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THE CZECH MACHINERY CLUSTER

HOW TO KEEP KNOW-HOW OF CZECH SUPPLY CHAIN FOR NEW NUCLEAR BUILDS

Ladislav Mravec, General Manager

**Conference NERS 2015, Prague
11. 11. 2015**





THE CZECH MACHINERY CLUSTER

**An Association founded in 2003,
now representing:**

- 78 organizations
- 26 000 employees
- Annual Sales cca 3 billion USD

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The Czech Machinery Cluster is supplier and contractor into:

- **Thermal Power Plants**
- **Nuclear Power Plants**
- **Chemical industry, petrochemistry**
- **Metalurgy**
- **Ecological Engineering**

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Leading Companies in the Cluster:

- **VÍTKOVICE MACHINERY GROUP**



- **ŽĎAS, a.s.**



- **Strojírny a stavby
Třinec, a.s.**



**STROJÍRNY A STAVBY
TŘINEC**

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**Supply Chain for NPP installations
organized by 37 NSK companies**

- **In the past cooperation with other suppliers,
e.g. Škoda JS**
- **Within Temelin tender close contacts with
Rosatom, Westinghouse, Areva**
- **Four key NSK companies are also members of
the Czech Energy Alliance**

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Cluster operations in nuclear energy sector cover:

- Deliveries for nuclear power plants
- Maintaining of previous installations
- Technical education projects
- Cooperation with research institutions and universities
- International supply chains for NPP

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Deliveries for NPP:

- Pressure vessels and heat exchangers
- Heating-exchange pipes
- Castings and forgings
- Pipes and fittings
- Hydraulic systems
- Pumps



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Deliveries for NPP:

- Primary and secondary circuit systems
- Control and supervision systems
- Electrical systems
- Commissioning systems
- Spare parts

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37 CLUSTER MEMBERS ACTIVE IN THE FIELD OF NUCLEAR ENERGY:

- Armaturka Krnov, a.s.
- ARMATURY Group, a.s.
- BAEST Machines and Structures, a.s.
- BAT Engineering, a.s.
- Bilfinger Industrial Services Czech, s.r.o.
- Colorspol, s.r.o.
- České vysoké učení technické v Praze
- dataPartner, s.r.o.
- Flash Steel Power, a.s.

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37 CLUSTER MEMBERS ACTIVE IN THE FIELD OF NUCLEAR ENERGY:

- Hutní montáže, a.s.
- Hutní montáže – Svarservis, s.r.o.
- Hydac, s.r.o.
- IVITAS, a.s.
- Jihomoravská armaturka spol. s r.o.
- KRÁLOVOPOLSKÁ, a.s.
- KOMA – Industry, s.r.o.
- MUT Tubes, s.r.o.
- PARS Děčín, s.r.o.

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37 CLUSTER MEMBERS ACTIVE IN THE FIELD OF NUCLEAR ENERGY:

- Power Team, s.r.o.
- RENETRA, s.r.o.
- Seco Tools CZ, s.r.o.
- SIGMA GROUP, a.s.
- Strojírny a stavby Třinec, a.s.
- TES, s.r.o
- TÜV Rheinland Česká republika s.r.o.
- TÜV SÜD Czech, s.r.o.
- Ústav aplikované mechaniky Brno, s.r.o.

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37 CLUSTER MEMBERS ACTIVE IN THE FIELD OF NUCLEAR ENERGY:

- V - NASS, a.s.
- VŠB – Technická Univerzita Ostrava
- Vysoké učení technické v Brně
- ZAT, a.s.
- ŽŽDAS, a.s.
- Vítkovce Machinery Group:
 - VÍTKOVICE POWER ENGINEERING, a.s.
 - VÍTKOVICE HEAVY MACHINERY, a.s.
 - VÍTKOVICE TESTING CENTER, s.r.o.
 - VÍTKOVICE UAM, a.s.

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How to keep /develop Czech know-how in nuclear energy

- **37 member companies from NKS involved**
- **To do it theoretically is not enough, access to the business and commissions is needed**
- **In case of nuclear energy the only way is cooperation with the government**
- **Participation in the projects abroad with the governmental support**

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Czech Energy Alliance

- **Vehicle for nuclear industry to cooperate with government**
- **National Action Plan for nuclear energy**
- **What does it mean „action“**



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The unavoidable role of the government



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Positive shift is expected in:

- Governmental committee
- Investment model for Temelin and Dukovany
- Link to the EPC contractor
- Participation in the projects abroad

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Four advices:

- Governemental support in projects abroad
- Declaration to continue with NPP at home
- Nuclear energy supply chains
- To oppose excluding NPP from national energy mix



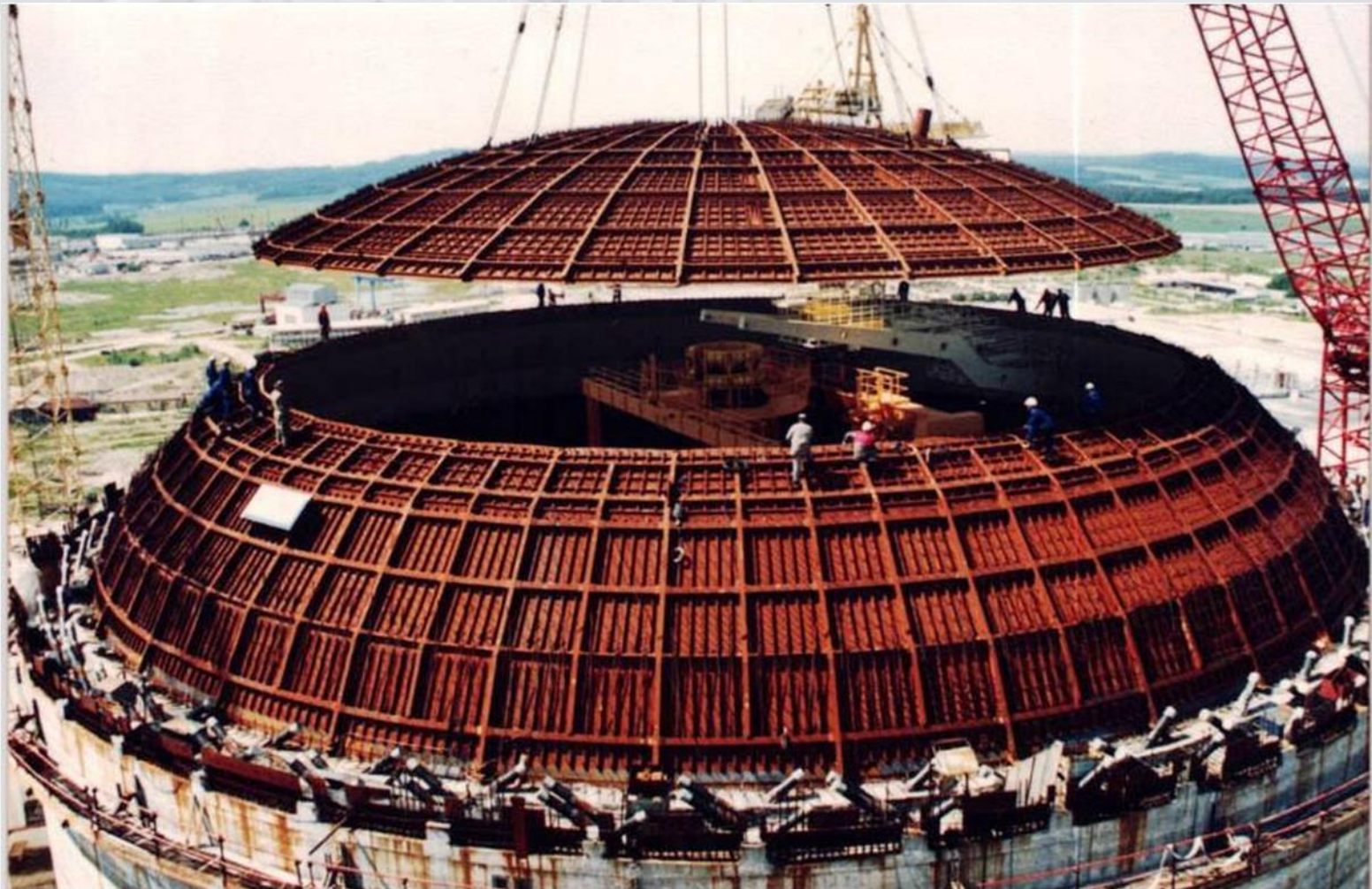
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The Czech nuclear industry

- **Did not interrupt production in the last decades**

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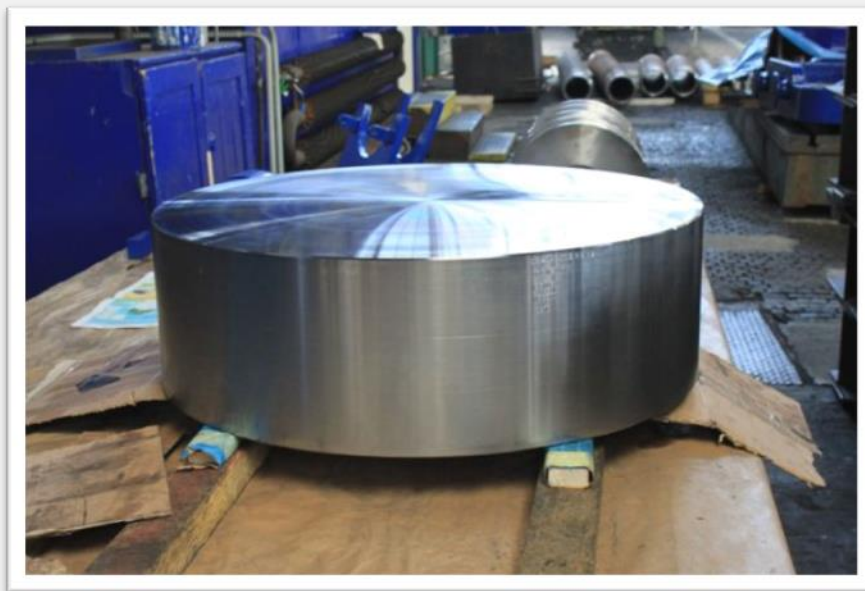
NPP Temelin - containment



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Ongoing and uninterrupted production in Vitkovice Machinery Group

Trubkovnice vysokotlakého ohříváku VVER-1000 a víko primárního kolektoru parogenerátoru VVER – 1200 / ruské JE



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Ongoing and uninterrupted production in Vitkovice Machinery Group



Kroužek pláště
parogenerátoru pro indické
JE s těžkovodními reaktory o
výkonu 700 MW

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Ongoing and uninterrupted production in Vitkovice
Machinery Group

Výkovky dílů primárních kolektorů pro
parogenerátory VVER -1200



Těleso kolektoru



Příruba

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Ongoing and uninterrupted production in



**STROJÍRNY A STAVBY
TŘINEC**

Těžké ocelové konstrukce vč. montáže, tlakové nádoby, tepelné výměníky, manipulátory, potrubní systémy aj.

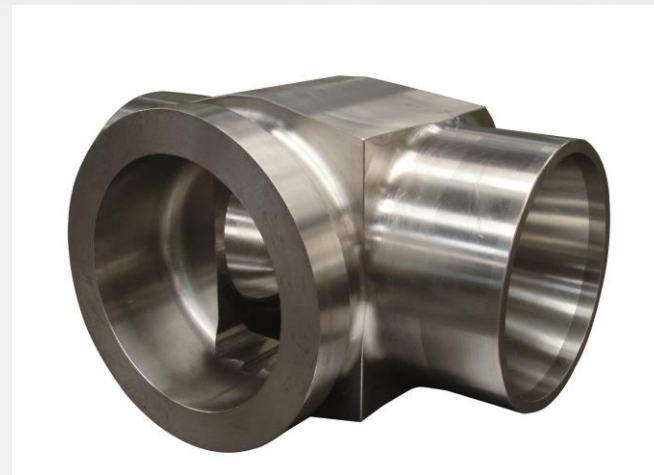


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Ongoing and uninterrupted production in ZDAS

Castings & forgings production and delivery

ŽDAS, a.s.



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BAEST Machines & Structures, a.s.



ZAT a.s., Czech Company, I&C solution



Highlights

- ZAT was founded in 1962 , privatized in 1992
- ZAT has deliveries to more than 50 countries, to more than 265 power plants
- ZAT is active in following areas:
I&C for Nuclear power generations, Heat and water power generations; gas distribution, transportation, etc.
- ZAT has 340 employees
- ZAT manufactures its own control systems

Nuclear sector

- 40 years of deliveries to nuclear sector
- Our systems operates at 18 NPP's in five European countries
- The biggest project:
NPP Dukovany - I&C modernization (realization 2000-2016);
- For deliveries to nuclear sector we use exclusively our own control systems
- We are able to comply with conditions of authority bodies in different countries

Sandra, 4th generation of I&C

- Safe and Reliable Automation
- Long-term lifetime
- Highest production quality
- 10 years warranty



Location



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Piping and semi – products for NPP

Flash Steel Power, a.s.



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Pumps for NPP

SIGMA GROUP, a.s.



Barrel Boiler Feed Pump SIGMA KNE 5.1 – 300 – 6 – 000

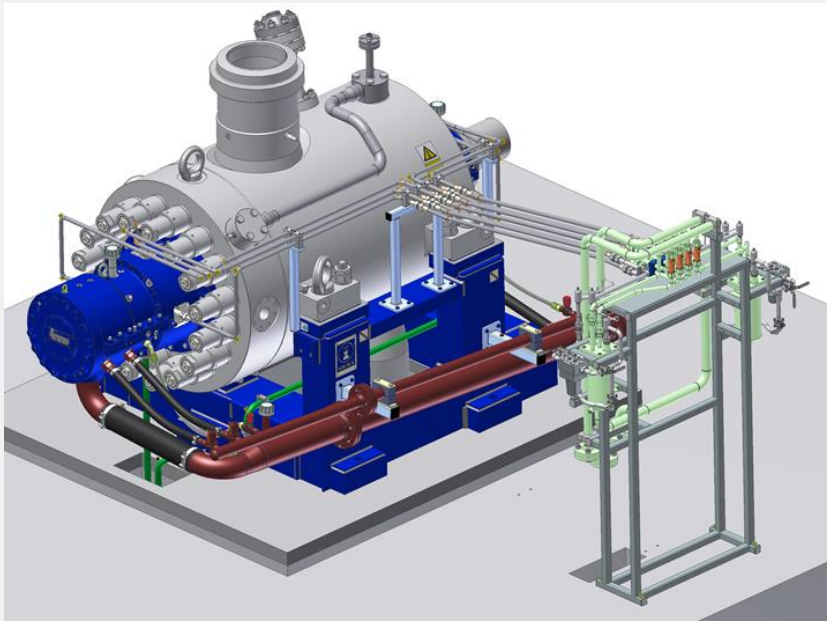
Q= 300 l/s

H= 4 000 m

n = 5 000 rpm

m= 13 147 kg

Ledvice PP Unit 660 MW Supercritical (2010)



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Výroba a dodávka hydraulických systémů pro JE

Hydac, s.r.o.



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Drivers of reactor fuel rods

V – NASS, a.s.

nass



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Pumps for NPP

RENETRA, s.r.o.

Procesní čerpací agregáty s brodivým rotorem

Určeno pro aplikace

Rozsah teplot:

-200 °C - +450 °C

Tlak: 55 MPa

$Q_{MAX} = 2400\text{m}^3/\text{h}$

$H_{MAX} = 750\text{ m}$



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Heavy steel constructions

- VÍTKOVICE POWER ENGINEERING, a.s.
- Hutní montáže, a.s.
- Strojírny a stavby Třinec, a.s.
- KRÁLOVOPOLSKÁ, a.s.
- Power Team, s.r.o.

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VMG

Steam generator for Framatome

V letech 1993 až 1996 bylo vyrobeno 42 kusů svařených kroužků s nátrubky v různých podsestavách plášťů pro vertikální parogenerátory – dodávka pro firmu "Framatome" (Francie)
Průměr ~ 3500 mm, hmotnost max. 65 000 kg, materiál 18MND5



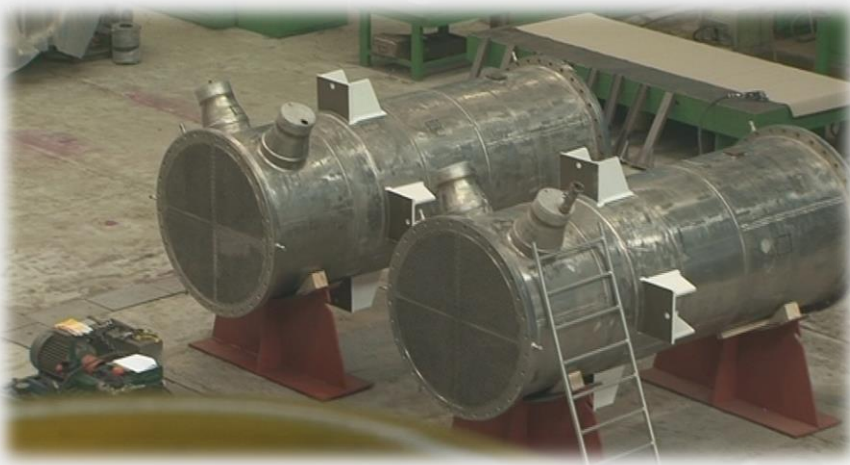
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KRÁLOVOPOLSKÁ, a.s.

Křížíkova 2989/68a, 612 00 Brno – Královo Pole, Česká republika

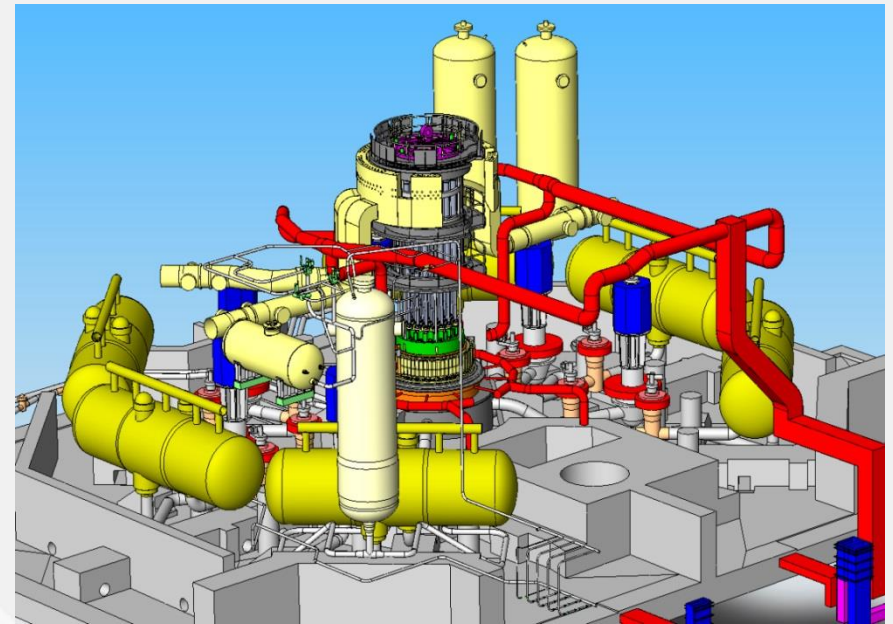
www.kralovopolska.cz



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Commissioning of NPP:

- TES, s.r.o.





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Quotes of nuclear veterans

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***We can speak about our know-how with
Russians ...***



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... also with Americans ...



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... and also with French.



**National Machinery Cluster
AREVA Saint-Marcel, October 24th 2011**



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Epilogue



NÁRODNÍ STROJÍRENSKÝ KLASTR

thank you



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