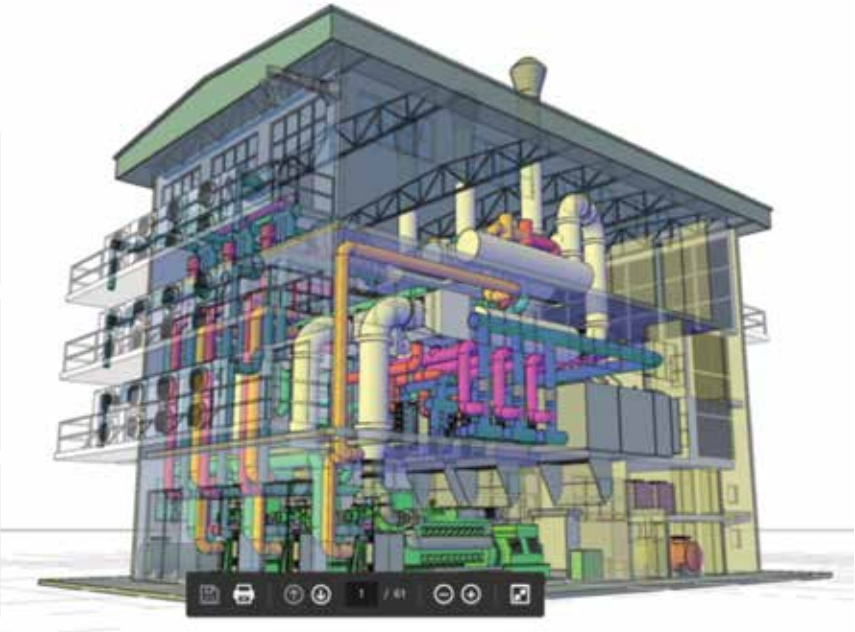
Toplotna energija sa gasnih motora plasira se u postojeći toplifikacioni sistem za grejanje i pripremu potrošne tople vode, a električna energija u spoljnu elektrodistributivnu mrežu saglasno Uredbi o uslovima i postupku sticanja statusa povlašćenog proizvođača.

Toplotni kapacitet predviđenog postrojenja iznosi:

3 x 3.341 kW = 10.023 kW = 10,023 MW
- temperature 90/70°C
3 x 171 kW = 513 kW = 0,513 MW
- temperature 47,7/44°C

Proizvodnja električne energije (10kV, 50Hz) predviđenog postrojenja iznosi:
3 x 3.328 kW = 9.984 kW = 9,984 MW

Za smeštaj kogeneratorskog postrojenja u kompleksu TO Voždovac projektovan je novi građevinski objekat, ukupne korisne površine oko 1.000 m^2.



PUC Beogradske Elektrane - Heating Plant Voždovac

Cogeneration Plant for PUC Beogradske Elektrane on Location of Heating Plant Voždovac

Delta Inženjering has prepared complete investment and technical documentation for the construction of cogeneration plant for the Investor PUC Beogradske Elektrane within the complex of heating plant Voždovac. By this project is planned connection of the cogeneration plant equipment for sequential operation with the existing heating system, i.e. sequential operation with the boilers. An analysis of the operation and efficiency of the cogeneration plant was carried out, all based on the performed measurements of heat consumption for the preparation of sanitary hot water in the winter and summer period by months at the level of the whole year. Based on this analysis, the selection of equipment for the cogeneration plant was carried out.

It is planned installation of three gas generators, complete with all related equipment, such as gas ramps, noise dampers, nitrogen oxide and carbon monoxide reduction catalysts, flue gas heaters, cooling towers, control boards for connecting equipment and synchronization of operation (mutual and with external network) and software for controlling the operation of cogeneration modules in the priority of thermal energy production driven by the demand of heat consumption.

Thermal energy from gas engines is placed in an existing heating system for heating and preparation of consumable hot water, and electricity in an external power distribution network in accordance with the Regulation on the Requirements and Procedure for Acquiring the Status of a Privileged Producer.

The thermal capacity of the planned plant is:

3 x 3.341 kW = 10.023 kW = 10,023 MW - temperature 90/70°C
3 x 171 kW = 513 kW = 0,513 MW - temperature 47,7/44°C

Electricity production of the planned plant is:
3 x 3.328 kW = 9.984 kW = 9,984 MW

For the installation of cogeneration plant in the complex HP Voždovac, a new construction facility has been designed, with total useful areas of about 1,000 m^2.

JKP Toplana Šabac i JP Stambeno Ruma

Na osnovu sporazuma o zajmu Nemačke Razvojne Banke - KfW i Republike Srbije i potom trilateralnog ugovora o korišćenju sredstava Republike Srbije namenjenih programu Rehabilitacija sistema daljinskog grejanja u Srbiji - faza IV, Delta Inženjering je, kao glavni izvođač u konzorcijumu sa Elektrotehnika Južna Bačka iz Novog Sada, potpisao ugovor o projektovanju i izvođenju radova na rekonstrukciji kotlarnice Trkalište u Šapcu sa JKP Toplana Šabac iz Šapca i rekonstrukciji toplane Sportska hala u Rumi sa JP Stambeno Ruma.

U postojećoj kotlarnici Trkalište u Šapcu je izvršena rekonstrukcija hidrauličkih instalacija, povezivanje kotlovskih jedinica i hidrauličkih prekidača, ugrađene su nove pumpe i sistem za pripremu vode i novo postrojenje za prečišćavanje vode.
U skladu sa tim, izvršena je rekonstrukcija elektroenergetskih instalacija: električnog razvoda napajanja, razvodnih ormana kotlova/gorionika i razvodnih ormana mrežnih pumpi, PLC i SCADA sistema.
Rekonstrukcijom toplane Sportska hala u Rumi obuhvaćena je isporuka i ugradnja novog 4,5 MW kotla sa ugradnjom gorionika, hidrauličkim podsistemom i neophodnim elektroradovima.

PUC Toplana Šabac and PC Stambeno Ruma

Based on the loan agreement of the German development bank - KfW and the Republic of Serbia, and then the trilateral agreement on the use of funds of the Republic of Serbia for the program Rehabilitation of District Heating Systems in Serbia - Phase IV, Delta Inženjering has, as the main contractor in the consortium with Elektrotehnika Južna Bačka from Novi Sad, signed a contract for the design and execution of works on the reconstruction of the boiler room Trkalište in Šabac with PUC Toplana Šabac from Šabac and the reconstruction of the heating plant Sportska hala in Ruma with PC Stambeno Ruma.

In the existing boiler room Trkalište in Šabac has been made reconstruction of hydraulic installations, connection of boiler units and hydraulic switches, the new pumps and water treatment system and the new water treatment plant have been installed. The reconstruction of electric power installations: electric power distribution, distribution cabinets of boilers/burners and distribution cabinets of network pumps, PLC and SCADA system has been made in accordance with this.

By the reconstruction of heating plant Sportska hala in Ruma are covered the delivery and installation of a new 4.5 MW boiler with the installation of a burner, a hydraulic subsystem and the necessary electrical works.

Distributivni centar gasova

U Industrijskom parku Beograd u Šimanovcima Delta Inženjering za potrebe Istrabenz plini Kopar – SIAD Bergamo izrađuje kompletnu projektnu dokumentaciju, pribavlja uslove i saglasnosti i zastupa investitora pred nadležnim organima, javnim preduzećima i ministarstvima za izgradnju distributivnog centra gasova.

Distributivni centar gasova se gradi na lokaciji od 2,55 hektara. Procenjena investiciona vrednost iznosi sedam miliona €.

U DCG se projektuju sledeći objekti:

- Skladište tečnog naftnog gasa (3x150m^3)
- Pretakalište TNG (200m^2)
- Pumpno-kompresorska stanica TNG (50m^2)
- Punionica boca TNG 300.000 boca /god. (380m^2)
- Skladište boca TNG (30.000kg)
- Skladišni rezervoari tečnih tehničkih gasova (O2, O2 med, N2, Ar, CO2 – ukupno 135m^3)
- Pumpno-isparivačka stanica tehničkih gasova
- Punionica boca tehničkih gasova na 300 bar 400.000 boca/god. (680m^2)
- Skladište boca tehničkih gasova (1.580m^2)
- Skladište boca zapaljivih gasova (170m^2)
- Objekat za prodaju gasne opreme i maloprodaju boca TNG i TG (380m^2)
- Tehnički blok (150m^2)
- Rezervoar protivpožarne vode (450m^3)
- Kolska vaga (54m^2)
- Upravna zgrada (820m^2)
- Portirnica (22m^2)
- Ograda i kapija (825m)
- Totem i jarboli
- Saobraćajnice i manipulativne površine (17.000m^2)
- Zelene površine (5.000m^2)

Gas Distribution Center

In the Industrial Park Belgrade in Šimanovci, Delta Inženjering for the needs of Istrabenz Plini Kopar - SIAD Bergamo prepares complete project documentation, acquires conditions and approvals, and represents the Investor in front of competent authorities, public companies and ministries for the construction of the gas distribution center.

The gas distribution center will be built at a location of 2.55 hectares. Estimated investment value amounts to seven million €.

In the gas distribution center will be designed the following facilities:

- Liquefied petroleum gas storage (3x150m^3)
- Liquefied petroleum gas loading/unloading station (200m^2)
- Pumping and compressor station LPG (50m^2)
- Liquefied petroleum gas filling station, 300,000 bottles/year (380m^2)
- Liquefied petroleum gas bottle storage (30,000kg)
- Storage tanks of liquid technical gases (O2, O2 medical, N2, Ar, CO2 - total 135m^3)
- Pumping-evaporator station of technical gases
- Technical gases filling station to 300 bar, 400,000 bottles/year. (680m^2)
- Technical gas bottle storage (1,580m^2)
- Warehouse of flammable gases (170m^2)
- Facility for sale of gas equipment and retail of LPG and TG bottles (380m^2)
- Technical block (150m^2)
- Fire water tank (450m^3)
- Wheel scale (54m^2)
- Administrative building (820m^2)
- Entrance facility (22m^2)
- Fence and gate (825m)
- Totem and masts
- Traffic and manipulative surfaces (17,000m^2)
- Green areas (5,000m^2)

03
Ekologija
Ecology

Grundfos

Postrojenje za prečišćavanje i recirkulaciju otpadnih voda

U okviru fabrike za proizvodnju pumpi i uređaja za povišenje pritiska Grundfos Srbija u Inđiji, na 108,29 m^2 prostora urađen je veoma značajan objekat - Postrojenje za prečišćavanje i recirkulaciju otpadnih voda.

Tehnološke otpadne vode nastaju u procesu mašinske obrade metala. To su obradne emulzije koje služe za hlađenje i podmazivanje alata i radnih predmeta u procesu mašinske obrade metala (struganje, glodanje, brušenje i sl.), i otpadne emulzije koje se u obliku zauljenih otpadnih voda odvode sa druge grupe radnih mesta i sakupljaju u zasebnom prihvatnom rezervoaru. Iz tog razloga je za potrebe fabrike projektovano i izvedeno postrojenje za prečišćavanje i recirkulaciju zauljenih otpadnih voda.

Proces prečišćavanja zauljenih otpadnih voda je koncipiran tako da voda prvo prolazi predtretman radi uklanjanja ulja. Nakon predtretmana sledi fizičko-hemijski tretman uz taloženje na lamelnom taložniku, odakle se preliv nakon finalne kontrole pH vrednosti usmerava na finalno prečišćavanje koje će se obavljati u dve faze: fino filtriranje i reversna osmoza, a istaloženi materijal se pomoću pneumatske pumpe transportuje na obradu mulja. Prečišćena voda se zahvata pumpama i vraća nazad prema mašinama u proizvodnoj hali. Projektovano postrojenje je max. kapaciteta 48 m^3/dan. Tretman će se obavljati kapacitetom 1-2 m^3/h.

Pored pomenutih otpadnih voda iz procesa proizvodnje vrši se i prečišćavanje atmosferskih voda i to izgradnjom posebnog postrojenja za njihovo prečišćavanje. Tretman atmosferskih voda zasniva se na procesu ultrafiltracije, separacije pod pritiskom preko membrane koja odvaja čestice zagađenja od rastvorljivih komponenti u vodi.

Postrojenje je opremljeno svom potrebnom odgovarajućom merno-regulacionom opremom (merači protoka, merači nivoa, nivo prekidači (detektori nivoa) za zaštitu pumpi od rada na "suvo" i od prelivanja, pH metri za merenje i regulaciju pH vrednosti vode i sl.).

Za realizaciju svih upravljačkih zahteva, obradu mernih signala i obavljanje logičkih funkcija koristi se programabilni logički kontroler - PLC SIMATIC S7. HMI displej koji se nalazi na vratima razvodnog ormana omogućuje potpunu operativnost komandovanja procesom, kao i vizuelizaciju.

Na postojećem sistemu BMS-a su prikazani osnovni parametri i alarmi iz procesa prečišćavanja otpadnih voda tako da operater ima uvid o statusu samog procesa.

Nakon procesa prečišćavanja, otpadne vode iz proizvodnje i kišnica pogodne su za ponovnu upotrebu i transportuju se ka potrošačima (ka mašinama koje se koriste u proizvodnji i toaletima kao sanitarna voda.

Grundfos

Wastewater Treatment and Recycling Plant

Within the factory for production of pumps and pressure boosters Grundfos Serbia in Inđija, on 108.29 m^2 has been constructed a very important facility - wastewater treatment and recycling plant.

Industrial wastewater occurs in the process of metal processing. These are processing emulsions which are used for cooling and lubrication of tools and workpieces in the machine metal processing (scraping, milling, grinding, etc.), and waste emulsions which are discharged in the form of oily wastewater from another group of workplaces and collected in a separate receiving tank. For this reason has been designed and constructed for the needs of the factory an oily wastewater treatment and recycling plant.

The oily wastewater treatment process is conceived so that water first passes through the pre-treatment to remove oil. After the pre-treatment follows the physical-chemical treatment with precipitation on the lamella settler, from which the overflow, after the final control of the pH value, is directed to the final purification which will be carried out in two phases: fine filtration and reverse osmosis, and the precipitated material is transported by means of a pneumatic pump to sludge treatment. Purified water is pumped and returned to the machines in the production hall.
The projected plant has max. capacity of 48 m^3/day. The treatment will be carried out with a capacity of 1- 2 m^3/h.

In addition to the aforementioned wastewater from the production process, purification of atmospheric water is also carried out by the construction of a special treatment plant. The treatment of atmospheric water is based on the ultrafiltration process, the separation under pressure through the membrane that separates particles of pollution from soluble components in water.

The plant is equipped with all necessary measuring and control equipment (flow meters, level gauges, level switches (level detectors) for protecting pumps from dry work and spillage, pH meters for measuring and regulation of water pH, etc.).

A programmable logic controller - PLC SIMATIC S7 is used for realization of all control requests, processing of measurement signals and performing logical functions. The HMI display located at the door of the distribution cabinet enables complete operation of command control, as well as visualization.

The existing BMS system displays the basic parameters and alarms from the wastewater treatment process so that the operator has an insight into the status of the process itself.

After the purification process, wastewater from production and rainwater is suitable for reuse and transport to consumers (to machines used in production and toilets as sanitary water).

TENT A3–A6

Projekat odsumporavanja dimnih gasova

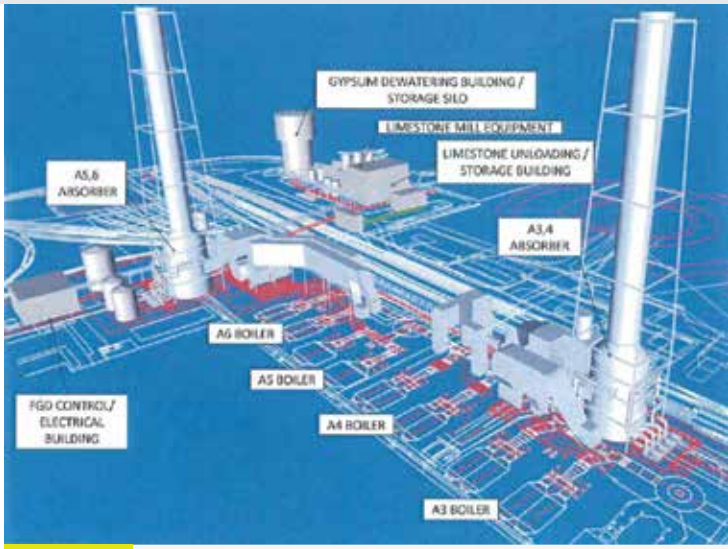
Nakon dugogodišnjih aktivnosti na rešavanju problema odsumporavanja dimnih gasova u TENT A, početkom septembra 2017. godine potpisan je sporazum između EPS i kompanije Mitshubishi Hitachi Power Systems (MHPS).

Kompanija MHPS gradiće postrojenje za odsumporavanje dimnih gasova (ODG ili FGD-Flue Gas Desulphurization) u termoelektrani Nikola Tesla A (TENT A3-A6) u Srbiji. Projekat vredan 167 miliona evra treba da omogući smanjenje emisije sumpor-dioksida (SO_2) i čvrstih čestica iz TENT A i da omogući Srbiji da dostigne standarde EU u domenu životne sredine. To je prvi takav posao MHPS-a u Srbiji i drugi na prostoru nekadašnje Jugoslavije. Projekat će se finansirati iz kredita koji je EPS-u obezbedila Japanska agencija za međunarodnu saradnju (JICA). Rok za završetak izgradnje postrojenja je 42 meseca od datuma stupanja ugovora na snagu, a japanska kompanija je saopštila da očekuje da sistem bude operativan 2021. godine. Projekat će realizovati konzorcijum koji predvodi MHPS a čine ga Itochu Corporation i srpska građevinska firma MPP Jedinstvo a.d. (JDS).

Kompanija Delta Inženjering sklopila je ugovor sa MPP Jedinstvom i učestvovaće sa drugim srpskim kompanijama u izradi potrebne tehničke dokumentacije za realizaciju projekta i pribavljanje svih neophodnih građevinskih dozvola.

Na slici 1 dat je 3D prikaz budućeg postrojenja za odsumporavanje dimnih gasova TENT A, iz koga se vidi da će dimni gasovi blokova A3 i A4 da se odsumporavaju u absorberu A3,4 a dimni gasovi iz blokova A5 i A6 u absorberu A5,6.

Prečnik vlažnih dimnjaka je 12,5 m, a visina 105 m iznad apsorbera. Postojeći dimnjaci projektovani su za rad sa toplim dimnim



Slika 1. 3D prikaz budućeg postrojenja za ODG u TENT A3-A6

Figure 1. 3D view of the future FGD plant in TENT A3-A6

gasom, čija je temperatura znatno viša od tačke rose dimnog gasa. Ispuštanje dimnog gasa posle apsorbera je sa nižom temperaturom (oko 70°C i velikom količinom vlage), i to bi uslovilo pojavu intenzivne akumulacije vlage na zidovima postojećih dimnjaka, da je usvojena ta varijanta.

Postavljanje vlažnog dimnjaka na vrhu apsorbera ne zahteva dodatni prostor, ali u građevinskom smislu predstavlja zahtevan objekat za velike visine dimnjaka kao što se vidi sa slike 2. Kondenzovana vlaga direktno se drenira u apsorber.

U slučaju postrojenja za ODG u TENT A usvojeno je kao optimalno rešenje vlažnog dimnjaka na apsorberima. Na taj način postižu se sledeći pozitivni efekti:

- Izbegava se postojanje dimnih kanala prečišćenog gasa;
- Vreme zastoja blokova je minimalno;
- Zauzimanje prostora je najmanje;
- Investicije u sistem dimni kanali-apsorber su minimalne.

Površina prostora potrebnog za smeštaj ODG postrojenja za TENT A3-A6 iznosi približno 19,300 hiljada kvadratnih metara.

Slika 2. Apsorber sa vlažnim dimnjakom u TE Kozienice u Poljskoj

Figure 2. Apsorber with a wet stack in the thermal power plant Kozienice in Poland

TENT A3-A6

Project of Flue Gas Desulphurization

After many years of activities to solve the problem of flue gas desulphurisation in TENT A an agreement was signed between EPS and Mitshubishi Hitachi Power Systems (MHPS) in early September 2017.

The company MHPS will build a flue gas desulphurization plant in the thermal power plant Nikola Tesla A (TENT A3-A6) in Serbia. The project worthy 167 million euros should enable the reduction of sulfur dioxide (SO_2) emissions and solid particles from TENT A and allow Serbia to reach EU standards in the field of environment. This is the first such activity of MHPS in Serbia and the second on the territory of former Yugoslavia. The project will be financed from a loan provided by the Japan International Cooperation Agency (JICA) to EPS. The deadline for completing of the plant construction is 42 months from the date of entry into force of the contract, and the Japanese company announced that expects the system to be operational in 2021. The project will be implemented by a consortium led by MHPS and made by Itochu Corporation and Serbian construction company MPP Jedinstvo a.d. (JDS).

Delta Inženjering has entered into a contract with MPP Jedinstvo and will participate with other Serbian companies in the preparation of the necessary technical documentation for the realization of the project and obtaining all necessary building permits.

Figure 1 shows a 3D view of the future flue gas desulphurization plant TENT A, from which it can be seen that the smoke gases of the A3 and A4 blocks will be desulphurized in the absorber A3.4 and flue gases from the blocks A5 and A6 in the absorber A5.6.

The diameter of the wet stacks is 12.5 m, and the height is 105 m above the absorber. The existing stacks are designed to work with warm flue gas, which temperature is significantly higher than dew point of flue gas. Discharge of flue gas after the absorber is with a lower temperature (about 70°C and a high amount of moisture), which would result in the occurrence of intense moisture accumulation on the walls of the existing stackes, if this variant has been adopted.

Installing the wet stack at the top of the absorber does not require additional space, but in the construction sense it represents the demanding object for high stack height, as shown in Figure 2. Condensed moisture is directly drained into the absorber.

In the case of FGD plant in TENT A it was accepted as the optimal solution for the wet stack on the absorbers. In this way, the following positive effects are achieved:

- Avoidance of the flue ducts for purified gas;
- Deadlock time for blocks is minimal;
- Space take up is minimal;
- Investments in the flue duck-absorber system are minimal.

The space required for the accommodation of FGD plant in TENT A3-A6 is approximately 19,300 square meters.

Bezbednost i zaštita na radu

Uvođenjem IMS, odnoso OHSAS 18001 Delta Inženjering je kroz procedure propisao kako treba da se ponašamo na gradilištu.

Delta Inženjering, kao društveno odgovorna kompanija u svim segmentima svog poslovanja, veliki značaj pridaje bezbednosti i zdravlju na radu kako svojih zaposlenih, tako i zaposlenih kod izvođača radova koje angažujemo na ugovorenim projektima, odnosno gradilištima.

Stalna kontrola i implementacija procedura doprinela je poboljšanju uslova rada na gradilištu i adekvatnom opremanju i korišćenju ličnih zaštitnih sredstava. Podizanje svesti kod izvođača radova u pogledu BZR, ZOP i ZŽS je ključni faktor za bolji, kvalitetniji i bezbedniji rad. Delta Inženjering zadao je sebi zadatak da bezbednost i zdravlje na radu podigne na viši nivo u odnosu na zakonske obaveze, a osnovni cilj je nulti nivo povreda. Da ovaj zadatak i cilj uspešno realizujemo potvrđuju i predstavnici SGS (sertfikovno telo) kroz svoje redovne godišnje kontrole primene integrisanog menandžment sistema. Takođe i tokom redovnih kontrola Republičke inspekcije rada nije bilo nepravilnosti koje bi prouzrokovalo izdavanje rešenja za otkalnjanje istih. Krenuli smo u primenu OHSAS-a, odnosno prešli smo sa teorije na praksu, na gradilištima širom Srbije i regiona - JP EPS TENT A; TENT B; Železara Smederevo; Fiat Kragujevac; Arcerol-Mital Zenica; Gorenje Valjevo; Henkel Kruševac; Henkel Bileća; Messer Bor; YU Alumil; Johnson Electric Niš; Hemofarm Vršac; Bambi Požarevac; Srpska fabrika stakla Paraćin; RN Pančevo; RN Novi Sad; RTB Bor; TE Kostolac; Tigar Pirot.

Gore navedeni investitori/naručioci pohvalili sun as za primenu mera BZR, kao i za samu organizaciju gradilišta. Zadovoljstvo investitora nam daje podstrek da nastavimo sa unapređenjem sistema.
Dobra praksa je da se pre uvođenja izvođača radova na gradilište, pored dostave neophodne dokumentacije na uvid, svi zaposleni upoznaju sa rizicima na samom gradilištu, odnosno sa njihovim obavezama iz oblasti BZR, ZOP i ZŽS. Nakon toga potpisuju dokument da su se sa istim upoznali i da će ista poštovati.

Prilikom obilaska gradilišta ne konstatujemo samo nepravilnosti u radu već znamo i da pohvalimo ako se radovi izvode u skladu sa propisanim merama.

U slučaju konstatovane nepravilnosti zaustavljamo rad i razgovorom sa zaposlenim ukazujemo mu na to kako treba bezbedno da izvrši radni zadatak. Smatramo da je najbolji načina da kroz razgovor sa zaposlenima stvaramo pozitivnu atmosferu na relaciji BZR-zaposleni. Do sada je oko 1000 zaposlenih izvođača radova, koji su bili angažovani na realizaciji ugovorenih obaveza, prošlo kroz upoznavanje sa rizicima i obavezama na gradilištu.

Zahvaljujući dobroj organizaciji, ali i posvećenosti svih zaposlenih na gradilištima postignuto je najvažnije – da nije bilo povreda u poslednje tri godine.

Povećanje stepena bezbednosti i zdravlja na radu za Delta Inženjering predstavlja jedan od prioriteta za ovu godinu.
Sigurni smo da će kroz stalno unapređenje, edukaciju i kontrolu rada dovesti do stvaranja kulture kod izvođača radova da kao najveću vrednost na prvo mesto stave bezbednost - život i zdravlje svojih zaposlenih.

Security and Safety at Work

With the introduction of IMS, i.e. OHSAS 18001 Delta Inženjering has prescribed through the procedure how should we behave on the site.

Delta Inženjering, as a socially responsible company in all segments of its business, gives high priority to the safety and health at work of its employees and of those employed by contractors who are engaged in the contracted projects, i.e. construction sites.

Permanent control and implementation of procedures contributed to the improvement of working conditions on the site and adequate furnishing and use of personal protective equipment. Raising awareness among contractors in terms of OHS, Law on Fire Protection and Environmental Protection is a key factor for a better, and safer operation. Delta Inženjering has given itself the task to raise safety and health at work to a higher level in relation to a legal obligation, and the primary goal is a zero level of injuries. That we successfully implement this task and goal is confirmed by representatives of SGS (certification body) through its regular annual inspection of integrated management system application. Also during regular audits of the State Labour Inspection there were no irregularities that would result in issuance of the decision for the elimination of irregularities. We started the implementation of OHSAS, i.e. we have moved from theory to practice, on building sites across Serbia and the region - JP EPS TENT A; TENT B; Železara Smederevo, Fiat Kragujevac, Arcelor-Mittal Zenica, Gorenje Valjevo; Kruševac Henkel, Henkel Bileća, Messer Bor, YU Alumil, Johnson Electric Niš; Hemofarm Vršac; Bambi Požarevac; Serbian Glass Factory Paraćin; RN Pančevo; RN Novi Sad, RTB Bor; TE Kostolac; Tigar Pirot.

The above mentioned Investors/Purchasers have praised us for the implementation of OSH, as well as for organizing the site. Satisfaction of the Investors gives us stimulation to keep improving the system.
Good practice is that, prior to the introduction of contractors to the site and in addition to delivery of the necessary documentation for review, all employees should be familiar with the risks at the site and with their obligations in the field of OHS, Law on Fire Protection and Environmental Protection. After that they signed a document that they have met with the risks and that they respected the same.

During the visit to the site conclude not only irregularities in work, but we know to praise if the works are executed in accordance with the prescribed measures.

In the case of found irregularities we stop work and talk with employee to point out to him how to safely perform the task. We believe that the best way is to create a positive atmosphere between OHS-employees through interview with the employees. So far, about 1,000 employees of contractors who were engaged in the implementation of contractual obligations went through getting to know the risks and responsibilities at the site.

Thanks to the good organization and commitment of all employees on construction sites is achieved the most important thing - that there were no injuries in the last three years.

**Increasing the level of safety and health at work for Delta Inženjering is one of the priorities for this year.
We are sure that continuous improvement, training and control of the work will lead to the creation of culture among contractors that at the highest level palce security - the life and health of their employees.**

Sistem kvaliteta

Kompanija Delta Inženjering je u periodu od maja do oktobra 2017. intenzivno radila na pripremama za resertifikacionu proveru.

U okviru priprema je vršeno preispitivanje i ažuriranje kompletne QMS i EMS dokumentacije u cilju usaglašavanja sa zahtevima standarda ISO 9001:2015 i ISO 14001:2015. U procesu revizije dokumentacije i usaglašavanja su učestvovali svi zaposleni, a pre svega rukovodstvo. Proces usaglašavanja je završen resertifikacionom proverom od strane sertifikacionog tela SGS Beograd koja je sprovedena 25.10.2017. Tokom provere tim proveravača nije utvrdio ni velike ni male neusaglašenosti što je rezultovalo izdavanjem novih sertifikata i predstavlja potvrdu uspešnog završetka tranzicije. Uspešno završena resertifikaciona provera označava početak novog trogodišnjeg sertifikacionog ciklusa čime smo potvrdili kontinuitet u primeni, održavanju i stalnom poboljšavanju našeg sistema menadžmenta kvalitetom (QMS), sistema menadžmenta životnom sredinom (EMS) i sistema menadžmenta zaštitom zdravlja i bezbednošću na radu (OH&SMS).

Quality System

In the period from May to October 2017, the company Delta Inženjering worked intensively on the preparations for the resertification check.

Within the preparation, the complete QMS and EMS documentation was reviewed and updated in order to comply with the requirements of ISO 9001: 2015 and ISO 14001: 2015 standards. All the employees, and above all the management, took part in the process of documentation audit and harmonization. The harmonization process was completed with a resertification check by SGS Belgrade certification body which was conducted on 25. October 2017. During the audit, the audit team did not identify any major or minor discrepancies resulting in the issuance of new certificates and a confirmation of the successful completion of the transition. The successfully completed verification check marks the start of a new three-year certification cycle, which confirmed the continuity in the application, maintenance and continuous improvement of our Quality Management System (QMS), the Environmental Management System (EMS) and the Occupational Health and Safety Management System (OH & SMS).

Kompanija Delta Inženjering će i dalje u okviru svog poslovanja posebnu pažnju pridavati sistemima menadžmenta doslednom primenom sledećih principa:

- Usredsređenost na potrebe i očekivanja zainteresovanih strana;
- Liderstvo;
- Angažovanje ljudi;
- Procesni pristup;
- Poboljšavanje;
- Donošenje odluka na osnovu činjenica;
- Menadžment međusobnim odnosima.

In the course of its business, the company Delta Inženjering will continue to pay special attention to the management systems by applying the following principles:

- Focus on the needs and expectations of interested parties;
- Leadership;
- People engaging;
- Process approach;
- Improvement;
- Making decisions based on facts;
- Management of mutual relations.

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