



Modernization of Process Control System

**Zuevskaya Thermal Power Plant,
Power Unit 1**

About Company



- Founded in 2000
- Part of big financial and industrial corporation MUST-IPRA
- Provides complete cycle of design, development, commissioning and maintenance of Process control systems, Automated metering systems, Dispatch control systems etc.
- Experience on various modern software and hardware platforms
- Staff consists of over 100 professionals, among them 70 highly skilled design engineers



Certificates of Khartep LLC



Automated Systems of Khartep LLC Implemented on Various Plants and Enterprises in Ukraine

Energy System of Ukraine

■ Dispatch Control

ДнепроБлЭнерго
Днепровская ЭС
Северная ЭС
Донбасская ЭС
Западная ЭС
Южная ЭС *

▲ Metering

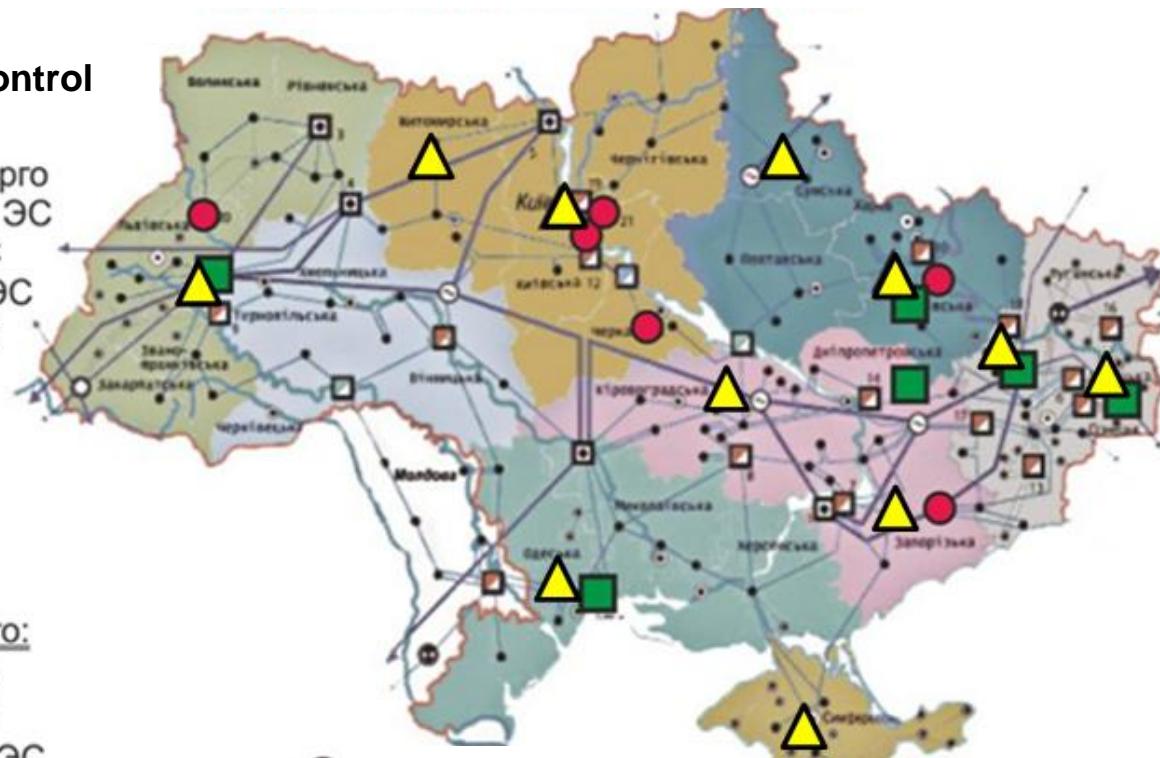
НЭК Укрэнерго:

Северная ЭС
Западная ЭС
Днепровская ЭС
Донбасская ЭС
Центр управления НЭК

● Power Generation

Днепроэнерго Дарницкая ТЭЦ
Западэнерго Черкасская ТЭЦ
Центрэнерго Харьковская ТЭЦ-5

* Примечание:
Системы на стадиях
проектирования и
внедрения



Process Control Systems for Metallurgical Plants

- PCS of multifuel boiler for Zaporizhstal
- PCS of gas cleanings for TNK “Kazchrom”, Kazakhstan (Aksu and Aktubinsk ferroalloy plants)
- PCS of gas cleanings for JCS Tikhvin ferroalloy plant, Russia
- PCS of gas cleanings for JCS Stakhanov ferroalloy plant, Ukraine
- PCS of charge dosage for JCS Zaporozhye ferroalloy plant, Ukraine



Process Control Systems for Power Generation Plants

- Turbine speed controller for JSC Ukrgidroenergo, Kanevskaya Hydropower Plant
- PCS of Power Unit 1 for Vostokenergo LLC (Zuevskaya Thermal Power Plant)



DTEK
Востокэнерго



Process Control System of Power Unit: Short Characteristics of Modernization Object

- Modernization object – Power unit 1 of Zuevskaya TPP, which is located in Zugres, Donetsk region, Ukraine
- Zuevskaya TPP has an installed capacity of 1200 MW. TPP is a part of Vostokenergo LLC (DTEK corporation), which is one of the biggest power energy generating companies in Ukraine and participates in the regulation of frequency and power of the united energy system of Ukraine
- Power unit 1 of Zuevskaya TPP has electrical power of 300 MW and was commissioned in March 1982, and as of January 1, 2008 has worked 153 599 hours with 508 startups and stops



PCS of Power Unit: Modernization Scope (1)

- PCS modernization including the supply cabinets with PLCs and replacement of equipment in main control room to modern workstations and video walls;
- Modernization of regulation system of turbine K-300-240-2, including the implementation of regulation system of turbo generator and electronic safety system;
- Modernization of regulation system of drive turbine OR-12PM, including the implementation of feed pump control system and electronic safety system;
- Modernization of boiler gas-air, with the implementation of auto-ignition and safety devices;
- PCS modernization of boiler dust feeders, including frequency regulation and replacement of dust feeders motors;



PCS of Power Unit: Modernization Scope (2)

- Modernization of vibration and mechanical quantities monitoring of feed pumps, installation of vibration and displacement sensors;
- Modernization of support mechanisms vibration monitoring system so as to reduce risks of rotating machinery maintenance;
- Implementation of water chemistry automatic control system, with the installation of analyzers and systems for sample preparation;
- Implementation of pipeline breaking sensors;
- Modernization of coal flow measurement with the installation of controllers, sensors and conveyor scales;

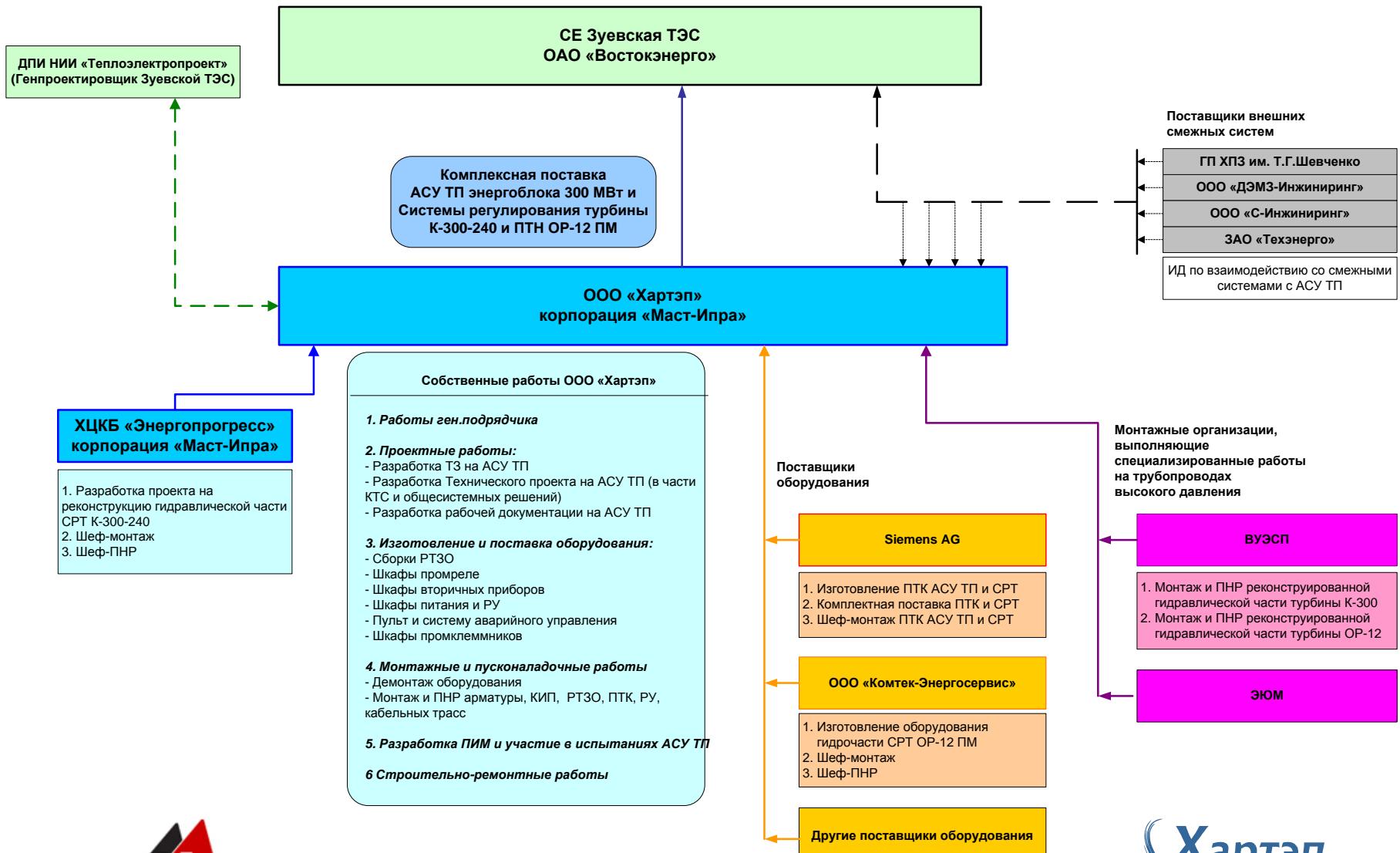


PCS of Power Unit: Modernization Scope (3)

- Implementation of gas analyzers and ultrasonic dust level meters;
- Implementation of the emergency control room;
- Implementation of generator self-synchronization;
- Modernization of the power subsystem;
- Modernization of control room support systems (lighting and air conditioning) etc.



PCS of Power Unit: Work Cooperation



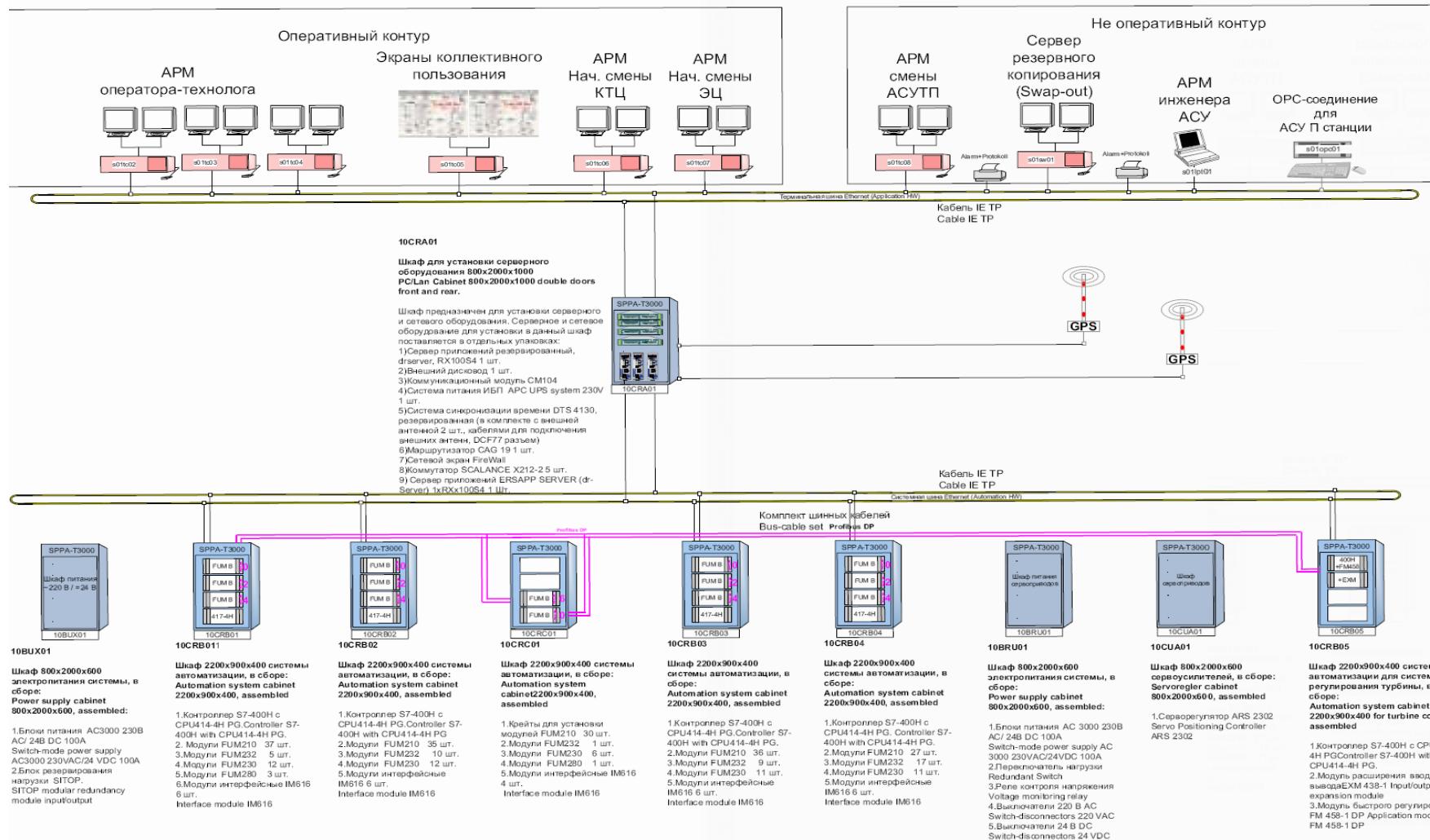
PCS of Power Unit: Modernization Schedule

№ п/п	Stage	Месяцы 2009												Месяцы 2010				
		03	04	05	06	07	08	09	10	11	12	01	02	03	04	05		
1	Разработка технического задания на АСУ ТП																	
2	Разработка технического проекта на реконструкцию АСУ ТП																	
3	Разработка рабочей документации на реконструкцию АСУ ТП																	
4	Разработка рабочей документации на реконструкцию гидравлической части турбины К-300																	
5	Разработка рабочей документации на реконструкцию гидравлической части турбины ОР-12 ПМ																	
6	Демонтаж оборудования																	
7	Строительные работы (ремонт помещений)																	
8	Поставка оборудования																	
9	Монтаж оборудования																	
10	Выполнение ремонтных и монтажных работ по турбинам К-300 и ОР-12 ПМ																	
11	ПНР полевого оборудования (арматура, КИП)																	
12	ПНР АСУ ТП																	
13	Метрологическая аттестация каналов АСУ ТП																	
14	Обучение персонала на площадке Исполнителя																	
15	Обучение персонала на площадке Заказчика																	
16	Комплексные испытания АСУ ТП																	
17	Гарантийные испытания АСУ ТП																	

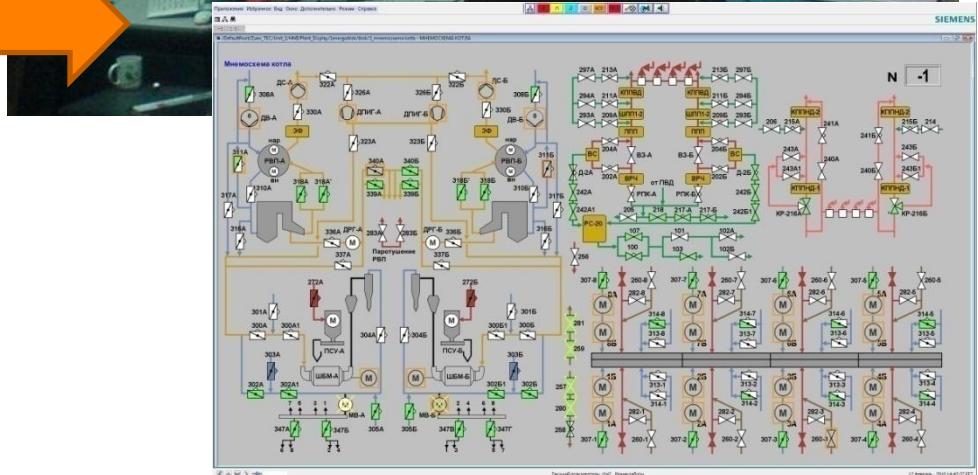
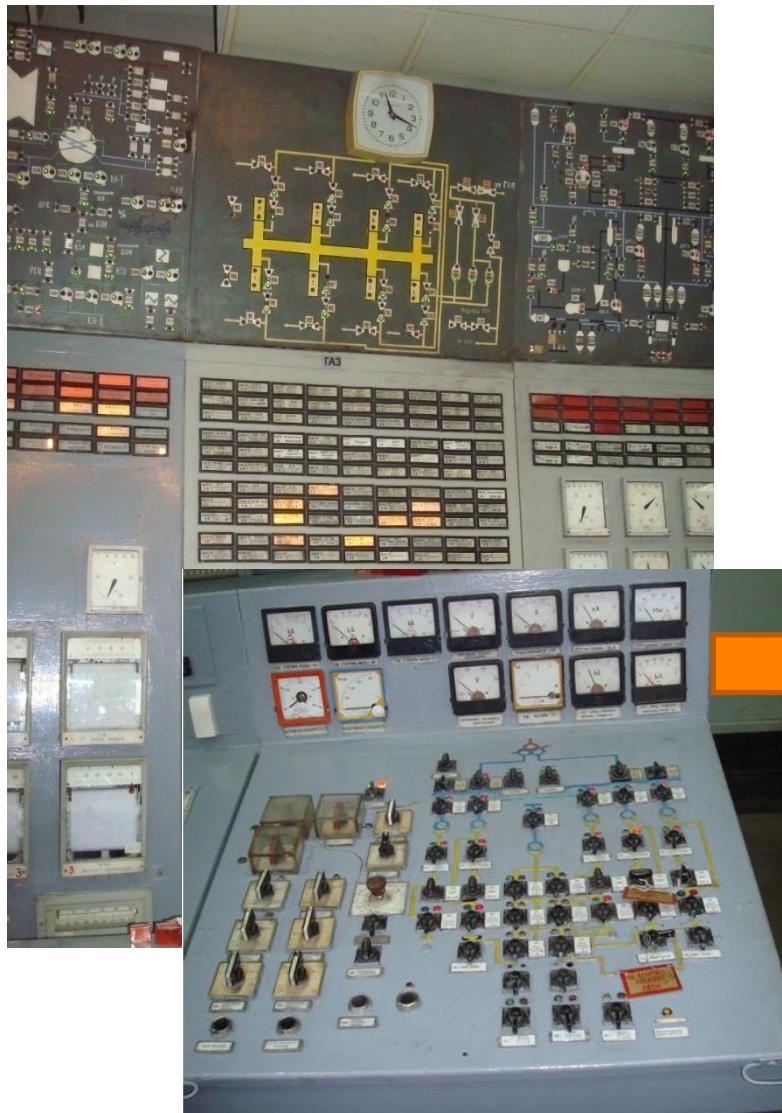


PCS of Power Unit 1, Zuevskaya TPP: Architecture

Схема структурная комплекса технических средств ПТК SPPA-T3000
АСУ ТП Зуевской ТЭС энергоблока № 1



Modernization of Main Control Room



PCS of Power Unit 1, Zuevskaya TPP: Lessons Learned (1)

- During modernization of PCS of Zuevskaya TPP Power Unit 1 Khartep LLC has completely mastered SPPA-T3000 Control System
- Nowadays Khartep LLC successfully performs maintenance of this PCS.



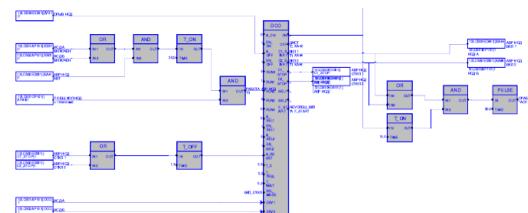
PCS of Power Unit 1, Zuevskaya TPP: Lessons Learned (2)

- During maintenance Khartep LLC has successfully performed the following activities:

- Implementation of PCS communication with interfacing systems

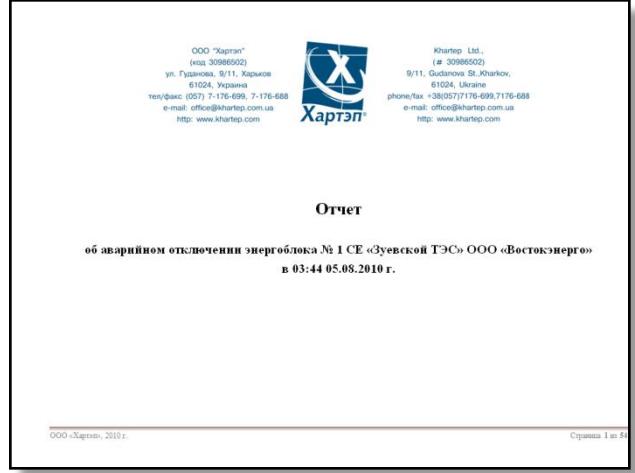
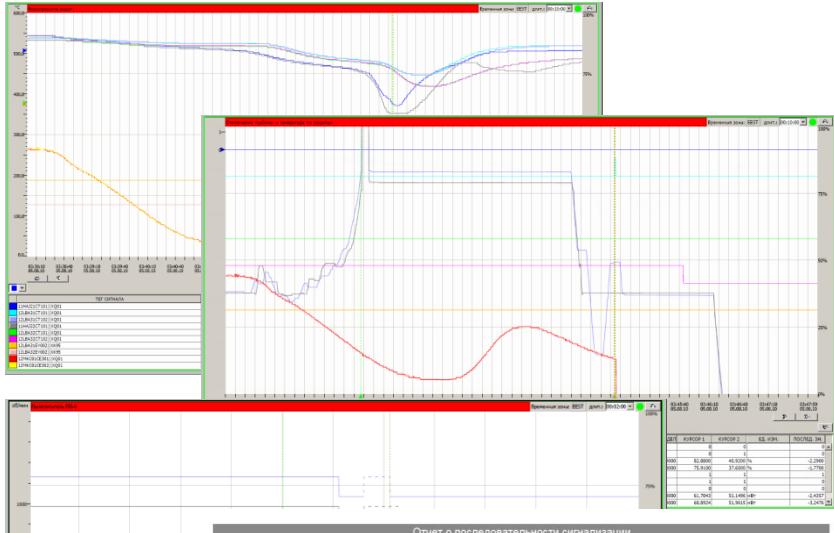


- Exchange of linear displacement transmitters from Turk to Solartron
 - Correction of algorithms
 - Repair of an industrial air-conditioner



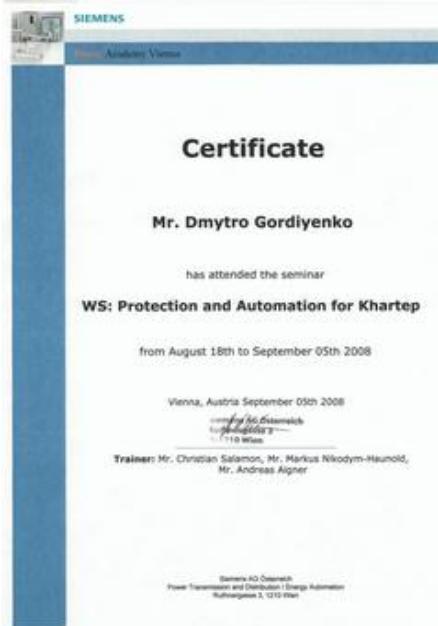
PCS of Power Unit 1, Zuevskaya TPP: Lessons Learned (3)

- Detailed analysis was performed to find out causes of power unit 1 stop on August, 5, 2010. Analysis results were given in the report.



Staff Competence

- Personnel of Khartep LLC has experience and certified competence on work with equipment and software produced by Siemens, Schneider Electric, ABB GE Intelligent Platforms etc.



Collaboration with Equipment Suppliers

- Khartep Ltd successfully collaborates with different suppliers of automation equipment

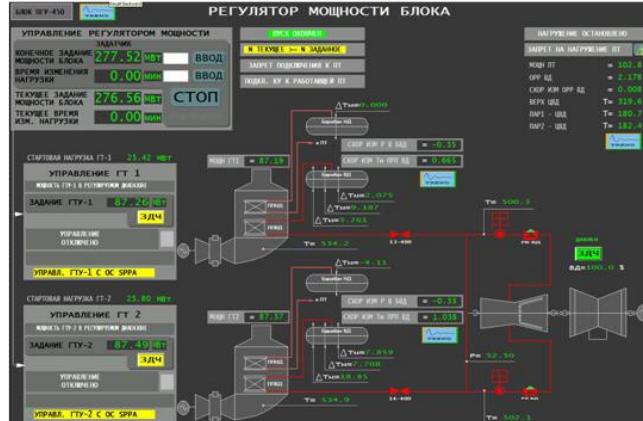


- Besides SPPA-T3000 produced by Siemens, Khartep LLC performed analysis of other control systems, such as ABB Symphony, Emerson Ovation, GE Energy OC6000 etc.

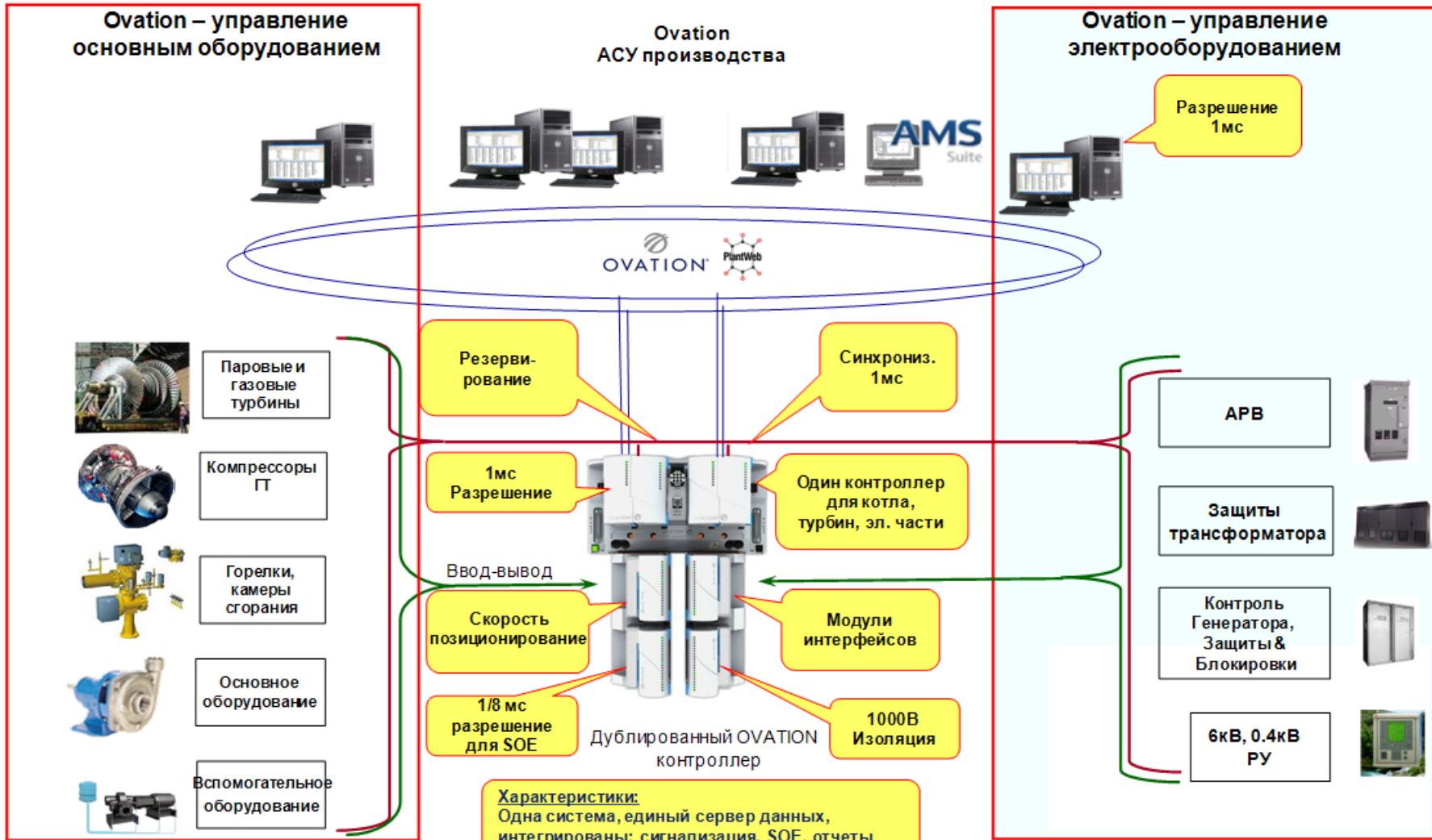


Collaboration with Emerson

- Khartep LLC and Emerson have an association agreement in the field of development and implementation of control systems based on Ovation™ Expert Control System
- Ovation™ Expert Control System is being developed and enhanced more than 20 years, nowadays it is being used on many power plants



Ovation Architecture



Ovation Components (1)

- Intel Pentium-based controllers
- 128 Mb Flash memory
- 64 Mb RAM
- 5 control tasks with fixed performance and 3 with user-chosen (from 10 ms to 30 s)
- Self-diagnostics
- Up to 128 local I/O modules, up to 1024 remote I/O modules
- Redundancy



Ovation Components (2)

- I/O modules are placed on DIN rack in Ovation cabinets
- There are lots of different modules, main are the following:
 - Analog input modules
 - Analog output modules
 - Digital input modules
 - Digital output modules
 - Special modules



Partners of Khartep LLC

APC

SIEMENS

ORACLE

DELL

intel

Invensys
Wonderware

MITSUBISHI

AB Allen-Bradley

Schneider
Electric

GROUPE SCHNEIDER

Merlin Gerin Modicon Square D Telemecanique

FUJITSU COMPUTERS
SIEMENS

hp
invent

lenovo

MUST-IPRA



GE
Intelligent Platforms

Microsoft

Хартэп

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