KSt 202- 811:2015

COMPANY STANDARD

CCPP UNIT MANAGER'S JOB DESCRIPTION

STOCK COMPANY SC « NTPP » NAVOI

Introduction

1 DEVELOPED AND ENTERED IN BY The CCPP unit of JSC "NTPP"

2 APPROVED AND RUN IN by the order SC « NTPP » №

3 INSTEAD OF KSt 202- 811:2012

Approved

Director of SC «NTPP »

K. KH. Ganiev

COMPANY STANDARD

CCPP UNIT MANAGER'S JOB DESCRIPTION

Term of validity from till

1. Application area

This manual is developed on basis of KSt 202-810: 2011 "Regulations of CCPP Unit ", Qualification directory of positions of managers, specialists and employees in 1987in order to regulate the functions, duties, rights and responsibility of the manager of CCPP unit (CCPP) and is mandatory for him.

2. General Provisions

2.1 The head of the unit of the CCPP coordinates and controls the production and economic activities of the unit, ensures technically correct operation of equipment and other fixed assets.

2.2 The head of the CCPP unit must have a higher technical education and work experience in engineering and technical and operational positions for at least 3

years or a specialized secondary education and work experience in engineering and technical and operational positions for at least 5 years.

2.3 The Head of the CCPP unit is appointed, moved and dismissed from the position by the director order of JSC "NTPP" on the proposal of the chief engineer of the personnel department of station in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.4 The manager of the CCGT unit in administrative and economic activities submits to the director of JSC "NTPP", the production and technical activities - to the chief engineer of the station.

2.5 In the event of a long absence of the unit manager of the CCGT, the duties are assigned to the deputy head of the CCGT unit for operation.

2.6 The unit manager of the CCGT should be guided in its work:

- Indication of PP - 56;

- "Regulations on the investigation and recording of accidents and other

damage to workers' health at work "approved by the Cabinet of Ministers on June 6, 1997;

- RH 34-114: 2007 "Regulations on Disciplinary Responsibility of Workers of the Uzbek Energy System";

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan of 12.01.1999 No. 140 "On measures to strengthen the performance discipline";

- The Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 of 30.09.2009;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan

No. 245 dated August 22, 2009 "On Approval of the Rules for the Use of Electric and Thermal Energy";

- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan", Tashkent, 2011;

Section I Chapter I. § 1-16;

Section II Chapter 2. § 4;

Chapter 3. § 1, 3, 4, 5, 7, 8, 9, 11, 12, 13;

Chapter 4 § 1, 2, 12, 13, 14;

Chapter 5 § 1-6;

- "Safety rules for the operation of thermal mechanical equipment of power plants and heating networks", Tashkent 2012 in the following volume:

Chapter I.

Chapter 2 § 1, 2;

Chapter 3 § 1-6, 9-14;

Chapter 4 § 2, 3, 4, 6, 8, 9.

Appendix: 2-8, 9.10, 11, 13-17, 19

- "Safety rules in the gas sector of the Republic of Uzbekistan", Tashkent 2004 in the following volume:

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Chapter I. General Provisions. § 1, 2, 4, 5;

Chapter III. Operation of gas facilities. § 1, 2, 3, 4.7;

Chapter VI. Gas hazardous work. Appendices 1, 2, 31, 32.

- "Rules for the Arrangement and Safe Operation of Steam and Hot Water Pipelines", 2010 in the amount of:

Chapter 1. General provisions § 1, 5-8;

Chapter 2. Designing § 1;

Chapter 5. Registration, technical survey,

permission to operate. § 12;

Chapter 6. Organization of safe operation and

repair § 1, 2, 3, 4;

Chapter 8. Paint Stains and Inscriptions Chapter 9 Safety Signs

Chapter 10 Accident and accident control Chapter 11 Control of compliance with regulations Annex 1, 2;

- "Fire safety rules for energy companies", Tashkent 2013;

- "Rules for the Arrangement and Safe Operation of Vessels Working Under Pressure", 2011, in the amount of:

Chapter I. § 1;

Chapter 3. § 1, 2;

Chapter 4.

Chapter 5 § 1, 2;

Applications: 1, 2, 3, 6, 9, 10, 13, 14, 15;

- "Rules for the Arrangement and Safe Operation of Steam and Hot Water Boilers", Tashkent, 1997, in the amount of:

Section 1. 1.1. - 1.4 .;

Section 2.

Section 3. 3.1. - 3.6 .;

Section 4. 4.1 .; 4.7 .;

Section 5. 5.1 .;

Section 6.

Section 7. 7.1. 7.4 ;;

Section 8. 8.1. - 8.3 .;

Section 9.

Section 10.

Appendices 1, 2, 3, 4, 6.

- Occupational safety standards system;

- KSt 202- 032: 2008 "Rules for working with low-sulfur gas";

- "Instructions for first aid to victims in connection with accidents in the maintenance of power equipment";

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- "Safety rules when working with tools and devices";

- Production and job descriptions of the unit;

- The Labor Code of the Republic of Uzbekistan, Tashkent, 1996.

- RH 34-400: 2008 "Regulations on the Occupational Safety Management System in the Energy Industry;

- RH 34-475: 2007 "Rules of internal labor regulations for employees of the executive apparatus of the State Joint Stock Company" Uzbekenergo ", its branch" Energosotish "and unitary enterprises";

- "Rules for the organization of work with personnel at energy production enterprises", registered by the Ministry of Justice of the Republic of Uzbekistan dated 04.10.2002 N 1178;

- "Explosion safety rules when using fuel oil and natural gas in boiler plants";

- Directory materials, operational and emergency response circulars of SJSC "Uzbekenergo";

- Orders, orders of JSC "NTPP", and other regulatory documents;

- RH 34-114: 2007 "Regulations on Disciplinary Responsibility of Workers of the Uzbek Energy System";

- Guidance document for the production of repair work (RDPR);

- KSt 202-038-2014 "Regulations on incentive payments for managers, specialists, employees and workstations for the main results of economic activity";

- KSt 202-036-2007 "Rules of internal labor regulations for employees of OJSC" NTPP ";

2.7 The Head of the CCGT unit should know:

- design and operation features and operational characteristics of all main and auxiliary equipment of the CCGT unit;

- technological diagrams of the equipment of the CCGT unit;

- location of fire extinguishing means and fire water supply system;

- the main electrical diagram of the CCGT unit;

- daily, monthly, quarterly and annual technical and economic indicators and targets for them;

- designation and operation principle of the control and measuring devices installed on the CCGT equipment, locking devices, automation, protection;

- the territorial location of equipment, pipelines of the valves of the unit of the CCGT;

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- the fundamentals of economics, organization and management.

2.8 The periodicity of testing the knowledge of PTE, PTB, PPB, job descriptions and production instructions, rules for the installation and safe operation of equipment controlled by Sanoatgeocontechnazorat, is carried out within the following periods:

- primary - before admission to independent work;

- periodic - once in 3 years;

- extraordinary - in case of violation of rules and instructions, on demand

bodies of State Supervision, State Energy Inspectorate for the operation of power plants and networks and higher management bodies, as decided by special commissions.

2.9 Frequency of attestation:

- primary - after 1 year of work in this position.

The subsequent attestations are carried out according to the results of the passed attestation, but not less often than 1 time in 5 years.

2.10 The workplace of the unit manager of the CCGT is located in the service room of the unit, in the building of the unit of the CCGT.

2.11 Service areas - the whole territory of the equipment location of the CCGT unit and all elevations; waste heat boiler, gas and steam turbines, CCGT, cooling tower, GBCS with adjoining territory and gas pipelines in the territory of CCPP to the gate valves of the gas pipeline of the station, Chemical water treatment of CCPP.

3 Functions and responsibilities

3.1 Controls the operation and condition of equipment, mechanisms, devices and premises under the control of the unit, by detours and inspections, with the purpose of timely detection and troubleshooting.

3.2 Provides maintenance of the set mode of operation of the equipment of the CCGT unit.

3.3 Operational and technical maintenance of fixed unit equipment.

3.4 Takes measures to eliminate damage and eliminate emergency condition of equipment.

3.5 Participates in the investigation of the causes of accidents and failures in the operation of thermal mechanical equipment, maintains their records and analyzes, and organizes emergency repairs.

3.6 Monitors the serviceable state of the fire fighting equipment.

3.7 Keeps track of the cleanliness of equipment, facilities and territory fixed to the unit.

3.8 Participates in the development of annual and long-term plans of repair, reconstruction and modernization of the thermal mechanical equipment of the unit, in the organization and implementation of measures for science and new technology, occupational safety and safety technique.

3.9 Performs organizational, technical measures for preparation and withdrawal of CCGT equipment in capital, medium, current repairs.

3.10 Supervises the quality, volume of repairs performed works by the centralized repair unit, contractors, as well as accounting for materials and spare parts.

3.11 Carries out a thorough acceptance of the equipment from repair, performed by all repair sites, JSC "NTPP", contractors and foreign companies; leads claim work in case of poor repair by contractors and foreign companies.

3.12 Keep records and report on the production activities of the unit, maintains technical documentation.

3.13 Determines the amount of knowledge and safety instructions for all occupations and positions of workers, employees and engineering departments of the unit, submits for approval to the trade union committee and approval to the management of the station, organizes a timely review of them and provides them with jobs and requires their compliance.

3.14 Provides safe working conditions for the operation, maintenance, repair of equipment, buildings, structures and maintenance of technical processes.

3.15 Every day he gets acquainted with the records in the operational journal of the unit, in the journal of equipment defects, on the status of Safety techniques (ST) and industrial sanitation, visits them, and ensures the elimination of shortcomings. Requires a report from the deputy heads, the shift head at the beginning of the day about the state of ST, technological processes of equipment, remedies, violations of ST measures, norms and safe work practices.

3.16 Timely organizes the study of new and overhauled instructions and other documents on labor protection by workers and engineers, exercises control over their performance. Provides workplaces with journals, instructions, maps,

diagrams, posters, signs, safety, means for preparing jobs, ST inscriptions controls their safety and maintenance.

3.17 Participates in monthly safety precautions, fire safety. Supervises the observance of labor and production discipline and the implementation of instructions Fire Safety technique (FST), immediately suppresses the violation of their operational personnel.

3.18 Weekly check the condition of workplaces, tools, protective equipment, ventilation system, take measures to eliminate the identified violations.

3.19 Take measures to reduce the level of harmful factors, ensure the proper operation of ventilation and heating systems, a normal microclimate, the illumination of workplaces. Carries out the maintenance of the passport of sanitary-technical condition in the unit.

3.20 Ensures timely management of all types of training, briefing, testing of staff knowledge. He heads a commission to check the knowledge of workers, issues orders for admission to independent work.

3.21 Immediately informs the management of the station of the accident, participates in the commission for its investigation, draws up the acts on accidents, develops measures to prevent them and sends them for approval.

3.22 At units discusses the state of Work safety (WS) and ST, industrial sanitation, morbidity, violations, orders, orders. The staff of the unit with injuries reviews and other documents on WS and ST are informed.

3.23 Organizes timely medical examination by the staff of the unit.

3.24 Imposes penalties on the workers of the unit for violation of WS and ST, instructions. Represents materials to encourage employees for active assistance in compliance with FST.

3.25 Conducts work on development of rational work, study and introduction of advanced labor methods and experience of innovators in the energy sector.

3.26 Organizes the holding of days of ST, the work and equipping of cabinets and corners for ST literature, manuals.

3.27 Organizes the recording and analysis of malignancy, heads the engineering and medical team of the unit.

3.28 Supervises observance of labor and industrial discipline, implementation of instructions, regimes, FST, industrial sanitation, immediately suppresses their violation.

3.29 Daily checks selectively the preparation of jobs.

3.30 Organize the provision of workers with personal protective equipment, safety devices, soap, drinking water, coupons for milk.

3.31. Once a month, in conjunction with the chairman of the unit committee (senior engineer for WS and ST), in order to implement the second stage of control, conduct a check on the condition of working conditions and safety in the unit, assess the work of the 1st stage of control.

3.32 Stops the operation of the units when creating hazardous conditions. Controls the correctness of issuing orders, orders for the production of works.

3.33 Ensures the implementation in due time of prescriptions, activities for ST, stipulated by acts, orders, etc.

3.34 Prepares an annual plan of measures for the protection of labor and technology safety, industrial sanitation, and disease reduction.

3.35 Ensures timely management of all types of training, briefings, personnel knowledge testing. He heads a commission to check the knowledge of workers, issues orders for admission to independent work.

3.36 Monthly with the Engineer Technical Personnel (ETP) and public ST inspectors, it reviews the implementation of WS and ST activities, analyzes the work of public inspectors.

3.37 Organizes timely preventive inspection by the unit staff.

4 Rights

4.1 Take urgent measures to stop or reduce the load of equipment, stop the production of work by workers of any unit in the event of danger to people and equipment.

4.2 Discontinue production of equipment and remove from work of persons violating safety rules, fire safety or in the absence of a proper permit (order).

4.3 To issue outfits and give orders for the production of repair work on the CCGT equipment.

4.4 Apply for withdrawal to repair equipment.

4.5 To make proposals to the management of the power plant on imposing penalties on persons whose actions are unlawful or negligent in relation to their duties, or could lead to damage or unreasonable disconnections of CCGT equipment.

4.6 Sign the plan or report documents of unit.

4.7 Make proposals to the management of the power plant and participate in the development of activities aimed at fulfilling the main objectives of the unit, improving its technical and economic indicators, improving the working conditions of the unit staff.

4.8 Give technical and administrative orders to subordinate staff.

4.9 Control compliance with the workers of the unit of labor and production discipline, the requirements of rules and regulations on labor protection, technology, safety and industrial sanitation.

4.10 Establish, in consultation with the trade union organization, the working and rest regime of the unit staff in accordance with the current legislation.

4.11Make proposals to the management of JSC "NTPP" on hiring, the dismissal and movement of the unit staff in accordance with applicable law.

4.12 Encourage or make proposals to the director of JSC "NTPP" on the promotion of distinguished workers in the unit.

4.13 To impose disciplinary sanctions on violators of labor and production discipline within their competence, in case of serious violations, to make proposals to the director of JSC "NTPP" on imposing penalties and reducing the premium.

5 Relationships

5.1 The relationship of the CCGT head is carried out in accordance with this job description and KSt 202-810: 2011 "Regulations on the unit of combined cycle gas turbine plants", and the approved management of JSC "NTPP" distributing the boundaries of maintenance of equipment, buildings and structures between the units.

6 Responsibility

6.1 The head of the unit of the CCGT is responsible for:

- implementation of the plan for the production and supply of electrical and thermal energy;

- execution of the dispatch schedule of loads;

- economy and reliability of operation of the thermal mechanical equipment fixed for the CCGT;

- safety of the equipment and property fixed to the unit;

- rational organization of work in the unit;

- timely and effective performance of the functions assigned to the unit, the full use of the rights granted to it.

6.2 The chief of the unit is responsible for the work of the whole unit, and each employee for the job site within the limits of the duties assigned to him by the job description.

6.3 The head of the unit and the engineering staff of the CCGT are personally responsible for failures in work and accidents on the equipment fixed to the unit floor, accidents, as well as tanning caused by their fault or the fault of the subordinate personnel.

6.4 The unit manager must comply with the requirements of the current legislation in the activities of subordinated personnel.

6.5 The head of the CCGT is involved in disciplinary, administrative and other measures of responsibility for failure to perform or improperly performing his or her functional duties, resulting in accidents and accidents, damage to the employer's property and other adverse consequences, in accordance with the current legislation of the Republic of Uzbekistan.

Information data

Designed by the CCPP Unit of JSC "NTPP"

Head of unit I. Kh. Abdulloev

Agreed

Production and Technical Department

Head of the department T.K. Soliev

Planning and Economic Department

Head of department EE. Davova

Service reliability of machinery and industrial safety

Head of service Kh. O. Muminov

Legal Advisor Sh.E. Nazarov

Responsible for standardization NSNurullaeva

KSt 202- 812:2015

COMPANY STANDARD

JOB DESCRIPTION OF THE DEPUTY HEAD ON OPERATION OF THE CCPP UNIT

STOCK COMPANY SC «NTPP»

NAVOI

Introduction

1 DEVELOPED AND ENTERED IN BY The CCPP unit of JSC "NTPP"

2 APPROVED AND RUN IN BY the order of SC « NTPP » №

3 INSTEAD OF KSt 202-812:2012

Approved

SC « NTPP » Director

K. Kh. Ganiev

COMPANY STANDARD

JOB DESCRIPTION OF THE DEPUTY HEAD ON OPERATION OF THE CCPP UNIT

Term of validity from till

1 Application area

This instruction is based on KSt 202-810: 2011 "Regulations on the unit of combined-cycle combined cycle gas turbine plants", Qualification reference book for the posts of managers, specialists and employees in 1987. In order to regulate the functions, duties, rights and responsibilities of the deputy head on operation of the combined-cycle gas turbine plant (CCGTs), it is mandatory for him.

2. General Provisions

2.1 Deputy Head of the CCGT Unit for Operations organizes and conducts work with the operational staff of the unit in accordance with the "Rules of work with personnel at enterprises of energy production", and is the responsible person for the organization of labor of operational personnel; reliable, safe and economical operation of the equipment attached to the unit.

2.2 For the post of deputy head of the unit of the CCGT on operation is assigned to a person with a higher technical education and work experience in the field of engineering and technical positions for at least 3 years, or secondary specialized education and work experience in engineering and technical positions for at least 5 years.

2.3 Deputy Head of the CCGT Unit of Operations is appointed, moved and dismissed by the order of the director of the station on the proposal of the head of the unit of the CCPP, the personnel department in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.4 The deputy head of the unit for the operation of the CCGT unit in the production, technical and administrative respect submits to the head of the CCGT unit.

2.5 All the operational staff of the CCGT unit are subordinated to the deputy head of the CCGT unit on operation for operational use in an administrative and technical sense.

The management of the operational staff is carried out as rule through the heads of shifts and the engineer-technologist of the unit of the CCPP.

2.6 All the masters for the operation of the CCGT unit are subordinate to the Deputy Head of Operations.

2.7 In the absence of the head of the unit and the deputy head for repair is replaced by the deputy head of the unit of the CCGT for operation.

2.8 In the absence of the head of the unit and the deputy head on operation is replaced by the deputy head of the unit of the CCGT for repair.

2.9 In his activity, the deputy head of the unit of the CCGT for operation is guided by official, operational instructions, methodological, regulatory documents, instructions, orders for the unit, station and SJSC "Uzbekenergo", Regulations on labor protection, Labor Code of the Republic of Uzbekistan.

2.10 The deputy head of the unit of the CCGT for operation of the equipment must know and be guided in its work:

- Indication of PP - 56;

- "Regulations on the investigation and recording of accidents and other damage to workers' health at work "approved by the Cabinet of Ministers on June 6, 1997;

- RH 34-114: 2007 "Regulations on Disciplinary Responsibility of Workers of the Uzbek Energy System";

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan of 12.01.1999 No. 140 "On measures to strengthen the performance discipline";

- The Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 of 30.09.2009;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan

No. 245 dated August 22, 2009 "On Approval of the Rules for the Use of Electric and Thermal Energy";

- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan", Tashkent 2011:

Section I Chapter I. § 1-16;

Section II Chapter 2. § 4;

Chapter 3. § 1, 3, 4, 5, 7, 8, 9, 11, 12, 13;

Chapter 4 § 1, 2, 12, 13, 14;

Chapter 5 § 1-6;

- "Safety rules for the operation of thermal mechanical equipment of power plants and heating networks", Tashkent 2012 in the following volume:

Chapter I.

Chapter 2 § 1, 2;

Chapter 3 § 1-6, 9-14;

Chapter 4 § 2, 3, 4, 6, 8, 9.

Appendix: 2-8, 10, 11, 13-17, 19

- "Safety rules in the gas sector of the Republic of Uzbekistan", Tashkent 2004 in the following volume:

Chapter I. General Provisions. § 1, 2, 4, 5;

Chapter III. Operation of gas facilities. §1, 2, 3,4,7; Chapter VI. Gas hazardous work.

Appendices 1, 2, 31, 32.

- "Rules for the Arrangement and Safe Operation of Steam and Hot Water Pipelines", 2010 in the amount of:

Chapter 1. General provisions § 1, 5-8;

Chapter 2. Designing § 1;

Chapter5. Registration, technical examination, permission to operate. § 12;

Chapter 6. Organization of safe operation and repair §1, 2, 3, 4;

Chapter 8. Paint Stains and Inscriptions Chapter 9 Safety Signs

Chapter 10 Accident and accident control Chapter 11 Control of compliance with regulations Annex 1, 2;

- "Fire safety rules for energy companies", Tashkent 2013;

- "Rules of the device and safe operation of vessels, working under pressure ", 2011, in the amount of:

Chapter I. § 1;

Chapter 3. § 1, 2;

Chapter 4.

Chapter 5 § 1, 2;

Applications: 1, 2, 3, 6, 9, 10, 13, 14, 15;

- "Rules for the Arrangement and Safe Operation of Steam and Hot Water Boilers", Tashkent, 1997, in the amount of:

Section 1. 1.1. - 1.4 .;

Section 2.

Section 3. 3.1. - 3.6 .;

Section 4. 4.1 .; 4.7 .;

Section 5. 5.1 .;

Section 6.

Section 7. 7.1. 7.4 ;;

Section 8. 8.1. - 8.3 .;

Section 9.

Section 10.

Appendices 1, 2, 3, 4, 6.

- KSt 202- 032: 2008 "Rules for working with low-sulfur gas";

- "Instructions for first aid to victims in connection with accidents in the maintenance of power equipment";

- "Safety rules when working with tools and devices";

- RH 34-400: 2008 "Regulations on the Occupational Safety Management System in the Energy Industry;

- RH 34-304-258: 2010 "Typical instructions. Contents and application of primary fire extinguishing means at electric power facilities ";

- "Explosion safety rules when using fuel oil and natural gas in boiler plants";

- The present job description, the Regulations on the CCGT unit of the job descriptions and production instructions of all subordinate personnel;

- KSt 202-036-2007 "Rules of internal labor regulations for employees of JSC" NTPP ";

- KSt 202-038-2014 "Regulations on incentive payments for managers, specialists, employees and workstations for the main results of economic activity";

- The Labor Code of the Republic of Uzbekistan. Tashkent, 1996;

- "Instructions for the investigation and recording of fires that occurred at energy facilities";

- Orders and orders of JSC "NTPP";

- Directive materials of SJSC "Uzbekenergo", operational and emergency circulars;

- "Rules for the organization of work with personnel at energy production enterprises", registered by the Ministry of Justice of the Republic of Uzbekistan dated 04.10.2002 N 1178;

- RH 34-301-800: 2006 "Typical instructions. Control and prolongation of the service life of the equipment of thermal power plants ";

- "Regulations on the procedure for determining the timing of further operation of boiler components, turbines and steam lines operating at T = 540 C".

- Design and operational characteristics of the main and auxiliary equipment, technological diagrams of the equipment of the CCGT unit, location of fire extinguishing means and water supply system, location of equipment, pipelines, fittings; purpose and principle of operation, installed on the equipment of the CCGT unit, control and measuring devices, alarm devices, interlocks, automation,

protection; rules and norms of labor, safety precautions, industrial sanitation, fire protection; the fundamentals of labor law; daily, monthly, quarterly and annual technical and economic indicators and targets for them;

- Existing GOSTs, SSBT, KMC with reference to activities.

2.11. Testing of knowledge of Rules of technical operation, Rules of safety technique, Rules of fire safety, job descriptions and production instructions should be carried out:

- primary - before admission to independent work;

- Periodic - on time,

- extraordinary - in violation of rules and regulations, at the request of the State Supervision, the State Energy Inspectorate, higher authorities, by decision of the special commission.

Periodic testing of knowledge of Rules of technical operation, Rules of fire safety, production and job descriptions should be carried out at least once every 3 years.

Periodicity of verification of Rules of safety technique knowledge, rules for the device and safe operation of equipment controlled by the Agency "Sanoat-Geocontekhnazorat" - once a year.

Primary attestation is conducted after 1 year of work in this position; further attestations are conducted according to the results of the past, but not less than 1 time in 5 years.

2.12 The location of the deputy head of the unit of the CCGT for the operation of the equipment of the CCGT unit is located in the service room of the CCGT unit.

2.13 The service area of the deputy head for the operation of the equipment of the CCGT unit is the entire territory for the location of the CCGT unit equipment and all elevations; HRSG, steam turbine, gas turbine, machine hall of CCPP, water treatment and treatment plant CCGT, heating network, boiler room with network pumps.

3 Functions and responsibilities

3.1. Timely review of operational existing schemes, instructions. Develops instructions for the operation of new equipment; programs for switching equipment sampling; input, output of equipment from repair; provides workplaces with

circuits, instructions, requires compliance with the requirements of safety and operating instructions.

3.2 Provides safe working conditions for operational personnel during operation, maintenance of equipment and in the conduct of technological processes.

3.3 Every day, to get acquainted with the entries in the operational journal on state of Safety technique (ST) and industrial sanitation, visits the magazine, provides for the elimination of shortcomings, requires a report from the shift supervisor at the beginning of the day on the status of ST, technological process, protective equipment, and security breaches.

3.4 Timely organizes the study by operational staff new, revised instructions and other documentation on labor protection, exercises control over execution.

Provides workplaces with safety signs, means for preparing jobs, and controls their safety and maintenance.

3.5 Participates in conducting safety days. Follows compliance with labor and production discipline and the implementation of instructions Rules of safety technique, immediately suppresses the violation of their operational personnel.

3.6. Daily checks the preparation and condition of workplaces, monitors the operation of protection and measurement of the ventilation system, and takes measures to eliminate comments.

3.7 Take measures to reduce the level of harmful factors, provides a normal microclimate of the control panel of the CCGT, ventilation of the gas and steam turbine hall.

3.8 Ensure timely management of all types of training instructing, checking the knowledge of operational personnel, participating in a commission to check the knowledge of workers, issuing orders to admit to the independent work of operational personnel.

3.9 Immediately informs the head of the of the CCGTU of the unfortunate case, participates in its investigation, develops measures to prevent them.

3.10 At meetings, discusses the status of Labor safety and ST, industrial sanitary, morbidity, violations, orders, introduces operative personnel with injury surveys and other Labor safety and ST documents.

3.11 Organizes timely medical examination of operational staff.

3.12 Submits monthly to the head of the unit for approval lists for bonuses to operational staff for accident-free and economic operation of equipment and

depriving the premium, in whole or in part, for violators of Rules of technical operation, Rules of safety technique, production instructions, labor discipline.

3.13 Works on the development, study and implementation of advanced methods of work and experience of innovators in the energy sector.

3.14 Constantly acquaints staff with all changes, alterations and modernization of schemes and equipment, documentation on operation and repair of the equipment of the CCGT unit, making necessary changes to the relevant documents.

3.15 Ensures uninterrupted, reliable and economical operation of the plant equipment in accordance with the production program, Rules of technical operation, Rules of safety technique and current regulations and standards.

3.16 Coordinates with the unit manager and submits for approval to the chief engineer of the power plant, a program to train newly recruited workers and increase the production qualification of the unit's staff, control attendance of staff, the state and quality of technical training.

3.17 Sets or changes the operating mode of the unit equipment CCGT on the basis of the results of the testing of the adjustment organizations when agreeing changes with the unit manager and the production and technical department.

3.18 Supervises the availability of the unit and its departments with everything necessary for the execution of the production program (production and technical documentation, equipment, tools, technological equipment, materials, components, transport, loading and unloading facilities, etc.).

3.19 Controls the availability and consumption of maintenance materials.

3.20 Organizes the uninterrupted movement of work in progress.

3.21 Take measures to prevent and eliminate any deviations in the course of the production process and, if necessary, involve the relevant subdivisions of the unit in order to eliminate such violations.

3.22 Develops and takes measures to reduce equipment downtime.

3.23 Periodic patrol of workplaces of operational personnel CCGT and monitoring the operation of the equipment in accordance with the regime cards. Verification of staff performance of Rules of safety technique, Rules of fire safety and staff performance, as well as cleanliness of workplaces and equipment.

3.24 Participation in the general station commission for the reception of equipment after major, mid-term repairs.

3.25 Monitoring the start-up and shutdown of units, analyzing and developing these processes with personnel, filling out the journal of accidents and failures in work, developing measures to prevent accidents and failures in work.

3.26 Control over the operation of buildings, structures and construction designs of the unit.

3.27 Participation in the commissioning and testing of unit equipment of CCPP.

3.28 Organization and participation in emergency response training and instruction of the unit staff, preparation of manuals and quipment.

4 Rights

4.1 Direct management of the work of operational personnel CCGT unit through the heads of shifts.

4.2 Suspension of production work and removal from work of operational staff of the CCGT unit, which does not have the appropriate work permit (order) or grossly violating Rules of technical operation, Rules of safety technique, Rules of fire safety, internal regulations.

4.3 Submission for approval to the head of the unit of CCGT materials on the admission and dismissal of operational personnel according to the Labor Code Republic of Uzbekistan and the approved staffing schedule of the unit.

4.4 Arrangement of operational staff for shifts.

4.5 Making proposals for the encouragement of the staff of the CCGT unit or imposing on his administrative penalties.

4.6 In case of disagreement with the order of the unit manager of the CCGT Unit and obtaining the final decision, without suspending the execution of the order, to report to the chief engineer or director of the power plant.

5 Relationships

5.1 Fulfills all administrative and technical orders of head of the unit. In case of disagreement with the received order, the deputy head of the unit of the CCGT for operation of the equipment declares this, but upon receipt of an order, executes it, if this does not threaten the safety of the personnel or the safety of the equipment.

To verify the correct understanding of the received order necessarily repeats it to the person who gave this order.

5.2 In case of receiving an order directly from the director or the chief engineer of a power plant fulfills it and brings this to the attention of the unit's head of the CCGT

5.3 Gives orders and instructions to the operational staff of the CCGT unit, receives from them reports about all the malfunctions in the operation of the equipment of the CCGT unit, takes steps to eliminate them.

5.4 Coordinates the issues of the regime and the scheme of operation of equipment CCGT, associated with the operation of equipment of other units, with the head of the production-technical department and deputy heads of production units, resolving the disagreements through the head of the CCGT unit.

5.5 During telephone and radio calls, he first of all calls his post and a surname, and then transmits or receives an order or a message.

6 Responsibility

6.1 The deputy head of the unit of the CCGT of operations must comply with the requirements of the current legislation in the activities of subordinate personnel.

6.2 The deputy head of the unit of the CCGT for the operation is involved in disciplinary, administrative and other measures of responsibility for failure to perform or improperly performing its functional duties, resulting in accidents and accidents, damage to the employer's property and other adverse consequences, in accordance with the current legislation of the Republic Uzbekistan.

Information data

Designed by the CCPP Unit of JSC "NTES"	
Head of unit	I. Kh. Abdulloev
Agreed	
Production and Technical Department	
Head of the department	T.K. Soliev
Planning and Economic Department	
Head of the department	E. E. Davov
Service reliability of machinery and industrial safety	
Head of the service	Kh. O. Muminov
Legal adviser	Sh. Y. Nazarov
Responsible for Standardization	N.S. Nurullaeva

KSt 202- 819:2015

COMPANY STANDARD

JOB DESCRIPTION OF LEADING SOFTWARE ENGINEER OF CCPP UNIT

JOINT STOCK COMPANY "NTPP"

Navoi

KSt 202- 819:2015

Preface

1 DEVELOPED AND INTRODUCED by CCPP Unit of JSC "NTPP"

2 APPROVED AND RUN by the Order of JSC "NTPP"
No. 214 dated 30.04.2015

3 INSTEAD of KSt 202- 819:2012

KSt 202- 819:2015

Approved

by

General Director

JSC “NTPP”

K.Kh. Ganiev

COMPANY STANDARD

JOB DESCRIPTION OF LEADING SOFTWARE ENGINEER OF CCPP UNIT

Valid from 01.05.2015 to 01.05.2018

1 Field of application

This manual is developed based on KSt 202-810: 2011 "Regulations on the unit of combined cycle gas turbine plants", the Qualification Reference Book for positions of managers, specialists and employees 1987, in order to regulate the functions, duties, rights and responsibilities of the leading programmer engineer of the combined-cycle combined cycle gas turbine unit (CCGTs), and is mandatory for him.

2 General Terms

2.1 The Leading engineer-programmer of the unit of combined-cycle combined cycle gas turbine plants determines the information to be processed on a computer, its volumes, structures, layouts and schemes for entering, processing, storing and issuing information, and methods for its control.

2.2 The leading engineer-programmer is assigned, moved and is dismissed from the position held by the order of the plant's general director upon presentation of the head of the unit of the CCGT, the personnel department in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.3 The leading software engineer submits to the head of the unit of the CCGT. The software engineer submits to the leading engineer-programmer

2.4 At the time of the absence of a leading software engineer, he is replaced by engineer-programmer of the CCGT unit.

2.5 A leading software engineer must have a higher technical or engineering-economic education without requiring a work experience, or a specialized secondary education and a minimum of 3 years experience in a Category I technician, or at other positions replaced by specialists with secondary specialized education, at least 5 years.

2.6 A leading software engineer should know and be guided in his activities:

- RH 34-114: 2007 "Regulations on Disciplinary Responsibility of Workers of the Uzbek Energy System";
- Indication of PP - 56;
- "Regulations on the investigation and recording of accidents and other damage to workers' health at work "approved by the Cabinet of Ministers on June 6, 1997;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan of 12.01.1999 No. 140 "On measures to strengthen the performance discipline";
- Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 from 30.09.2009;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated August 22, 2009 "On Approval of the Rules for the Use of Electric and Thermal Energy";
- "Rules for the technical operation of power plants and networks Republic of Uzbekistan ", Tashkent 2011;
- "Safety rules for the operation of thermal mechanical equipment and heat networks", Tashkent 2012;
- “Safety rules in the gas economy of the Republic of Uzbekistan”, Tashkent 2004
- “Rules for the construction and safe operation of pressure vessels”, 1990
- "Instructions for first aid to victims in connection with accidents while servicing power equipment";
- Fire safety rules for energy companies, Tashkent, 2013;
- Production and job descriptions of the CCGT unit;
- The Labor Code of the Republic of Uzbekistan, Tashkent, 1996;

- RH 34 - 400: 2008 "Regulations on the Occupational Safety Management System in the Energy Industry";

- RH 34 - 475: 2007 "Rules of internal labor regulations employees of the executive apparatus of the State Joint Stock Company "Uzbekenergo", its branch "Energosotish" and unitary enterprises ";

- "Rules for the organization of work with personnel in enterprises energy production ", registered by the Ministry of Justice of the Republic of Uzbekistan No. 1178 of October 4, 2002;

- Guidance and normative materials concerning the methods of programming and the use of computer technology in the processing of information;

- Technical and operational characteristics, design features, purpose and operation modes of equipment, rules for its technical operation;

- Technology of mechanized information processing;

- Methods of classification and coding of information;

- Formalized programming languages;

- Basic principles of structural programming;

- Types of software;

- The order of registration of technical documentation.

- Directive materials, operational and emergency circulars of JSC "Uzbekenergo";

- Orders, orders of JSC "NTPP", and other regulatory documents;

- KSt 202 - 038: 2008 "Regulations on awarding workers, managers, specialists and other workers of the station for the main results of economic activity ";

- KSt 202 - 036: 2007 "Rules of internal labor regulations employees of JSC "NTPP";

- Design and features of the operation and operational characteristics of all the main and auxiliary equipment of the CCGT unit;

- The main technological diagrams of the equipment of the CCGT unit;

- Location of fire extinguishing means and fire water supply system;

- Daily, monthly, quarterly and annual technical and economic indicators and targets for them;

- Purpose and principle of operation of the main instrumentation, alarm devices, interlocks, automatics, protection, installed on the equipment of the CCGT unit;

- Territorial location of equipment, pipelines and fittings of the CCGT unit;

- The fundamentals of the economy, the organization of labor and production organization, the rules and norms of labor protection, safety engineering, industrial sanitation and fire protection.

2.7 The verification of the knowledge of RULES OF TECHNICAL OPERATION, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY, job descriptions and production instructions should be carried out:

- primary - before admission to independent work;

- Periodic - on time;

- extraordinary - in violation of rules and regulations, at the request of the State Supervision, the State Energy Inspectorate, higher authorities, by decision of the special commission.

Periodic testing of knowledge of RULES OF TECHNICAL OPERATION, RULES OF FIRE SAFETY, production and job descriptions should be made at least once every 3 years.

Periodicity of RULES OF SAFETY TECHNIQUE knowledge testing, device rules and safe operation of equipment controlled by the Agency "Sanoatgeocontechnazorat" - once a year.

Initial certification is carried out after 1 year of work in the of this position; The following attestations are conducted according to the results of past, but not less than 1 time in 5 years.

2.8 The workplace of the leading software engineer is located in the office building of the management building of the CCGT unit.

3 Functions and responsibilities

3.1 Control over the operation of service organizations for maintenance of software and hardware of the automated process control system.

3.2 Correction of the hardware settings of the System in case of changes in the operation period, the necessary changes in the switching circuits of measuring instruments.

3.3 Administration and archiving of the technological database of the system and applications of user software (hereinafter referred to as "software") in accordance with the regulations, maintenance of the communication server of the technological database, and the execution of preventive works on the server.

3.4 Backup of the software and the archive of operational data.

3.5 Providing methodological assistance in the preparation of data for the level of automated control systems, the processing of necessary documents and the decipherment of information processed by computer facilities.

3.6 Based on the analysis of mathematical models and algorithms (productions of economic and other problems) develops programs that implement the solution of the problem.

3.7 Develops the technology for solving the problem for all stages of information processing.

3.8 Selects the programming language and translates the task algorithms to it.

3.9 Identifies the information to be processed by computer facilities, its volumes, structure, layouts and schemes for input, processing, storage and delivery of information, methods for its control.

3.10 Performs work on preparing programs for debugging and debugging.

3.11 Runs debugged programs and input the initial data, determined by the conditions of the tasks.

3.12 Corrects the developed program based on the analysis of the output data.

3.13 Develops instructions for working with programs, prepares necessary technical documentation.

3.14 Determines the use of ready-made software.

3.15 Maintains the implemented programs and software.

3.16 Develops and implements methods and tools for automating programming, typical and standard software, constitutes information processing technology.

3.17 Performs work on unification and typing of computing processes.

3.18 Participates in monthly safety precautions, fire safety.

3.19 Weekly checks the status of workplaces, tools, means of protection, DCS equipment, takes measures to eliminate identified violations.

3.20 In the event of an accident, the software engineer must immediately contact the health center, informing the administration of the accident.

3.21 At unit meetings takes part in the discussion of the state of occupational safety and health, industrial sanitation, morbidity, and violations.

3.22 The leading engineer-programmer of the CCGT unit timely, according to the schedule, undergoes a medical examination.

4 Rights

4.1 Get acquainted with the draft decisions of the management of the unit and the enterprise regarding its activities.

4.2 To submit proposals for the improvement of work related to the duties provided for in this Instruction to the management.

4.3 Inform your immediate supervisor about all the shortcomings in the activities of the unit (its structural units) identified in the course of carrying out its official duties and make proposals for their elimination.

5 Relationships

5.1 The relationship of a leading software engineer is carried out in accordance with this job description.

6 Responsibility

6.1 Leading engineer programmer of CCGT unit should comply with the compliance of subordinate personnel with the requirements of the current legislation

6.2 The leading engineer - programmer of the unit of the CCGT is involved to disciplinary, administrative and other measures of liability for non-fulfillment or improper performance of their functional duties that led to the occurrence of accidents and accidents, damage to the employer's property and

other adverse consequences, in accordance with the current legislation of the Republic of Uzbekistan.

KSt 202-819: 2015

Informational data

Designed by the CCGT Unit of JSC "NTPP"

Head of unit
I. Kh. Abdulloev

Agreed

Production and Technical Department
Head of the department
T.K. Soliev

Planning and Economic Department
Head of the department
E. E. Davov

Service reliability of machinery and industrial safety

Head of the service
Kh. O. Muminov

Legal adviser
Sh. Y. Nazarov

Responsible for Standardization
N.S. Nurullaeva

KSt 202- 820:2015

COMPANY STANDARD

JOB DESCRIPTION OF SOFTWARE ENGINEER OF CCPP UNIT

JOINT STOCK COMPANY "NTPP"
Navoi

Preface

1 DEVELOPED AND INTRODUCED by CCPP Unit of JSC "NTPP"

2 APPROVED AND RUN by the Order of JSC "NTPP"
No. dated

3 INSTEAD of KSt 202- 820:2012

KSt 202- 820:2015

Approved

by

General Director
JSC “NTPP”

K.Kh. Ganiev

COMPANY STANDARD

JOB DESCRIPTION OF SOFTWARE ENGINEER OF CCPP UNIT

Valid from

to

1 Field of application

This manual is developed based on KSt 202-810: 2011 "Regulations on the unit of combined cycle gas turbine plants", the Qualification Reference Book for positions of managers, specialists and employees 1987, in order to regulate the functions, duties, rights and responsibilities of the programmer engineer of the combined-cycle combined cycle gas turbine unit (CCGTs), and is mandatory for him.

2 General Terms

2.1 The engineer-programmer of the unit of combined-cycle combined cycle gas turbine plants determines the information to be processed on a computer,

its volumes, structures, layouts and schemes for entering, processing, storing and issuing information, and methods for its control.

2.2 The engineer-programmer is assigned, moved and is dismissed from the position held by the order of the plant's general director upon presentation of the head of the unit of the CCGT, the personnel department in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.3 The software engineer submits to the leading engineer-programmer and the head of the unit of the CCGT.

2.4 At the time of the absence of a software engineer, he is replaced by the leading engineer-programmer of the CCGT unit.

2.5 A software engineer must have a higher technical or engineering-economic education without requiring a work experience, or a specialized secondary education and a minimum of 3 years experience in a Category I technician, or at other positions replaced by specialists with secondary specialized education, at least 5 years.

2.6 A software engineer should know and be guided in his activities:

- RH 34-114: 2007 "Regulations on Disciplinary Responsibility of Workers of the Uzbek Energy System";
- Indication of PP - 56;
- "Regulations on the investigation and recording of accidents and other damage to workers' health at work "approved by the Cabinet of Ministers on June 6, 1997;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan of 12.01.1999 No. 140 "On measures to strengthen the performance discipline";
- Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 from 30.09.2009;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated August 22, 2009 "On Approval of the Rules for the Use of Electric and Thermal Energy";
- "Rules for the technical operation of power plants and networks Republic of Uzbekistan ", Tashkent 2011;
- "Safety rules for the operation of thermal mechanical equipment and heat networks", Tashkent 2012;
- "Instructions for first aid to victims in connection with accidents while servicing power equipment";
- Fire safety rules for energy companies, Tashkent, 2013;
- Production and job descriptions of the CCGT unit;
- The Labor Code of the Republic of Uzbekistan, Tashkent, 1996;
- RH 34 - 400: 2008 "Regulations on the Occupational Safety Management System in the Energy Industry";
- RH 34 - 475: 2007 "Rules of internal labor regulations employees of the executive apparatus of the State Joint Stock Company "Uzbekenergo", its branch "Energosotish" and unitary enterprises ";
- "Rules for the organization of work with personnel in enterprises energy production ", registered by the Ministry of Justice of the Republic of Uzbekistan No. 1178 of October 4, 2002;

- Guidance and normative materials concerning the methods of programming and the use of computer technology in the processing of information;

- Technical and operational characteristics, design features, purpose and operation modes of equipment, rules for its technical operation;

- Technology of mechanized information processing;

- Methods of classification and coding of information;

- Formalized programming languages;

- Basic principles of structural programming;

- Types of software;

- The order of registration of technical documentation.

- Directive materials, operational and emergency circulars of JSC "Uzbekenergo";

- Orders, orders of JSC "NTPP", and other regulatory documents;

- KSt 202 - 038: 2008 "Regulations on awarding workers, managers, specialists and other workers of the station for the main results of economic activity ";

- KSt 202 - 036: 2007 "Rules of internal labor regulations employees of JSC "NTPP";

- Design and features of the operation and operational characteristics of all the main and auxiliary equipment of the CCGT unit;

- The main technological diagrams of the equipment of the CCGT unit;

- Location of fire extinguishing means and fire water supply system;

- Daily, monthly, quarterly and annual technical and economic indicators and targets for them;

- Purpose and principle of operation of the main instrumentation, alarm devices, interlocks, automatics, protection, installed on the equipment of the CCGT unit;

- Territorial location of equipment, pipelines and fittings of the CCGT unit;

- The fundamentals of the economy, the organization of labor and production organization, the rules and norms of labor protection, safety engineering, industrial sanitation and fire protection.

2.7 The verification of the knowledge of RULES OF TECHNICAL OPERATION, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY, job descriptions and production instructions should be carried out:

- primary - before admission to independent work;

- Periodic - on time;

- extraordinary - in violation of rules and regulations, at the request of the State Supervision, the State Energy Inspectorate, higher authorities, by decision of the special commission.

Periodic testing of knowledge of RULES OF TECHNICAL OPERATION, RULES OF FIRE SAFETY, production and job descriptions should be made at least once every 3 years.

Periodicity of RULES OF SAFETY TECHNIQUE knowledge testing, device rules and safe operation of equipment controlled by the Agency "Sanoatgeocontechnazorat" - once a year.

Initial certification is carried out after 1 year of work in the of this position; The following attestations are conducted according to the results of past, but not less than 1 time in 5 years.

2.8 The workplace of the software engineer is located in the office building of the management building of the CCGT unit.

3 Functions and responsibilities

3.1 Control over the operation of service organizations for maintenance of software and hardware of the automated process control system.

3.2 Correction of the hardware settings of the System in case of changes in the operation period, the necessary changes in the switching circuits of measuring instruments.

3.3 Administration and archiving of the technological database of the system and applications of user software (hereinafter referred to as "software") in accordance with the regulations, maintenance of the communication server of the technological database, and the execution of preventive works on the server.

3.4 Backup of the software and the archive of operational data.

3.5 Providing methodological assistance in the preparation of data for the level of automated control systems, the processing of necessary documents and the decipherment of information processed by computer facilities.

3.6 Based on the analysis of mathematical models and algorithms (productions of economic and other problems) develops programs that implement the solution of the problem.

3.7 Develops the technology for solving the problem for all stages of information processing.

3.8 Selects the programming language and translates the task algorithms to it.

3.9 Identifies the information to be processed by computer facilities, its volumes, structure, layouts and schemes for input, processing, storage and delivery of information, methods for its control.

3.10 Performs work on preparing programs for debugging and debugging.

3.11 Runs debugged programs and input the initial data, determined by the conditions of the tasks.

3.12 Corrects the developed program based on the analysis of the output data.

3.13 Develops instructions for working with programs, prepares necessary technical documentation.

3.14 Determines the use of ready-made software.

3.15 Maintains the implemented programs and software.

3.16 Develops and implements methods and tools for automating programming, typical and standard software, constitutes information processing technology.

3.17 Defines the aggregate of data that provides solutions to the maximum number of conditions included in the program, performs work on its preparation and debugging.

3.18 Debug developed programs, adjusts them in the process of refinement.

3.19 Determines the possibility of using ready-made programs developed by other enterprises.

3.20 Develops and introduces methods of programming automation, standard and standard programs, programming programs, translators, input algorithms.

3.21 Performs work on unification and typing of computing processes.

3.22 Participates in monthly safety precautions, fire safety.

3.23 Participates in the creation of catalogs and card indexes of standard programs, in the development of forms of documents to be machine-processed in the design work to expand the field of application of computer technology.

3.24 Weekly checks the status of workplaces, tools, means of protection, DCS equipment, takes measures to eliminate identified violations.

3.25 In the event of an accident, the software engineer must immediately contact the health center, informing the administration of the accident.

3.26 At unit meetings takes part in the discussion of the state of occupational safety and health, industrial sanitation, morbidity, and violations.

3.27 The engineer-programmer of the CCGT unit timely, according to the schedule, undergoes a medical examination.

4 Rights

4.1 Get acquainted with the draft decisions of the management of the unit and the enterprise regarding its activities.

4.2 To submit proposals for the improvement of work related to the duties provided for in this Instruction to the management.

4.3 Inform your immediate supervisor about all the shortcomings in the activities of the unit (its structural units) identified in the course of carrying out its official duties and make proposals for their elimination.

5 Relationships

5.1 The relationship of a software engineer is carried out in accordance with this job description.

6 Responsibility

6.1 The engineer - programmer of the unit of the CCGT is involved to disciplinary, administrative and other measures of liability for non-fulfillment or improper performance of their functional duties that led to the occurrence of

accidents and accidents, damage to the employer's property and other adverse consequences, in accordance with the current legislation of the Republic of Uzbekistan.

KSt 202-820: 2015

Informational data

Designed by the CCGT Unit of JSC "NTPP"

Head of unit
I. Kh. Abdulloev

Agreed

Production and Technical Department
Head of the department
T.K. Soliev

Planning and Economic Department
Head of the department
E. E. Davov

Service reliability of machinery and industrial safety

Head of the service
Kh. O. Muminov

Legal adviser
Sh. Y. Nazarov

Responsible for Standardization
N.S. Nurullaeva

COMPANY STANDARD

JOB DESCRIPTION OF ELECTRONICS ENGINEER OF CCPP UNIT

STOCK COMPANY SC «NTPP»

NAVOI

Introduction

1 DEVELOPED AND ENTERED IN BY The CCPP unit of JSC " NTPP "

2 APPROVED AND RUN IN by the order SC « NTPP » №

3 INTRODUCED FOR THE FIRST TIME

Approved

OJSC « NTPP» Director

K. KH. Ganiev

COMPANY STANDARD

JOB DESCRIPTION OF ELECTRONICS ENGINEER OF CCPP UNIT

Term of validity from till

1 Application area

This manual is developed based on KSt 202-810: 2011 "Regulations on the unit of combined cycle gas turbine plants", the Qualification Reference Book for the positions of managers, specialists of employees 1987, for the purposes of regulating the function, duties, rights and responsibilities of the electronic engineer of combined cycle combined cycle (CCGTs) and is mandatory for him.

2 General terms

2.1 The electronic engineer of the unit of combined-cycle combined cycle gas turbine plants monitors and reliably manages the equipment of the automated process control system at the CCPP.

2.2 The electronic engineer of the CCGT must have a higher engineering education without claiming to work experience or secondary specialized education and experience work in the position of a technician of the 1st category for at least 3 years or on other posts replaced by specialists with an average special education, at least 5 years.

2.3 The electronic engineer of the CCGT unit is appointed, moved and dismissed from the position by the order of the station director on the proposal of the Personnel Department and the Head of the CCGT unit, in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.4 The electronic engineer of the CCGT unit is administratively subordinate to the head of the CCGT CC, and in the production and technical assistant to the unit manager of the CCGT unit.

2.5 The electronics engineer of the CCGT unit should know and be guided in its work:

- Indication of PP - 56;

- "Regulations on the investigation and recording of accidents and other injuries to workers' health at work" approved by the Cabinet of Ministers on June 06, 1997;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan from 12.01.1999 № 140 "On measures to strengthen the performance discipline";

- Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 rom 30.09.2009;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated August 22, 2009 "On Approval of the Rules for the Use of Electric and Thermal Energy";

- "Rules for the technical operation of power plants and networks Republic of Uzbekistan ", Tashkent, 2005;

- "Safety rules for the operation of thermal mechanical equipment and heat networks"

- "Safety rules in the gas economy of the Republic of Uzbekistan", Tashkent, 2004;

- "Rules for the Arrangement and Safe Operation of Vessels Working Under Pressure", 1990;

- "Instruction on rendering first aid to victims in communication with accidents at service of the power equipment ";

- Fire safety rules for energy companies, Tashkent, 2004;

- Production and job descriptions of the CCGT unit;

- The Labor Code of the Republic of Uzbekistan, Tashkent, 1996;

- RH 34-114: 2007 "Regulations on Disciplinary Responsibility of Workers of the Uzbek Energy System";

- RH 34 - 400: 2008 "Regulations on the Occupational Safety Management System in the Energy Industry";

- RN 34-475: 2007 "Rules of internal labor regulations for employees of the executive apparatus of the State Joint Stock Company" Uzbekenergo ", its branch" Energosotish "and unitary enterprises;

- "Rules for the organization of work with personnel in enterprises Energy production », registered by the Ministry of Justice of the Republic of Uzbekistan

No. 1178 of October 4, 2002;

2.8 The electronics engineer of the CCGT unit should know:

- normative documents concerning the operation and repair of electronic computers;

- technical and operational characteristics, design features, purpose and operation modes of the process control system equipment.

- technical operation;

- types of technical information carriers;

- Methods for the development of prospective and annual plans (schedules) of work and the procedure for reporting on their implementation;

- organization of repair service;

- maintenance of electronic computers;

- the procedure for drawing up applications for equipment, spare parts,

- read the diagrams and repairs, the interconnection of electronic blocks between other control devices.

- Location of equipment

- the fundamentals of economics, organization and management;

- rules and norms of labor protection, safety precautions, industrial sanitation and fire protection.

2.9 Testing the knowledge of RULES OF TECHNICAL OPERATION, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY , should be performed:

- primary - before admission to independent work;

- Periodic - on time;

- Extraordinary - in violation of rules and regulations, at the request of Sanoatgeocontechnazorat, Uzdavenergonazorat, higher authorities, as decided by the special commission.

Periodic testing of knowledge of RULES OF TECHNICAL OPERATION, RULES OF FIRE SAFETY , production and job descriptions should be made at least once in 3 years.

Periodicity of RULES OF SAFETY TECHNIQUE knowledge testing, device rules and safe operation of equipment controlled SI "Sanoatgeocontechnazorat" - once a year.

2.10 Primary attestation is conducted after 1 year of work in this position; further attestations are conducted according to the results of the past, but not less than 1 time in 5 years.

2.11 The workplace of the electronic engineer of the CCGT unit is located in the management building of the CCGT unit.

2.12 The service area is the switchboard for the management of the CCGT unit, as well as the DCS in the control rooms of the GT, ST PN, Chemical water treatment (CWT), cooling tower and GBCS section.

3 Functions and responsibilities

3.1 Carry out work according to the Rules of Organization of Work with the personnel at the enterprises of power production.

3.2 To monitor the operation of the electronic equipment of the CCGT unit, to ensure uninterrupted and reliable operation and timely elimination of the defects that have arisen together, by software engineers and C&I engineers, to monitor the cleanliness of jobs.

3.3. Inform the deputy head of operation of the unit about all detected by the personnel or operational personnel of the shift in the work of equipment and the measures taken to eliminate them.

3.4 In the event of an accident, failure to work, malfunctioning of the equipment, fire in cable half-stories or cable routes, act in accordance with the Rules for Technical Operation and Electrical Networks of the Republic of Uzbekistan and instructions for eliminating malfunctions, investigating accidents and accidents.

3.5 Regularly revise the schemes, instructions to check their status and match the date of revision.

3.6 Carry out adjustment of elements and electronic blocks of computer technology, radio electronic equipment and individual devices and units.

3.7 To improve qualifications, study guidance materials SJSC "Uzbekenergo" and attend thematic courses of technical training of engineers.

3.8 Notify the head of the unit of the CCGT and his deputy head of operation for all unplanned outages of electronic equipment of the CCGT unit.

4 Rights

4.1 Within the limits of its competence, inform the immediate supervisor about all the shortcomings identified in the course of the activity and make proposals for their elimination.

4.2 To submit proposals for the improvement of work related to the responsibilities provided for in this Instruction to the management.

5 Relationships

5.1 Carries out all production and technical orders of the deputy head of operation of the CCGT unit.

5.2 Coordinates orders received directly from the director or the chief engineer of the station with the notification of the head of the CCGT or his deputy head of operation and performs them.

5.3 Will appeal against the orders of the deputy head on operation of the CCGT unit in front of the unit manager of the CCGT, without suspending its execution until a final decision is made by the unit management.

6 Responsibility

6.1. The electronic engineer of the unit of combined cycle gas turbine plants must comply with the requirements of the current legislation in the activities of subordinated personnel.

6.1. The electronic engineer of the unit of combined cycle gas turbine plants is involved in disciplinary, administrative and other measures of responsibility for non-fulfillment or improper performance of his functional duties that led to the occurrence of accidents and accidents, damage to the employer's property and other adverse consequences, in accordance with the current legislation of the Republic of Uzbekistan.

Informational data

Designed by the CCPP unit of OJSC "NTPP"

Head of unit I. Kh. Abdulloev

Agreed

Production and Technical Department

Head of the department T.K. Soliev

Planning and Economic Department

Head of the department F. R. Khozhiev

Service reliability of machinery and industrial safety

Head of the service Kh. O. Muminov

Legal adviser T.A. Toilokov

Responsible for standardization O.L. Zelenskaya

KSt 202- 823:2013

COMPANY STANDARD

JOB DESCRIPTION OF THE LEADING ENGINEER ON THERMAL MECHANICAL EQUIPMENT OF CCPP UNIT

STOCK COMPANY SC « NTPP »

NAVOI

Introduction

1 DEVELOPED AND ENTERED IN BY The CCPP unit of JSC "NTPP"

2 APPROVED AND RUN IN by the order SC « NTPP » №

3 INTRODUCED FOR THE FIRST TIME

Approved

SC « NTPP » Director

K. Kh. Ganiev

COMPANY STANDARD

JOB DESCRIPTION OF THE LEADING ENGINEER ON THERMAL MECHANICAL EQUIPMENT OF CCPP UNIT

Term of validity from till

1 Application area

This manual is developed based on KSt 202-810: 2011 "Regulations on the unit of combined cycle gas turbine plants", Qualification directory of positions of managers, specialists and employees, 1987, in order to regulate the functions, duties, rights and responsibilities of the leading heat engineering engineer Thermal Mechanical Equipment (TME), and is mandatory for him.

Knowledge of this job description is mandatory for the deputy head of the CCGT unit for operation, the deputy head of the CCGT unit for repair of equipment, the head of the CCGT and the shift supervisor of the CCGT.

2 General terms

2.1 The main task of the leading heat and power engineering engineer on TME of CCGT is the development of measures for the operation of CCGT equipment in accordance with the Rules of Technical operation of power plants and networks, Tashkent 2005, and other normative documents and control over the implementation of operational personnel of the CCGT Rules of technical operation operating personnel of technological norms and requirements of the manufacturer, official, operational and fire-fighting instructions.

2.2 The leading heat engineering engineer on TME of CCGT should have a higher technical education requirements for work experience of at least 1 year or an average special education and work experience in the post of a technologist of the 1st category for at least 3 years or in other positions replaced by specialists with an average special education, at least 5 years.

2.3 The Lead Engineer of the Heat and Power Engineer, based on the TME of CCGT, is appointed, relocated and dismissed from the position by the director of the station upon presentation of the Head of the CCGT unit, HR department in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.4 Leading heat-and-power engineer on TME of CCGT in administrative terms, is subordinate to the head of the CCGT, and in production and technical directly to the deputy head of the CCGT for operation.

2.5 All the operational personnel of the CCGT unit are subordinate to the leading heat engineering engineer for the TME CCGT in production and technical activities.

2.6 In the event of a long absence of a leading engineer of heat and power engineering, all functions and responsibilities are assigned to the deputy head of the CCGT for operation.

2.7 The leading heat engineering engineer for the TMO of CCGT should know and be guided in its work:

- "Safety rules for the operation of thermal mechanical equipment of power plants and heating networks" in the following volume:

Section 1;

Section 2. Subsections 2.1-2.11;

Section 3. subsection 3.2 clauses 3.2.40-3.2.97;

subsections 3.3; 3.6; 3.7 items 3.7.9 to 3.7.12,

3.7.14, 3.7.17-3.7.26, 3.8, 3.8.7-3.8.22,

3.8.27, 3.8.26, 3.8.29-3.8.34;

Section 4. subsections 4.1-4.8;

Appendices 1-9.

- "Fire safety rules for energy enterprises », Tashkent 2004, in the following volume:

Chapter I § 1, 2;

§ 3 paras. 33-38;

Chapter II § 1, 2;

Chapter III § 1, 2, 3;

Chapter IV § 1, 2, 3, 4;

Appendix № 1.

Section I § 1, 2;

Section II § 4 paragraph 99;

§6;

Section III § 2;

Section IV § 1;

Section V § 2;

Section VI § 2;

Appendix 5.

- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan », Tashkent 2005, in the following volume:

Section I Chapter I § 1, 2, 3, 4, 6, 7, 8, 12, 13, 14, 15, 16;

Appendix No. 1;

Chapter 2. § 4 paras. 120-125;

Chapter 3. § 1, paragraphs 145-147, 149, 150, 173, 174, 176, 182, 183, 186, 201-208, 212-218;

§ 3 paras. 236-252, 255-262, 265-280;

§ 4;

§ 5 315-330;

§ 7, § 8, § 9, § 11;

Chapter 4 § 2;

§ 12 paras. 811-815;

§ 14 paras. 843, 852-865;

Chapter 5 § 1 866-875;

§2;

§ 3 903, 904;

§ 4,905 - 916;

§ 5 917 - 924;

§ 6 929 - 931.

- "Rules for the Arrangement and Safe Operation of Vessels Working Under Pressure", Tashkent 1997, in the following scope:

Section 1;

Section 2;

Section 3;

Section 4 subsection 4.6;

subsection 4.8;

Section 5 subsection 5.1;

Section 6;

Section 7;

Section 10;

Appendix: 1, 3, 4.

- "Safety rules in the gas economy of the Republic of Uzbekistan", Tashkent 2004, in the following volume:

Chapter I § 1 paragraphs 1, 2;

§ 2 paragraphs 5-8;

§3;

§ 4 paras. 11, 12, 14;

§ 5;

Chapter II § 2;

Chapter III § 1;

§2;

§ 3 paras. 47-53, 55, 59, 66, 70, 71, 73, 75, 76, 77, 81, 85;

§ 4 paras. 86, 88-101;

§ 7;

§ 11 paras. 265, 266, 277;

§ 12;

Chapter V;

Chapter VI;

Chapter VII;

Appendix: 1, 2, 8, 15, 31, 32.

- "Rules for the Arrangement and Safe Operation of Steam and Hot Water Pipelines", Tashkent, 1992, in the following scope:

Section 1;

Section 2;

Section 3;

Section 4;

Section 5;

Section 6;

Section 7

Applications: 1, 3, 4, 5, 6, 7.

- "Rules for the Arrangement and Safe Operation of Steam and Hot Water Boilers", Tashkent 1997, in the following scope:

Section 1;

Section 2;

Section 3;

Section 4 subsections 4.1-4.7, 4.10;

Section 5 subsection 5.1;

Section 6;

Section 7 subsections 7.1-7.4;

Section 8;

Section 9;

Section 10;

Appendices 1, 3, 4.

- Indication of PP - 56;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan from 12.01.1999 № 140 "On measures to strengthen the performance discipline";

- The Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 from 30.09.2009;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated August 22, 2009 "On Approval of the Rules for the Use of Electric and Thermal Energy";

- "Rules for the organization of work with personnel at energy production enterprises", registered by the Ministry of Justice of the Republic of Uzbekistan No. 1178 of October 4, 2002;

- "Regulations on the investigation and recording of accidents and other damage to workers' health at work "approved by the Cabinet of Ministers on June 6, 1997;

- "Safety rules when working with tools and devices."

- "Explosion safety rules for the use of oil and natural gas in boiler plants".

- KSt 202-032: 2008 "Rules for working with low-sulfur gas."

- "Instructions for the investigation and recording of fires that occurred at energy facilities";

- "Instructions for first aid to victims in connection with accidents while servicing power equipment";

- "Instruction for the investigation and recording of technological violations in the operation of power plants, networks and power systems";

- A real job description;

- Typical factory instructions for the operation of the main and auxiliary equipment of the CCGT Unit.

- Orders, orders of OJSC "NTPP", and other administrative documents;

- Directive materials, operational and emergency circulars of SJSC "Uzbekenergo";

- KSt 202-038: 2008 "Regulations on incentive payments for managers, specialists, employees and workstations for the main results of economic activity ";

- Labor Code of the Republic of Uzbekistan, Tashkent, 1996;

- KSt 202-057: 2007 "Regulations on the Occupational Health and Safety Management System at OJSC" NTPP "

- KSt 202-810: 2011 "Regulations on the unit of combined cycle gas turbine installations".

2.8 The leading engineer of the CCGT unit must know and be guided in its work by the operating instructions for the operation of CCGT equipment, as well as the daily, monthly and annual technical and economic indicators and the planned tasks for them.

2.9 Testing the knowledge of Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY, should be performed:

- primary - before admission to independent work;

- Periodic - on time;

- Extraordinary - in violation of rules and instructions, at the request of the bodies of "Sanoatgeocontechnazorat", State Energy Inspectorate, higher authorities, by decision of the special commission.

Periodic testing of knowledge of Rules of technical operation, RULES OF FIRE SAFETY, production and job descriptions should be carried out at least once every 3 years.

Periodicity of verification of RULES OF SAFETY TECHNIQUE knowledge, rules for the device and safe operation of equipment controlled by the Agency "Sanoategeocontechnazorat" - once a year.

2.10 Initial certification is carried out after 1 year of operation in this position; The following attestations are conducted according to the results of past, but not less than 1 time in 5 years.

2.11 The workplace of the leading heat engineering engineer of the CCPP is located in the room of the engineering department of the building of the CCGT control and is equipped in accordance with the "Typical projects for the organization of workplaces for engineers and technicians, units for thermal power plants".

2.12 The service area is the entire territory of the equipment location of the CCGT unit, all elevations, height HRSG, gas and steam turbines, a CCPP compressor station, a cooling tower, GBCS with the adjacent territory and gas pipelines in the territory of the CCGT before the gate valves of the gas pipeline of the station.

3 Functions and responsibilities

3.1 Drawing up schedules for checking the knowledge of the personnel of the CCGT unit on Rules of technical operation, RULES OF SAFETY TECHNIQUE, Rules of fire safety and organize this check.

3.2 Draw schedules for testing equipment in accordance with Rules of technical operation, instructions, operating manuals and technical maintenance of the manufacturer and monitor their performance, schedules for the inspection of equipment subject to control by the SI "Sanoatgeocontehnazorat".

3.3 Draw up schedules, develop a program and organize the conduct of unit anti-emergency and fire fighting.

3.4 To monitor the proper operation and timely inspection of the SI "Sanoatgeocontechnazorat" facilities.

3.5 To issue technical documentation for the execution of all schedules of equipment testing, personnel knowledge testing, SI "Sanoatgeocontechnazorat".

3.6. It monitors the performance of Rules of technical operation, RULES OF SAFETY TECHNIQUE, operational and production instructions, technological discipline by operational personnel.

3.7 Make plans for the organization of jobs.

3.8 Develops technological schemes, route maps, instructions, changes the technical documentation in connection with the adjustment and change of technological processes.

3.9 Participates in the development of measures to reduce accidents, refusals in the unit.

4 Rights

4.1 Receive from other units of OJSC "Navoi TPP" documents and information necessary for the performance of production duties.

4.2. Give the technical staff instructions to the operational personnel through the CCGT and demand their execution.

4.3 Do not comply with the instructions that are contrary to this instruction, the requirements of Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY, as well as posing a threat to the safety of people, the safety of equipment.

4.4. Suspend the work being performed by CCGT personnel in the event of gross violations of Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY, fire safety instructions, internal labor regulations.

4.5 Prohibit the performance of work with the use of a faulty tool, tools and the use of materials and spare parts that do not meet the technical requirements.

4.6 Appeal to the head of the unit of the CCGT of the order of the deputy head of the CCGT for the operation of the equipment in case of disagreement with it.

4.7 To apply to the deputy head of the CCGT CC for exploitation on imposition of penalties, incentives for operational personnel of the CCGT.

5 Relationships

5.1 Carries out the orders of the unit manager of the CCGT and the deputy head of operation.

5.2 In case of receiving an order directly from the director of the power plant, the chief engineer or the unit manager, it executes them and brings them to the attention of the deputy head of the CCGT for operation.

5.3 In operative telephone conversations, he first of all names his position and surname, and then transmits or receives an order or a message; To verify the correct understanding of the received order, he repeats it to the person who issued the order.

5.4 The order of the leading heat engineering engineer on TME of the CCGT can be canceled by the deputy head of the CCGT unit of operation or by the head of the CCGT CC.

6 Responsibility

6.1 The leading heat engineering engineer for TME of CCGT should comply with the requirements of the current legislation in the activity of subordinated personnel.

6.2 The leading heat engineering engineer on TME of CCGT is involved in disciplinary, administrative and other measures of responsibility for non-fulfillment or improper performance of its functional duties that led to the occurrence of accidents and accidents, damage to the employer's property and other adverse consequences, in accordance with the current legislation of the Republic of Uzbekistan

Designed by the CCGT unit of OJSC "NTPP"

Head of unit I. Kh. Abdulloev

Agreed

Service reliability of machinery and industrial safety

Head of the service Kh. O. Muminov

Production and Technical Department

Head of the department T.K. Soliev

Planning and Economic Department

Head of the department F. R. Khozhiev

Legal adviser T.A. Toilokov

Responsible for standardization O.L. Zelenskaya

COMPANY STANDARD

JOB DESCRIPTION OF THE SHIFT HEAD (SUPERVISOR) OF CCPP UNIT

STOCK COMPANY SC « NTPP »

NAVOI

Introduction

1 DEVELOPED AND ENTERED IN BY The CCPP UNIT of JSC "NTPP"

2 APPROVED AND RUN IN by the order SC « NTPP » №

3 INSTEAD OF KSt 202- 817:2012

Approved

SC « NTPP » Director

K. Kh. Ganiev

COMPANY STANDARD

JOB DESCRIPTION OF THE SHIFT HEAD (SUPERVISOR) OF CCPP UNIT

Term of validity from till

1 Application area

This instruction is developed based on KSt 202-810: 2011 "Regulations on the unit of combined-cycle gas turbine plants", the Qualification Reference Book for the positions of managers, employees' specialists 1987, for the purpose of regulating the functions, duties, rights and responsibilities of the head of the shift unit for combined cycle steam and gas turbine plants (CCGTs) and is mandatory for the shift head of the CCGT, the station shift head, Engineer technical personnel of CCGT.

2 General provisons

2.1 The shift head of CCPP organizes and carries out the work with the operational management personnel in accordance with the "Rules of the organization of work with the personnel at the enterprises of energy production", and is the person responsible for the organization of operational personnel work;

reliable, safe and economical operation of the equipment attached to the unit. As well as shift staff compliance of the CCGT of official and industrial instructions, Rules of technical operation, Rules of safety technique, Rules of fire safety, labor and production discipline, internal labor regulations.

2.2 The post of shift head of CCGT appointed person having higher technical education and professional experience of at least 2 years or specialized secondary education and experience in the operational management of the production work for at least 3 years.

2.3 Prior to being appointed to independent work, the shift head of CCGT should:

2.3.1 Undergo the production training according to the individual training program.

2.3.2 Pass the examinations of the qualification commission under the chairmanship of the technical manager of the organization.

2.3.3 After passing the exams to pass duplicating at workplace shift head of CCGT for at least 12 working shifts, under the guidance of an experienced shift head of CCGT, while for all activities equally have a responsibility as a major shift supervisor and understudy.

2.3.4 After completion of the period of duplication, pass emergency and fire fighting training.

2.4 The CCGT shift supervisor is assigned, moved and is relieved of his post by the order of the station director on the recommendation of the head of the CCGT and the personnel department, in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.5 The head of shift of the CCGT in administrative and technical terms is subject to the head of the unit and his deputy for exploitation. Operatively, he obeys the head of the shift of station. The entire operational staff of the CCGT unit is administratively and technically responsible for the replacement of the CCGT

The management of the work of operational personnel is carried out, as a rule, through the deputy. the head of the unit for operation and the leading engineer-technologist of the CCGT.

2.6 In the event of a long absence of the shift head, his duties are assigned to deputy. the head of the CCGT.

2.7 In its activities, the shift is guided by CCGT officers, operating instructions, technical maps, directions, orders, administrative documents or indication on the unit floor, the station and "Uzbekenergo" Regulations on Labor.

2.8 The shift supervisor of the CCGT should know and be guided in its work:

- Indication of PP - 56;

- "Regulations on the investigation and recording of accidents and other damage to workers' health at work "approved by the Cabinet of Ministers on June 6, 1997;

- RH 34-114: 2007 "Regulations on Disciplinary Responsibility of Workers of the Uzbek Energy System";

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan from 12.01.1999 № 140 "On measures to strengthen the performance discipline";

- The Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 from 30.09.2009;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated August 22, 2009 "On Approval of the Rules for the Use of Electric and Thermal Energy";

- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan", Tashkent 2011 in the amount of:

Section I Chapter 1 § 1, 2, 3, 4;

§ 5 paras. 75, 76, 80-84;

§ 6, paragraphs 85, 87, 89;

§ 7 paras. 94, 105, 107;

§ 8 paras. 124, 125;

§ 12, 13, 14;

§ 15 para. 224;

§ 16 paras. 236, 241, 242

Table 1 and annexes of Table 1

Section II Chapter I § 1, 2;

Chapter III § 1 paras. 145, 183, 201-218;

§ 3, § 4, § 5;

§ 8 paras. 394-396;

§ 9 § 10 paragraphs 434-448;

§ eleven;

Chapter IV § 1 para. 553;

§ 2, § 12, paragraphs 811, 815;

§ 14 paras. 843, 853-858;

Chapter V § 1 paragraph 867;

§ 3 para. 888;

§ 4, paragraph 905;

§ 5 paras. 917, 921, 922, Appendix No. 1

- "Safety rules for operation thermal mechanical equipment of power plants and heat networks ", Tashkent 2012; in the following volume:

Chapter I

Chapter II § 1, 2, 3, 4, 6, 9, 10, 11, 12;

Chapter IV § 2 B, D, D; § 3 A, B; § 4 A, B; § 8, 9;

Appendix No. 2, 3, 4, 5, 6, 7, 10, 11, 15, 16, 17;

- "Safety rules when working with the tool and adaptations ";

- "Rules for the organization of work with personnel at the enterprises of power production" registered by the Ministry of Justice of the Republic of Uzbekistan No. 1178 of October 4, 2002.

- "Rules for the Arrangement and Safe Operation of Vessels Working Under Pressure" Tashkent 2011, in the amount of:

Chapter I § 1;

Chapter III § 1, 2;

Chapter V § 1, 2,

Appendix No. 3 § 1, 2;

Appendix No. 13;

Appendix No. 14;

- "Safety rules in the gas economy of the Republic of Uzbekistan", Tashkent 2004, in the amount of:

Chapter I § 1, paragraphs 1, 2;

§ 2 pp. 5-8, § 3;

§ 4 pp. 11,12,14, §5;

Chapter II § 2;

Chapter III § 1, §2;

§ 3 pp. 47-53, 55, 59, 66, 70, 71, 73, 75-77, 81-85;

§ 4 pp. 86, 88-101; §7;

§ 11 pp. 265, 266, 277; §12;

Chapter V;

Chapter VI;

Chapter VII;

Appendices No. 1, 2, 8, 15, 31 (11-16), 32.

- "Rules for the Arrangement and Safe Operation of Steam and Hot Water Pipelines" Tashkent 2010, in the amount of:

- "Explosion safety rules for the use of fuel oil and natural gas in boiler plants".

- "Rules for the design and safe operation of steam and hot-water boilers », Tashkent 1997, in the amount of:

Section 1

Section 2

Section 3 subsections 3.1-3.6,

Section 4 subsections 4.1-4. 7, 4.10;

Section 5 subsection 5.1;

Section 6

Section 7 subsections 7.1-7.4;

Section 8

Section 9

Section 10

Applications: 1, 3, 4.

- "Fire safety rules for energy enterprises », Tashkent 2004, in the following volume:

Chapter I § 1 par. 10-12;

§ 2 paras. 16, 20;

Chapter II § 1 paras. 52, 53;

§ 2 paras. 66-80;

Chapter III § 1 paragraph 92;

§ 2 paras. 95-97; §3;

Chapter IV § 1 paras. 110, 126-128, 134;

§ 3 paras. 156 -161, 164 -169;

§ 4 paras. 172, 174, 175, 177;

Annex 1

Section I § 1 paras. 1-9

§ 2 items 12-15, 18, 20-23.

Section II § 5 §6;

Section III § 2

Appendices No. 5, 8.

- The present job description and official instructions of subordinate operational personnel;

- KSt 202 - 036: 2007 "Rules of internal labor regulations of employees of OJSC" NTPP";

- Rules and norms of labor protection, safety precautions, industrial sanitation and fire protection;

- "Instructions for the investigation and recording of fires that occurred at energy facilities";

- "Instruction for the investigation and recording of technological violations in the operation of power plants, networks and power systems";

- "Regulations on investigation and recording of accidents on production », Tashkent 1997;

- "Instruction on rendering first aid to victims in communication with accidents in the maintenance of power equipment "

- KSt 202 - 038: 2008 "Regulations on awarding workers, managers and other plant employees for the main results of economic activity"

2. 8 The shift supervisor should know:

- The device, works and operational instructions of the main and auxiliary equipment of the CCGT unit;

- Thermal circuits of the main equipment;

- Main electrical diagrams and electrical power schemes SN CCGT - 478 MW, the principle of operation of instrumentation, signaling devices, technological protection, automation, interlocks;

- Norms for the quality of steam, water, fuel, oils;

- The territorial location of all equipment, pipelines;

- Technical and economic parameters of CCGT-478 MW and planned targets for them.

2.9 Testing the knowledge of Rules of technical operation, Rules of safety technique, Rules of fire safety should be carried out:

- primary - before admission to independent work;

- Periodic - on time;

- Extraordinary - in violation of rules and regulations, at the request of SI Sanoatkontehnazorat, SI Uzenergonadzor, higher authorities, by decision of the special commission.

Periodic testing of knowledge of Rules of technical operation, Rules of safety technique, production and job descriptions should be carried out at least once every 3 years.

Periodicity of Rules of safety technique knowledge testing, device rules and safe operation of equipment controlled by SI "Sanoatkontehnazorat" - once a year.

2.10 Primary attestation is conducted after 1 year of work in this position; further attestations are conducted according to the results of the past, but not less than 1 time in 5 years.

2.11 The workplace of the shift supervisor is the control room.

2.12 The following documentation should be on the workplace of the shift supervisor:

2.12.1. Lists, schedules, lists:

- a list of works performed on orders, orders;

- List of gas hazardous works performed by orders and orders;

- list of persons entitled to issue orders, orders, orders for the production of gas hazardous works;

- List of persons entitled to be responsible for the management of work on orders, orders, general outfits, orders for the production of gas hazardous works;

- list of places of CCGT dangerous with respect to gas contamination;

- list of personnel in the unit with addresses and telephones;

- shift work schedule;

- cleaning zones of the unit area, assigned for shifts;

- phonebook.

- graph of testing TZ, AVR, interlocks.

2.12.2. The main electrical diagram of the station, the diagram of own needs of electric motors 0,4 and 6 kV.

2.12.3. Instructions for the protection of labor of operational personnel, job descriptions:

- Head of shift of CCGT;

- Senior Engineer of the power unit;

- PT operator;

- GT operator;

- the operator of auxiliary equipment;

- Engineer of GBCS;

- Patrol operator for the boiler;

- Patrol operator on the turbine;

- Patrol operator on the gas turbine;

- Patrol operator on the GBCS;

2.12.4. JOURNALS:

- operational;

- technical instructions;

- administrative orders

- Scheduled and extraordinary trainings of operational personnel;

- development of policy materials;

- accounting for work on orders and orders;

- Registration of orders for gas hazardous works;
- technical and economic indicators of the blocks.
- defects in gas turbine equipment.
- defects in the equipment of the steam turbine.
- defects in auxiliary equipment.
- starting and stopping the unit.
- circumvention of workplaces.
- temperature control of gas turbine and waste heat boiler.
- changes in technological schemes of the CCGT unit.

3 Functions and responsibilities

3.1 The shift supervisor of the CCGT, during its duty, performs general operational and technical management of the operation of the unit equipment and is the person responsible for correct, economical and trouble-free servicing of the main and auxiliary equipment, for timely and qualitative preparation of repair work, for labor and production discipline, compliance staff requirements of the rules of internal labor regulations, industrial safety, safety rules, safety rules in the gas economy, the rules of the SI "Sanoatkontehnazorat", safety rules when working with tools and devices.

3.2 The CCGT shift supervisor works according to the approved replacement schedule.

3.3 Violation of the duty schedule is prohibited. The change of shift of duty is allowed with the permission of the unit manager or his deputies, and duty for 2 consecutive shifts is prohibited. In the event that the shiftman does not come for duty, the shift head must inform the head of the CCGT about this and continue the duty until the arrival of the shift supervisor called on for duty.

3.4. Performs operational control over the provision of material and energy resources, the technically correct operation of equipment and other fixed assets, the economical use of raw materials, fuel, and materials.

3.5 Identify, prevent and eliminate the causes of violations. Carries out work on increasing labor productivity, reducing labor intensity to the cost of production.

3.6 Participates in the dissemination of advanced techniques and methods of reducing labor costs.

3.7 Analyzes the results of production activities subsections per shift; reasons that cause idle equipment; participates in the development and implementation of measures to address identified shortcomings.

3.8 Supervises the observance by employees of technological, industrial and labor discipline, rules and norms of labor protection, safety precautions, industrial sanitation and fire protection, presents proposals for imposition of disciplinary sanctions against violators of industrial and labor discipline.

3.9 The acceptance and delivery of the shift is carried out in accordance with the "Rules for the Technical Operation of Electric Power Stations and Networks".

Arrival at the workplace for 20-30 minutes before the start of the work shift in order to:

- familiarize yourself with the state of the circuit and the mode of operation of the equipment;

- to receive information from the shifting person about the equipment, for which it is necessary to strengthen control to prevent an accident or malfunctions and equipment that is under repair, reserve;

- find out what works are performed according to orders;

- check and accept operational documentation and instructions;

- read all the records and orders for the time past from the previous watch;

- accept the report from the subordinate staff and report to the Station shift head on the entry into duty and the shortcomings revealed when taking the shift;

- to register the acceptance and delivery of the shift in the operational journal for with his signature and the signature of the transferee, indicating the exact time.

3.10 Departure from duty without changing the shift is FORBIDDEN.

3.11 Acceptance of the shift during the liquidation of an emergency is FORBIDDEN.

The personnel arriving to shift are placed at the disposal of the head of the liquidation of the accident.

3.12 Prepare workplaces for repair teams in accordance with normative and technical documentation and with the permission of the station shift head.

3.13 Controls the testing of technological protections, fire, warning and emergency signaling, communication; checks the correctness of the clock in the workplace;

according to the schedule, the equipment is transferred from the working time to the standby time and performs the testing of the latter.

3.14 Increases technical knowledge, conducts technical studies with the staff, briefing; participates in the commission for the verification of knowledge staff Rules of technical operation, Rules of safety technique, Rules of fire safety, job descriptions and production instructions.

3.15 Conducts interchangeable meetings.

3.16 Duties of the CCGT shift supervisor on labor safety management system:

3.16.1 Every day, upon acceptance of the shift, by personal inspection and questioning, he checks the state of safety at workplaces, the equipment's equipment, protective equipment, interlocks and alarms.

Acquainted with the modes of conducting technological processes, records in journals, orders and instructions of the unit's management.

Gives assignments and instructions to the shift personnel for the shift period. Eliminates shortcomings that were not eliminated by the previous shift and identified during the control;

3.16.2 Regularly, at least 1 time per shift, to bypass all equipment of CCGT, paying special attention to the condition of supports, suspension, insulation of pipelines, stairs, platforms, lighting, fire fighting equipment. With regard to all the observations revealed, to make entries in the journal of defects, and also to organize their elimination by the personnel of the Center, the personnel of the shift

3.16.3 Provides maintenance of workplaces, production areas and territories in proper condition by organizing timely cleaning of equipment and communications, excluding accumulation of raw materials and materials;

3.16.4 Monitor the operation of ventilation (air conditioning) and the state of the air, take measures to eliminate gas and dust;

3.16.5 Ensures that personnel comply with changing safety requirements and applying safe work practices, maintaining technological processes in accordance with approved technological (mode) cards and instructions.

Work with the personnel all information materials of higher organizations and surveys of accidents;

3.16.6 Immediately suppresses violations of safe methods and methods of work, as well as industrial discipline.

Makes an idea of imposition of penalties on violators, removes from executing the work of persons for failure to comply with instructions related to observance of discipline and safe working methods, notifies the head of the unit about this;

3.16.7 Daily reviews the entries in the logs of reception and delivery by the senior local operators (local operators) and operators, makes in it a note and the necessary instructions for the elimination of fixed violations and deficiencies;

3.16.8. The issues, connected with the performance of works to improve the safety conditions of work, decide by himself, and if necessary with the unit manager;

3.16.9 It does not allow untrained and unverified knowledge of repair personnel for the production of works.

Provides quality training of jobs and equipment, as well as compliance with the established sequence and safety measures in the performance of work.

Does not allow the execution of works without preliminary registration of written permits (permits), if they are provided for these works, suspends also the production of the said works, if they are conducted in violation of safety rules or where circumstances that create a danger exist for workers;

3.16.10 Gives suggestions on the development and updating of instructions on labor protection for each workplace.

3.16.11 Stops the equipment in the event of an accident or fire that threatens the safety of the equipment or life of the personnel, in accordance with the instructions for eliminating emergency situations in the instructions.

3.16.12 Represent management of the unit proposals for the promotion of subordinate staff.

3.17 In the shift from 000 - 800 to prepare a report to the head of the unit, in which to indicate:

a) the load on ST and GT;

b) the vacuum in the condenser and the exhaust temperature of the CND.

c) deadlines for applications for equipment repair;

d) water reserves in BRK, DB and its quality according to chemical data. analysis;

e) The water balance of the CCGT: the recharge rate,

f) basic defects in the equipment of the unit, blocks.

g) deviations from the TEP norms, the water-chemical regime of the block and the generator;

h) remarks (encouragement) to the staff.

j) condition of the smart - admission system;

l) equipment under repair;

3.18 Change of Shift is not allowed:

a) during the elimination of accidents.

b) with contaminated equipment.

c) in the time of switching operations or the operation of switching on and off the equipment.

d) if the normal operating mode of the equipment is disrupted.

e) in exceptional cases, the delivery of a change during the liquidation of an accident is allowed with the permission of the management of the unit or the chief engineer.

f) when the duty personnel enter the work in an incapacitated state.

g) the delivery of a shift in case of violation of the equipment operation mode, during start-up and shutdown is allowed with the permission of the unit manager or his deputy.

3.19 During the production of repair work, the shift manager of the CCPP:

a) organizes the preparation of equipment for repair within the time specified in the attire or order, ensures the completeness of the fulfillment of the conditions for the production of work.

b) determines the amount of equipment remaining in the work area of the outfit.

c) instructs the responsible manager and the fulfiller of work on safety measures in the production of work and determines the work area of the team.

d) makes an admission and completes the work for the CCGT equipment in accordance with the "Safety rules for the operation of thermal mechanical equipment of power plants and heating networks".

e) prohibits admission to work if the responsible manager or server of work does not have a certificate of verification of Rules of safety technique knowledge or expiration of its validity;

f) provides periodic monitoring of working teams;

g) removes the team from work in case of detection of violations of the Rules of safety technique or expansion of the zone of work by the members of the brigade;

h) organizes the acceptance of workplaces for cleanliness after the completion of work;

i) organize testing of equipment and subsequent withdrawal to the reserve or work;

j) takes part in the acceptance of equipment from the installation;

l) draw up admission, end of work on orders and orders in the register of work on orders and orders;

m) makes an admission, with the permission of the station shift supervisor, to testing by order of the unit manager or the program approved by the technical manager;

n) makes a record in the operational journal about his admission to the order, indicating the number of the order, place of work and time of admission;

o) renews the local application for equipment under repair for the period necessary to complete the work for the identified additional work in the process of equipment repair;

p) closes local applications upon completion of equipment repair and testing. The withdrawal of equipment from repair to a reserve without testing is prohibited;

3.20. In case of emergency:

An emergency situation means a violation of the normal operation of equipment or individual units, which, if not taken timely, creates a threat to the safety of equipment, the uninterrupted operation of the station, and the safety of people.

Liquidation of the emergency situation in the CCGT is carried out under the supervision of the shift supervisor.

The shift supervisor must arrive at the site, the facility where the emergency situation was created, find out the nature and size of the accident, identify the cause as soon as possible and take measures to eliminate the accident, report the incident to the station shift supervisor and the unit manager.

In the event of accidents related to load limitation, damage to equipment, fire requiring a fire department call, accidents, immediately report to the unit management. If at the time of the accident any repair work or testing was carried out, they should be immediately suspended and people withdrawn from the danger zone.

In case of an emergency situation, except for the personnel participating in the liquidation of the accident, the equipment has unimpeded access to the equipment: the management of "NTPP", the management of the CCGT, Electrical

unit, TAI unit. All other personnel must be removed from the main control room and the accident site.

During the development of the accident, the shift supervisor supervises the actions of the subordinate personnel, gives instructions on taking the necessary measures for the successful liquidation of the emergency situation, the safety of people, the safety of equipment, the fulfillment of the load dispatch schedule, guided by the job description and production instructions, and in case of an unusual situation, makes decisions independently , depending on the specific situation.

If the emergency situation was created during the acceptance-delivery of the shift, all personnel who arrived to the shift are placed at the disposal of the head of the liquidation of the accident. Delivery of the shift during the liquidation of the accident is allowed only with the permission of the unit's management.

4 Relationships

4.1 The CCGT shift supervisor performs all administrative and technical orders of the unit manager, the deputy head of the equipment on operation, the leading process engineer, the operative orders of the shift supervisor.

In case of disagreement with the received order of the station shift supervisor, the CCGT shift supervisor should state this to the person who gave the order, but after receiving the confirmation of the order, it executes it if it does not harm the safety of the personnel or the safety of the equipment.

4.2 In case orders are received directly from the director, chief engineer or from another administrative person of the power plant, the shift supervisor of the CCGT executes it and notifies the shift supervisor of the station.

4.3 In operational telephone conversations with personnel, first of all, he names his position and surname, and then transmits or receives orders or messages.

4.4 If necessary, requires additional or more frequent monitoring of the chemical regime of the equipment through the head of the unit chemical mode.

Coordinates with the head of shift chemical unit all the switching on the pipelines of demineralized, raw and tap water, contaminated condensate and washing solutions after acid washing of the equipment at the COPS.

4.5 Gives the senior duty officer of the TAI unit on thermal automation and measurements directly or through subordinate personnel instructions for performing work not related to the input or output of protection or connected with

the necessity of the output of any protection in emergency order due to the appearance of a defect on the devices of thermal automation and measurement.

4.6. Provides the senior duty technician at the TAI unit with regard to the thermal automation and measuring the instructions for entering or leaving the protection of the process equipment when starting or stopping it. These instructions are preliminarily agreed with the shift supervisor.

4.7 With the knowledge of the station shift supervisor, he gives instructions to the senior electrician on duty to assemble and disassemble the electrical circuits of the drives of non-compliant mechanisms.

4.8 With the knowledge of the station shift supervisor, the head of the shift of the electrical unit requires the assembly or disassembly of the electrical circuits for the drive of the responsible mechanisms.

4.8 In emergency cases, it requires the station supervisor to take measures to maintain pressure in the collectors of the gas pipeline of the station, raw and tap water.

5. Rights

5.1. The shift supervisor of the CCGT has the right to demand healthy and safe working conditions, as well as proper technical equipment of the workplace.

5.2. With the permission of the Station shift head, give instructions to the senior operational personnel of other unit on the procedure for maintaining the operating mode of the equipment.

5.3. Involve through the Station shift head for the production of repair work for the staff of the Central Repair Unit.

5.4. Load the shift staff with current business and production work.

5.5. To take part in the decision of questions on rearrangement of personnel in the shift.

5.6. To suspend from duty the subordinate staff, who do not ensure the performance of their duties, who violated the Rules of technical operation, the Rules of fire safety, Rules of safety technique, etc.

5.7. To abolish orders given by subordinate personnel.

5.8. In agreement with the Station shift head, authorize the withdrawal in repair of auxiliary equipment, not connected with the reduction of the load, for the duration of their watch.

5.9. In order to eliminate the emergency situation in the unit, all operational personnel and repair personnel of the shift, as well as the personnel of the host shift.

5.10. To apply to the administration of the unit for the encouragement and punishment of shift personnel.

5.11. In case of disagreement with the received order, the shift head has the right to appeal against it to the higher management, without suspending its execution, if this does not threaten damage to equipment and people's lives.

5.12. Select the attire from the manufacturer of work in case of detection of violations of the Rules of safety technique, or identify other circumstances that threaten the safety of workers and remove the team from their place of work.

5.13. Require the heads of shifts Electrical unit, and the unit of TAI to eliminate defects affecting the operation of CCGT equipment.

5.14. Do not comply with orders that contradict the requirements of Rules of technical operation, Rules of safety technique, Rules of fire safety, or pose a threat to the safety of people or the safety of power equipment.

6 Responsibility

6.1 The head of the shift unit of the CCGT must comply with the requirements of the current legislation in the activities of subordinated personnel.

6.2 The shift supervisor of the CCGT is responsible for:

- untimely and substandard performance of the assigned functions,

- not use of the granted rights;

- failure to comply with the job description;

- all cases of violations in the operation of process equipment, committed by him or directly subordinate to him personnel, performing work on his instruction (order).

- Injury and tanning caused by his fault or fault subordinate staff;

- organization of safety of the serviced equipment.

- late exams.

- the state of labor, production and technological discipline in the shift.

6.3 The head of the shift unit of the CCGT is involved to disciplinary, administrative and other measures of liability for non-fulfillment or improper performance of their functional duties that led to the occurrence of accidents and accidents, damage to the employer's property and other adverse consequences, in accordance with the current legislation of the Republic of Uzbekistan.

KSt 202- 817:2015

Information data

Designed by The unit of the CCPP of JSC "NTPP"

Head of unit I. Kh. Abdulloev

Agreed

Production and Technical Department

Head of the department T. Kh. Soliev

Planning and Economic Department

Head of the department E.E.Davova

Reliability and Industrial Safety Service

Head of the department Kh. O. Muminov

Legal adviser Sh. Y. Nazarov

Responsible for Standardization N. S. Nurullaeva

COMPANY STANDARD

JOB DESCRIPTION OF SENIOR OPERATOR OF THE CCPP UNIT

OPEN JOINT STOCK COMPANY "NTPP"
Navoi

Preface

1 DEVELOPED AND INTRODUCED by the CCPP UNIT of JSC "NTPP"

2 APPROVED AND INTRODUCED by the Order of JSC "NTPP"
No. dated

3 INTRODUCED FOR THE FIRST TIME

Approved by

Chief engineer of JSC "NTPP"

T. G. Nazarov

COMPANY STANDARD

JOB DESCRIPTION OF SENIOR OPERATOR OF THE CCPP UNIT

Valid from to

1 Application area

This job description is developed on the basis of KSt 202-810: 2011 "Regulations on the unit of combined cycle gas turbine plants", the Unified tariff and qualification reference book of jobs and occupations of workers in order to regulate the functions, duties, rights and responsibilities of the senior operator of the power unit of the CCGT unit and is mandatory for him.

Should know instructions:

- Senior operator of the CCGT Unit
- the head of the CCGT shift,
- Head of the GBCS section
- station shift supervisor
- Engineering technical personnel of the CCGT.

2 General terms

2.1 The senior operator of the power unit of the CCGT is a person in charge of the operational management of his subordinate personnel, providing safe, reliable and economical operation of equipment assigned to the CCGT unit and GBCS, organization of switching in the technological schemes of auxiliary equipment CCGT and equipment of the GBCS section, as well as compliance with the personnel of the CCGT and GBCS replacement of duty and production instructions, Rules of Technical Operation, Safety Rules, Fire Safety Rules, Labor and Industrial Discipline, Rules of Internal Labor Regulations.

2.2 The senior operator of the power unit of the CCGT unit must be at least 18 years old, having a higher or secondary technical education and a practical experience of work at the CCGT not less than 3 years old, having undergone a medical examination.

Before the assignment to independent work, the senior operator of the power unit must:

2.3.1 Undertake production training, according to the individual training program.

2.3.2 Pass the examinations of the qualification commission under the chairmanship of the chief engineer or his deputy for operation, in the amount of necessary knowledge for the senior operator of the power unit, in accordance with the Rules of the organization work with personnel at energy production enterprises, registered by the Ministry of Justice R.Uz of 04.10.2010, No. 1178 .

2.3.3 After passing the examinations, the senior operator of the power unit of the CCGT unit must undergo duplication at the workplace of the senior operator of the power unit of the CCGT unit for a period of not less than 12 shifts, under the supervision of an experienced senior operator of the power unit of the CCGT unit. After the end of the period of duplication and with a positive evaluation of the emergency response training, the senior operator of the power unit of the CCGT unit is allowed to work independently by ordering the unit.

2.4 The senior operator of the power unit of the CCGT unit is appointed, moved and dismissed from the position by the director of the enterprise upon presentation of the head of the unit of the CCGT, the personnel department in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.5 The senior operator of the power unit of the CCGT unit is administratively and technically subject to the unit manager and his deputies, the leading process engineer of the CCGT, and to the operational head of the CCGT replacement.

The senior operator of the power unit of CCGT was promptly subordinated to operators and patrol-operators for servicing the CCGT equipment and GBCS.

For the time of the absence of the senior operator of the power unit of CCGT, he is replaced by the shift supervisor of the CCGT.

2.6 The senior operator of the power unit of CCGT should know and be guided in its work:

- Indication of PP-56;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan from 12.01.1999 № 140 "On measures to strengthen the performance discipline ";

- The Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 as of 30.09.2009;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated August 22, 2009 "On Approval of the Rules for the Use of Electric and Thermal Energy";

- "Regulations on the investigation and recording of accidents and other injuries to workers' health at work" approved by the Cabinet of Ministers on June 06, 1997;

- RH 34-114: 2007 "Regulations on Disciplinary Responsibility of Workers of the Uzbek Energy System";

- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan", Tashkent 2011;

Section I Chapter I;

Section II Chapter I;

Chapter II §4;

Chapter III §1 paragraphs 201-218, §3, §4, §6, §7, §8, §9, §11, §12, §13;

Chapter IV §1, §2, §10, §12, §14;

Chapter V §1, §4-6, §7;

- "Safety technique on operation of thermal mechanical equipments on power stations and heat networks", Tashkent 2012, in the following scope:

Chapter I;

Chapter II;

Chapter III §§1-7; §§9-14;

Chapter IV §2 B, D, D, §3, §4, §6, §8, §9;

Appendices 2-8, 10, 11, 13-17, 19.

- "Rules for the Arrangement and Safe Operation of Vessels Working Under Pressure", approved by agreement with the Ministry of Justice of the Republic of Uzbekistan, assigned to technical documents December 23, 2011, No. 6-24 / 11-13112 / 6;

- "Fire safety rules for an energy company", Tashkent 2004;

- "Safety rules in the gas economy of the Republic of Uzbekistan", Tashkent-2004, in the following volume:

Chapter I § 1, §2;

Chapter III §1, §2, §3, §4, §7;

Chapter VI;

Appendices 1, 2, 31, 32.

- "Instruction on fire safety measures for fire works at power facilities";

- "Explosion safety rules for the use of gas, fuel oil in boiler plants";

- "Safety rules when working with tools and devices";

- KSt 202-036-2007 "Rules of internal labor regulations for employees of OJSC" NTPP ";

- The present job description and job descriptions of the subordinate staff;

- "Instructions for first aid to victims in connection with accidents in the service of power equipment."

2.7 The senior operator of the power unit of the CCGT should know:

- The device, operation and operational instructions of the main and auxiliary equipment of the GBCS section;

- Technological and general technological schemes of equipment
CCGT and GBCS(Gas boosting compressor station);

- Main electrical diagrams and power supply circuits for auxiliary needs of CCGT equipment;

- Purpose and principle of operation of instrumentation, signaling device, technological protection, automation, interlocks;

- Norms of quality of gas, fuel, oils;

- The territorial location of all equipment, pipelines, fittings and structures of the CCGT and the GBCS section;

- Technical and economic indicators of the CCGT unit and planning targets for them;

- Theoretical fundamentals of heat engineering, general electrical engineering, mechanics and water treatment, fundamentals of electronics, ACS TP;

- Operating mode of the CCGT unit and GBCS equipment;

- The device, operation and technical characteristics of the main and auxiliary equipment of the CCGT unit and CCGS; production instructions for start-up, shutdown, operation of boiler equipment and elimination of emergency situations in the work of CCGTs and GBCS, as well as instructions of other units related to the equipment being serviced.

2.8 Testing the knowledge of Rules of safety technique, Rules of technical operation, Rules of fire safety, job descriptions and production instructions should be carried out:

- primary - before admission to independent work;

- Periodic - on time;

- Extraordinary - in case of violation of rules and instructions, at the request of the state supervision bodies, the State Inspectorate for the operation of power plants and networks and higher management bodies, as decided by the special commission.

Periodic testing of knowledge of Rules of technical operation, Rules of fire safety, production and job descriptions should be carried out at least once every 3 years.

Periodicity of verification of Rules of safety technique knowledge, rules of the device and safe operation of equipment controlled by the Agency "Sanoatkontehnazorat" once a year.

2.9 The workplace of the senior operator is the operator's building CCPP.

2.10 The service area of the senior operator is all the technological equipment assigned to the CCGT unit and to the GBCS site.

3 **Functions and responsibilities**

3.1 The senior operator of the power unit of the CCGT conducts general operational and technical supervision of the operation of the unit's equipment and is the person responsible for the correct, economical and trouble-free servicing of the main and auxiliary equipment; for timely and qualitative preparation of repair work, for labor and production discipline on the unit, compliance with subordinate personnel requirements of internal labor regulations, industrial sanitation.

3.2 The senior operator of the power unit of the CCGT works according to the approved schedule.

3.3 Getting to work should take a shift from the previous senior operator, and after the end of the work to pass the next shift according to the schedule to the senior operator.

3.4 Violation of the schedule of duty is FORBIDDEN.

3.5 Substitution of duty is allowed only with the permission of the unit manager or his deputies, and duty for two shifts in a row is PROHIBITED.

3.6 In the event that the shiftman is not on duty, the senior operator of the power unit of the CCGT must inform the shift head about this, continue the duty until the arrival of the senior operator of the power unit of the CCGT, called for duty.

Departure from duty without changing the shift is FORBIDDEN.

3.7 When accepting shifts, the senior operator must:

- To get acquainted with the status, the scheme and the regime of operation of power plants in its operational management or management, in its operational management or management, in the amount determined by the relevant instructions;
- To receive information from the shifting about the equipment, for which it is necessary to conduct especially careful monitoring, to prevent violations in work and equipment that is in reserve and repair;
- To find out what works are performed according to orders on the area assigned to it:
- Check and accept tools, materials, room keys, on-line documentation and workplace documentation:
- To get acquainted with all the records and orders for the time elapsed since

your previous watch:

- To accept the report from the subordinate staff and report directly to the shift supervisor on the entry into duty and the shortcomings revealed during the acceptance of the shift:

- Make a receipt-delivery shift in a record in a journal or in a statement for his signature that passes the shift.

Acceptance and delivery of the shift during the liquidation of the accident is FORBIDDEN.

- The operative personnel replaced are used at the discretion of the person guiding the liquidation of the accident.

3.8 Under the supervision of the shift supervisor, the general technical and operational management of the operation of the CCGT equipment and the GBCS section is carried out during its stay.

3.9 If the subordinate operational personnel violates the rules of internal labor regulations, labor discipline, Rules of technical operation, Rules of fire safety, Rules of safety technique, or failure to comply with his instructions, is obliged to file a report to the head of the unit shift or to the head of the CCPP on imposing a penalty on the perpetrator.

3.10 The senior operator of the power unit is obliged to take measures to reduce soaring, condensate leaks, oil leaks and fire-resistant liquids, and require repair personnel to repair defects.

3.11 Controls directly and through subordinate personnel at the work and state of the equipment of the GBCS site.

3.12 Provides reliable and economical operation of the CCGT equipment and the GBCS section.

Periodically, in accordance with the instruction, it tests the operation of technological, fire, warning and emergency signaling, communication equipment, and also checks the accuracy of the clock in the workplace.

3.13 According to the approved schedule, the equipment is transferred from the worker to the standby state, performs testing and preventive inspections of the equipment.

3.14 Organize subordinate personnel to maintain workplaces and equipment of CCGT and GBCS site in a clean state.

3.15 Senior Operator of the CCGT during the shift:

- Checks the cleanliness and order of workplaces, serviceability of equipment, tools, safety and protective devices, protective equipment, instrumentation and so on;

- Supervises the use of each subordinate worker's issued uniforms, special footwear, required personal protective equipment;

- DO NOT let unauthorized persons to the serviced site;

- Monitor compliance with those working for CCGT and the site of the GBCS safety regulations, instructions for the safe conduct of the technological (production) process;

- IMMEDIATELY suppresses violations of rules and regulations that ensure the safety of employees, safety and serviceability of equipment;

- Reports to his immediate supervisor on the detected malfunctions of equipment, devices, as well as on the appearance of abnormalities and process management or in the performance of an operation that could lead to an accident (fire) or to reduce work safety; about each case of injury, poisoning, burn of workers at the site served by him or near this site.

3.16 It monitors during the shift the operation of all CCGT equipment, compressors and its auxiliary equipment, their vibration state; temperature of electric motors of pumps, their bearings; condition of stuffing box seals of pumps, fittings; condition of oil lines for leaks; operation of gas cooling fans; temperature regime of the bearings of the compressor unit.

3.17 When the equipment is traversed during the shift, the senior operator checks the equipment operation mode according to the control devices, the maintenance of the documentation by the operators of the gas-compression compressor unit; reveals defects, malfunctions in the operation of equipment, if necessary, promptly fixes problems with the help of subordinate personnel.

3.18 During rounds, the senior operator is obliged to reveal the correctness application of the established system of work-permits in the performance of repair work and work on orders; check the condition of the fire safety equipment.

3.19 The results of the patrol are processed by the senior operator in the operational journal of the senior operator, defects in the defect log and reports to the head of the shift of CCGT.

3.20 Participates in the implementation of operations for starting, stopping, testing, crimping, as well as the distribution of thermal and electrical loads.

3.21 Participates in the production of switching in technological schemes of CCGTs and GBCS.

3.22 Carries out revealing and elimination of malfunctions of the equipment of CCGT and GBCS site.

3.23 Participates in the preparation of workplaces and the admission to repair and commissioning works.

3.24 The Senior operator of the Unit of the CCGT is obliged:

- To raise the level of their technical knowledge by attending organized training courses for workers, schools for studying advanced working methods, participating in training exercises;

- Participate in competitions;

- A senior operator of the power unit of the CCGT can be used as a operator of

the GBCS after redundancy and briefing;

- Organizes first aid to the victim and immediate call of ambulance;

- Carries out the admission on implementation of works.

3.25 When a senior operator appears at the workplace, the management of JSC "NTPP", the unit manager and his deputies, reports on the condition of the equipment assigned to it: load on the unit, main TEPs, deviations from the equipment operation schedule; basic defects in equipment, equipment under repair, which equipment and parts of the schemes are allowed to repair personnel, and for what repairs.

3.26 When starting CCGT and GBCS shall:

3.26.1 Verify the closure of all orders and orders for the repair of CCGT equipment and GBCS.

3.26.2 Check equipment for fire safety compliance.

3.26.3 Bring to the subordinate personnel the tasks of the Station shift head on the unit start-up regime.

3.26.4 Manage the launch of the GBCS, supervising the execution by the subordinate personnel of the start-up instructions of the unit, the start-up schedule.

3.27 During the production of repair work, the senior operator of the CCGT must:

3.27.1 With the permission of the Station shift head, organize the withdrawal of equipment for repairs by the time specified in the order, ensure the completeness of the fulfillment of the conditions for the production of work, determine the amount of equipment remaining in work in the area of the work order. To instruct the chief of work on safety measures in the course of work and to determine the work area of the team.

3.27.2 With the permission of the STATION SHIFT HEAD, authorize and complete the work on the equipment of the unit in accordance with the Safety Regulations for the operation of thermal mechanical equipment of power plants and heating networks.

3.27.3 BANNER admission to work in the absence of a responsible manager or manufacturer of work certificates for checking Rules of safety technique knowledge or expiration of their validity.

3.27.4 Ensure periodic monitoring of working teams.

327.5 Remove the brigade from work in case of detection of violations of the Rules of safety technique or the expansion of the zone of work by the members of the brigade.

3.27.6 Arrange acceptance of workplaces for cleanliness after completion of work; organize testing of equipment and subsequent withdrawal to the reserve or work.

3.27.7 To participate in the acceptance of equipment from installation.

3.28 Participates in the elimination of emergency situations.

3.29 Actions of the senior operator in the event of emergency response:

3.29.1. An emergency situation means a violation of the normal operation of equipment or individual units, which, if untimely measures are taken, threatens the safety of the equipment, the uninterrupted operation of the station, and the safety of people.

3.29.2 Liquidation of the emergency situation on the unit is carried out under the guidance of the STATION SHIFT HEAD, in its absence under the supervision of the senior operator.

3.29.3 In the event of the liquidation of an emergency, the senior operator must ascertain the nature and extent of the emergency situation.

3.29.4 Monitor and coordinate the actions of subordinate personnel, and if necessary, provide direct assistance to personnel in the elimination of the accident.
Decide on the adoption of the most favorable measures for the successful liquidation of the emergency situation, the safety of people, the safety of equipment, the fulfillment of the dispatch schedule of the load, guided by official and production instructions. And in the event of an unusual situation, make decisions independently, depending on the specific situation.

3.29.5 Report on the measures taken to eliminate the emergency situation to report to the head of the CCGT shift

3.29.6 If, at the time of the occurrence of an accident, any repairs or tests have been carried out, they must be discontinued immediately, people are withdrawn.

3.29.7 In emergency situations, except for the personnel involved in the elimination of the accident, the equipment has unimpeded access:

- management of JSC "NTPP";
- supervising staff of the CCGT and GBCS;

All other personnel should be removed from the main control room and accident areas.

3.29.8 If the emergency situation was created during the acceptance-delivery of the shift, all the personnel of the receiving shift are placed at the disposal of the head of the liquidation of the accident.

3.29.9 In case of accidents with people, IMMEDIATLY inform the shift head, the management of the CCGT, to call an ambulance if it is necessary to provide first aid to the victim, involving a number of people.

3.29.10 Do not interfere with the operation of automatic devices, unless instructed to do so;

3.29.11 Ensure normal operation of the main equipment remaining in operation.

3.29.12 Find out the location, nature and extent of the damage and disconnect the damaged equipment. On what happened to report to the head of the CCGT shift.

3.30 It is forbidden to engage in strangers during business hours, not related to the performance of official duties by affairs.

4 Rights

4.1 Give operational orders to subordinate personnel.

4.2 Remove subordinate personnel who do not fulfill their duties, as well as in case of gross violations of Rules of technical operation, Rules of safety technique or internal labor regulations of the station, while notifying the Shift head of CCGT.

4.3 Stop the equipment in the event of an accident or fire that threatens the safety of the equipment or the life of the personnel in accordance with the instructions for the elimination of emergency situations.

4.4 To involve all the operational shift staff, as well as the personnel of the host shift, in order to eliminate the emergency situation in the unit.

4.5 Do not follow orders that are contrary to the requirements of Rules of safety technique, Rules of technical operation or pose a threat to human security or safety power equipment, appeal other disagreements in the event of disagreement, without suspending their execution.

4.6 Represent the management of the unit through the head of the CCGT shift of the proposal on the promotion of subordinate personnel or the imposition of penalties on him.

5 Relationships

5.1 The Senior operator of the CCGT unit, during his duty, performs the administrative and technical orders of the unit manager, his deputies, the leading process engineer and operational orders from the shift supervisor of the CCGT or the station shift supervisor.

In the event that orders are received directly from the management of OJSC "NTPP", it executes the order with the subsequent notification to the head of the unit shift.

5.2 The senior operator of the power unit of the CCGT unit accepts and replaces the substitute senior operator of the CCGT.

With administrative orders, the senior operator of the GBCS site is to be consulted in the journal of administrative orders of the CCGT unit.

Communication with operational staff of other units, the senior operator of the power unit of the CCGT, leads through the shift supervisor of the CCGT.

The senior operator of the power unit of the CCGT is contacted by the station shift head to maintain the specified pressure in the main gas pipeline.

5.3 In operational telephone conversations with personnel, first of all, he names his position and surname, and then transmits or receives an order or a message.

5.4 Upon receipt of the order, he must repeat it, execute and report on the execution to the person who issued the order. In case of disagreement with the received order, the senior operator of the unit of the CCGT should reasonably object, but upon receipt of a repeated order to execute it. It is not allowed to carry out orders that could lead to equipment damage, as well as contradicting Rules of safety technique.

5.5 Disagreements that have not found a common solution may be resolved by the "Labor Disputes Commission".

6 Responsibility

6.1 The senior operator of the power unit of the CCGT is personally responsible:

- For all cases of violations of Rules of technical operation, Rules of safety technique, Rules of fire safety, production and this instruction, accidents, incidents of fire, occupational accidents occurred due to his fault and through the fault of subordinate personnel;
- For failure to comply with orders of higher-level operational personnel;
- for safety of the serviced equipment;
- For violation of labor, production and technological discipline;
- For the performance of duties and use of the rights provided for by the job description;
- For damage caused to the environment caused by personal actions or violation of operational instructions;

6.2 The senior operator of the power unit of the CCGT must observe compliance in the activities of subordinate personnel with the requirements of the current legislation.

6.3 The senior operator of the power unit of the CCGT, depending on the degree and nature of the violations, is brought to disciplinary, administrative and other measures of responsibility in accordance with the current legislation of the Republic of Uzbekistan.

Informational data

Developed by	CCGT Unit of OJSC “NTPP”
Head of unit	I.Kh.Abdulloev
Agreed	
Production and Technical Department	
Head of the department	T.H.Soliev
Planning and Economic Department	
Head of the Department	E.E.Davov
Service reliability of machinery and industrial safety	
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STANDARD OF THE ENTERPRISE

JOB INSTRUCTION
OF THE OPERATOR OF GAS TURBINE OF THE WORKSHOP
OF THE COMBINED CYCLE GAS TURBINES

Open Joint Stock Company NTPS
Navoi

Foreword

1. ELABORATED AND SUBMITTED by the Workshop of the Combined Cycle Gas Turbines of the Open Joint Stock Company NTPS

2. APPROVED AND ENFORCED by the Order of the Open JSC NTPS date _____ No. _____

3. INTRODUCED FOR THE FIRST TIME

KSt 202-830:2012

Approved
Chief Engineer of Open JSC NTPS

/signature/ T.G. Nazarov

STANDARD OF THE ENTERPRISE

JOB INSTRUCTION
OF THE OPERATOR OF STEAM TURBINE OF THE WORKSHOP
OF THE COMBINED CYCLE GAS TURBINES

Validity period from 01.07.2012 to 01.07.2015

1. Field of application

The present Instruction is elaborated on the basis of the KSt 202-810:2011 “Regulations on the workshop of the combined cycle gas turbines”, Unified tariff-qualification reference book of the works and professions of the workers, for the purposes of regulation of the functions, obligations, rights and responsibilities of the operator of gas turbine of the workshop of combined cycle gas turbines (CCGT) and is obligatory for him.

Head of the shift of the CCGT, Head of the CCGT and his deputies, Engineers technologists of the CCGT, head of the shift of the power plant are obliged to know the Instruction.

2. General Provisions

2.1. Operator of gas turbine of the workshop of combined cycle gas turbines is the person, who ensures reliable, safe and economic operation of the gas turbine of the combined cycle gas turbine with the capacity of 478 MW with all its auxiliary equipment.

2.2. Persons not younger than 18 years, with general secondary education, who have passed medical examination, specially trained, systematically briefed, passed examination of the qualification commission, who have certificates and passed training and duplication in accordance with the Rules of organization of the work with the personnel at the enterprises of the energy generation, registered by the Ministry of Justice of the Republic of Uzbekistan dated 04.10.2002 No. 1178 are accepted to the position of the operator of gas turbine of the combined cycle gas turbine.

2.3. Operator of gas turbine of the CCGT is assigned to his position, transferred to other position and dismissed from the position by the order of the Director of the enterprise upon proposal of the Head of the CCGT workshop, Human Resource Department in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.3. Operator of gas turbine of the CCGT from the production-technical and administrative point of view is subordinated to the Head of the CCGT workshop and deputy head of the workshop on operation of equipment, while in the operational aspects he is subordinated to head of the shift of power plant, head of the shift of the CCGT workshop.

Operator of gas turbine of the CCGT has under his operative subordination operators-inspectors on gas turbine and boiler equipment.

2.5. Operator of gas turbines of the CCGT shall be aware and follow in performing his duties the followings:

- Instruction RR-56;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated 12.01.1999 No. 140 “On the measures aimed on strengthening the operational discipline”
- Law of the Republic of Uzbekistan “On Electric power” No. 225 dated 30.09.2009;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated 22.08.2009 “On Approval of the rules of using the electric and heat power”;
- “Rules of the Installation and safe operation of the vessels operating under pressure”: Tashkent 1997;
- “Rules of design and safe operation of the pipelines of steam and hot water” 1992;
- “Rules of technical operation of the power plants and networks of the Republic of Uzbekistan”, Tashkent 2005, in the following scope:

Section I Chapter 1;
Section II Chapter 1;
Chapter 2. §4;
Chapter 3. §1, 3, 4, 5, 7, 8, 9, 12, 13;
Chapter 5.

- “Rules of Safety measures in operation of the heat mechanics equipment of the power stations and heating networks” 1985, in the following scope:

Section 1;
Section 2;
Section 3 Subsection 3.1; (E, F); 3.2 (C, D, E); 3.3 (A); 3.6, 3.7, 3.8;
Section 4;
Annexes 1-12;

- Rules of safety in the gas sector of the Republic of Uzbekistan, Tashkent – 2004, in the following scope:

Chapter I;
Chapter II §2;
Chapter III §1, 2, 3, 4, 7, 8;
Chapter IV;
- Annexes 1, 31.
- “Rules of design and safe operation of the pipelines of steam and hot water” 1992;
- “Rules of design and safe operation of the steam and water heating boilers”, Tashkent 1997;
- “Rules on fire safety for the power enterprises”, Tashkent 2004;
- “Rules of explosion safety in using the mazut and natural gas in the boiler units”.

- the present job instruction and instructions for the operator inspectors on the boiler and turbine equipment;

- KSt 202-036-2007 “Rules of internal labor policy of the workers of the Open Joint Stock Company “NTPS””;

- “Rules of safety in working with the instruments and devises”;

Sections 3, 4, 5

- “Instructions on rendering first aid to the injured persons in connection with the accidents in the process of servicing the energy equipment”;

- “Instructions on investigation and accounting of the technological violations in the operation of the power stations, networks ad power grids”

- “Instructions on conservation of the drum boilers of high pressure in the regimen of their shutdown”.

- KSt 202-032:2008 “Rules of operation with the low sulfur gas”.

- RH 34-400:2008 “Regulations on the system of management of the labor safety in the power sector”.

- Model instructions on operation of fast-response pressure-reducing and desuperheating station, pressure-reducing and desuperheating station.

2.7. Operator gas turbine of the CCGT shall know followings:

2.7.1. Design and principle of operation and technical specifications of the boiler utilizer, gas and steam turbines, generators, transformers, gas boosting compressor station, cooling tower and balance of plant.

2.7.2. Heat protections and their operation.

2.7.3. Heat circuits and technological process of production of heat and electric power.

2.7.4. Regimen of loads of the power unit of CCGT.

2.7.5. Principal electric circuit of the generators and own needs of the block of CCGT.

2.7.6. Designation and principle of operation of the controlling and measurement devises, alarms, automatics, block ups and regulators.

2.7.7. Norms of quality of the steam, water, fuel and lubricants.

2.7.8. Territorial layout of all equipment, pipelines, valves and facilities.

2.7.9. Technical and economic indicators of the CCGT and planned assignments on them.

2.7.10. Basics of the heat engineering, electric engineering, mechanics and water treatment.

2.8. Examination on the knowledge of the technical operation rules, safety rules, fire safety, job instructions and industrial instructions shall be carried out as follows:

- initial – before granting the permission to the independent operation;

- periodical – within the set periods;

- unscheduled – in case of violation of the rules and instructions, upon the request of the bodies of the State Control, State Energy Inspection, higher bodies of management in accordance with the decision of the special commission.

Periodical examination for the knowledge of the Operation Rules, Fire Safety Rules, industrial and job instructions shall be carried out not later than once in 3 years.

Periodicity of the examination of the knowledge of the safety rules, rules of installation and safe operation of the equipment, supervised by the State Inspection “Sanoatgeokontehnazorat” is as follows: for

the persons, directly connected with the operation and servicing the power units, as well as for the workers of all categories once a year.

2.9. Working place of the operator of gas turbine of combined cycle gas turbine is located in the building of the electric department of the 478 MW CCGT

2.10. Servicing zone of the operator of gas turbine of the combined cycle gas turbine is gas turbine of the combined cycle gas turbine with auxiliary equipment (gas pipeline within the area of the CCGT, heater of the gas, air filter, air cooler and etc.).

3. Functions and duties

3.1. Operational servicing of the gas turbine of the combined cycle gas turbine and ensuring its continuous and economic operation.

3.2. At the time of taking over of the shift operator of the gas turbine of combined cycle gas turbine is obliged:

- to get familiarized with the status, circuit and regimen of the operation of the power units, under his operative management, within the scope determined by the corresponding instructions;
- to receive information from the person who is handing over the shift about the equipment, which shall be especially thoroughly observed, for the purposes of preventing the disturbances in the operation, and about the equipment, which is in the reserve and in repair;
- to clarify what kind of works is in process in accordance with the orders and instructions at the areas assigned to him;
- to examine and accept the fire hose, protection means, which are stored at Unit switchboard, operative documentation and documentation of the working place;
- to get familiarized with all records and instructions for the period, passed from the previous period of duty;
- to receive report from the subordinated personnel about takeover of the shift and on shortcomings, revealed at the time of taking over the shift and hand over the report to the head of the shift of CCGT;
- to register the takeover-handover of the shift by the records to the bulletin with his signature and the signature of the person handing over the shift.

Leaving the shift without handover of the shift is PROHIBITED.

3.3. Start up and shut down, testing, pressure testing of the equipment.

3.4. Switching in the heat and electric circuits of the power unit of CCGT.

3.5. Shutdown of the gas and steam turbine generator and switching the supply of the own needs from the main to reserve and vice versa (in emergency situations).

3.6. Control of the indicators of the measurement devises, operation of the auto regulators and alarm system.

3.7. Revealing defects in the operation of the equipment and undertaking measures aimed on their elimination.

3.8. Operator of the gas turbine of the combined cycle gas turbine in case of the emergency situations and liquidation of the emergencies is obliged:

- to compile general picture of what happened in accordance with the indicators of the alarm devises and external signs;

- to eliminate the hazard for the personnel and equipment, up to disconnecting it, is necessity will arise;

- do not interfere to the operation of the automatic devises;

- to ensure normal operation of the main equipment which is in operation; as well as mechanisms of own needs of the CCGT;

- to identify the place, character and volume of the damages and to shut down damaged equipment;

- switched down in the process of emergency equipment shall be started up immediately after clarifying and elimination of its malfunctions, upon the order of the head of the shift of the CCGT workshop;

- on each operation on liquidation of the emergency the operator steam turbine is obliged to report to the head of the shift without waiting for the inquiry.

3.9. Management of the subordinated workers (operator-inspectors).

3.10. Preparing the working place for repair;

3.11. Raising technical knowledge, participation in the training.

3.12. Maintaining cleanness of his working place.

3.13. Rendering first aid to the injured person.

3.14. Free from the duty operator of gas turbine may be used by the instructions on the workshop as operator-inspector after duplication and briefing.

4. Rights

4.1 To give operational orders to the subordinated personnel and check their implementation;

4.2. To stop equipment in case of emergency or fire, threatening the safety of the equipment or life of the personnel.

4.3. Submit to the management of the workshop through the head of the shift of CCGT proposals on stimulation of the subordinated personnel or on imposing penalty to the personnel.

4.4. Suspend the works and remove all persons from the working place, who hinder normal operation of the equipment.

4.5. Do not fulfill the orders, which contradict to the requirements of the rules of technical operation of power plants and networks, rules of safety measures, fire safety rules or threaten the safety of the people or equipment.

4.6. Lodge a complaint in case of disagreement against the other orders, without suspending their fulfillment.

5. Interactions

5.1. Operator gas turbine of combined cycle gas turbine hands over and takes over shift from the shift operator of gas turbines.

5.2. Operator of the gas turbine shall get familiarized with the administrative orders or shall be familiarized through the “Journal of administrative orders of the CCGT workshop”.

5.3. Operational orders, as a rule, shall be received through or from the head of the shift of CCGT workshop.

5.4. Instructions of the laboratory assistants of the Chemical water treatment of the CCGT shall be performed through the operator-inspectors, making corresponding records in the operations bulletin of the CCGT.

5.5. In case of receiving the instructions directly from the director, chief engineer or from other administrative person of the power plant, fulfills it and notifies the head of the shift of CCGT and head of the CCGT workshop.

5.6. In operational telephone conversations with the personnel, first of all pronounces his surname and position, then shall transfer or receive order or message.

5.7. Disagreements which were not mutually solved, may be resolved by the “Commission on labor disputes”.

6. Responsibility

6.1. Operator of gas turbine of the combined cycle gas turbine depending on the level and the character of the violation shall bear disciplinary, administrative and other measures of responsibility for failing to fulfill or improper fulfillment of his functional duties, obligations, which lead to occurrence of the accidents and emergencies, damage of the property of the employer and other unfavorable consequences in accordance with the currently in force legislation of the Republic of Uzbekistan.

Information data

Elaborated by the Combined Cycle Gas Turbine Workshop of the Open joint Stock Company NTPS

Head of the workshop	/signature/	I.H. Abdulloev

Coordinated with

Production and technical division		
Head of the division	/signature/	I.S. Murtazaev
Planning and economic division Head of the division	/signature/	F.R. Hojieva
Service for reliability of the equipment and industrial safety		
Head of the division	/signature/	H. O. Muminov
Legal Advisor	/signature/	T.A. Toylokov
Staff responsible for standardization	/signature/	O.L. Zelenskaya

COMPANY STANDARD

JOB DESCRIPTION OF OPERATOR OF GAS TURBINE OF CCPP UNIT

Open Joint-Stock Company “NTPP”
Navoi

INTRODUCTION

1 DEVELOPED BY CCPP UNIT OF OSJC “NTPP”

2. APPROVED AND ENTRY INTO ACTION BY THE ORDER OF OSCJ "NTPP"
dated _____ No.

3 INTRODUCED FOR THE FIRST TIME

APPROVE

Chief Engineer of OJSC "NTPP"

T. G. Nazarov

COMPANY STANDARD

JOB DESCRIPTION OF OPERATOR OF GAS TURBINE OF CCPP UNIT

Validity period from up to

1 AREA OF USE

This instruction manual is based on the KSt 202-810: 2011 "Regulations on the unit of combined cycle gas turbine plants", the Unified tariff and qualification reference book of jobs and occupations of workers for the purposes of regulating the functions, duties, rights and responsibilities of the operator of gas turbine equipment of the Combined Cycle Combined Cycle Plant (CCGTs) and is mandatory for him.

It must be known by:

- auxiliary equipment operator;
- GT operator;
- Senior operator of the unit of the CCGT;
- Head of unit shift;
- Engineering and technical personnel of CCGT

2 General terms

2.1 For the post of gas turbine equipment operator are accepted, persons with a secondary specialized education who is not younger than 18 years old and who have undergone medical examination.

2.2 Prior to independent work, the gas turbine engine operator must undergo on-job training, according to a special training program. After passing the training, the operator of the gas turbine equipment is subjected to the examination of knowledge by the qualification commission under the chairmanship of the unit manager or his deputy for the operation of equipment, in the amount of necessary knowledge for the operator of gas turbine equipment, in accordance with the Rules for the organization of work with personnel at energy production enterprises registered by the Ministry of Justice of the Republic of Uzbekistan. 04 10 of 2002 No. 1178.

2.3 After passing the examinations, the operator of the gas turbine equipment must undergo duplication at the workplace of the gas turbine equipment

operator, for a period of not less than 12 shifts under the supervision of an experienced gas turbine operator. After the end of the period of duplication and with a positive evaluation of the emergency response, the operator of the gas turbine equipment, by order of the unit, is allowed to work independently.

2.4 The operator of the gas turbine equipment is appointed, moved and dismissed from his position by the order of the director of the enterprise upon presentation of the head of the unit of the CCGT, personnel department in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.5 The operator of the gas turbine equipment is technically and administratively responsible to the head of the unit of the CCGT, the deputy head of the equipment operation department and the leading engineer-technologist, and in the operative operator of the auxiliary equipment, the gas turbine operator of the CCGT unit, the senior operator of the CCGT and the shift supervisor of unit.

2.6 The operator of the gas turbine equipment is the person providing accident-free, reliable and economical operation of the HRSG and its auxiliary equipment.

2.7 The operator of the gas turbine equipment of the CCGT unit should know and be guided in its work:

- Indication of PP - 56;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan of 12.01.1999 No. 140 "On measures to strengthen the performance discipline";
- The Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 as of 30.09.2009;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated August 22, 2009 "On Approval of the Rules for the Use of Electric and Thermal Energy";
- "Regulations on the investigation and recording of accidents and other injuries to workers' health at work" approved by the Cabinet of Ministers on June 06, 1997;
- RH 34-114: 2007 "Regulations on Disciplinary Responsibility of Workers of the Uzbek Energy System";
- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan", Tashkent 2011:

Section I Chapter I § 1-8 § 13-16;

Section II Chapter III § 6 - 9, § 11 paras. 487, 488.

- "Fire safety rules for energy enterprises", Tashkent 2004;
- KSt 202-036-2007 "Rules of internal labor regulations for employees of OJSC" NTPP ";
- "Instructions for first aid to victims in connection with accidents while servicing power equipment";
- "Safety rules for the operation of thermal mechanical equipment of power plants and heating networks", Tashkent 2012, in the following volume:

Chapter I;

Chapter II;

Chapter III §§ 1-4, 5, 6, 9-11,

Chapter IV§§2 (B, D, D),
Appendices 1-8, 10, 15.

- Rules for the design and safe operation of pressure vessels approved by agreement with the Ministry of Justice of the Republic of Uzbekistan, referred to technical documents on December 23, 2011, No. 6-24 / 11-13112 / 6;

- "Rules for the Arrangement and Safe Operation of Steam and Hot Water Pipelines", 1992:

Section 1 subsections 1.1, 1.2;
Section 4 subsection 4.5;
Section 5 subsections 5.1-5.4;
Section 6;
Section 8.

- The current job description.

2.8 In his work, a gas turbine equipment operator is guided by existing operational and production instructions and other directive materials, as well as orders and instructions from the management of the unit, senior operational personnel.

2.9 The operator of the gas turbine equipment of the CCGT unit should know:

- The device, operation and technical characteristics of the main and auxiliary equipment of the CCGT unit;

Production instructions for starting, stopping, operating the gas turbine and eliminating the emergency situation in the gas turbine operation of the CCGT as well as instructions of other units related to the equipment being serviced;

- Thermal diagrams of the serviced equipment of the CCGT unit;

- Purpose and principle of operation of instrumentation, signaling devices, technological protection, automation, interlocks, auto regulators;

- The territorial arrangement of the serviced equipment, pipelines, fittings and structures;

- Technical and economic indicators of the equipment of the CCGT unit and the planned targets for them.

2.10 Testing of knowledge of Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY, job descriptions and production instructions should be carried out:

- primary - before admission to independent work;

- Periodic - on time;

- extraordinary - in case of violation of rules and instructions, at the request of state supervision bodies, State Energy Inspectorate, higher authorities, by decision of a special commission.

Periodic testing of knowledge of Rules of technical operation, RULES OF FIRE SAFETY, production and job descriptions should be carried out at least once every 3 years.

Periodicity of verification of RULES OF SAFETY TECHNIQUE knowledge, rules for the device and safe operation of equipment controlled by the Agency "Sanoategeocontechnazorat" for workers of all categories once a year.

2.11 The service area of the operator of the gas turbine equipment of the CCGT unit is the technological equipment gas turbines with all auxiliary equipment of the CCGT unit, carbon dioxide fire extinguishing equipment, gas turbine and gas valves.

3 Functions and responsibilities

3.1 The operator of the gas turbine equipment is the person responsible for the correct, reliable, economical and trouble-free maintenance of the gas turbine and its auxiliary equipment, for timely and qualitative preparation of workplaces for performing repair work.

3.2 The operator of the gas turbine equipment works according to the approved schedule.

Violation of the schedule of duty is FORBIDDEN.

The change of shift of duty is allowed only with the permission of the unit manager or his deputies, and duty for two shifts in a row is PROHIBITED.

In the event that the changer does not go on duty, the gas turbine equipment operator is obliged to inform the shift supervisor about this, continue the duty until the operator of the gas turbine equipment is called in for duty.

3.3 When starting to work, the operator of gas turbine equipment must take a change from the previous operator of the gas turbine equipment of the CCGT unit, and after the end of the work, take the next shift according to the schedule.

Departure from duty without changing the shift is FORBIDDEN!

3.4. To get acquainted with the state of the scheme and the operating mode of the power plants in its operational control.

3.5 Obtain information from the person taking the shift about the equipment, for which it is necessary to conduct an especially careful observation. In the future, to prevent violations in work and equipment stored in the reserve and repair.

3.6 Find out what works are performed according to orders on the area assigned to it.

3.7 Check and accept tools, materials, key of premises, operational documentation.

3.8 Familiarize yourself with all the records and orders from the time since your previous watch.

3.9 Report directly to the operator on the shift to enter on duty and the deficiencies identified when taking the shift.

3.10 Changing the Shift is FORBIDDEN:

3.10.1 During the liquidation of the accident.

3.10.2 With contaminated equipment.

3.10.3 In the imlpementation of responsible switching operations.

3.10.4 When the duty personnel enter service in a disabled state.

3.11. Change of the shift during the liquidation of the accident, in case of violation of the equipment operation mode in exceptional cases, is allowed with the permission of the unit manager or his deputy for equipment operation, shift supervisor or Station shift head.

3.12 To issue a receipt-delivery shift of a record in the journal or a statement after the signature of the transferee.

3.13 The operator of gas turbine equipment is obliged to exercise constant control over the operating mode of the gas turbine and its auxiliary equipment. Take measures to reduce leaks of oils, cooling water.

3.14 During the patrol of the equipment, the operator of the gas turbine equipment of the CCGT unit conducts monitoring of the operation of the mechanisms, pipelines, the condition of supports and suspensions, the density of the oil systems, the insulation of the pipelines, the condition of the stairs, the areas, the condition of the safety valves, the presence of seals on emergency shutdown mechanisms, at the controls of the oil system valves, fire fighting equipment, lighting; vibration state of the bearings of the gas turbine; temperature of pump bearings and the state of turbine equipment; oil temperature on the drain from the bearings and behind the oil cooler; temperature of electric motors of pumps; condition of stuffing box seals.

Check the safety of tags on the valve; posters on RULES OF SAFETY TECHNIQUEs and locking devices on equipment under repair; the absence of open (not enclosed) openings in floors, ceilings, maintenance areas.

All reported observations should be reported to the operator of gas turbines for recording defects in the log, and take measures to eliminate them.

3.15 Every 2 hours the gas turbine engine operator records the parameters (pressure, temperature, etc.) of the technical state of the gas turbine and its auxiliary equipment.

If the operation mode of the gas turbine and its auxiliary equipment is disrupted and the operation parameters and the Rules for the technical operation of the power plants and networks of the Republic of Uzbekistan do not match, the operator is informed about this and jointly they take measures to eliminate the violation of the regime.

3.16 Monitor the quality of the oil in the oil tank of the gas turbine, in the oil tank of the control system.

3.17 Observe the operation of the water part of the air cooler and fuel gas heater, avoiding temperature deviation from the relevant parameters of the heater and cooler. To do this, it monitors the flow and pressure in the heater, the pressure of air and feed water.

3.18 Maintain the cleanliness of workplaces, clean the spilled oil IMMEDIATELY.

3.19. Control the implementation of repair work on the gas turbine and auxiliary equipment.

3.20 By order, the gas turbine operator performs shift tasks.

3.21 Do not allow unauthorized persons to enter the working area without an escort.

3.22 Take measures to prevent freezing of equipment at negative outdoor temperatures.

3.23 In case of emergency.

3.23.1. An emergency situation means a violation of the normal operation of equipment or individual units, which, if not taken timely, creates a threat to the safety of the equipment, the uninterrupted operation of the station, and the safety of people.

3.23.2. Liquidation of the emergency situation on the unit is carried out under the supervision of the auxiliary equipment operator, the senior operator of the unit and the unit shift supervisor.

3.23.3 When the emergency situation is eliminated, the operator of the boiler shall:

- find out the nature and scale of the emergency damage;
- as soon as possible to identify the cause and take measures to eliminate the accident;
- report the incident to the auxiliary equipment operator; to the senior operator.

3.23.4 During the accident elimination, the gas turbine equipment operator shall take the necessary measures for the successful liquidation of the emergency situation, ensuring the safety of people and the safety of equipment, guided by the Rules of technical operation, job descriptions and production instructions, and in case of an unusual situation, makes decisions independently, depending on the specific situation.

3.23.5 On the measures taken to eliminate the emergency situation, reports to the operator the gas turbines and the senior operator.

3.23.6 If, at the time of the occurrence of the accident, any repairs or tests have to be stopped immediately, people are withdrawn.

In the emergency situation, all other personnel must be removed from the control room and accident areas, except for personnel who have unimpeded access to participate in the elimination of the accident.

3.23.7 If the emergency situation was created during the acceptance-delivery of the shift, all the personnel of the receiving shift are placed at the disposal of the head of the liquidation of the accident.

3.23.8 In case of accidents with people, the gas turbine engine operator is obligated to immediately provide assistance to the victim in accordance with the instructions for providing first aid, inform the shift supervisor of the call for a doctor.

3.24 The operator of the gas turbine equipment participates in the production of the necessary switching in the thermal circuits of the equipment under control, starting and stopping of the main and auxiliary equipment, testing and testing the equipment with the permission and under the supervision of the auxiliary equipment operator and the gas turbine of the CCGT unit. Participates in the preparation of a workplace for repair teams.

3.25 In the implementation of repair work, a gas turbine equipment operator shall:

3.25.1 Ensure the completeness of the fulfillment of the conditions for the production of work.

3.25.2 Perform periodic monitoring of working teams alongside and ordering.

3.25.3 Remove maintenance personnel from work when a violation of the RULES OF SAFETY TECHNIQUE is detected or the workplace is expanded by team members.

3.25.4 To accept workplaces for cleanliness after the termination of repair work.

3.25.5 Take part in the acceptance of equipment from the installation.

3.26 Complies with the operational orders of the higher-level operational staff of the CCGT unit.

3.27 Increases technical knowledge and skills by attending advanced training courses in the study of best practices, participation in training exercises.

3.28 Participates in events, shows and competitions held in the CCGT unit.

3.29 Timely on schedule, take the next exams according to the rules and in the amounts specified in paragraph 2.7.

3.30 It is forbidden to engage in strangers during working hours, not related to the performance of official duties, affairs.

4 Rights

4.1 Stop the equipment in the event of an accident or fire that threatens the safety of the equipment or the life of the personnel.

4.2 In case of receiving an order directly from the director, chief engineer or other administrative person of the station, it executes it and informs the operator of the auxiliary equipment of the CCGT unit.

4.3 Do not comply with orders that are contrary to the requirements of the Rules for the Technical Operation of Electric Power Stations and Networks, Safety Regulations, Fire Safety Rules or pose a threat to the safety of people or the safety of equipment.

4.4 In case of disagreement with the received order, it will appeal against it to the higher management, not suspending its execution, if this does not threaten damage to equipment and people's lives.

4.5 Remove unauthorized persons from the unit if they do not have an accompanying person.

5 Relationships

5.1 With administrative orders, the operator of gas turbine equipment should be acquainted or should be acquainted with the "Administrative order book of the unit CCGT CC ".

5.2 In operational telephone conversations with personnel, first of all, he names his position and surname, and then receives an order (message) or himself makes a communication.

Having executed the received order, the operator of the gas-turbine equipment is obliged to report this to the person who issued the order.

5.3 The operator of the gas turbine equipment, during his duty, performs all administrative and technical orders of the unit manager of the CCGT and his deputy for the operation of equipment, the leading process engineer and operational orders of the auxiliary equipment operator, the senior operator of the unit, and the Shift head. Upon receipt of the instruction (team) it is obliged to repeat it, execute and report on its execution to the operator.

5.4 If the operator of the gas turbine equipment does not agree with the order received, he should notify the person who issued the orders, but after receiving the confirmation of the order, it fulfills it, if this does not threaten the safety of the personnel or the safety of the equipment.

5.5 In case of receiving an order directly from the head of the unit, his assistant in charge of operation, the leading engineer-technologist brings to the attention of the GT operator and carries out this order.

5.6 Disagreements that have not found a common solution can be resolved by the "Labor Disputes Commission".

6 Responsibility

6.1 The operator of the gas turbine equipment shall be personally responsible for:

6.1.1 Untimely and substandard performance of the assigned functions, not the use of the granted rights;

6.1.2 Failure to comply with job description;

6.1.3. For their incorrect actions leading to an accident, damage to equipment, accidents, as well as for violation of the job description and production instruction, rules for Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY, instructions and orders of the unit and power plant management, internal labor regulations, late delivery examinations.

6.1.4 Cases of fire resulting from its improper actions,

6.1.5 Preservation of serviced equipment and devices, including the safety of fire fighting equipment.

6.2 The operator of the gas turbine equipment of the CCGT unit, depending on the degree and nature of the violations, is involved in disciplinary, administrative and other measures of liability in accordance with the current legislation of the Republic of Uzbekistan.

Informational data

Developed by CCGT Unit of OJSC "NTPP"
Head of unit I.Kh.Abdulloev
Agreed
Production and Technical Department
Head of the department T.H.Soliev
Planning and Economic Department
Head of the Department E.E.Davov
Service reliability of machinery and industrial safety
Head of the service Kh.O. Muminov
Senior Inspector for Labor Protection and Technology security T.K.Jumanazarov
Legal adviser Sh.Y.Nazarov
Responsible for standardization O.L. Zelenskaya

COMPANY STANDARD

JOB DESCRIPTION OF PATROL-OPERATOR OF BOILER EQUIPMENT OF CCPP UNIT

Open Joint-Stock Company “NTPP”
Navoi

INTRODUCTION

1 DEVELOPED BY CCPP UNIT OF OJSC “NTPP”

2. APPROVED AND ENTRY INTO ACTION BY THE ORDER OF OJSC "NTPP"
dated _____ No.

3 INTRODUCED FOR THE FIRST TIME

APPROVE

Chief Engineer of OJSC "NTPP"

T. G. Nazarov

COMPANY STANDARD

JOB DESCRIPTION OF PATROL-OPERATOR OF BOILER EQUIPMENT OF CCPP UNIT

Validity period from up to

1 AREA OF USE

This instruction manual is based on the KSt 202-810: 2011 "Regulations on the unit of combined cycle steam and gas turbine plants", the Unified tariff and qualification reference book of jobs and occupations of workers, in order to regulate the functions, duties, rights and responsibilities of the patrol-operator of the boiler equipment of the combined cycle steam and gas turbine plants (CCGT) and is mandatory for him.

It must be known by:
- The patrol-operator of the boiler equipment;
- auxiliary equipment operator;
- GT operator;
- Senior operator of the unit of the CCGT;
- Head of unit shift;
- Engineering and technical personnel of CCGT unit.

2 GENERAL TERMS

2.1 For the post of patrol-operator of the boiler equipment are accepted persons having a secondary special education, not younger than 18 years old, who have undergone medical examination.

2.2 Prior to the assignment to independent work, the patrol-operator of the boiler equipment must undergo industrial training according to a special training program. After passing the training, patrol-operator of the boiler equipment undergoes a knowledge check by the qualification commission, under the chairmanship of the unit manager or his deputy, in the amount of necessary knowledge for the patrol-operator of the boiler equipment, in accordance with the Rules for the organization of work with personnel at energy production enterprises registered by the Ministry of Justice of the Republic of Uzbekistan from 04.10.2002 of the year №1178.

2.3 After taking the exams, the patrol-operator of the boiler equipment must undergo duplication at the workplace of the patrol-operator of the boiler equipment, for a period of not less than 12 shifts under the supervision of an experienced patrol-operator of the boiler equipment. After the end of the period of duplication and with a positive assessment of the emergency response training, the operator of the boiler equipment, an order for the unit, is allowed to work independently.

2.4 The operator of the boiler equipment is appointed, moved and dismissed from the position by the order of the director of the enterprise upon presentation of the unit manager of the CCGT, the personnel department in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.5 The operator of the boiler equipment in production and technical and administrative respects is subordinate to the head of the CCGT unit, the deputy head of the equipment operation department and the leading process engineer, and in the operational - to the auxiliary equipment operator, the GT unit operator of the CCGT, the senior operator of the CCGT and the head of the shift unit of the CCGT.

2.6 The patrol-operator of the boiler equipment is the person providing accident-free, reliable and economical operation of the waste heat boiler and its auxiliary equipment.

2.7 The patrol-operator of the boiler equipment of the CCGT unit should know and be guided in its work:

- Indication of PP - 56;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan of 12.01.1999 No. 140 "On measures to strengthen the performance discipline";
- The Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 of 30.09.2009;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 of August 22, 2009 "On Approval of the Rules for the Use of Electric and Thermal Energy";
- "Regulations on the investigation and recording of accidents and other injuries to workers' health at work" approved by the Cabinet of Ministers on June 06, 1997;
- RH 34-114: 2007 "Regulations on Disciplinary Responsibility of Workers of the Uzbek Energy System";
- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan", Tashkent 2011:

Section I Chapter I § 1-8 § 13-16;

Section II Chapter III § 3; 6; 8 (paras. 408,409-418); § 9, 11 paras. 487, 488.

- "Fire safety rules for energy enterprises", Tashkent 2004;
- KSt 202-036: 2007 "Rules of internal labor regulations for employees of OJSC" NTES ";
- "Instructions for first aid to victims in connection with accidents while servicing power equipment";

- "Safety rules for the operation of thermal mechanical equipment of power plants and heating networks", Tashkent 2012, in the following volume:

Chapter I;

Chapter II;

Chapter III §§ 1-4, 5, 6, 9-1;

Chapter IV §§2 (B, D, D),

Appendices 1-8, 10, 15.

- Rules for the design and safe operation of pressure vessels approved by agreement with the Ministry of Justice of the Republic of Uzbekistan, referred to technical documents on December 23, 2011, No. 6-24 / 11-13112 / 6;

- "Rules for the Arrangement and Safe Operation of Steam and Hot Water Pipelines", 1992:

Section 1 subsections 1.1, 1.2;

Section 4 subsection 4.5;

Section 5 subsections 5.1-5.4;

Section 6;

Section 8.

- The current job description.

2.8 The patrol-operator of the boiler equipment of the CCGT unit should know:

- The device, operation and technical characteristics of the main and auxiliary equipment of the CCGT unit; production instructions for starting, stopping, operating boiler equipment and eliminating the emergency situation in the operation of boiler equipment CCGT, as well as instructions of other units related to the equipment being serviced;

- Thermal diagrams of the serviced equipment of the CCGT unit;

- Purpose and principle of operation of instrumentation, signaling devices, technological protection, automation, interlocks, auto regulators;

- The territorial arrangement of the serviced equipment, pipelines, fittings and structures;

- Technical and economic indicators of the equipment of the CCGT unit and the planned targets for them.

2.9 Testing the knowledge of Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY, job descriptions and production instructions should be carried out:

- primary - before admission to independent work;

- Periodic - on time;

- extraordinary - in case of violation of rules and instructions, at the request of state supervision bodies, State Energy Inspectorate, higher authorities, by decision of a special commission.

Periodic testing of knowledge of Rules of technical operation, RULES OF FIRE SAFETY, production and job descriptions should be carried out at least once every 3 years.

Periodicity of verification of RULES OF SAFETY TECHNIQUE knowledge, rules for the device and safe operation of equipment controlled by the Agency "Sanoategeocontechnazorat" for workers of all categories once a year.

2.10 The service area of the patrol-operator of the boiler equipment of the CCGT unit is the technological equipment of the HRSG with all auxiliary equipment of the CCGT unit, gas equipment, burners of the HRSG within the main building.

3 Functions and responsibilities

3.1 The operator of the boiler equipment is the person responsible for the correct, reliable, economical and trouble-free maintenance of the boiler and its auxiliary equipment; for timely and qualitative preparation of workplaces for performance of repair work.

3.2 The patrol-operator of the boiler equipment works according to the approved schedule.

Violation of the schedule of duty is FORBIDDEN.

The change of the shift of duty is allowed only with the permission of the unit manager or his deputies, and duty for two shifts in a row is PROHIBITED.

In the event that the shiftman is not on duty, the patrol-operator of the boiler equipment must inform the Shift head about this, continue on duty until the operator arrives on the boiler equipment, called for on duty.

3.3 In its work, the operator of the boiler equipment is guided by existing operational and production instructions and other directive materials, as well as orders and instructions from the management of the unit, senior operational personnel.

3.4 Getting started, the operator of the boiler equipment should:

3.4.1. Take a shift from the previous patrol-operator of the boiler equipment of the CCGT unit, and after the end of the work, change the next one according to the schedule;

Departure from duty without changing the shift is FORBIDDEN!

3.4.2. Familiarize yourself with the state of the scheme and the operating mode of the power plants in its operational management;

3.4.3 Obtain information from the person taking the shift about the equipment, for which it is necessary to carry out a very careful monitoring;

In the future, to prevent violations in work and equipment that is in reserve and repair;

3.4.4 Find out what works are performed according to orders and orders in the area assigned to it;

3.4.5 Check and accept tools, materials, key of premises, operational documentation;

3.4.6. To get acquainted with all the records and orders during the past from their previous watch;

3.4.7 Report directly to the operator on the shift of attendance on duty and the shortcomings revealed when taking the shift.

3.5 Delivery of the shift is FORBIDDEN:

3.5.1 During the liquidation of the accident;

3.5.2 In case of contaminated equipment;

3.5.3 In the implementation of responsible switching operations.

3.6 When entering duty personnel in a disabled state, the change of the shift is FORBIDDEN.

3.7 Delivery of the shift during the liquidation of the accident, in case of violation of the equipment operation mode, in exceptional cases, is allowed with the permission of the unit manager or his deputies, the unit shift supervisor or the Station shift supervisor.

3.8 Make a receipt-delivery change of the shift in the journal or the statement after the signature of the transferee.

3.9 The patrol-operator of the boiler equipment is obliged to exercise constant control over the operating mode of the HRSG and its auxiliary equipment; take measures to reduce soaring, leakage of condensate, oils.

3.10 During the patrols of the equipment, the patrol-operator of the boiler equipment of the CCGT unit conducts control of the operation of mechanisms, pipelines, the condition of supports and suspensions, the density of oil systems of feed pumps, the insulation of pipelines, the condition of ladders, sites, the condition of safety valves, the presence of seals on the emergency release buttons , on loads of safety valves, on the controls of the oil system valves, fire-fighting equipment, lighting; vibration state of pump bearings; temperature of pump bearings and condition of boiler equipment; oil temperature on the drain from the bearings and behind the oil cooler; temperature of electric motors of pumps; condition of stuffing box seals; safety of tags on the valve; posters on RULES OF SAFETY TECHNIQUEs and locking devices on equipment under repair; the absence of open (not enclosed) openings in floors, ceilings, maintenance areas.

3.11 Report all the observations revealed to the operator of the auxiliary equipment for writing to the defects log, and take measures to eliminate them.

3.12 Every 2 hours, the operator of the boiler equipment records the parameters (pressure, temperature, etc.) of the technical condition of the HRSG.

3.13 If the operation mode of the HRSG, the violation of the chemical regime of the boiler equipment and the mismatch of the operating parameters and the Rules for the technical operation of the power plants and networks of the Republic of Uzbekistan, inform the operator and measures are jointly taken to eliminate the violation of the regime.

3.14 It monitors the quality of oil in the oil tanks of feed pumps.

3.15. It monitors the operation of the water part of the air cooler and the fuel gas heater, preventing temperature deviation from the relevant parameters of the heater and cooler.

To do this, it monitors the flow and pressure in the heater, the pressure of the feed water.

3.16 Maintains clean jobs, spilled oil removes immediately

3.17 Monitor the production of repair work on the boiler and auxiliary equipment.

3.18 On the instructions of the auxiliary equipment operator, performs shift tasks.

3.19 Does not allow unauthorized persons to enter the area of the operating equipment without an escort.

3.20 Take measures to prevent freezing of equipment at negative outdoor temperatures.

3.21 The operator of the boiler equipment participates in the manufacture of the necessary switching in the thermal circuits of the equipment under control, the start-up and shutdown of the main and auxiliary equipment, crimping, testing the equipment with the permission and under the supervision of the auxiliary equipment operator and the unit's unit. Participates in the preparation of a workplace for repair teams.

3.22 In case of emergency:

3.22.1. An emergency situation means a violation of the normal operation of equipment or individual units, which, if not taken timely, creates a threat to the safety of the equipment, the uninterrupted operation of the station, and the safety of people.

3.22.2 The emergency situation on the unit is eliminated under the supervision of the auxiliary equipment operator, the senior operator of the unit and the shift supervisor.

3.22.3 In the event of liquidation of an emergency situation, the patrol-operator of the boiler equipment shall:

- find out the nature and scale of the emergency damage;
- as soon as possible to identify the cause and take measures to eliminate the accident;
- report the incident to the auxiliary equipment operator; to the senior operator.

3.22.4 During the elimination of the accident, the patrol-operator of the boiler equipment takes the necessary measures to successfully eliminate the emergency situation, ensuring the safety of people and the safety of equipment, guided by Rules of technical operation, official and production instructions, and in case of an unusual situation, makes decisions independently, depending on the specific situation.

3.22.5 On the measures taken to eliminate the emergency situation, reports to the auxiliary equipment operator and the senior operator.

3.22.6 If, at the time of the occurrence of the accident, any repairs or tests have been carried out, they must be IMMEDIATELY DISCONTENT, people are withdrawn.

In an emergency situation, all other personnel should be removed from the control room and accident areas, except for personnel who have unimpeded access to participate in the elimination of the accident.

3.22.7 If the emergency situation was created during the acceptance-delivery of the shift, all the personnel of the receiving shift are placed at the disposal of the head of the liquidation of the accident.

3.22.8 In case of accidents, the patrol-operator of the boiler equipment must immediately provide assistance to the victim in accordance with the instructions for first aid, inform the shift supervisor of the call for a doctor.

3.23 In the production of repair work, the patrol-operator of the boiler equipment shall:

3.23.1 Ensure the fulfillment of the conditions for the production of work.

3.23.2 Perform periodic monitoring of working teams alongside and ordering.

3.23.3 Remove the repair personnel from work when a violation of the RULES OF SAFETY TECHNIQUE is detected or the workplace is expanded by the team members.

3.23.4 To accept workplaces for cleanliness after the termination of repair work.

3.23.5 Take part in the acceptance of equipment from the installation.

3.24 Complies with the operational orders of the higher-level operational staff of the CCGT unit.

3.25 Increases technical knowledge and skills by attending advanced training courses in the study of best practices, participation in training exercises.

3.26 Participates in events, shows and competitions held in the CCGT unit.

3.27 Timely on schedule, take the next exams in accordance with the rules and in the amounts specified in paragraph 2.7.

3.28 It is forbidden to engage in strangers during working hours, not related to the performance of official duties, affairs.

4 Rights

4.1 Stop the equipment in the event of an accident or fire that threatens the safety of the equipment or the life of the personnel.

4.2 In case of receiving an order directly from the director, chief engineer or other administrative person of the station, it executes it and informs the operator of the auxiliary equipment of the CCGT unit.

4.3 Do not comply with orders that are contrary to the requirements of the Rules for the Technical Operation of Electric Power Stations and Networks, Safety Regulations, Fire Safety Rules or pose a threat to the safety of people or the safety of equipment.

4.4 In case of disagreement with the received order, it has the right to appeal against it to the higher management, without suspending its execution, if this does not threaten damage to equipment and people's lives.

4.5 Remove unauthorized persons from the unit if they do not have an accompanying person.

5 Relationships

5.1 With instructions of the administrative order, the patrol-operator of the boiler equipment must be acquainted or should be acquainted with the "Journal of administrative orders of the unit of the CCGT".

5.2 In operational telephone conversations with personnel, first of all, he names his position and surname, and then receives an order (message) or he himself makes a message.

Having executed the received order, the patrol-operator of the boiler equipment is obliged to report this to the person who gave the order.

5.3 The patrol-operator of the boiler equipment during his duty performs all the administrative and technical orders of the unit manager of the CCGT and his deputy for operation, the leading process engineer and the operational orders of the auxiliary equipment operator, the senior operator of the unit, the Shift head.

Upon receipt of the instruction (team) it is obliged to repeat it, execute and report on its execution to the operator.

5.4 In case of disagreement with the received instruction, the patrol-operator of the boiler equipment must notify the person who issued the orders, but after receiving the confirmation of the order, it fulfills it, if this does not threaten the safety of the personnel or the safety of the equipment.

5.5 In the event that an order is received directly from the unit manager, his operation assistant, the lead process engineer informs the operator of the auxiliary equipment and executes this order.

5.6 Disagreements that have not found a common solution can be resolved by the "Labor Disputes Commission".

6 Responsibility

6.1 The patrol-operator of the boiler equipment shall be personally responsible for:

6.1.1 Untimely and substandard performance of the assigned functions, not the use of the granted rights;

6.1.2 Failure to comply with job description;

6.1.3. For their incorrect actions leading to an accident, damage to equipment, accidents, as well as for violation of the job description and production instruction, rules for Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY instructions and instructions of the unit and power plant management, internal labor regulations, late exams .

6.1.4 Cases of fire resulting from its improper actions,

6.1.5 Preservation of serviced equipment and devices, including the safety of fire fighting equipment.

6.2 The patrol-operator of the boiler equipment of the CCGT unit, depending on the degree and nature of the violations, is brought to disciplinary,

administrative and other measures of responsibility in accordance with the current legislation of the Republic of Uzbekistan.

Informational data

Developed by CCGT unit of OJSC “NTPP”
Head of unit I.Kh.Abdulloev
Agreed
Production and Technical Department
Head of the department T.H.Soliev
Planning and Economic Department
Head of the Department E.E.Davov
Service reliability of machinery and industrial safety
Head of the service Kh.O. Muminov
Senior Inspector for Labor Protection and Technology security T.K. Dzhumanazarov
Legal adviser Sh.Y.Nazarov
Responsible for standardization O.L. Zelenskaya

COMPANY STANDARD

JOB DESCRIPTION OF THE OPERATOR OF AUXILLARY EQUIPMENT (BOP OPERATOR) OF CCPP UNIT

STOCK COMPANY SC « NTPP »
NAVOI

Introduction

1 DEVELOPED AND ENTERED IN BY The CCPP unit of JSC " NTPP "

2 APPROVED AND RUN IN by the order SC « NTPP » №

3 INSTEAD OF KSt 202-831:2012

Approved

Chief engineer SC « NTPP »

T. G. Nazarov

COMPANY STANDARD

JOB DESCRIPTION OF THE OPERATOR OF AUXILLARY EQUIPMENT (BOP OPERATOR) OF CCPP UNIT

Term of validity from till

1 Application area

This manual is developed based on KSt 202-810: 2011 "Regulations on the unit of combined cycle gas turbine plants", the Unified tariff and qualification reference book of jobs and occupations of workers in order to regulate the functions, duties, rights and responsibilities of the operator for the auxiliary equipment of the combined cycle gas turbine plants (CCGTs) and is mandatory for him. Manual should be known by: the shift supervisor of the CCGT, the head of the CCGT and his deputies, the engineers of the CCGT, the head of the shift station.

2 General terms

2.1 The operator of the CCGT auxiliary equipment is a person providing reliable, safe and economical operation of a combined cycle plant with a capacity of 478

MW with all its auxiliary equipment in accordance with Rules of technical operation, instructions and dispatch schedule of loads.

2.2 For the position of an operator for auxiliary equipment of steam and gas turbine installations of a combined cycle are accepted, persons who are not younger than 18 years of age, have secondary specialized education, have undergone medical examination, are specially trained, systematically instructed, passed the examination of the qualification commission, have an identity certificate, trainee and duplication in accordance with the Rules of the organization of work with personnel at enterprises of power production, registered by MINof Just. of RUz from 04.10.2002 year № 1178.

2.3 The operator of the auxiliary equipment of combined cycle gas turbine plants is appointed, moved and dismissed from the position by the director of the enterprise upon presentation of the unit manager of the CCGT, the personnel department in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.4 The operator of the auxiliary equipment of combined cycle gas turbine plants in production, technical and administrative terms is subordinate to the head of the CCGT unit, the deputy head of the maintenance department and the lead engineer of the TME, in operational terms to the head of the shift station, the shift head and the senior patrol operator of the CCGT unit.

The operator of the auxiliary equipment of combined cycle gas turbine plants is promptly subordinated to gas turbine equipment operators and patrol-operators of turbine and boiler equipment.

2.5Operator for auxiliary equipment should know and be guided in his work:

- Indication of PP - 56;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan from 12.01.1999 № 140 "On measures to strengthen the performance discipline";

- The Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 from 30.09.2009;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated August 22, 2009 "On Approval of the Rules for the Use of Electric and Thermal Energy";

- "Rules for the Arrangement and Safe Operation of Vessels Working Under Pressure", Tashkent 2011;

- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan », Tashkent 2011.

Section I Chapter 1;

Section II Chapter 1;

Chapter 2.§ 4;

Chapter 3. § 1, 3, 4, 5, 7, 8, 9, 12, 13;

Chapter 5.

- "Safety rules for the operation of thermal mechanical equipment of a power plant of heating networks" in the following volume:

Section 1;

Section 2;

Section 3; subsection 3.1D, E;

subsection 3.2B, G, D;

subsection 3.3 A;

subsection 3.6;

subsection 3.7;

subsection 3.8;

Section 4

Appendices 1-12.

- "Safety rules in the gas economy of the Republic Uzbekistan ", Tashkent - 2004, in the following volume:

Chapter I;

Chapter I I§ 2;

Chapter I I I § 1, 2, 3, 4, 7, 8;

Chapter IV;

Applications1,31.

- "Rules of the device and safe operation of steam and hot water pipelines", 2010;

- "Rules for the Arrangement and Safe Operation of Steam and Hot Water Boilers", Tashkent 1997;

- "Fire safety rules for energy enterprises ", Tashkent 2013;

- "Explosion safety rules when using fuel oil and natural gas in boiler plants".

- The present job description and instructions for patrol-operators of boiler and turbine equipment.

- KSt 202-036: 2007 "Rules of internal labor regulations for employees of OJSC" NTPP ";

- "Instructions for first aid to victims in connection with accidents in the service of power equipment"

- "Instructions for investigating and recording technological irregularities in the operation of power plants, networks and power systems".

- "Instructions for the conservation of high-pressure drum boilers in the mode of their shutdown".

- "Safety rules when working with tools and devices";

Section 3;

Section 4;

Section 5.

- KSt 202-032: 2008 "Rules for working with low-sulfur gas."

- RH 34-400: 2008 "Regulations on the Occupational Safety Management System in the Energy Industry".

- Typical instructions for the operation of BROU, ROU.

2.6 The operator of auxiliary equipment of CCGT should know:

2.6.1. The device, the principle of operation and technical characteristics of the HRSG, gas and steam turbines, generators, transformers, gas boosting compressor plant, cooling tower and auxiliary equipment.

2.6.2 Thermal protection and their action.

2.6.3 Thermal schemes and technological process for the production of thermal and electric power.

2.6.4 Load modes of CCGTs.

2.6.5 Principal electrical diagram of generators and auxiliary needs of CCGT Unit.

2.6.6 Purpose and principle of operation of the control-measuring devices, signaling devices, automation, interlocks and regulators.

2.6.7. The quality standards for steam, water, fuel, oils.

2.6.8 Location of all equipment pipelines, fittings and structures.

2.6.9 Technical and economic indicators of the CCGT and planned targets for them.

2.6.10 Fundamentals of heat engineering, electrical engineering, mechanics and water treatment.

2.7 The verification of the knowledge of Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY, job descriptions and production instructions should be carried out:

- primary - before admission to independent work;

- Periodic - on time;

- an extraordinary one - in case of violation of the rules and instructions, at the request of the state supervision bodies, the State Inspectorate for the operation of power plants and networks and higher authorities, the resolution of the special commission.

Periodic testing of knowledge of Rules of technical operation, RULES OF FIRE SAFETY, production and job descriptions should be carried out at least once every 3 years.

The periodicity of checking the knowledge of RULES OF SAFETY TECHNIQUE, the rules of the device and the safe operation of equipment controlled by the SI "Sanoatkontekhnazorat" is as follows: for persons directly connected with the management and maintenance of power plants, as well as for workers of all categories, once a year.

2.8 Operator's auxiliary equipment workstation the CCGT is located in the control building of the CCGT-478MW.

2.9 The operator's service area for the auxiliary equipment of the CCGT is the thermal mechanical equipment included in the system of the CCGT unit of the CCGT (HRSG, dosing unit with chemical reagents of the steam-water cycle, the circulating cooling tower with pumps and with the dosing unit, oily waste water treatment plants, boiler room with CCGT pumps) .

3 Functions and responsibilities

3.1 Operational maintenance of the CCGT unit and ensuring its uninterrupted and economical operation.

3.2 Upon acceptance of the shift, the operator of auxiliary equipment of CCGT must:

- get acquainted with the status, the scheme and the operating mode of the power plants that are in its operational control, in the volume defined by appropriate instructions;

- to receive information from the shifting about the equipment, for which it is necessary to conduct especially careful monitoring, for prevention of violations in work, and equipment located in reserve in repair;

- to find out what works are performed according to the orders and orders in the area assigned to it;

- check and accept fire hoses, protective equipment, which are stored in the control room, operational documentation and workplace documentation;

- read all the records and orders for the time, past from his previous watch;

- accept the report from the subordinate staff of the CCGT on entering duty and on the shortcomings revealed when taking the shift for the shift supervisor;

- formalize the acceptance and delivery of the shift with a record in the statement for its signature and the signature of the transferor.

Departure from duty without changing the shift is FORBIDDEN.

3.3 Starting and stopping, testing, crimping equipment.

3.4 Switching in thermal and electrical circuits of the CCGT unit.

3.5. Shutdown of gas and steam turbine generator and switching of auxiliary power supply from main to standby and vice versa (in emergency situations).

3.6 Monitoring of the reading of measuring instruments, work autoregulators and alarms.

3.7 Troubleshooting and Acceptance of Equipment measures to eliminate them.

3.8 The operator of the auxiliary equipment of the CCGT, in the event of emergency situations and the elimination of an accident, must:

- to draw up a general idea of what happened according to the signaling devices and external signs;

- eliminate the danger to personnel and equipment, up to the disconnection of the latter, if this becomes necessary;

- do not interfere with the operation of automatic devices;

- ensure the normal operation of the main equipment remaining in the work, as well as the mechanisms of its own needs CCGT;

- find out the place, nature and extent of damage and disconnect damaged equipment;

- equipment disconnected during the accident should be put into operation immediately after finding out and eliminating its malfunctions, by order of the shift manager of the CCGT unit;

- for each operation for the elimination of accidents, the auxiliary equipment operator must report to the shift supervisor or the senior operator without waiting for a survey.

3.9 Management of subordinate workers (patrol-operators).

3.10 Preparation of the workplace for repair.

3.11 Increase of technical knowledge, participation in technical training.

3.12 Keep his workplace clean.

3.13 Provision of first aid to the victim.

3.14 The operator-free operator's watch can be used as a machine operator by the order of the unit after duplication and briefing.

4 Rights

4.1 Give operational orders to a subordinate personnel and demand their execution.

4.2 Stop the equipment in the event of an accident or fire, threatening the safety of equipment or life of staff.

4.3 Represent the management of the unit through the head of the CCGT shift of the offer for the promotion of subordinate personnel or for imposing penalties on him.

4.4. Suspend work and remove from its workplace all persons who impede the normal operation of the equipment.

4.5 Do not follow orders that are contrary to the requirements of Rules of technical operation, RULES OF SAFETY TECHNIQUE or pose a threat to the safety of people or the safety of equipment.

4.6 Appeal in case of disagreement other orders, without suspending their execution.

5 Relationships

5.1 The operator of the auxiliary equipment of the CCGT delivers and receives a shift from the replacement operator for auxiliary equipment.

5.2. With the administrative order, the operator of the auxiliary equipment of the CCGT should familiarize himself or be acquainted with the "Journal of Administrative Orders of the CCGT Unit".

5.3 Operational orders should, as a rule, to enter through or from the shift supervisor and the senior operator of the power unit of the CCGT.

5.4. Instructions of laboratory assistants of the Chemical water treatment of CCGT performs by means of patrol-operators, making corresponding entries in the operative list of the CCGT.

5.5 In case of receiving an order directly from the director, chief engineer or from another administrative person of the station, he executes it and informs the shift supervisor of the CCGT and the unit manager of the CCGT.

5.6 In the course of operational telephone conversations with personnel, first of all he names his office, and then transmits or receives an order or a message.

5.7 Disagreements that have not found a common solution may be resolved by the "Labor Disputes Commission".

6 Responsibility

6.1 The operator of auxiliary equipment of combined cycle gas turbine plants, depending on the degree and nature of the violations, is brought to disciplinary, administrative and other measures of responsibility for failure to perform or improperly performing their functional duties, resulting in accidents and accidents, damage to the employer's property and other adverse consequences , in accordance with the current legislation of the Republic of Uzbekistan an.

Informational data

Designed by the CCGT unit of JSC "NTPP"

Head of unit I. Kh. Abdulloev

Agreed

Production and Technical Department

Head of the department T.K. Soliev

Planning and Economic Department

Head of the department E. E. Davov

Service reliability of machinery and industrial safety

Head of the service Kh. O. Muminov

The Legal Advisor Sh. Nazarov

Responsible for Standardization N.S. Nurullaeva

STANDARD OF THE ENTERPRISE

JOB INSTRUCTION
OF THE OPERATOR OF STEAM TURBINE OF THE WORKSHOP
OF THE COMBINED CYCLE GAS TURBINES

Open Joint Stock Company NTPS
Navoi

Foreword

1. ELABORATED AND SUBMITTED by the Workshop of the Combined Cycle Gas Turbines of the Open Joint Stock Company NTPS

2. APPROVED AND ENFORCED by the Order of the Open JSC NTPS date _____ No. _____

3. INTRODUCED FOR THE FIRST TIME

KSt 202-829:2012

Approved
Chief Engineer of Open JSC NTPS

/signature/ T.G. Nazarov

STANDARD OF THE ENTERPRISE

JOB INSTRUCTION
OF THE OPERATOR OF STEAM TURBINE OF THE WORKSHOP
OF THE COMBINED CYCLE GAS TURBINES

Validity period from 01.07.2012 to 01.07.2015

1. Field of application

The present Instruction is elaborated on the basis of the KSt 202-810:2011 “Regulations on the workshop of the combined cycle gas turbines”, Unified tariff-qualification reference book of the works and professions of the workers, for the purposes of regulation of the functions, obligations, rights and responsibilities of the operator of steam turbine of the workshop of combined cycle gas turbines (CCGT) and is obligatory for him.

2. General Provisions

2.1. Persons not younger than 18 years, with general secondary education, who have passed medical examination, specially trained, systematically briefed, passed examination of the qualification commission, who have certificates and passed training and duplication in accordance with the Rules of organization of the work with the personnel at the enterprises of the energy generation, registered by the Ministry of Justice of the Republic of Uzbekistan dated 04.10.2002 No. 1178 are accepted to the position of the operator of steam turbines of the combined cycle gas turbine.

2.2. Operator of steam turbines of the CCGT is assigned to his position, transferred to other position and dismissed from the position by the order of the Director of the enterprise upon proposal of the Head of the CCGT workshop, Human Resource Department in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.3. Operator of steam turbines of the CCGT from the production-technical and administrative point of view is subordinated to the Head of the CCGT workshop and deputy head of the workshop on operation of equipment, while in the operational aspects he is subordinated to head of the shift of the CCGT workshop.

Operator of steam turbines of the CCGT has under his operative subordination operators-inspectors on gas turbine and boiler equipment.

2.4. Operator of steam turbines of the CCGT shall be aware and follow in performing his duties the followings:

- Instruction RR-56;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated 12.01.1999 No. 140 “On the measures aimed on strengthening the operational discipline”
- Law of the Republic of Uzbekistan “On Electric power” No. 225 dated 30.09.2009;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated 22.08.2009 “On Approval of the rules of using the electric and heat power”;
- “Rules of the Installation and safe operation of the vessels operating under pressure”: Tashkent 1997;
- “Rules of design and safe operation of the pipelines of steam and hot water” 1992;
- “Rules of design and safe operation of the steam and water heating boilers”, Tashkent 1997;
- “Rules on fire safety for the power enterprises”, Tashkent 2004;
- “Rules of explosion safety in using the mazut and natural gas in the boiler units”.
- the present Job Instruction;
- KSt 202-032:2008 “Rules of operation with the low sulfur gas”.

“Rules of technical operation of the power plants and networks of the Republic of Uzbekistan”, Tashkent 2005, in the following scope:

Section I	Chapter 1;	
Section II	Chapter 1;	
	Chapter 2.	§4;
	Chapter 3.	§1, 3, 4, 5, 7, 8, 9, 12, 13;
	Chapter 5.	

- “Rules of Safety measures in operation of the heat mechanics equipment of the power stations and heating networks” 1985, in the following scope:

Section 1;	
Section 2;	
Section 3	Subsection 3.1 E, F;
	Subsection 3.2 C, D, E;
	Subsection 3.3 A;
	Subsection 3.6, 3.7, 3.8;
Section 4;	
Annexes 1-12;	

- Rules of safety in the gas sector of the Republic of Uzbekistan, Tashkent – 2004, in the following scope:

Chapter I;
Chapter II §2;
Chapter III §1, 2, 3, 4, 7, 8;
Chapter IV;
- Annexes 1, 31.

- KSt 202-036-2007 “Rules of internal labor policy of the workers of the Open Joint Stock Company “NTPS””;

- “Rules of safety in working with the instruments and devises”;

Chapter 3, 4, 5

- “Instructions on rendering first aid to the injured persons in connection with the accidents in the process of servicing the energy equipment”;

- “Instructions on investigation and accounting of the technological violations in the operation of the power stations, networks ad power grids”

- “Instructions on conservation of the drum boilers of high pressure in the regimen of their shutdown”.

- RH 34-400:2008 “Regulations on the system of management of the labor safety in the power sector”.

- Model instructions on operation of fast-response pressure-reducing and desuperheating station, pressure-reducing and desuperheating station.

2.6. Operator of steam turbines of the CCGT shall know followings:

2.6.1. Design and principle of operation and technical specifications of the boiler utilizer, gas and steam turbines, generators, transformers, gas boosting compressor station, cooling tower and balance of plant.

2.6.2. Heat protections and their operation.

2.6.3. Heat circuits and technological process of production of heat and electric power.

2.6.4. Regimen of loads of the power unit of CCGT.

2.6.5. Principal electric circuit of the generators and own needs of the block of CCGT.

2.6.6. Designation and principle of operation of the controlling and measurement devises, alarms, automatics, block ups and regulators.

2.6.7. Norms of quality of the steam, water, fuel and lubricants.

2.6.8. Territorial layout of all equipment, pipelines, valves and facilities.

2.6.9. Technical and economic indicators of the CCGT and planned assignments on them.

2.6.10. Basics of the heat engineering, electric engineering, mechanics and water treatment.

2.7. Examination on the knowledge of the technical operation rules, safety rules, fire safety, job instructions and industrial instructions shall be carried out as follows:

- initial – before granting the permission to the independent operation;

- periodical – within the set periods;

- unscheduled – in case of violation of the rules and instructions, upon the request of the bodies of the State Control, State Energy Inspection, higher bodies of management in accordance with the decision of the special commission.

Periodical examination for the knowledge of the Operation Rules, Fire Safety Rules, industrial and job instructions shall be carried out not later than once in 3 years.

Periodicity of the examination of the knowledge of the safety rules, rules of installation and safe operation of the equipment, supervised by the State Inspection “Sanoatgeokontehnazorat” is as follows: for

the persons, directly connected with the operation and servicing the power units, as well as for the workers of all categories once a year.

2.8. Working place of the operator of steam turbine of CCGT is located in the building of the electric department of the CCGT-478 MW

2.9. Servicing zone of the operator of steam turbine of the CCGT is servicing of steam turbine of the 478 MW combined cycle gas turbine (one person in one shift) with all auxiliary equipment (condenser, vacuum pumps, closed cooling system, steam conduits and pipelines within the area of the steam turbine).

3. Functions and duties

3.1. Main functions and obligations of the operator of steam turbine of CCGT are operational servicing of the power unit of the CCGT and ensuring its continuous and economic operation.

3.2. At the time of taking over of the shift operator of the steam turbine of CCGT is obliged:

- to get familiarized with the status, circuit and regimen of the operation of the power units, under his operative management, within the scope determined by the corresponding instructions;
- to receive information from the person who is handing over the shift about the equipment, which shall be especially thoroughly observed, for the purposes of preventing the disturbances in the operation, and about the equipment, which is in the reserve and in repair;
- to clarify what kind of works is in process in accordance with the orders and instructions at the areas assigned to him;
- to examine and accept the fire hose, protection means, which are stored at Unit switchboard, operative documentation and documentation of the working place;
- to get familiarized with all records and instructions for the period, passed from the previous period of duty;
- to receive report from the subordinated personnel;
- to report to the head of the shift of the CCGT on taking over the duty and on shortcomings, which were revealed at the time of takeover the shift.
- to register the takeover-handover of the shift by the records to the bulletin with his signature and the signature of the person handing over the shift.

Leaving the shift without handover of the shift is PROHIBITED.

3.3. Start up and shut down, testing, pressure testing of the equipment.

3.4. Switching in the heat and electric circuits of the power unit of CCGT.

3.5. Shutdown of the gas and steam turbine generator and switching the supply of the own needs from the main to reserve and vice versa (in emergency situations).

3.6. Control of the indicators of the measurement devises, operation of the auto regulators and alarm system.

3.7. Revealing defects in the operation of the equipment and undertaking measures aimed on their elimination.

3.8. Operator of the steam turbine of the CCGT in case of the emergency situations and liquidation of the emergencies is obliged:

- to compile general picture of what happened in accordance with the indicators of the alarm devises and external signs;

- to eliminate the hazard for the personnel and equipment, up to disconnecting it, is necessity will arise;

- do not interfere to the operation of the automatic devises;

- to ensure normal operation of the main equipment which is in operation; as well as mechanisms of own needs of the CCGT;

- to identify the place, character and volume of the damages and to shut down damaged equipment;

- switched down in the process of emergency equipment shall be started up immediately after clarifying and elimination of its malfunctions, upon the order of the head of the shift of the CCGT workshop;

- on each operation on liquidation of the emergency the operator steam turbine is obliged to report to the head of the shift without waiting for the inquiry.

3.9. Management of the subordinated workers (operator-inspectors).

3.10. Preparing the working place for repair;

3.11. Raising technical knowledge, participation in the training.

3.12. Maintaining cleanness of his working place.

3.13. Rendering first aid to the injured person.

3.14. Free from the duty operator of steam turbine may be used by the instructions on the workshop as operator-inspector after duplication and briefing.

4. Rights

4.1 To give operational orders to the subordinated personnel and check their implementation;

4.2. To stop equipment in case of emergency or fire, threatening the safety of the equipment or life of the personnel.

4.3. Submit to the management of the workshop through the head of the shift of CCGT proposals on stimulation of the subordinated personnel or on imposing penalty to the personnel.

4.4. Suspend the works and remove all persons from the working place, who hinder normal operation of the equipment.

4.5. Do not fulfill the orders, which contradict to the requirements of the rules of technical operation of power plants and networks, rules of safety measures, fire safety rules or threaten the safety of the people or equipment.

5. Interactions

5.1. Operator steam turbine of CCGT hands over and takes over shift from the shift operator of steam turbines, who is handing over the shift.

5.2. Operator of the steam turbine shall get familiarized with the administrative orders or shall be familiarized through the “Journal of administrative orders of the CCGT workshop”.

5.3. Operational orders, as a rule, shall be received through or from the head of the shift of CCGT workshop.

5.4. Instructions of the laboratory assistants of the Chemical water treatment of the CCGT shall be performed through the operator-inspectors, making corresponding records in the operations bulletin of the CCGT.

5.5. In case of receiving the instructions directly from the director, chief engineer or from other administrative person of the power plant, fulfills it and notifies the head of the shift of CCGT and head of the CCGT workshop.

5.6. In operational telephone conversations with the personnel, first of all pronounces his surname and position, then shall receive instruction (message) or himself shall transfer the message.

5.7. Disagreements which were not mutually solved, may be resolved by the “Commission on labor disputes”.

6. Responsibility

6.1. Operator of steam turbine of the combined cycle gas turbine depending on the level and the character of the violation shall bear disciplinary, administrative and other measures of responsibility for failing to fulfill or improper fulfillment of his functional duties, obligations, which lead to occurrence of the accidents and emergencies, damage of the property of the employer and other unfavorable consequences in accordance with the currently in force legislation of the Republic of Uzbekistan.

Information data

Elaborated by the Combined Cycle Gas Turbine Workshop of the Open joint Stock Company NTPS

Head of the workshop	/signature/	I.H. Abdulloev

Coordinated with

Production and technical division		
Head of the division	/signature/	I.S. Murtazaev
Planning and economic division Head of the division	/signature/	F.R. Hojieva
Service for reliability of the equipment and industrial safety		
Head of the division	/signature/	H. O. Muminov
Legal Advisor	/signature/	T.A. Toylokov
Staff responsible for standardization	/signature/	O.L. Zelenskaya

COMPANY STANDARD

JOB DESCRIPTION OF PATROL-OPERATOR OF THE TURBINE EQUIPMENT OF CCPP UNIT

Open Joint-Stock Company “NTPP”
Navoi

INTRODUCTION

1 DEVELOPED BY CCPP UNIT OF OJSC “NTPP”

2. APPROVED AND ENTRY INTO ACTION BY THE ORDER OF OJSC "NTPP"
dated _____ No.

3 INTRODUCED FOR THE FIRST TIME

APPROVE

Chief Engineer of OJSC "NTPP"

T. G. Nazarov

COMPANY STANDARD

JOB DESCRIPTION OF PATROL-OPERATOR OF THE TURBINE EQUIPMENT OF CCPP UNIT

Validity period from up to

1 AREA OF USE

This instruction manual is based on the
KSt 202-810: 2011 "Regulations on the unit of combined cycle gas turbine plants", the Unified tariff and qualification reference book for the work and occupations of workers for the purposes of regulating the functions, duties, rights and responsibilities of the patrol-operator of turbine equipment of the combined cycle steam and gas turbine unit (CCGTs) and is mandatory for him.

It must be known by:

- auxiliary equipment operator;
- operator of the steam turbine;
- Senior operator of the CCPP unit;
- Head of shift of the unit;
- Engineering and technical personnel of the CCGT.

2 GENERAL TERMS

2.1 For the post of patrol-operator of turbine equipment, accepted the persons who have a secondary specialized education, at least 18 years old, who have undergone medical examination.

2.2 The patrol-operator of turbine equipment is a person who provides trouble-free, reliable and economical operation of the HRSG and its auxiliary equipment.

2.3 Prior to the appointment to work independently, the patrol-operator of turbine equipment should undergo industrial training in accordance with a special training program. After completing the training, the patrol-operator of turbine equipment is subjected to a knowledge check by the qualification commission, under the chairmanship of the unit manager or his deputy for operating the equipment in the amount of necessary knowledge for the patrol-

operator of turbine equipment, in accordance with the Rules of the organization of work with personnel at energy production enterprises registered by the Ministry of Justice of the Republic of Uzbekistan. 04 10 2002 year no. 1178.

2.4 After passing the examinations, the patrol-operator of turbine equipment must undergo a duplication at the workplace of the patrol-operator of turbine equipment for a period of not less than 12 shifts, under the supervision of an experienced patrol-operator of turbine equipment. After the end of the period of duplication and with a positive assessment of the emergency response, the patrol-operator of turbine equipment is allowed to work independently by order of the unit.

2.5 The patrol-operator of turbine equipment is appointed, moved and dismissed from the position by the order of the director of the enterprise upon presentation of the head of the unit of the CCGT, the personnel department in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.6 The operator of the turbine equipment is technically and administratively responsible to the head of the unit of the CCGT, to the deputy head of the equipment operation department, and to the leading engineer-technologist, and in the operative - to the auxiliary equipment operator, to the steam-turbine operator of the CCGT unit, to the senior operator of the CCGT and the head of the shift of CCGT unit.

2.7 The patrol-operator of turbine equipment of the CCGT unit should know and be guided in its work:

- Indication of PP-56;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan from 12.01.1999 № 140 "On measures to strengthen the performance discipline ";
- The Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 as of 30.09.2009;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated August 22, 2009 "On Approval of the Rules for the Use of Electric and Thermal Energy";
- "Regulations on the investigation and recording of accidents and other injuries to workers' health at work" approved by the Cabinet of Ministers on June 06, 1997;
- RH 34-114: 2007 "Regulations on Disciplinary Responsibility of Workers of the Uzbek Energy System";
- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan", Tashkent 2005:

Section I Chapter I § 1-8 § 13-16;

Section II Chapter III § 4, 5, 7, paras. 404-418; §9; §eleven paras. 487, 488.

- "Fire safety rules for energy enterprises", Tashkent 2004;
- KSt 202-036-2007 "Rules of internal labor regulations for employees of OJSC" NTPP ";

- "Instructions for first aid to victims in connection with accidents while servicing power equipment";

- "Safety rules for the operation of thermal mechanical equipment of power plants and heating networks", Tashkent 2012, in the following volume:

Chapter I;

Chapter II;

Chapter III §§ 1-4, 5, 6, 9-11,

Chapter IV§§2 (B, D, D),

Appendices 1-8, 10, 15.

- Rules for the design and safe operation of pressure vessels approved by agreement with the Ministry of Justice of the Republic of Uzbekistan, referred to technical documents on December 23, 2011, No. 6-24 / 11-13112 / 6;

- "Rules for the Arrangement and Safe Operation of Steam and Hot Water Pipelines", 1992:

Section 1 subsections 1.1, 1.2;

Section 4 subsection 4.5;

Section 5 subsections 5.1-5.4;

Section 6;

Section 8.

- A real job description.

2.8 In its work, the patrol-operator of turbine equipment is guided by existing operational and production instructions and other directive materials, as well as orders and instructions from the management of the unit, senior operational personnel.

2.9 The patrol-operator of turbine equipment at the CCGT unit should know:

- The device, operation and technical characteristics of the main and auxiliary equipment of the CCGT unit;

- Production instructions for start-up, shutdown, operation of steam-turbine equipment and liquidation of the emergency situation in the operation of the CCGT steam turbine, as well as instructions of other units related to the equipment being serviced;

- Thermal diagrams of the serviced equipment of the CCGT unit;

- Purpose and principle of operation of instrumentation, signaling devices, technological protection, automation, interlocks, auto regulators;

- The territorial arrangement of the serviced equipment, pipelines, fittings and structures;

- Technical and economic indicators of the equipment of the CCGT unit and the planned targets for them.

2.10 Testing of knowledge of Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY, job descriptions and production instructions should be carried out:

- primary - before admission to independent work;

- Periodic - on time;

- extraordinary - in case of violation of rules and instructions, at the request of state supervision bodies, State Energy Inspectorate, higher authorities, by decision of a special commission.

Periodic testing of knowledge of Rules of technical operation, RULES OF FIRE SAFETY , production and job descriptions should be carried out at least once every 3 years.

Periodicity of verification of RULES OF SAFETY TECHNIQUE knowledge, rules of the device and safe operation of equipment, controlled SI "Sanoatgeocontechnazorat" for workers of all categories once a year.

2.11 The service area of the patrol-operator of turbine equipment of the CCGT unit is the technological equipment of the steam turbine with all auxiliary equipment, the condenser, the condensate system, the closed cooling circuit system, the auxiliary cooling system, the circulating water system condenser and cooling tower; vacuum pumps; the first, second, third floors of the steam turbine building; district heating system.

3 Functions and responsibilities

3.1 The patrol-operator of turbine equipment is the person responsible for the correct, reliable, economical and accident-free operation of the steam turbine and its auxiliary equipment, for the timely and qualitative preparation of workplaces for repair work.

3.2 The patrol-operator of turbine equipment is working according to the approved schedule.

Violation of the schedule of duty is FORBIDDEN.

The shift of duty is allowed only with the permission of the unit manager or his deputies, and duty for two shifts in a row is PROHIBITED.

In the event that the changer is not on duty, the patrol-operator of turbine equipment should inform the shift supervisor of this, continue on duty until the patrol-operator of turbine equipment arrives on duty.

3.3 When getting started, the patrol-operator of turbine equipment should take a shift from the previous patrol-operator of turbine equipment at the CCGT unit, and after the end of the work, take the next shift according to the schedule.

3.4. To get acquainted with the state of the scheme and the operating mode of the power plants in its operational control.

3.5 Obtain information from the person who takes the shift about the equipment, for which it is necessary to conduct an especially careful observation. In the future, to prevent violations in work and equipment stored in the reserve and repair.

3.6 Find out what works are performed according to orders on the area assigned to it.

3.7 Check and accept tools, materials, key of premises, operational documentation.

3.8 Familiarize yourself with all the records and orders from the time since your previous watch.

3.9 Report directly to the operator on the shift to enter on duty and the deficiencies identified when taking the shift.

Departure from duty without changing the change is FORBIDDEN!

3.10 Changing the Shift is FORBIDDEN:

3.10.1 During the liquidation of the accident.

3.10.2 With contaminated equipment.

3.10.3 In the implementation of responsible switching operations.

3.10.4 When the duty personnel enter service in a disabled state.

3.11. Change of the shift during the liquidation of the accident, in case of violation of the equipment operation mode in exceptional cases, is allowed with the permission of the unit manager or his deputy for equipment operation, shift supervisor or Station shift head.

3.12 To issue a receipt-delivery shift of a record in the journal or a statement after the signature of the transferee.

3.13 The patrol-operator of turbine equipment must perform constant monitoring of the operating mode of the steam turbine and its auxiliary equipment; take measures to reduce soaring, leakage of condensate, oils.

3.14 During the patrol of the equipment, the patrol-operator of turbine equipment of the CCGT unit performs control over the operation of mechanisms, pipelines, the condition of supports and suspensions, thermal displacements of steam pipelines; the density of the oil system of the steam turbine, the insulation of pipelines, the condition of the ladders, the sites, the condition of the safety valves, the presence of seals on the emergency shutdown buttons of the mechanisms, the loads of the safety valves, the controls of the oil system valves, fire-fighting equipment, lighting; vibration state of pump bearings; temperature of pump bearings and the state of turbine equipment; oil temperature on the drain from the bearings and behind the oil cooler; temperature of electric motors of pumps; condition of stuffing box seals; checks the safety of tags on the valve; posters on RULES OF SAFETY TECHNIQUEs and locking devices on equipment under repair; the absence of open (not enclosed) openings in floors, ceilings, maintenance areas. All reported observations are reported to the auxiliary equipment operator and operator of the steam turbine for recording defects in the log, and also takes measures to eliminate them.

3.15 Every 2 hours, the patrol-operator of turbine equipment checks parameters (pressure, temperature, and so on) technical condition of the steam turbine and auxiliary equipment.

If the operation mode of the steam turbine is disrupted, the chemical regime of the steam entering the turbine is violated and the operating parameters and the Rules for the technical operation of the power plants and networks of the Republic of Uzbekistan do not match, the operator is informed about this and together they take measures to eliminate the violation of the regime.

3.16 To monitor the quality of oil in the oil tank of the steam turbine,

3.17 Observe the oil cooler, avoiding temperature deviation from the relevant coolant parameters.

This is controlled by the flow and pressure of the water in the cooler.

It monitors the vacuum in the condenser.

When the vacuum in the condenser decreases, with the auxiliary equipment operator takes the necessary measures to eliminate it.

3.18 Maintain clean workplaces, spill oil IMMEDIATELY

3.19. Control over the manufacture of repair work on the steam turbine and auxiliary equipment.

3.20 By order of the operator of auxiliary equipment and operator, the steam turbine performs shift tasks.

3.21 Do not allow unauthorized persons to enter the working area without an escort.

3.22 Take measures to prevent freezing of equipment at negative outdoor temperatures.

3.23 In case of emergency:

3.23.1. An emergency situation means a violation of the normal operation of equipment or individual units, which, if not taken timely, creates a threat to the safety of equipment, the uninterrupted operation of the station, and the safety of people.

3.23.2 Liquidation of the emergency situation at the CCGT is carried out under the supervision of the auxiliary equipment operator, the steam-turbine operator, the senior operator of the unit and the unit shift supervisor.

3.23.3 In the event of liquidation of an emergency situation, the patrol-operator of turbine equipment shall:

- find out the nature and scale of the emergency damage;
- as soon as possible to identify the cause and take measures to eliminate the accident;
- report the incident to the auxiliary equipment operator; operator of a steam turbine, a senior operator.

3.23.4 During the elimination of the accident, the patrol-operator of turbine equipment will take the necessary measures to successfully eliminate the emergency situation, ensuring people's safety and equipment safety, guided by the Rules of technical operation, job descriptions and production instructions, and in case of an unusual situation, makes decisions independently, depending on specific situation.

3.23.5 On the measures taken to eliminate the emergency situation, reports to the operator of auxiliary equipment, the operator of the steam turbine and the senior driver.

3.23.6 If, at the time of the occurrence of an accident, any repairs or tests were carried out, they must be immediately discontinued, and the people withdrawn.

In case of emergency, all personnel must be removed from the emergency control room and accident areas, except for personnel who have unhindered access to participate in the elimination of the accident,

3.23.7 If the emergency situation was created during the acceptance-delivery of the shift, then all the personnel taking the shift are placed at the disposal of the head of the liquidation of the accident.

3.23.8 In case of accidents with people, the patrol-operator of turbine equipment must immediately provide assistance to the victim in accordance with the instructions for providing first aid, inform the shift supervisor of the call for a doctor.

3.24 The patrol-operator of turbine equipment is involved in the manufacture of the necessary switching in the thermal circuits of the equipment under control, starting and stopping the main and auxiliary equipment, crimping, testing the equipment with the permission and under the supervision of the auxiliary equipment operator and steam turbine of the CCGT unit.

Participates in the preparation of a workplace for repair teams.

3.25 In the manufacture of repair work, the patrol-operator of turbine equipment shall:

3.25.1 Ensure the completeness of the fulfillment of the conditions for the production of work.

3.25.2 Perform periodic monitoring of working teams alongside and ordering.

3.25.3 To remove repair personnel from work activities when RULES OF SAFETY TECHNIQUE violations are found or the workplace is expanded by the members of the brigade.

3.25.4 To accept workplaces for cleanliness after the termination of repair work.

3.25.5 Take part in the acceptance of equipment from the installation.

3.26 Complies with the operational orders of the higher-level operational staff of the CCGT unit.

3.27 Increases technical knowledge and skills by attending advanced training courses in the study of best practices, participation in training exercises.

3.28 Participates in events, shows and competitions held in the CCGT unit.

3.29 Timely on schedule, take the next exams according to the rules and in the amounts specified in paragraph 2.7.

3.30 It is forbidden to engage in strangers during working hours, not related to the performance of official duties, affairs.

4 Rights

4.1 Stop the equipment in the event of an accident or fire that threatens the safety of the equipment or the life of the personnel.

4.2 In case of receiving an order directly from the director, chief engineer or other administrative person of the station, it executes it and informs the operator of the auxiliary equipment of the CCGT unit.

4.3 Do not comply with orders that are contrary to the requirements of the Rules for the Technical Operation of Electric Power Stations and Networks, Safety Regulations, Fire Safety Rules or pose a threat to the safety of people or the safety of equipment.

4.4 In case of disagreement with the received order, it has the right to appeal against it to the higher management, without suspending its execution, if this does not threaten damage to equipment and people's lives.

4.5 Remove unauthorized persons from the unit if they do not have an accompanying person.

5 Relationships

5.1 With administrative orders, the patrol-operator of turbine equipment should be familiar with or should be acquainted with the "Journal of administrative orders of the unit of the CCGT".

5.2 In operational telephone conversations with personnel, first of all, he names his position and surname, and then receives an order (message) or himself makes a communication.

Having executed the received order, the patrol-operator of turbine equipment is obliged to report this to the person who issued the order.

5.3 The patrol-operator of turbine equipment on duty performs all the administrative and technical orders of the unit manager of the CCGT and his deputy on the operation of equipment, the leading process engineer and operational orders of the auxiliary equipment operator, the operator of the steam turbine, the senior operator of the unit, the shift supervisor.

Upon receipt of the instruction (team) it is obliged to repeat it, execute and report on its execution to the operator.

5.4 If the patrol-operator of turbine equipment does not agree with the received order, he must notify the person who issued the orders, but after receiving the confirmation of the order, it fulfills it, if this does not threaten the safety of the personnel or the safety of the equipment.

5.5 In the event that an order is received directly from the head of the unit, his assistant for the operation of equipment, the leading process engineer brings to the attention of the operator of auxiliary equipment or the operator of the steam turbine and carries out this order.

5.6 Disagreements that have not found a common solution can be resolved by the "Labor Disputes Commission".

6 Responsibility

6.1 The patrol-operator of turbine equipment is personally responsible for:

6.1.1 Untimely and substandard performance of the assigned functions, not the use of the granted rights;

6.1.2 Failure to comply with job description;

6.1.3 For their incorrect actions leading to an accident, damage to equipment, accidents, as well as for violation of the job description and production instruction, rules for Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY instructions and instructions from the management of the unit and power plant, rules of internal labor regulations, untimely passing of exams.

6.1.4 Cases of fire resulting from its improper actions,

6.1.5 Preservation of serviced equipment and devices, including the safety of fire fighting equipment.

6.2 The patrol-operator of turbine equipment unit CCGT, depending on the degree and nature of the violations, is brought to disciplinary, administrative and other measures of responsibility under the current legislation of the Republic of Uzbekistan.

KSt 202-871: 2014

Informational data

Developed by The Combined Cycle Gas Turbine Combine Plant of OJSC "NTPP"

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Agreed

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KSt 202- 826:2015

COMPANY STANDARD

JOB DESCRIPTION OF THE OPERATOR OF COMPRESSOR UNITS OF THE CCPP UNIT

STOCK COMPANY SC « NTPP »

NAVOI

Introduction

1 DEVELOPED AND ENTERED IN BY The CCGT UNIT of JSC "NTPP"

2 APPROVED AND RUN IN by the order SC « NTPP » №

3 INSTEAD OF KSt 202- 826:2012

KSt 202- 826:2015

Approved

SC « NTPP » Chief engineer

T. G. Nazarov

COMPANY STANDARD

JOB DESCRIPTION OF THE OPERATOR OF COMPRESSOR UNITS OF THE CCPP UNIT

Term of validity from till

1 Application area

This instruction is based on KSt 202-810: 2011 "Regulations on the unit of combined cycle gas turbine plants", the Unified tariff-qualification reference book of works and occupations of workers, for the purposes of regulating functions, duties, rights and the responsibility of the compressor operator of the combined-cycle steam and gas-turbine unit (CCGTs) and is mandatory for the operator of compressor units, the patrol-operator of the GBCS, the senior operator of the CCGT unit, the unit shift supervisor and the engineering-technical personnel of CCGT.

2 General requirements

2.1 For the position of an operator of compressor units, persons accepted, who have a general secondary education, at least 18 years of age who have undergone a medical examination, are specially trained, systematically instructed, passed the examination of the qualification commission, who have an identity card in their hands, who have been trained and duplicated in accordance with the Rules for Organization of Work with Personnel at the enterprises of power production, registered Ministry of Justice of RUz from 04.10.2002 year № 1178.

2.2 The operator of compressor plants is appointed, occupying and relieving of his position.

2.3 The operator of the compressor plants is technically and administratively responsible to the head of the unit of the CCGT, to the head of the GBCS section and to the deputy head of the equipment maintenance department.

In the operational - the head of the station shift, the head of the shift unit CCGT.

The operator of the compressor units is promptly subordinated to the patrol-operators of the compressor units and the duty locksmiths of the GBCS.

2.4 The operator of the compressor units of the CCGT unit should know and be guided by its work:

- Indication of PP - 56;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan of 12.01.1999 No. 140 "On measures to strengthen the performance discipline";

- The Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 from 30.09.2009;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated August 22, 2009 "On approval of the rules for the use of electric and thermal energy";

- "Regulations on the investigation and recording of accidents and other damage to workers' health at work "approved by the Cabinet of Ministers on June 6, 1997;

-RH 34-114: 2007 "Regulations on Disciplinary Responsibility of Workers of the Uzbek Energy System";

- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan », Tashkent 2011:

Section I Chapter I § 1-8 § 13-16;

Section II Chapter I,

- "Safety rules for the operation of thermal mechanical equipment of power plants of heating networks", Tashkent 2012 in the following volume:

Chapter I;

Chapter II;

Chapter III;

Chapter VI § 2B;

Appendices 2, 3, 4, 5, 6, 7, 16.

- "Safety rules when working with tools and devices."

Chapters 1, 3, 5, 6.

- "Fire Safety Rules for Power Enterprises", Tashkent, 2004.

- "Instructions for first aid to victims in connection with accidents in the service of power equipment."

- "Safety rules in the gas economy of the Republic of Uzbekistan", Tashkent 2004. in the following volume:

Chapter I §1 paragraphs 1, 2.

§2 - 5, 6, 7, 8.

§3 - 9, 10.

§4 - 11, 12, 14.

§5 - 15, 16.

Chapter II §2 - 20, 21, 22, 23, 24, 25, 26, 27.

Chapter III § 1 - 28-37.

§2 - 38-46.

§3 - 47-53, 55, 59, 66, 70, 71, 73, 75-77, 81-85.

§4 - 86, 88-101.

§ 7 - 210-226.

§11 - 265, 266, 277.

§12 - 279-294.

Chapter V of paragraphs 310-351.

Chapter VI - 352-428.

Chapter VII - 429-441.

Appendices 1, 2, 8, 11, 12, 13, 14, 15, 16, 31, 32.

- "Rules and regulations for the operation of pressure vessels": Tashkent, 1997. in the following volume:

Section 1 subsections 1.1; 1.2.; 1.3.;

Section 2 subsections 2.1; 2.2.;

Section 3;

Section 4 subsections 4.6.-4.8.;

Section5;

Section 6:

Section 7;

Section 10

Appendices 1, 3, 4.

- KSt 202-036-2007 "Rules of internal labor regulations employees of OJSC "NTPP";

- "Instruction on the provision of first aid rendered in holy accidents while servicing power equipment";

- The present instruction;

- Properties, marks and characteristics of used oils for lubrication of compressors;

- The scheme of the gas distribution network within the compressor;

- The principle of operation of the automatic control and redundancy of the compressor station.

- Purpose and principle of operation of instrumentation, signaling devices, technological protection.

- The territorial arrangement of the serviced equipment, pipelines, fittings, structures, vessels (receivers).

- Types of structures and technical characteristics of serviced compressors.

2.5 Testing the knowledge of Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY, job description and production instructions should be made:

- primary - before admission to independent work;

- Periodic-on time;

- Extraordinary - violation of rules and instructions, at the request of state supervision bodies, State Energy Inspectorate, supervisory authorities, by decision of a special commission.

Periodic testing of knowledge of Rules of technical operation, RULES OF FIRE SAFETY, production and job descriptions should be made at least 1 time in 3 years.

2.6 The location of the compressor operator is the operator's building of the compressor station.

2.7 The service area is compressor units with auxiliary equipment and a gas pipeline within the gas compressor station.

3 Functions and responsibilities

3.1 Ensuring the reliability and safety of the compressor unit type ECA-C-8 / 12-49M1 and their communication;

3.2. Maintaining the set gas pressure at the outlet of the compressor unit.

- to monitor the cleanliness and condition of fire safety in the compressor station and on the territory adjacent to the compressor;

- timely identify all defects and malfunctions of compressor equipment and record them in the fault log.

- maintenance, monitoring of equipment operation by patrolling the purging of chillers and receivers;

- start-up, shutdown, testing of compressor units;

- participation and elimination of emergency situations, equipment withdrawal for repairs, commissioning after repairs;

- maintaining the cleanliness of equipment and fixed site.

3.3 When accepting a shift, the compressor operator must:

- get acquainted with the status, the scheme and the operating mode of the power plants that are in its operational control, in the volume defined by appropriate instructions;

- receive information from the person who takes the shift about the equipment, for which it is necessary to conduct especially careful monitoring, in

order to prevent violations in work, and about equipment being in reserve and in repair;

- to find out what works are performed according to the orders and orders in the area assigned to it;

- check and accept fire hoses, protective equipment, which are stored in the control room, operational documentation and workplace documentation;

- to get acquainted with all the records and orders for the time elapsed from their previous watch;

- to accept a report from the subordinate personnel on entering into duty and on the shortcomings revealed during the acceptance of the shift and to give the report to the shift supervisor of the CCGT unit;

- formalize the acceptance-delivery of the shift with the record in the statement for its signature and signature of the transferee.

Departure from duty without changing the shift is FORBIDDEN.

3.4 Starting and stopping, testing, crimping equipment.

3.5. Switching in the thermal and electrical circuits of the gas turbine CCGT.

3.6 Disconnecting the gas turbo generator and switching the power supply from the main to the backup and vice versa (in emergency situations).

3.7 Control over the readings of measuring instruments, the operation of auto regulators and signaling.

3.8. Detection of malfunctions in the operation of equipment and taking measures to eliminate them.

3.9 The operator of compressor installations in the event of emergency situations and the elimination of an accident shall:

- draw up a general idea of what happened, according to the signaling devices and external signs;

- eliminate the danger to personnel and equipment, up to the disconnection of the latter, if this becomes necessary;

- do not interfere with the operation of automatic devices;

- to ensure the normal operation of the main equipment remaining in the work, as well as the mechanisms of the own needs of the CCGT unit;

- find out the place, nature and extent of damage and disconnect damaged equipment;

- equipment that has shut down during an accident must be entered in the work immediately after finding and fixing its malfunctions, by order of the head of the shift unit of the CCGT;

- for each operation to eliminate accidents, the compressor operator must report to the shift supervisor without waiting for a survey.

3.10 Management of subordinate workers (patrol-operators and duty locksmiths)

3.11 Preparation of the workplace for repair.

3.12 Increase of technical knowledge, participation in technical training.

3.13 Keep your workplace clean.

3.14 Provision of first aid to the victim.

3.15 A shift-free operator f compressor units may be used as a patrol-operator after duplication and briefing.

3.16 In case of emergency:

3.16.1. An emergency situation means a violation of the normal operation of equipment or individual components, which, if not taken timely, creates a threat to the safety of equipment, the uninterrupted operation of the station, and the safety of people.

3.16.2. The emergency situation on the unit is eliminated under the supervision of the compressor operator, the senior operator of the unit and the shift supervisor.

3.16.3 When liquidating an emergency situation, the Compressor Unit operator shall:

- find out the nature and scale of the emergency damage;

- as soon as possible to identify the cause and take measures to eliminate the accident;

- Report on what happened to the senior operator, the head of the shift.

3.16.4 During the elimination of the accident, the compressor operator takes the necessary measures to successfully eliminate the emergency situation, ensuring the safety of people and safety equipment, guided by Rules of technical operation, job and production instructions, and in case of an unusual situation, makes decisions independently, depending on the specific situation.

3.16.5 On the measures taken to eliminate the emergency situation, reports to the senior operator and the shift supervisor.

3.16.6 If, at the time of the occurrence of an accident, any repair works or tests, they must be IMMEDIATELY DISCONTENT, people are withdrawn.

In an emergency situation, all other personnel should be removed from the accident sites, except for personnel who have unimpeded access to participate in the elimination of the accident.

3.16.7 If the emergency situation was created during the acceptance-delivery of the shift, all the personnel of the receiving shift are placed at the disposal of the head of the liquidation of the accident.

3.16.8 In the case of accidents, the Compressor operator is obligated to immediately provide assistance to the victim in accordance with the instructions for first aid, inform the compressor operator of the compressor systems for calling the doctor.

4 Rights

4.1 Give operational orders to a subordinate personnel and demand their execution.

4.2 Stop the equipment in the event of an accident or fire, threatening the safety of equipment or life of staff.

4.3 Represent the management of the unit through the head of the CCGT shift of the proposal on the promotion of subordinate personnel or the imposition of penalties on him.

4.4. Suspend work and remove from its workplace all persons who impede the normal operation of the equipment.

4.5 Do not follow orders that are contrary to the requirements of Rules of technical operation, RULES OF SAFETY TECHNIQUE or pose a threat to the safety of people or the safety of equipment.

4.6 Appeal in case of disagreement other orders, without suspending their implementation.

4.7 Shown to work according to the approved schedule.

It is FORBIDDEN to leave the watch without changing the shift.

5 Relationships

5.1 Carry out all operational orders of the shift supervisor of the CCGT and the Station shift head.

5.2 After receiving the shift, he reports to the shift supervisor of the CCGT on the telephone.

5.3 In case of emergency, the change of shift is FORBIDDEN.

5.4 If the order is received directly from the superior administrative officials, it executes it and brings it to the head of the CCGT shift, to the master or deputy head of the equipment operation department.

5.5 In case of operational telephone conversations with personnel

he names his surname and position, and then receives an order or a message.

5.6 In case of short-term absence, if necessary during the day, warn the trainer with his replacement, and during the rest of the time the shift supervisor of the CCGT.

6 Responsibility

6.1 The operator of the compressor units of the CCGT unit, depending on the degree and nature of the violations, is brought to disciplinary, administrative and other measures of responsibility for failure to perform or improperly performing its functional duties, resulting in accidents and accidents, damage to the employer's property and other adverse consequences, in accordance with the current legislation of the Republic of Uzbekistan.

Information data

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Agreed

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Service reliability of machinery and industrial safety

Head of the service Kh. O. Muminov

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KSt 202- 839:2015

COMPANY STANDARD

JOB DESCRIPTION OF PATROL-OPERATOR OF COMPRESSOR FACILITIES OF CCPP UNIT

JOINT STOCK COMPANY "NTPP”
Navoi

KSt 202- 839:2015

Preface

1 DEVELOPED AND INTRODUCED by the CCGT UNIT of JSC "NTPP"

2 APPROVED AND RUN by the Order of JSC "NTPP"
No. dated

3 INSTEAD of KSt 202- 839:2012

KSt 202-839:2015

Approved by

Chief engineer of JSC "NTPP"

T. G. Nazarov

COMPANY STANDARD

JOB DESCRIPTION OF PATROL-OPERATOR OF COMPRESSOR FACILITIES OF CCPP UNIT

Valid from to

1 Field of application

This manual is developed based on KSt 202-810: 2011 "Regulations on the unit of combined cycle gas turbine plants," the Unified tariff-qualification reference book of works and occupations of workers, with a view to regulating functions, duties, rights and the responsibility of the patrol-operator of compressor facilities of the combined-cycle combined cycle gas turbine unit (CCGTs) and is mandatory for the patrol-operator of compressor units, operator of GBCS, senior operator of unit, unit shift head and CCGT Engineer-technical personnel.

2 General requirements

2.1 Persons who are at least 18 years of age and have undergone medical examination are admitted to the position of the patrol-operator of compressor facilities.

2.2. Prior to the assignment to independent work, the patrol-operator of compressor facilities must undergo industrial training according to a special training program. After completing the training, the patrol-operator of compressor facilities is subjected to the verification of knowledge by the qualification commission under the chairmanship of the unit manager or his deputy in the amount of necessary knowledge for the patrol-operator of compressor facilities. In accordance with the Rules for the organization of work

with personnel at energy production enterprises, registered by the Ministry of Justice of the Republic of Uzbekistan from 04. 10. 2002 № 1178.
2.3 After passing the examinations, the patrol-operator of compressor facilities must undergo duplication at the workplace of the patrol-operator of compressor facilities, for a period of not less than 12 shifts under the supervision of an experienced patrol-operator of compressor facilities. After the end of the period of duplication and with a positive evaluation of the emergency response training, the patrol-operator of compressor facilities, by order of the unit, is allowed to work independently.

2.4 The patrol-operator of compressor facilities is appointed, moved and dismissed from the position by the order of the director of the enterprise upon presentation of the head of the unit at the CCGT, human resources department, in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.5 The patrol-operator of compressor facilities in production, technical and administrative respect submits to the head of the CCGT unit, the deputy head of the operation department, and to the head of the GBCS section, and in the operative - to the operator and to the shift supervisor 0f CCGT.
2.6 The patrol-operator of compressor facilities of the CCGT unit should know and be guided in its work:
- Indication of PP - 56;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan from 12.01.1999 № 140 "On measures to strengthen the performance discipline";
- The Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 from 30.09.2009;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated August 22, 2009 "On Approval of the Rules for the Use of Electric and Thermal Energy";

- "Regulations on the investigation and recording of accidents and other damage to workers' health at work "approved by the Cabinet of Ministers on June 6, 1997;
-RH 34-114: 2007 "Regulations on disciplinary liability workers of the Uzbek power system ";
- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan", Tashkent 2011:
Section I Chapter I § 1-8 § 13-16;
Section II Chapter I,

- "Safety rules for the operation of thermal mechanical equipment of power plants and heating networks" in the following volume:
Section 1;

Section 2. Subsections 2.1., 2.2., 2.3., 2.5., 2.9.
- "Safety rules when working with tools and devices" in the following scope: Chapters 1, 3, 5, 6.
- "Fire safety rules for energy enterprises", Tashkent 2004;

- "Instruction on rendering first aid to victims in communication with accidents at service of the power equipment ";
- "Safety rules in the gas economy of the Republic of Uzbekistan", Tashkent 2004, in the following volume:

Chapter I §1 paragraphs 1, 2;
§ 2 - 5, 6, 7, 8;
§3;
§ 4 - 11, 12, 14;
§ 5;
Chapter II § 2;
Chapter III § 1;
§2;
§3 - 47-53, 55, 59, 66, 70, 71, 73, 75-77, 81-85;
§4 - 86, 88-101;
§ 7;
§11 - 265, 266, 277;
§ 12;
Chapter V;
Chapter VI;
Chapter VII;
Appendices 1, 2, 8, 11, 12, 13, 14, 15, 16, 31, 32.

- "Rules for the Arrangement and Safe Operation of Vessels Working Under Pressure", Tashkent 1997, in the following scope:

Section 1;
Section 2 subsections 2.1 .; 2.2 .;
Section 3;
Section 4 subsections 4.6.-4.8 .;
Section 5;
Section 6;
Section 7;
Section 10;
Appendices 1, 3, 4.

-KSt 202-036-2007 "Rules of internal labor regulations employees of JSC "NTPP";
- The present instruction.

2.7 The patrol-operator of compressor facilities of the CCGT should know:

- Properties, marks and characteristics of used oils for lubrication of compressors;
- The scheme of the gas distribution network within the compressor;
-Principle of operation system of automatic control and backup of the compressor station;
- Purpose and principle of operation of instrumentation, signaling devices, technological protection;
- The territorial arrangement of the serviced equipment, pipelines, armature, structures, vessels (receivers);

- Types of structures and technical characteristics of serviced compressors.

2.8 Testing the knowledge of Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY, job descriptions and production instructions should be carried out:

- primary - before admission to independent work;
- Periodic - on time;
- an extraordinary one - in case of violation of the rules and instructions, at the request of the state supervision bodies, the State Inspectorate for the operation of power plants and networks and the higher management bodies, as decided by the special commission.

Periodic testing of knowledge of Rules of technical operation, RULES OF FIRE SAFETY, production and job descriptions should be made at least once in 3 years.

Periodicity of verification of RULES OF SAFETY TECHNIQUE knowledge, device rules and safe operation of equipment controlled by SI "Sanoatkontehnazorat", the following: for persons directly connected with the management and maintenance of power plants, as well as for workers of all categories, once a year.

2.9 The location of the patrol-operator of compressor facilities is the operator's office of the compressor station.

2.10 The service area is compressor units with auxiliary equipment and a gas pipeline within the gas compressor station.

3 Functions and responsibilities

3.1 The operator of the compressor units is the person responsible for the correct, reliable, economical and accident-free operation of compressor plants and its auxiliary equipment; for timely and qualitative preparation of workplaces for performance of repair work.

3.2 The patrol-operator of compressor facilities works on the approved schedule.

Violation of the schedule of duty is FORBIDDEN.

The shift of duty is allowed only with the permission of the unit manager or his deputies, and duty for two shifts in a row is PROHIBITED.

In the event that the replacement is not on duty, the patrol-operator of compressor facilities is obliged to inform the shift head about this, continue on duty until the arrival of the patrol-operator of compressor facilities, called for on duty.

3.3 In its work, the patrol-operator of compressor facilities is guided by existing operational and production instructions and other directive materials, as well as orders and instructions from the management of the unit, senior operational personnel.

3.4 Getting Started, The patrol-operator of compressor facilities should:

3.4.1 Accept a shift from the previous patrol-operator of compressor facilities at the GBCS site, and after the end of the work, take the next shift according to the schedule;

Departure from duty without changing the change is FORBIDDEN!

3.4.2. Familiarize yourself with the state of the scheme and the operating mode of the power plants in its operational management;

3.4.3 Obtain information from the person taking the shift about the equipment, for which it is necessary to carry out a very careful monitoring; In the future, to prevent violations in work and equipment that is in reserve and repair;

3.4.4 Find out what works are performed according to orders and orders in the area assigned to it;

3.4.5 Check and accept tools, materials, key of premises, operational documentation;

3.4.6. To get acquainted with all the records and orders during the past from their previous watch;

3.4.7 Report directly to the operator on the shift of attendance on duty and the shortcomings revealed when taking the shift.

3.5 Delivery of the shift is FORBIDDEN:

3.5.1 During the liquidation of the accident;

3.5.2 In case of contaminated equipment;

3.5.3 In the manufacture of responsible switching operations.

3.6 When entering duty personnel in a disabled state, the change of the shift is FORBIDDEN.

3.7 Delivery of the shift during the liquidation of the accident, in case of violation of the equipment operation mode, in exceptional cases, is allowed with the permission of the unit manager or his deputies, the unit shift supervisor or the station shift head.

3.8 Make a receipt-change delivery shift in the journal or the statement after the signature of the transferee.

3.9 The operator of the compressor units is obliged to ensure the reliability and safety of the compressor unit type ECA-C-8 / 12-49M1 and its communication.

3.10 During the patrol of the equipment, the operator of the compressor units of the GBCS section monitors the operation of the mechanisms, gas pipelines, the condition of the supports and suspensions, the density of the oil systems, the condition of the stairs, the areas, the condition of the safety valves, the presence of seals on emergency shutdown mechanisms, handles of oil system valves, fire fighting equipment, lighting; vibration state of pump bearings; temperature of pump bearings and the status of auxiliary equipment; oil temperature on the drain from the bearings and behind the oil cooler; temperature of electric motors of pumps; condition of stuffing box seals; safety of tags on the valve; posters on RULES OF SAFETY TECHNIQUEs and locking devices on equipment under repair; the absence of open (not enclosed) openings in floors, ceilings, maintenance areas.

3.11 Report all comments to the patrol-operator of compressor facilities for writing to the defects log, and take measures to eliminate them.

3.12 Every 2 hours. The patrol-operator of compressor facilities captures the parameters (pressure, temperature, etc.) of the technical condition of the compressor units.

3.13 It monitors the quality of oil in oil tanks.

3.14 Maintains cleanliness of jobs, spilled oil removes immediately.

3.15 Monitor the production of repair work on compressor plants and auxiliary equipment.

3.16 At the disposal of the patrol-operator of compressor facilities, the refueling tasks are performed.

3.17 Does not allow unauthorized persons to enter the area of the operating equipment without an escort.

3.18 Take measures to prevent freezing of equipment at negative outdoor temperatures.

3.19 The operator of the compressor units participates in the production of the necessary switching in the gas circuits of the equipment under control, starting and stopping of the main and auxiliary equipment, crimping, testing the equipment with the permission and under the supervision of the patrol-operator of compressor facilities of the GBCS section. Participates in the preparation of a workplace for repair teams.

3.20 In case of emergency:

3.20.1. An emergency position means a violation of the normal operation of equipment or individual units, which, if not taken timely, creates a threat to the safety of equipment, the uninterrupted operation of the station, and the safety of people.

3.20.2 Liquidation of the emergency situation at the GBCS is carried out under the supervision of the patrol-operator of compressor facilities, the senior operator of the unit and the shift supervisor.

3.20.3 In the event of an emergency, the patrol-operator of compressor facilities shall:

- find out the nature and scale of the emergency damage;
- as soon as possible to identify the cause and take measures to eliminate the accident;
- report on what happened to the compressor operator; to the senior machinist.

3.20.4 During the elimination of the accident, the compressor engine operator takes the necessary measures to successfully eliminate the emergency situation, ensuring the safety of people and the safety of equipment, guided by the Rules of technical operation, official and production instructions, and in case of an unusual situation, makes decisions independently, depending on the specific situation.

3.20.5 On the measures taken to eliminate the emergency situation, the patrol-operator of compressor facilities and the senior operator are reported.

3.20.6 If, at the time of the occurrence of the accident, any repair work or test, they must be IMMEDIATELY DISCONTENT, people are withdrawn.

In case of emergency, all other personnel should be removed from the accident sites, except for personnel having unhindered admission for participation in the liquidation of the accident.

3.20.7. If the emergency situation was created during the acceptance-delivery of the shift, all the personnel of the receiving shift are placed at the disposal of the head of the liquidation of the accident.

3.20.8 In case of accidents, the patrol-operator of compressor facilities must immediately provide assistance to the injured person in accordance with the instructions for first aid, inform the compressor operator of the compressor equipment to call the doctor.

3.21 In the manufacture of repair work The patrol-operator of compressor facilities of compressor installations is obliged:

3.21.1 Ensure the fulfillment of the conditions for the production of work.

3.21.2. Perform periodic monitoring of working teams alongside and disposition.

3.21.3 To remove repair personnel from work activities in case of detection of RULES OF SAFETY TECHNIQUE violations or expansion of the workplace by team members.

3.21.4 To accept workplaces for cleanliness after the termination of repair work.

3.21.5 Take part in the acceptance of equipment from the installation.

3.22 Complies with the operational orders of the higher-level operational staff of the CCGT unit.

3.23 Increases technical knowledge and skills by attending advanced training courses in the study of best practices, participation in training exercises.

3.24 Participates in events, shows and competitions held in the CCGT unit.

3.25 Timely on schedule, take the next examinations according to the rules and in the amounts specified in clause 2.5.

3.26 It is forbidden to engage in strangers during working hours, not related to the performance of official duties, affairs.

4 Rights

4.1 Suspend work and remove all persons who impede normal operation, testing and maintenance of equipment.

4.2 Do not comply with orders that are contrary to the requirements of Rules of technical operation, RULES OF SAFETY TECHNIQUE or pose a threat to people's safety or equipment reliability.

4.3 Stop the equipment in the event of an accident or fire that threatens the safety of the equipment or the life of the personnel in accordance with the instructions for the elimination of emergency situations.

4.4 Do not comply with orders that contradict the requirements of RULES OF SAFETY TECHNIQUE, Rules of technical operation or pose a threat to the

safety of people or the safety of power equipment, appeal in case of disagreement other orders, without suspending their implementation.

4.5 Go to work according to the approved schedule.

5 Relationships

5.1 Carry out all operational orders of the operator and the shift supervisor of the CCGT unit.

5.2 After acceptance of the shift, notify the compressor operator of this.

5.3 If the order is received directly from the higher-level administrative officials, it executes it and brings to the attention of the compressor operator.

5.4 In operational telephone conversations with staff, he first of all names his surname and position, and then receives an order or a message.

6 Responsibility

6.1 The patrol-operator of compressor facilities is responsible for:

6.1.1 Untimely and substandard performance of the assigned functions, not the use of the granted rights;

6.1.2 Failure to comply with job description;

6.1.3. For their incorrect actions leading to an accident, damage to equipment, accidents, as well as for violation of the job description and production instruction, rules for Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY instructions and instructions of the unit and power plant management, internal labor regulations, late exams .

6.1.4 Tanning incidents resulting from improper actions,

6.1.5 Preservation of serviced equipment and devices, including the safety of fire equipment.

6.2 The patrol-operator of compressor facilities of the GBCS section, depending on the degree and nature of the violations, is brought to disciplinary, administrative and other measures of responsibility in accordance with the current legislation of the Republic of Uzbekistan.

KSt 202-839: 2015

Informational data

Designed by the CCGT unit of JSC "NTPP"

Head of unit	I. Kh. Abdulloev
Agreed	
Production and Technical Department	
Head of the department	T.H.Soliev
Planning and Economic Department	
Head of the Department	E.E.Davov
Service reliability of machinery and industrial safety	
Head of the service	Kh. O. Muminov
Legal adviser	Sh.Y.Nazarov
Responsible for standardization	N.S.Nurullaeva

KSt 202- 818:2015

COMPANY STANDARD

JOB DESCRIPTION OF THE HEAD OF GAS BOOSTING COMPRESSOR STATION OF CCPP UNIT

STOCK COMPANY SC «NTPP»

NAVOI

Introduction

1 DEVELOPED AND ENTERED IN BY The CCGT UNIT of JSC "NTPP"

2 APPROVED AND RUN IN BY the order of SC « NTPP » №

3 INSTEAD OF KSt 202- 818:2012

Approved

SC « NTPP » Director

K. Kh. Ganiev

COMPANY STANDARD

JOB DESCRIPTION OF THE HEAD OF GAS BOOSTING COMPRESSOR STATION OF CCPP UNIT

Term of validity from till

1 Application area

This manual is developed based on KSt 202-810: 2011 "Regulations on the unit of combined cycle gas turbine plants", the Qualification Reference Book for the positions of managers, specialists of employees 1987, for the purposes of regulating the functions, duties, rights and responsibilities of the head of the gas boosting compressor station of the CCGT and is mandatory for him.

2 General terms

2.1 The head of the gas boosting compressor station of the Combined Cycle Gas Turbine Combine Plant (GBCS CCGT) coordinates and controls the production and economic activities of the plots, ensures technically correct operation of equipment and labor safety her fixed assets.

2.2 A person with a higher technical education and at least 3 years of professional experience in engineering and technical positions at least 3 years or a specialized secondary education and at least 5 years of experience in engineering positions are appointed to the position of the head of the GBCS CCGT section.

2.3 The head of the GBCS section of the CCGT is appointed to the position, moved and dismissed from the position by the director of the station upon presentation of the head of the CCGT, HR department in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.4 The head of the GBCS section of the CCGT is administratively and technically subject to the head of the CCGT unit.

2.5 In the event of a long absence of the head of the gas boosting compressor station, his duties are assigned to the maintenance master of the GBCS.

2.6 head of the gas boosting compressor station of the CCGT should know and be guided in its work:

- Indication of PP - 56;
- The Law of the Republic of Uzbekistan "On Industrial Safety of Hazardous Production Facilities" of 28.09.2006 No.Z RUz-57;
- CTX 13-58-2009 "Rules for the Organization and Implementation of Production Control at Hazardous Production Facilities" Tashkent 2009;
- "Regulations on the investigation and recording of accidents and labor safety her injuries to workers' health at work" approved by the Cabinet of Ministers on June 6, 1997;
- RH 34-114: 2007 "Regulations on Disciplinary Responsibility of Workers of the Uzbek Energy System";
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan of 12.01.1999 No. 140 "On measures to strengthen the performance discipline";
- The Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 from 30.09.2009;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated August 22, 2009 "On Approval of the Rules for the Use of Electric and Thermal Energy";
- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan", Tashkent, 2011;

Section I Chapter I. § 1-16;

Section II Chapter 2. § 4;

Chapter 3. § 1, 3, 4, 5, 7, 8, 9, 11, 12, 13;

Chapter 4 § 1, 2, 12, 13, 14;

Chapter 5 § 1-6;

- "Safety rules for the operation of thermal mechanical equipment of power plants and heating networks", Tashkent 2012 in the following volume:

Chapter I.

Chapter 2 § 1, 2;

Chapter 3 § 1-6, 9-14;

Chapter 4 § 2, 3, 4, 6, 8, 9.

Appendix: 2-8, 9.10, 11, 13-17, 19

- "Safety rules in the gas economy of the Republic of Uzbekistan", Tashkent 2004;

Chapter I. General Provisions. § 1, 2, 4, 5;

Chapter III. Operation of gas facilities. § 1, 2, 3, 4.7;

Chapter VI. Gas hazardous work. Appendices 1, 2, 31, 32.

- "Fire safety rules for energy companies", Tashkent 2013;

Chapter I;

Chapter II;

Chapter III;

Chapter IV;

Appendix No. 1

Section I § 1, 2;

Section II §4 paragraph 99, §6;

Section III § 2;

Section IV § 1;

Section V § 2;

Section VI §2;

Applications Nos. 2, 3, 4, 5, 8.

- "Rules for the Arrangement and Safe Operation of Vessels Working Under Pressure", 2011, in the amount of:

Chapter I. § 1;

Chapter 3. § 1, 2;

Chapter 4.

Chapter 5 § 1, 2;

Applications: 1, 2, 3, 6, 9, 10, 13, 14, 15;

- "Rules for the Arrangement and Safe Operation of Steam and Hlabor safety Water Boilers", Tashkent, 1997, in the amount of:

Section 1. 1.1. - 1.4 .;

Section 2.

Section 3. 3.1. - 3.6 .;

Section 4. 4.1 .; 4.7 .;

Section 5. 5.1 .;

Section 6.

Section 7. 7.1. 7.4 ;;

Section 8. 8.1. - 8.3 .;

Section 9.

Section 10.

Appendices 1, 2, 3, 4, 6.

- "Instruction on rendering first aid to victims in connection with accidents in the maintenance of power equipment "

- Occupational safety standards system;
- "Explosion safety rules for the use of gas, fuel oil in boiler plants ";
- "Safety rules when working with the tool and adaptations ";
- Production and job descriptions of sites;
- The Labor Code of the Republic of Uzbekistan, Tashkent, 1996;
- RH 34 - 400: 2008 "Regulations on the Occupational Safety Management System in the Energy Industry";
- RH 34 - 475: 2007 "Rules of internal labor regulations employees of the executive apparatus of the State Joint Stock Company "Uzbekenergo", its branch "Energosotish" and unitary enterprises ";
- Rules of organization of work with personnel at enterprises of energy production registered by the Ministry of Justice of the Republic of Uzbekistan No. 1178 of October 4, 2002;
- Directive materials, operational and emergency circulars of SJSC "Uzbekenergo";
- Orders, orders of JSC "NTPP", and labor safety her administrative documents;
- KSt 202-032: 2008 "Rules for working with low-sulfur gas";
- RN 34-114: 2007 "Regulations on disciplinary liability workers of the Uzbek power system ";
- Guidance document for the production of repair work (GDPRW);
- KSt 202 - 038: 2008 "Regulations on incentive payments for managers, specialists, employees and workstations for the main results of economic activity ";
- KSt 202 - 036: 2007 "Rules of internal labor regulations employees of JSC "NTPP";

2.7 The head of the gas boosting compressor station should know:

- design and features of operation and performance characteristics of all main and auxiliary equipment of the GBCS CCGT site;
- technological diagrams of the equipment of GBCS CCGT;
- location of fire extinguishing means and fire water supply system;
- electric circuit of the gas-turbine unit of the CCGT;
- per diem, monthly, quarterly and annual technical and economic indicators and planned tasks of the unit;
- designation and operation principle of the equipment of the GBCS CCGT Unit of the instrumentation, signaling devices, interlocks, automation, protection;
- The territorial location of equipment, pipelines and fittings of the GBCS CCGT site;
- the fundamentals of economics, organization and management.

2.8 Testing the knowledge of Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY should be carried out:

- primary - before admission to independent work;
- Periodic - on time;

- Extraordinary - in violation of rules and regulations, at the request of the SI "Sanoatkontekhnazorat", "Uzdavenergonazorat", higher authorities, by decision of the special commission.

Periodic testing of knowledge of Rules of technical operation, RULES OF FIRE SAFETY, production and job descriptions should be carried out at least once every 3 years.

Periodicity of RULES OF SAFETY TECHNIQUE knowledge testing, device rules and safe operation of equipment controlled by SI "Sanoatkontehnazorat" - once a year.

2.9 Primary attestation is conducted after 1 year of work in this position; further attestations are conducted according to the results of the past, but not less than 1 time in 5 years.

2.10 The location of the Head of the GBCS section of the CCGT is located in the building of the GBCS Operator Station of the CCGT.

2.11 Service zone - the whole territory of the equipment location of the GBCS CCGT: gas-compression compressor plant, separator filters, air-cooling unit, compressed air compressor with receivers, nitrogen plant, dust collectors and gas pipelines on the territory of the GBCS section to the gate valves of the gas pipeline of the station.

3 Functions and responsibilities

3.1 Controls the operation and condition of equipment, mechanisms, devices and premises under its control, patrolling and inspecting, in order to detect and resolve problems in a timely manner.

3.2 Provides maintenance of the specified mode of operation of the site equipment.

3.3 Conducts prompt and technical maintenance of the equipment attached to the site.

3.4 Take measures to eliminate damage and eliminate the emergency condition of the equipment.

3.5 Participates in the investigation of the causes of accidents and failures in the operation of the compressor unit, records and analyzes them, and organizes emergency repairs.

3.6 It monitors the serviceable condition of fire fighting equipment.

3.7 Keeps track of the cleanliness of the equipment, premises and territory assigned to the site.

3.8 Participates in the development of annual and long-term plans repair, reconstruction and modernization of the thermal mechanical equipment of the site, as well as in the organization and implementation of measures for science and new technology, occupational safety and safety.

3.9 Performs organizational, technical measures for preparation and withdrawal of the site equipment in capital, medium, current repairs.

3.10 Supervises the quality, volume of repair work carried out by the centralized repair area, contractors, and also keeps a record of the required materials, spare parts.

3.11 Carry out the acceptance of the equipment after repair performed by all repair sites of JSC "NTPP", contractors and foreign companies.

3.12 Carries out a claim work in case of poor repair by contractors and foreign companies.

3.13 Keep records and report on the production activities of the site, maintains technical documentation.

3.14 Determines the amount of knowledge and safety instructions for all occupations and positions of workers, employees and engineers of the site, submits to the coordination with the trade union committee, unit management and for approval to the management of the station, organizes a timely review of them and provides them with jobs, requires their implementation and compliance.

3.15 Provides safe working conditions during operation, maintenance, repair of equipment, buildings, structures and in the management of technical processes.

3.16 Every day he gets acquainted with the records in the operational journal of the site, in the journal of equipment defects, on the status of SAFETY TECHNIQUE and industrial sanitation, visits them, and ensures the elimination of shortcomings.

Requires a report from the master and the senior shift operator at the beginning of the day on the state of SAFETY TECHNIQUE, technological processes of equipment, remedies, violations of SAFETY TECHNIQUE measures, norms and safe methods of work.

3.17 Timely organizes the study by workers and engineers of new and revised instructions and labor safety her documentation on labor protection, exercises control over their implementation.

Provides workplaces with operational journals, instructions, maps, diagrams, posters, safety signs, means for training jobs, and controls their safety and maintenance.

3.18 Participates in monthly safety precautions, fire safety. Supervises the observance of labor and production discipline and the implementation of instructions RULES OF SAFETY TECHNIQUE, immediately suppresses the violation of their operational personnel.

3.19 Weekly checks the condition of workplaces, tools, protective equipment, ventilation system, takes measures on elimination of the revealed infringements.

3.20 Take measures to reduce the level of harmful factors, ensure the proper operation of ventilation and heating systems, a normal microclimate, the illumination of workplaces. Carries out the maintenance of the passport of the sanitary and technical state in the unit.

3.21 Ensure timely management of all types of training, briefing, testing of staff knowledge. Participates in the commission to check the knowledge of workers, issues orders for admission to independent work.

3.22 Immediately informs the head of the unit and the management of the station about an accident, participates in the commission for its investigation, draws up the acts on accidents, develops measures to prevent them and directs them to the management of the unit for approval.

3.23 At the site meetings, discusses the state of LABOR SAFETY and SAFETY TECHNIQUE, industrial sanitation, morbidity, violations, orders, orders.

The staff of the site with injuries reviews and labor safety her documents on HSE are informed.

3.24 Organizes timely medical examination by the site staff.

3.25 Imposes penalties on the employees of the site for violation of LABOR SAFETY and SAFETY TECHNIQUE, instructions. Represents materials to encourage employees for active assistance in compliance with RULES OF SAFETY TECHNIQUE.

3.26 Works on the development of rational work, study and implementation of advanced labor methods and experience of innovators in the energy sector.

3.27 Organizes the holding of days of SAFETY TECHNIQUE, the work and equipping of cabinets and corners for SAFETY TECHNIQUE literature, manuals.

3.28 Supervises observance of labor and industrial discipline, implementation of instructions, regimes, RULES OF SAFETY TECHNIQUE, industrial sanitation, immediately suppresses their violation.

3.29 Daily checks selectively the preparation of jobs.

3.30 Organize the provision of workers with personal protective equipment, safety devices, soap, drinking water, coupons for milk.

3.31. Once a month, in conjunction with the chairman of the departmental committee (senior engineer for labor safety and safety technique), in order to implement the second stage of control, conduct a check on the condition of labor and safety conditions on the site, assess the work of the 1st stage of control.

3.32 Stops the operation of the units when creating hazardous conditions. Controls the correctness of issuing orders, orders for the production of works.

3.33 Ensures compliance with prescribed requirements, activities on SAFETY TECHNIQUE, stipulated by acts, orders and the like.

3.34 Prepares an annual plan of measures for the protection of labor and technology safety, industrial sanitation.

4 Rights

4.1 Take urgent measures to stop or reduce the load equipment, to stop the production of works by employees of the site in case of danger to people and equipment.

4.2 Discontinue work on the equipment and suspend from the work of persons violating safety regulations, fire safety or in the absence of a proper permit (order).

4.3 Issue outfits and give orders for implementation repair work on the equipment of the GBCS section.

4.4 Apply for withdrawal to repair equipment.

4.5 Make suggestions to the unit manager about imposing penalties for persons whose actions are unlawful or negligent attitude towards their duties led or could lead to spoilage or unjustified disconnections of the equipment of the GBCS site.

4.6 Sign the planned or reporting documents of the site.

4.7 Make suggestions to the unit manager and participate in the development of measures aimed at fulfilling the main tasks of the site, improving its technical and economic indicators, improving the working conditions of the site staff.

4.8 Give technical and administrative orders to subordinate staff.

4.9 Control compliance with the workplace workers and the workplace, the requirements of rules and regulations on labor protection, technology, safety and industrial sanitation.

4.10. Make proposals through the unit manager to the management of JSC "NTPP" about the hiring, dismissal and relocation of the site staff in accordance with the current legislation.

4.11 Encourage or make suggestions to the unit manager on the promotion of distinguished employees of the site.

4.12 Impose disciplinary sanctions against violators of labor and production discipline through the head of the unit.

5 Relationships

5.1 Relationships between the head of the GBCS section of the CCGT are carried out in accordance with this job description and KSt 202-810: 2011 "Regulations on the unit of combined cycle gas turbine plants".

6 Responsibility

6.1 The head of the section of the gas compressor station of the combined cycle gas turbine plants should comply with the requirements of the current legislation in the activities of subordinated personnel.

6.2 Head of the gas boosting compressor station of the unit combined-cycle steam and gas turbine plants to disciplinary, administrative and labor safety her measures of liability for non-fulfillment or improper performance of their

functional duties that led to the occurrence of accidents and accidents, damage to the employer's property and labor safety her adverse consequences, in accordance with the current legislation of the Republic of Uzbekistan.

Information data

Developed by

The CCGT unit of JSC "NTPP"

Head of unit I. Kh. Abdulloev

Agreed

Production and Technical Department

Head of the department T.K. Soliev

Planning and Economic Department

Head of department EE. Davova

Service reliability of machinery and industrial safety

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KSt 202- 818:2015

KSt 202- 836:2015

COMPANY STANDARD

JOB DESCRIPTION OF THE REPAIR MASTER OF THE THERMAL-MECHANICAL EQUIPMENT OF THE GAS BOOSTING COMPRESSOR STATON OF CCPP UNIT

STOCK COMPANY SC «NTPP»
NAVOI

Introduction

1 DEVELOPED AND ENTERED IN BY The CCGT UNIT of JSC "NTPP"

2 APPROVED AND RUN IN by the order SC «NTPP» №

3 INSTEAD OF KSt 202-836:2012

Approved

Chief engineer SC «NTPP»

T.G.Nazarov

COMPANY STANDARD

JOB DESCRIPTION OF THE REPAIR MASTER OF THE THERMAL-MECHANICAL EQUIPMENT OF THE GAS BOOSTING COMPRESSOR STATON OF CCPP UNIT

Expiration date from till

1 Application area

This manual is developed based on KSt 202-810: 2011 Regulations for the Combined Cycle of Gas Turbine Units, the Qualification Reference Book for Leaders, Employee Specialists 1987, for the purpose of regulating the functions, duties, rights and responsibilities of the repairman for the thermal mechanical equipment (TME) of the gas boosting compressor station of the combined cycle gas turbine plants, and is mandatory for him.

2 General terms

2.1 The repair master of the TME ensures the readiness of the equipment to a high degree of reliability and economy.

2.2 The repair master of the TME must have a higher technical education and work experience at least 1 year, or secondary specialized education and work experience at least 3 years.

In the absence of special education, the work experience in the industry is at least 5 years.

2.3 The repair master of the TME is appointed to the post, moved and dismissed from the position by the order of the general director of the station upon

presentation of the head of the unit of the CCGT, personnel department in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.4 The repair master of the TME in production and technical respect submits to the head of the GBCS section, administratively reports to the head of the CCGT unit, and to the deputy head of the CCGT unit on repair.

2.5 A group of duty locksmiths at the GBCS site are subordinated to the repair master of the TME in production and technical terms.

2.6 The repair master of the TME must know and be guided in his work:

- Indication of PP - 56;
- "Regulations on the investigation and recording of accidents and other damage to workers' health at work "approved by the Cabinet of Ministers on June 6, 1997;
- RH 34-114: 2007 "Regulations on Disciplinary Responsibility of Workers of the Uzbek Energy System";
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan of 12.01.1999 No. 140 "On measures to strengthen the performance discipline";
- The Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 from 30.09.2009;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated August 22, 2009 "On Approval of the Rules for the Use of Electric and Thermal Energy";
- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan", Tashkent 2011, in the following scope:

Section 1 Chapter 1; §1-16
Section 2 Chapter 1; §1-2
Chapter 3 paras. 1,7,9,13;
Chapter 4 paras. 2.12.14;
Chapter 5.

- "Safety rules for operation thermal mechanical equipment of power stations and heat networks »Tashkent 2012, in the following volume:

Chapter I
Chapter II, III § 1, 2, 3, 4, 6, 9, 11, 12, 13;

Chapter IV § 2 B, D; § 3 B; § 4 A, B; § 8, 9;
Appendix No. 2, 3, 4, 5, 6, 7, 10, 11, 15, 16, 17;

- "Safety rules in the gas economy of the Republic of Uzbekistan", Tashkent 2004, in the following volume:

Chapter I §§1.2, §3, §4;
Chapter II§ 1, §2;
Chapter III §§4§ 7;
Chapter V;
Chapter VI;
Chapter VII;

Annexes 1,2,19,30,31,32.

- "Rules for the Arrangement and Safe Operation of Vessels Working Under Pressure", Tashkent 2011 in the following scope:

Chapter I § 1;
Chapter III § 1, 2;
Chapter V § 1, 2,
Appendix No. 3 § 1, 2;
Appendix No. 13;
Appendix No. 14;

- "Safety rules when working with tools and devices";
- "Fire Safety Rules for Power Enterprises", Tashkent 2013;
- "Instruction on fire safety measures for fire works at power facilities";
- "Explosion safety rules for the use of gas, fuel oil in boiler plants";
- The present job description, "Regulations on the CCGT unit", job descriptions and production instructions of all subordinate personnel;
- KSt 202-036-2007 "Rules of internal labor regulations of employees of JSC "NTPP";
- RH 34-304-258: 2010 "Typical instructions. Contents and application of primary fire extinguishing means at electric power facilities ";
- "Instructions for the investigation and recording of fires that occurred at energy facilities";
- "Regulations on the investigation and recording of accidents and other injuries to workers' health at work" approved by the Cabinet of Ministers on June 06, 1997;
- Orders and orders of NTPP;
- Directive materials of SJC "Uzbekenergo", operational and emergency warnings, emergency orders and others;
- "Rules for the organization of work with personnel at energy production enterprises", registered by the Ministry of Justice RUz on 04.10.2002 № 1178;
- KSt202-038: 2008 "Regulations on incentive payments for managers, specialists, employees and workstations for the main results of economic activity";
- The Labor Code of the Republic of Uzbekistan, Tashkent1996;
- "Typical instruction for control and prolongation of the service life of the main components of boilers, turbines and pipelines of thermal power plants".
- "Instructions for first aid for victims in connection with accidents in the maintenance of power equipment";

2.7 The repairman for the thermal mechanical equipment of the GBCS section of the CCGT unit should know:

2.7.1. Design, operating characteristics and performance characteristics of the main and auxiliary equipment of GBCS.

2.7.2 Technological diagrams of equipment.

2.7.3 Arrangement of fire extinguishing means and systems water supply of the GBCS section.

2.7.4 Daily, monthly, quarterly annual technical-economic indicators and planned targets for them.

2.7.5 Geographical location of equipment (gas-boosting compressor unit, pipelines, filter-separators, compressed air compressor, ABO coolers, etc.).

2.8 Testing the knowledge of Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY, job descriptions and production instructions should be carried out:

- primary - before admission to independent work,
- Periodic - on time,
- an extraordinary one - in case of violation of rules and instructions, at the request of the State Supervision Authority, the State Energy Inspectorate, higher officials of the administration, by decision of the special commission.

Periodic testing of knowledge of Rules of technical operation, RULES OF FIRE SAFETY, production and job descriptions should be carried out at least every 3 years.

Periodicity of verification of RULES OF SAFETY TECHNIQUE knowledge, rules for the device and safe operation of equipment controlled by the Agency "Sanoategeocontechnazorat" - once a year.

2.9 Primary attestation is conducted after 1 year of work in this position; further attestations are conducted according to the results of the past, but not less than 1 time in 5 years.

2.10 The workplace of the repairman for the TME of the GBCS section is located in the operator building of the GBCS section.

2.11 Service area - equipment of the GBCS site.

3 Functions and responsibilities

3.1 Participates in drawing up annual repair schedules equipment, as well as in the program before and after repair work.

3.2 Participates in drawing up annual applications for materials, spare parts for reconstruction and technical re-equipment.

3.3 Controls the completeness of the work sheets for capital, current and emergency repairs.

3.4 Controls the completeness of volumes and quality of repair work, takes part in the acceptance of equipment.

3.5. It monitors the maintenance of repair documentation (passports, forms) of basic and auxiliary equipment.

3.6 Determines the possibility and need for repair of auxiliary equipment, coordinates the scope of repairs with the Central Repair Unit(CRU), monitors the implementation of organizational and technical measures to remove equipment for repairs.

3.7 Participates in the implementation of measures to improve fire safety equipment of the GBCS section.

3.8 Participates in compiling monthly work plans for the CRU and contracting organizations.

3.9 Prepares the equipment of the GBCS site for technical inspection by the inspectors of "Sanoatgeocontechnazorat" and the station commission.

3.10. It monitors the operational elimination of defects in the operation of the equipment of the GBCS site in fault logs.

3.11 Periodically supervises the observance of RULES OF SAFETY TECHNIQUE by the staff of the CRU and the contracting organizations with the measures taken against the offenders.

3.12It conducts regular patrol of the equipment of the GBCS section.

3.13Organizes and verifies the work of the personnel of the repair group of the GBCS section in accordance with the "Rules for the organization of work with personnel at energy production enterprises".

3.14 Implements in accordance with the provisions of the CCGT unit leadership led by the group; Ensures that the group fulfills planned tasks within the established timeframe; increase in labor productivity; rational use of materials, fuel, energy; normalizes their work and compiles a report for the month.

3.15 Organization of the introduction of advanced methods and techniques of labor, combining professions, attestation and rationalization of workplaces and other elements of scientific organization of work.

Ensures the fulfillment of the working standards of working out, the correct use of organizational and technical measures, the correct use of organizational technical toolings (tooling and tools).

3.16Provides industrial instruction of workers, conducts measures to implement the rules of labor protection, safety and industrial sanitation, technical operation of equipment and tools, as well as monitoring their compliance.

3.17 Promotes the application of progressive forms of labor organization, introduces proposals for assigning workers in accordance with the ETCS, participates in the tariffing of works and assignment of qualification categories to working day groups.

3.18 Analyzes the results of production activities: controls the expenditure of the wage fund to the established group, ensures the correctness and timeliness of the preparation of primary documents for the recording of working hours.

3.19 Promotes the dissemination of best practices, attentions, the development of creative plans, the introduction of rationalization proposals and inventions.

3.20 Ensures timely review in accordance with the established procedure of labor cost norms, the introduction of technically sound norms and standardized tasks.

Takes part in the implementation of works to identify the reserves of production, in the development of measures to create favorable working conditions, enhance the culture of production, and rational use of working time.

3.21 Ensures compliance with the working requirements of the rules and instructions of safety engineering and the application of safe methods in the performance of work.

3.22 Daily checks for serviceability and correct operation of equipment, mechanisms.
Takes measures to eliminate the identified shortcomings.
In cases where malfunctions in the operation of the equipment can not be eliminated and there is a clear danger to the workers, DO NOT carry out the work, and the repairman of the TME notifies the site manager about it.

3.23 It organizes preventive maintenance of equipment that ensures its safe operation.

3.24 Receives (issues) work orders-permits and orders for the production of works that require their registration, and does not allow the execution of such works without obtaining the necessary permits.

3.25Organizes periodic and unscheduled briefings, briefings at workplaces on safe methods of work with their registration in the briefing book, attire-admission.

3.26 Before starting work, checks compliance with safety requirements for tools, equipment, mechanisms, safety devices, protective equipment, scaffolding, decking, and other devices intended for repair.
DO NOT use them until the defects are solved.

3.27. Provides warning equipment on the equipment and corresponding shut-off devices on maintenance of repair works, as well as fences and other safety precautions.

3.28 Carries out continuous supervision and direct management of work or the performance of its individual stages in cases provided for in the safety regulations.

3.29 Every day, at the beginning of the working day, in conjunction with the public inspector for labor protection, in order to carry out the first stage of control, checks the personnel compliance with safety regulations, the use of overalls and special footwear, the necessary devices identified by the previous test.
When there is disobedience on the part of individual workers in observance of safe methods of work, removes them from work, makes representation with imposing penalties, conducts emergency instruction in safety precautions.

3.30 Ensures cleanliness and order in workplaces, in the aisles, and on access roads, as well as sufficient illumination of workplaces, correct maintenance of crane tracks with systematic (daily) inspection of working conditions of workers.
Takes measures to eliminate the identified shortcomings.

3.31 Controls compliance with the norms of carrying loads, including women and adolescents, providing jobs with safety signs, warning inscriptions and posters.

3.32Also measures against the possible presence of outsiders in the territory of the site of work, in production premises and at workplaces.

3.33 Daily reviews of logs on the status of equipment, violations of safety rules and production sanitation, visits them, determines the measures and gives the task to eliminate the defects, malfunctions, violations.

3.34Increases the causes of violations of safety rules in the conduct of work, parses them with staff and determines measures to prevent further.

3.35 Participates in the development for workplaces and professions of safety instructions for maintenance work during repair.

3.36 Ensures the fulfillment in due time of prescriptions and measures for the improvement and creation of safe working conditions, provided for by acts, orders and orders, lists of defects.

3.37 At meetings of engineering and technical workers of the unit, meetings of production personnel (site) or shifts, reports on the violations of safety rules during work, cleaning and repair of equipment.

3.38 In case of an emergency, he urgently organizes first aid to the victim and his delivery to the medical unit (clinic), immediately notifies the head of the production unit and the shift supervisor, keeps the situation at the workplace and the condition of the equipment as they were at the time of the incident does not threaten the life and health of employees, does not lead to an accident, does not violate the continuous production process in technology).

It takes measures to eliminate other incidents (fires, equipment malfunctions), taking into account the timeliness and correctness of the measures taken, and adjusting them. Informs the head of the site about this.

3.39 Train the newly adopted and transferred workers in safe working methods. Participates in the work of the commissions to check the knowledge of the unit for admission to independent work. Supervises the timely conduct of briefings, training, testing of knowledge of subordinate personnel.

3.40 Introduces proposals for the promotion of subordinate staff for observance of discipline and safe working methods, good maintenance and continuous use of protective equipment, safety devices and devices.

3.42 Organizes the development of surveys on accidents and information materials.

4 Rights

4.1 Supervises a group of locksmiths on the repair of the TME of the GBCS section.

4.2 Terminates the production of works and removes from repair personnel for violations of RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY.

4.3 Submits to the head of the GBCS section the materials on the encouragement or imposition of penalties on locksmiths on the repair of equipment.

4.4 Appeals the orders of the head of the GBCS section to the head of the CCGT unit. Do not suspend its execution until a final decision has been made by the management of the unit.

4.5 In case of disagreement with the received order, the repair master of the TME of the site of the GBCS of the CCGT unit declares this, but after receiving the confirmation, it performs it, if this does not threaten the safety of the personnel

or the safety of the equipment. To verify the correctness of the understanding of the received order, he repeatedly replies to his person who gave this order.

5 Relationships

5.1 Fulfills all administrative and technical orders of the head of the GBCS section and the deputy head of repair of the CCGT unit.

5.2 In case of receiving an order from the chief engineer or the director, executes it and brings it to the attention of the deputy head of the unit of the CCGT of the GBCS section.

5.3 Gives orders and instructions to the repair and operational personnel of the GBCS site, receives from them reports of all malfunctions and defects in the operation of the equipment plots, takes measures to eliminate them, recruiting repair personnel at the GBCS section of the CCGT unit, CRU and contractors.

5.4 Coordinates the issues of repairing equipment with the masters of the CRU, the electric unit, the TAI unit, contractors, resolving the issues of disagreement through the deputy head of the unit of the CCGTs on repair.

5.5 In telephone conversations, he names his name and position, and then transmits or receives an order or message.

5.6 The orders of the repairman for the thermal mechanical equipment of the GBCS section of the CCGT unit can be canceled by the head of the GBCS section.

6 Responsibility

6.1. The repairman for the TME of the GBCS section of the CCGT unit should comply with the requirements of the current legislation in the activities of subordinated personnel.

6.2. The repairman for the TME of the GBCS section of the CCGT unit is involved in disciplinary, administrative and other measures of responsibility for failure to perform or improperly performing its functional duties, resulting in accidents and accidents, damage to the employer's property and other adverse consequences, in accordance with the current legislation of the Republic Uzbekistan.

Informational data

Developed by The CCGT unit of JSC "NTPP"
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Agreed
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Head of the department T.K. Soliev

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Responsible for Standardization N.S. Nurullaeva

KSt 202-831:2015

COMPANY STANDARD

JOB DESCRIPTION OF DUTY LOCKSMITH(MECHANIC) OF GAS BOOSTING COMPRESSOR STATION OF CCPP UNIT

STOCK COMPANY SC «NTPP»

NAVOI

Introduction

1 DEVELOPED AND ENTERED BY The CCGT UNIT of JSC " NTPP "

2 APPROVED AND RUN IN by the order SC « NTPP » №

3 INSTEAD OF KSt 202-838:2012

Approved

Production director

SC « NTPP»

T. G. Nazarov

COMPANY STANDARD

JOB DESCRIPTION OF DUTY LOCKSMITH OF GAS BOOSTING COMPRESSOR STATION OF CCPP UNIT

Term of validity from till

1 Application area

This manual is developed based on KSt 202-810: 2011 "Regulations on the unit of combined cycle steam and gas turbine plants", the Unified tariff and qualification directory of works and occupations of workers, in order to regulate the functions, duties, rights and responsibilities of the duty locksmith at the GBCS unit of the CCGT unit, and is mandatory for him.

The instruction should be known by: the duty locksmith of the GBCS section, the senior operator of the GBCS section, the operators and the patrol-operators of the compressor unit.

2 General terms

2.1 The main task of the on-duty locksmith is the repair maintenance of thermal mechanical equipment in the section of GBCS. Monitoring the operation of the equipment of the service site.

2.2 Persons who are not younger than 18 years old and have secondary specialized education, who have undergone medical examination, knowledge testing, internship (duplication) are appointed to the position of the on-duty locksmith at the GBCS site, in accordance with the "Rules for the organization of work with personnel at energy production enterprises" by the registered Ministry of Justice of the Republic of Uzbekistan dated 04.10.2002 N 1178.

2.3 The duty locksmith of the GBCS site is appointed, moved and dismissed by the order of the general director of the power station on the proposal of the head of the GBCS section, the head of the CCGT unit and the personnel department, in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.4 The duty locksmith of the GBCS section administratively and technically obeys the master of the GBCS section, and in the operational senior operator of the CCGT and the operator of the GBCS compressor unit.

2.5 The responsibility for the preparation of the workplace for the on-duty locksmith and the admitting is the senior operator of the CCGT unit.

2.6 The duty locksmith of the GBCS site should know and be guided in his work:

- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan", Tashkent 2011 in the following volume:

Section I Chapter 1§ 1-7, 12-16;

Section II Chapter 1;

Chapter 3 § 1 paras. 173-190, paras. 201-218

§ 9, 13;

Chapter 4§2, 12, 14;

Chapter 5§ 5-6.

- "Safety rules for the operation of thermal mechanical equipment of the power plant of heating networks", Tashkent 2012 in the following volume:

Chapter I;

Chapter II;

Chapter III;

Chapter VI § 2B;

Annexes 2, 3, 4, 5, 6, 7, 16.

- "Safety rules in the gas economy of the Republic Uzbekistan, Tashkent 2004, in the following volume:

Chapter I§ 1,2,3,4;

Chapter VI;

Appendices 31.

- "Safety rules when working with tools and devices";

- "Fire safety rules for energy companies", Tashkent 213;

- KSt 202-036-2007 "Rules of internal labor regulations of employees of JSC "NTPP";

- RH 34-304-258: 2010 "Typical instructions. Contents and application of primary fire extinguishing means at electric power facilities ";

- "Instructions for first aid for victims in connection with accidents in the maintenance of power equipment";

- Job description.

2.7 The on-duty locksmith of the GBCS site should know:

- The device, operation and main operational characteristics of the compressor plant, fittings, filter-separators and technology of their repair;

- Operational instructions and flow diagrams of the compressor station;

- Territorial location of the main and auxiliary equipment.

2.8 Testing the knowledge of Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY, job descriptions and production instructions should be carried out:

- primary - before admission to independent work;

- Periodic - on time;

- extraordinary - in case of violation of rules and instructions, at the request of the state supervision bodies, the State Energy Inspectorate, higher management bodies as decided by the special commission.

Periodic testing of knowledge of Rules of technical operation, RULES OF FIRE SAFETY, production and job descriptions should be carried out at least once every 3 years.

Periodicity of verification of RULES OF SAFETY TECHNIQUE knowledge, rules for the device and safe operation of equipment controlled by the Agency "Sanoatgeotehnazorat" - once a year.

2.9 The workplace of the on-duty locksmith at the GBCS site is located in the operator's building of the CCGT.

2.10. The service zone of the duty locksmith at the GBCS site is the entire territory where the GBCS equipment is located.

3 Responsibilities

3.1 To monitor the timely tightening of the oil seals of pumps and accessories of the compressor plant, as well as the quality stuffing of the stuffing boxes on the

valves and pumps that have been put out for repair and replacement fingers on the couplings of pumps.

3.2 Clean ABO pipe system, oil coolers, separator filters, gas heaters disconnected for repair.

3.3 Troubleshoot the operation of the equipment.

3.4 Maintain control over the parameters of the compressor plant during start-up stops.

3.5 Eliminate leaks of air, oil and nitrogen by order of the senior operator or compressor operator.

3.6 Participate in start-ups, equipment breakdowns, in the elimination of emergency situations.

3.7 Reception and delivery of the shift in accordance with the Rules for the technical operation of power plants and networks.

3.8 Inspection of the equipment during the shift.

3.8.1 When taking a shift, the on-duty locksmith must:

- receive information from the person who takes the shift about the equipment, which must be carefully monitored to prevent violations in the work;

- check and accept from the person who gives the shift tool, materials, (stuffing box packing, lubricant, keys, workplace documentation);

- report to the senior operator about entering into duty and

The shortcomings revealed during the acceptance of the shift.

- acceptance and delivery of the shift during the liquidation of the accident is FORBIDDEN.

- in the event of an emergency situation, the on-duty locksmith who comes on the job is used at the discretion of the person guiding the liquidation of the accident;

- leaving from duty without changing the shift is PROHIBITED.

3.9 Extinguishing fires and fires on equipment senior operator of the power unit of the CCGT unit.

3.10 Increase technical knowledge, participate in production and economic studies.

3.11 Maintain the complete tool and tools in serviceability.

3.12 Keep your workplace clean.

3.13 In case of emergency, immediately arrange first aid to the victim and deliver him to the medical unit (medical center), immediately inform the site manager and the shift supervisor, keeping the situation at the workplace and the condition of the equipment as they were at the time of the incident threatens life and health of employees, will not lead to an accident, it will not break the continuous production process in technology).

4 Rights

4.1 Require the senior operator of the GBCS site to repair equipment in order to eliminate defects.

4.2 Require the administration of the unit to provide on-duty locksmiths with the necessary tools, consumables, and protective equipment in accordance with the requirements of RULES OF SAFETY TECHNIQUE.

4.3 Do not comply with orders that conflict with Rules of technical operation, RULES OF SAFETY TECHNIQUE or pose a threat to the safety of people or the safety of equipment.

4.4 Appeal in case of disagreement other orders not suspending their execution.

5 Relationships

5.1 Carries out all orders of the higher shift personnel, stipulated by the duties of the duty locksmith, in accordance with this job description.

If disagreement is received by the order, the duty locksmith of the site, the GBCS must state this to the person who issued the order, but after receiving the confirmation of the order, it fulfills it, if this does not threaten the safety of the personnel or the safety of the equipment.

5.2 In case of receiving an order directly from the general director, production director or other administrative person of the power plant, it executes it and informs the operator of the GBCS or the senior operator of the CCGT unit.

5.3 In operational telephone conversations with personnel, he first of all names his position and surname, and then receives an order or a message.

5.4 Disagreements that do not find a common solution may be resolved by the "Labor Disputes Commission".

6 Responsibility

6.2 The duty locksmith of the GBCS site is involved in disciplinary, administrative and other measures of responsibility for failure to perform or improperly performing his or her functional duties, resulting in accidents and accidents, damage to the employer's property and other adverse consequences, in accordance with the current legislation of the Republic of Uzbekistan.

Information data

Developed

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COMPANY STANDARD

JOB DESCRIPTION OF THE DEPUTY HEAD ON REPAIR OF CCPP UNIT

STOCK COMPANY SC «NTPP»

NAVOI

Introduction

1 DEVELOPED AND ENTERED IN BY The CCPP unit of JSC "NTPP"

2 APPROVED AND RUN IN BY the order of SC « NTPP » №

3 INSTEAD OF KSt 202-813:2012

Approved

SC « NTPP » Director

K. Kh. Ganiev

COMPANY STANDARD

JOB DESCRIPTION OF THE DEPUTY HEAD ON REPAIR OF CCPP UNIT

Term of validity from till

1 Application area

This manual is developed based on KSt 202-810: 2011 "Regulations on the unit of combined-cycle combined cycle gas turbine plants", the Qualification Reference Book for the positions of managers, specialists and employees in 1987, for the purpose of regulating the functions, duties, rights and responsibilities of the deputy head of the combined-cycle gas turbine plants (CCPP) and is mandatory for him.

2 General provisions

2.1 The deputy head for repair of the equipment at the CCGT unit is responsible for organizing the timely production of repair of equipment assigned to the CCGT unit, for ensuring the equipment is ready for carrying electrical and thermal loads with a high degree of reliability and economy.

2.2 The deputy head of the unit of the CCGT for repair must have higher technical education and work experience in engineering and technical positions for at least 3 years or secondary special and work experience in engineering and technical positions for at least 5 years.

2.3 The deputy head of the unit of the CCGT for repair is appointed, moved and is relieved of his post by the order of the director of the station at the request of the personnel department and the unit manager of the CCGT, in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.4 The deputy head of the unit for repair of the equipment of the CCGT unit in the production, technical and administrative respect submits to the head of the CCGT unit.

2.5 All repair engineers of the CCGT unit are subordinate to the deputy head of repair.

2.6 In the absence of the head of the unit and the deputy head for repair is replaced by the deputy head of the unit of the CCGT for operation.

2.7 In the absence of the head of the unit and the deputy head on operation is replaced by the deputy head of the unit of the CCGT CC for repair.

2.8 In the course of its activities, the Deputy Head of repair manages the entire repair team through the leading engineers of the CCGT unit.

2.9 Deputy Head of the unit of the CCGT for repair of equipment should know and be guided in their work:

- Indication of PP - 56;

- "Regulations on the investigation and recording of accidents and other damage to workers' health at work "approved by the Cabinet of Ministers on June 6, 1997;

- RH 34-114: 2007 "Regulations on Disciplinary Responsibility of Workers of the Uzbek Energy System";

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan of 12.01.1999 No. 140 "On measures to strengthen the performance discipline";

- The Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 of 30.09.2009;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan

No. 245 dated August 22, 2009 "On Approval of the Rules for the Use of Electric and Thermal Energy";

- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan", Tashkent 2011:

Section I Chapter I. § 1-16;

Section II Chapter 2. § 4;

Chapter 3. § 1, 3, 4, 5, 7, 8, 9, 11, 12, 13;

Chapter 4 § 1, 2, 12, 13, 14;

Chapter 5 § 1-6;

- "Safety rules for the operation of thermal mechanical equipment of power plants and heating networks", Tashkent 2012 in the following volume:

Chapter I.

Chapter 2 § 1, 2;

Chapter 3 § 1-6, 9-14;

Chapter 4 § 2, 3, 4, 6, 8, 9.

Appendix: 2-8, 10, 11, 13-17, 19

- "Safety rules in the gas economy of the Republic of Uzbekistan", Tashkent 2004 in the following volume:

Chapter I. General provisions. § 15;

Chapter III. Operation of gas facilities § 1, 2, 3, 4, 7;

Chapter VI. Gas hazardous work;

Applications - 19, 20, 30, 31, 32.

- "Rules for the Arrangement and Safe Operation of Steam and Hot Water Pipelines", 2010 in the amount of:

Chapter 1 General Provisions

Chapter 2 Designing

Chapter 3 Materials and semi-finished products

Chapter 4 Manufacturing, installation and repair

Chapter 5 Registration, technical survey, permit for operation

Chapter 6 Organization of Safe Operation and Repairs Chapter 8 Painting and Inscriptions on Pipelines

Chapter 9 Safety Signs

Chapter 10 Accident and accident control

Chapter 11 Compliance

Appendices 1-10;

- "Rules for the Arrangement and Safe Operation of Steam and Hot Water Boilers", Tashkent 1997 in the following scope:

Section 1.;

Section 2;

Section 3. 3.1 - 3.6;

Section 4. 4.1 - 4.7; 4.10;

Section 5. 5.1;

Section 6.

Section 7. 7.1-7.4;

Section 8;

Section 9;

Section 10;

Appendices 1, 2, 3, 4, 6.

- "Safety rules when working with tools and attachments";

- "Fire safety rules for energy companies", Tashkent 2013;

- RH 34-400: 2008 "Regulations on the Occupational Safety Management System in the Energy Industry;

- RH 34-304-258: 2010 "Typical instructions. Contents and application of primary fire extinguishing means at electric power facilities ";

- "Explosion safety rules when using fuel oil and natural gas in boiler plants";

- The present job description, the Regulations on the CCGT unit of the job descriptions and production instructions of all subordinate personnel;

- KSt 202-036-2007 "Rules of internal labor regulations for employees of JSC" NTPP ";

- "Instructions for the investigation and recording of fires that occurred at energy facilities";

- RH 34-077: 2008 "Rules for the organization of maintenance and repair of power plant equipment";

- Orders and orders of JSC "NTPP";

-Directive materials of SJSC "Uzbekenergo", operational and emergency circulars;

- "Rules of organization of work with personnel at energy production enterprises", registered by the Ministry of Justice RUz from 04.10.2002 N 1178;

- "Instructions for first aid to victims in connection with accidents while servicing power equipment";

- Labor Code of the Republic of Uzbekistan, Tashkent, 1996;

- RH 34-301-800: 2006 "Typical instructions. Control and prolongation of the service life of metal of the equipment of thermal power plants ";

- Guidance documents for the production of repair work;

- Design and operational characteristics of the main and auxiliary equipment, technological diagrams of the equipment of the CCGT unit, location of fire extinguishing means and water supply system, location of equipment, pipelines, fittings; rules and norms of labor, safety precautions, industrial sanitation, fire protection; the fundamentals of labor law; daily, monthly, quarterly and annual technical and economic indicators and targets for them;

- Existing GOSTs, SSBT, KMK with reference to activities.

2.10 Testing of knowledge of Rules of technical operation, Rules of safety technique, Rules of fire safety, job descriptions and production instructions should be carried out:

- primary - before admission to independent work,

- Periodic - on time,

- extraordinary - in case of violation of rules and instructions, on demand bodies of State Supervision, State Energy Inspectorate, higher management bodies, by decision of a special commission.

Periodic testing of knowledge of Rules of technical operation, Rules of fire safety, production and job descriptions should be made at least once every 3 years.

The periodicity of checking Rules of safety technique knowledge, the rules of the device and the maintenance of equipment controlled by the Agency "Sanoat-Geocontekhnazorat "- once a year.

Initial certification is carried out after 1 year of work in the of this position; The following attestations are conducted according to the results of past, but not less than 1 time in 5 years.

2.11 The location of the deputy head of the unit of the CCGT for repair of the equipment of the CCGT unit is located in the service room of the CCGT unit.

2.12 The repair service area is all the equipment of the CCGT unit at all heights: HRSG, steam and gas turbines of the CCGT, the gas compression compressor station and gas pipelines to the main gas valves of the gas supply station, the reserve condensate tank, the main pipelines of the heating network , a boiler with pumps.

3 Functions and responsibilities

3.1 Timely preparation and quality repairs and maintenance of the equipment at the CCGT unit.

3.2 Increasing the efficiency, repair production of the unit, the station.

3.3. Implementation of instructions (orders) of the unit manager of the CCGT on production and economic activities of the unit.

3.4 Bring production tasks, work plans to the masters, and organize their implementation.

3.5 To promote the development of rationalization, invention, to organize the introduction of adopted proposals.

3.6 Timely organization of scheduling, including network schedules, organization of work on planned, emergency repairs.

3.7 Participate in the acceptance of equipment from capital, medium, current repairs and testing after equipment repairs.

3.8 Coordinate the work of contractors, employed in repairing the equipment of the CCGT unit, organize acceptance of the repaired equipment by contractors with the preparation and maintenance of the relevant documentation for the work performed; to control volumes, quality, terms of performance and progress of repair work.

3.9 To organize the inspection of the technical condition and the defectiveness of the equipment being removed for repair.

3.10 Control the registration of technical documentation for the equipment being repaired, the receipt and storage of the accounting documentation on repair work performed by contractors.

3.11 Participate in the technical survey of facilities registered with the local bodies of Sanoat-geocontechnazorat ".

3.12 Ensure the implementation of approved measures, those decisions for the reconstruction, modernization of equipment.

3.13 Draw up claims for spare parts and materials, and protect them in OPPR and OMTC.

3.14 Maintain systematic monitoring of technical condition repaired equipment by patrol and acquaintance with the records in the fault logs, give appropriate instructions to the sections of the Central Repair Unit regarding the nature of the defects, the timing of their implementation and the order of priority.

3.15 Take into account, systematize all the problems, defects, simple equipment, study the causes of their occurrence; carry out measures to reduce them.

3.16 Organize subordinate staff training and implement quality control of training.

3.17 Ensure safe working conditions during operation, repair, maintenance of equipment.

3.18 Every day, get acquainted with the entries in the state of safety and industrial sanitation; to ensure the elimination of shortcomings by the personnel of the unit of the CCGT or CRU of station.

3.19 Require the masters of the report at the beginning of the day on the state of safety engineering, means of protection and violations of Rules of safety technique, norms and safe methods of work.

3.20. Provides the subordinate personnel with magazines, instructions, signs, safety posters, controls their safety; condition and equipment of the corners of Safety technique, Safety rules literature, manuals.

3.21 Supervises the observance of labor and production discipline, the implementation of instructions, regimes, Rules of safety technique, industrial sanitary, immediately suppresses their violation.

3.22 Daily checks the status of workplaces, tools, means of protection, takes measures to eliminate violations.

3.23 Daily checks the preparation of jobs (selectively).

3.24 Organizes the provision of individual workers protection with preventive devices, drinking water.

3.25 Controls the correctness of filling and issuing orders for the production of works.

3.26 Ensures compliance with prescribed requirements according to the Rules of safety technique, provided by the acts, orders, etc ..

3.27 Prepares proposals for a prospective comprehensive plan, makes ready plan of measures for the protection of labor and safety equipment, industrial sanitary, reducing the incidence of disease in the repair group of the unit.

3.28 Ensure timely management of all types of training instructing, testing the knowledge of the personnel.

He enters the commission to check the knowledge of workers, issues orders and permits for independent work..

4 Rights

4.1 Obtain from the unit manager of the CCGT and other engineering and technical employees and structural units of JSC "NTPP" documents and information necessary for the performance of their duties.

4.2 To give instructions to the unit masters of the CCGT for questions of production and economic activities, to require timely and high-quality implementation.

4.3 Participate in disassembling and discussing work plans and in summarizing the unit of the CCGT.

4.4 To issue spare parts, materials, tools, equipment, overalls, etc. from the warehouses of JSC "NTPP" in accordance with the established procedure.

4.5 To monitor and demand from the staff of the CCGT unit of the timely preparation of equipment for repair.

4.6 Suspend work in the event of a violation Rules of technical operation, Rules of fire safety, Rules of safety technique, production technology and other violations that could lead to injury to personnel, the violation of production technology or breakdown of equipment.

4.7 To head the tariff-qualification commission when checking the knowledge of personnel.

4.8 Make suggestions to the unit manager of the CCGT and develop measures aimed at the fulfillment of the main tasks of the CCGT unit on improvement of working conditions, technical and economic indicators of the unit, the station.

4.9 Make suggestions to the head of the CCGT CC on encouraging, punishing, depriving or reducing the premium to staff for production omissions or violations; on the training and placement of personnel; on the admission, transfer or dismissal of subordinate personnel; on the timing or order and labor leaves to the workers of the unit.

5 Relationships

5.1 Performs all administrative and technical orders of the head of unit of CCPP.

5.2 In case of disagreement with the received order, declares this, upon confirmation of the order, fulfills it, if this does not threaten the safety of personnel, the preservation of equipment.

To verify the correctness of the received order, he must repeat it to the person who issued the order.

5.3 If you receive an order from the director or chief engineer of the station performs it and brings this to the attention of the head of the CCGT unit.

5.4 Through the masters of the CCGT unit receives information and gives instructions to the operative and repair personnel regarding the withdrawal to repair, the commissioning after repair of the equipment of the CCGT unit, receives information from the masters about all the failures and defects in the equipment of the CCGT unit and takes measures to eliminate them.

5.5. Coordinates issues and documents for repair of equipment with the management of the Central Repair Unit, the electrical unit, CTAI, contractors, resolving the disagreements through the Deputy Chief Engineer for the repair of equipment of JSC "NTPP" and the unit manager of the CCGT.

5.6 At telephone conversations first of all says the surname and a post, and then transfers or receives the order or the message.

5.7 Orders of the deputy head of repair can be canceled by the unit manager of the CCGT.

6 Responsibility

6.1 The Deputy Head of Repair must comply with the requirements of the current legislation in the activities of subordinate personnel.

6.2 The Deputy Head of Repair is involved in disciplinary, administrative and other measures of responsibility for failure to perform or improper performance of their functional duties that led to the occurrence of accidents and accidents, damage to the employer's property and other adverse consequences, in accordance with the current legislation of the Republic of Uzbekistan

Information data

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Planning and Economic Department

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Head of Service Kh. O. Muminov

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KSt 202- 813:2015

STANDARD OF THE ENTERPRISE

JOB INSTRUCTION
OF THE FOREMAN ON REPAIR OF HEAT MECHANICS EQUIPMENT OF THE
THE WORKSHOP OF THE COMBINED CYCLE GAS TURBINES

Open Joint Stock Company NTPS
Navoi

Foreword

1. ELABORATED AND SUBMITTED by the Workshop of the Combined Cycle Gas Turbines of the Open Joint Stock Company NTPS

2. APPROVED AND ENFORCED by the Order of the Open JSC NTPS dated 27.04.2012 No. 221

3. INTRODUCED FOR THE FIRST TIME

KSt 202-822:2012

Approved
Chief Engineer of Open JSC NTPS

/signature/ K.H. Ganiev

STANDARD OF THE ENTERPRISE

JOB INSTRUCTION
OF THE FOREMAN ON REPAIR OF HEAT MECHANICS EQUIPMENT OF THE
THE WORKSHOP OF THE COMBINED CYCLE GAS TURBINES

Validity period from 01.05.2012 to 01.05.2015

1. Field of application

The present Instruction is elaborated on the basis of the KSt 202-810:2011 “Regulations on the workshop of the combined cycle gas turbines”, Qualification reference book of the positions of the heads, specialists and employees 1987 for the purposes of regulation of the functions, obligations, rights and responsibilities of the foreman on repair of heat mechanics equipment of the workshop of combined cycle gas turbines (CCGT) and is obligatory for him.

2. General Provisions

2.1. Foreman on repair of heat mechanics equipment of the CCGT workshop ensures readiness of the equipment for bearing thermal and electric loads at high level reliability and economy.

2.2. Foreman on repair of heat mechanics equipment of the CCGT workshop shall have higher technical education and years in service in the production not less than 1 year or secondary specialized education and years in service not less than 3 years.

In case of no specialized education years in service shall be not less than 5 years.

2.3. Foreman on repair of heat mechanics equipment of the CCGT workshop is assigned to his position, transferred to other position and dismissed from the position by the order of the Director of the power plant upon proposal of the Head of the CCGT workshop and Human Resource Department, in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.4. Foreman on repair of heat mechanics equipment of the CCGT workshop from administrative point of view is subordinated to the Head of the CCGT workshop while in production and technical aspects to the deputy head of the CCGT workshop on repair.

2.5. Foreman on repair of heat mechanics equipment of the CCGT workshop in production and technical aspects has subordinated team of the metalworkers and cleaning ladies for the production premises of the CCGT workshop.

2.6. Foreman on repair of heat mechanics equipment of the CCGT workshop shall be aware and follow in performing his duties the followings:

- "Rules of technical operation of the power stations and networks of the Republic of Uzbekistan", Tashkent 2005 in the following scope:

Section I	Chapter 1	§ 1-16;
Section II	Chapter 1	§ 1, 2;
	Chapter 2	§ 4;
	Chapter 3	§ 1, 3, 4, 5, 7, 8, 9, 11, 12, 13;
	Chapter 4	§ 1, 2, 12, 14;
	Chapter 5	§ 1-8;

- "Rules of Safety measures in operation of the heat mechanics equipment of the power stations and heating networks" in the following scope:

Section 1;

Section 2. Subsections 2.1-2.11;

Section 3. Subsection 3.1 – "A" clauses 3.1.1.; 3.1.4.; 3.1.14; 3.1.16; 3.1.18;
Subsection 3.2 – "C", "E";
Subsection 3.3 – "A";

Annexes 1-12.

- "Rules on fire safety for the power enterprises", Tashkent 2004;

- "Safety Rules in the gas sector of the Republic of Uzbekistan", Tashkent 2004, in the following scope:

Chapter I	§ 1; § 2 Clause 4
Chapter III	§ 1, 2, 3, 4,7;
Chapter V;	

Annexes 1, 2, 19, 30, 31, 32.

- "Rules of the Installation and safe operation of the vessels operating under pressure": Tashkent 1990 in the following scope:

Section 1	Subsections	1.1.; 1.2.;
Section 2	Subsection	2.1. Clauses 2.1.1, 2.1.2;
	Subsection	2.4. Clause 2.4.6;
Section 5	Subsections	5.1.-5.6.;
Section 6;	Subsections	6.2.-6.4.;
Section 7;	Subsections	7.1.-7.4.

- "Rules of design and safe operation of the pipelines of steam and hot water", 1992 in the following scope:

Section 1	Subsections	1.1.; 1.2.;
Section 4	Subsection	4.5;
Section 5	Subsections	5.1.-5.4.;

Section 6.

- Instruction RR-56;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated 12.01.1999 No. 140 "On the measures aimed on strengthening the operational discipline"

- Law of the Republic of Uzbekistan "On Electric power" No. 225 dated 30.09.2009;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated 22.08.2009 “On Approval of the rules of using the electric and heat power”;

- “Rules of design and safe operation of the steam and water heating boiler”, Tashkent, 1997;

- “Safety Rules in working with the instruments and devises”;

- “Instruction on the fire safety measures in performing fire related works at the power facilities”;

- “Rules of explosion safety in using the gas, mazut in the boiler units”;

- the present Job Instruction, “Regulations on the workshop of CCGT”, Job instructions and Industrial Instructions of all subordinated personnel;

- KSt 202-036: 2007 “Rules of internal labor policy of the workers of the Open Joint Stock Company NTPS”;

- RH 34-304-258:2010 “Model Instruction. Content and application of the primary means of fire extinguishing at the power sector facilities”;

- “Instructions on investigation and accounting of the fires, occurring at the power sector facilities”;

- “Regulations on investigation and recording the occupational accidents and other damages to the health of the personnel”, approved by the Cabinet of Ministers dated June 6, 1997;

- Orders and Instructions of the Open Joints Stock Company NTPS;

- Directive materials of the State Joint Stock Company “Uzbekenergo”, operational and emergency prevention instructions, emergency prevention orders and etc.;

- “Rules of organization of the work with the personnel at the enterprises of the power sector”, registered by the Ministry of Justice of the Republic of Uzbekistan dated 04.10.2012 No. 1178.

- KSt 202 – 038 : 2007 “Regulations on bonus payment of the workers, heads, specialists and other workers of the power station for the main results of the economic activity”;

- Labor Code of the Republic of Uzbekistan. Tashkent, 1996;

- RH 34-301-800:2006 “Model Instruction. Control and extension of the service life of metal of the equipment of thermal power stations”;

- “Model Instruction on control and extension of the service life of metal of the main elements of the boilers, turbines and pipelines of the thermal power stations”;

- “Instructions on rendering first aid to the injured persons in connection with the accidents in the process of servicing the energy equipment”;

- Rules and norms of the labor safety, safety measures, production sanitary and fire protection.

2.7. Examination on the knowledge of the Operation Rules, Safety Rules, Fire Safety, job instructions and industrial instructions shall be carried out as follows:

- initial – before granting the permission to the independent operation;

- periodical – within the set periods;

- unscheduled – in case of violation of the rules and instructions, upon the request of the bodies of the State Control, State Energy Inspection, higher bodies of management in accordance with the decision of the special commission.

Periodical examination for the knowledge of the Operation Rules, Fire Safety Rules, industrial and job instructions shall be carried out not less than once in 1 year.

2.7. Foreman on repair of heat mechanics equipment of the CCGT workshop shall know followings:

2.7.1. Design, specifics of operation and operational specifications of the main and auxiliary equipment of the CCGT workshop.

2.7.2. Manufacturing scheme of the equipment.

2.7.3. Location of the fire extinguishing means and the system of water supply of the CCGT workshop.

2.7.4. Daily, monthly, quarterly and annual technical and economic indicators and planned assignments on them.

2.7.5. Territorial location of the equipment (main equipment, pipelines, drums, heaters, coolers and etc.).

2.8. Examination on the knowledge of the technical operation rules, safety rules, fire safety, job instructions and industrial instructions shall be carried out as follows:

- initial – before granting the permission to the independent operation;
- periodical – within the set periods;
- unscheduled – in case of violation of the rules and instructions, upon the request of the bodies of the State Control, State Energy Inspection, higher bodies of management in accordance with the decision of the special commission.

Periodical examination for the knowledge of the technical operation rules, fire safety rules, industrial and job instructions shall be carried out not later than once in 3 years.

Periodicity of the examination of the knowledge of the safety measures, rules of design and safe operation of the equipment, supervised by the State Inspection “Sanoatgeokontehnazorat” is once a year.

2.9. Primary attestation shall be carried out after passing 1 year of working in the present position; subsequent attestations shall be carried out on the basis of the results of the previous attestation, but not later than once in 5 years.

2.10. Working place of the foreman on repair of the heat mechanics equipment of the CCGT workshop is in the service room of the CCGT workshop.

2.11. Servicing zone is the equipment of the CCGT workshop.

3. Functions and duties

3.1. Takes part in compiling the annual schedules of the repair of the equipment, as well as in the program of before repair and after repair works.

3.2. Takes part in compiling the annual applications for the materials, spare parts on reconstruction and technical re-equipment.

3.3. Controls complete filling the bulletins of the volumes of the works for overall, current and emergency repairs.

3.4. Controls completeness of the volumes and quality of the repair works, takes part in the acceptance of the equipment.

3.5. Performs control of maintaining repair documentation (passport, forms) of the main and auxiliary equipment.

3.6. Determines the possibility and necessity of the repair of the auxiliary equipment, coordinates the volume of the repair with the Central Repair Workshop, performs control over the fulfillment of the organizational and technical activities on the de-commissioning of the equipment to repair.

3.7. Carries out introduction of the activities on raising the fire safety level of the equipment of the CCGT workshop.

3.8. Takes part in compiling the monthly plans of the works for the Central Repair Workshop and contractor organizations.

3.9. Organizes readiness of the equipment of the CCGT workshop for conducting technical certification by the Inspectors of the Sanoatgeokontehnazorat and commission of the power plant.

3.10. Performs control over operative elimination of the defects in the operation of the equipment of the CCGT workshop in accordance with the journal of defects.

3.11. Performs periodical supervision over the observation of the rules of safety measures by the personnel of the Central Repair Workshop and by the contractor organizations with applying measures towards the violators.

3.12. Carries out regular inspections of the equipment of the CCGT workshop.

3.13. Organizes and examines the work of the personnel of the repair team of the CCGT workshop in accordance with the Rules of organization of the work with the personnel at the enterprises of power generation.

3.14. Ensures fulfillment by the subordinated personnel within the established timeframes planned tasks, raising the productivity of the labor, rational spending of the materials, fuel, power, normalizes their work and compiles report for the month.

3.15. Organizes introduction of the advanced methods and ways of the labor, combination of the professions, attestation and rationalization of the working places and other elements of the scientific organization of the labor.

Ensures fulfilling by the workers the norms of the output, correct usage of the organizational and technical activities, correct usage of the organizational technical equipment and facilities (fittings and equipment).

3.16. Performs production briefing to the workers, carries out activities on fulfilling the labor safety rules, safety measures and production sanitary, technical operation of the equipment, tools, as well as control over their observation.

3.17. Facilitates application of the modern forms of organization of the labor, submits proposals on assigning the qualification categories to the workers, takes part in the tariffing works and assigning the qualification categories to the workers of the daytime shift team.

3.18. Analyses the results of the production activity:

- controls the spending of the payroll fund established to the team;
- ensures correctness and timely filling the primary documents on accounting the working hours.

3.19. Facilitates dissemination of the advanced experience, initiatives, development of the creative plans, introduction of rationalization proposals and inventions.

3.20. Ensures timely revision of the norms of labor expenses in accordance with the established procedures, introduction of the technically grounded norms and standardized assignments.

Takes part in implementation of the works on revealing the reserves of production, elaboration of the activities on creation of the favorable labor conditions, raising the production culture, rational usage of the working hours.

3.21. Ensures observation by the workers the requirements of the rules and instructions of the safety measures and application of the safe methods in production of the works.

3.22. On daily basis carries out examination of the operability and correct operation of the equipment, mechanisms.

Takes measures on elimination of the revealed shortcomings.

In cases, when malfunctions in the operation of the equipment cannot be eliminated and there is an obvious danger for the workers, PROHIBITES performing works by the personnel and notifies about this the management of the workshop.

3.23. Organizes planned-prophylactic repair of the equipment, which ensures its safe operation.

3.24. Receives (issues) orders-permits and instructions for performing the works, which require their issuance and is not allowed to perform these works without obtaining the necessary permits.

3.25. Carries out periodical and unscheduled briefings, briefings at the work places on safe methods of the labor with registering them in the journal of briefings, order-permits.

3.26. Before s=commencement of the works, examines compliance with the requirements of the safety of the instrument, means of protection, scaffoldings, bridge floors, other devises, designed for carrying out repairs.

PROHIBITES their usage until hidden shortcomings are eliminated.

3.27. Ensures availability on the equipment and on corresponding disconnected devises the warning posters informing about carrying out repair works, as well as fences and other means of the safety measures.

3.28. Performs continuous control and direct supervision of the works or execution of its certain stages in cases, provided by the rules of safety measures.

3.29. On the daily basis, in the beginning of the working day, jointly with the public inspector on labor safety, in the form of the control of stage one, examines compliance by the personnel the rules of safety measures, application of the special protective clothes and footwear, necessary devises, violations, revealed in the time of previous examination.

In case of misconduct by the particular workers in observation of the safe methods of labor, removes them from the work and submits proposal on imposing penalty, as well as carries out unscheduled briefing on the safety measures.

3.30. Ensures cleanness and order at the working places, in passages, and access roads, as well as sufficient lighting of the working places, correct maintenance of the crane ways with systematical (daily) examination of the labor conditions of the workers.

Takes measures for elimination of the revealed shortcomings.

3.31. Control observation of the norms of carrying out weights, including by the women and teenagers.

3.32. Equips the working places with the safety signs, warning notices and posters.

3.33. Takes measures against possible presence of the outsiders at the area of working section, in production premises and at the working places.

3.34. Daily checks records in the journal on the conditions of the equipment, violation of the safety rules and production sanitary, endorses them, determines the measures and gives assignments for the elimination of the defects, malfunctions and violations.

3.35. Reveals the reasons of the violations of the rules of safety measures in performing the works, reviews them together with the personnel and determines the measures on preventing their occurrence in the future.

3.36. Participates in elaboration of the job instructions for the workers, instructions on safety measures and labor safety.

3.37. Ensures fulfilling the within the established timeframes instructions and activities on improvement and creation of safe labor conditions, provided by the acts, orders and instructions, bulletins of the defects.

3.38. At the meetings of the engineering and technical personnel of the workshop, meetings of the production personnel (section) or shifts, reports on the violations which took place in the process of operation, cleaning and repair of the equipment.

3.39. In case of accident immediately organizes first aid to the injured person and arranges his delivery to the medical center, immediately reports to the head of the workshop and head of the sift, preserves till the investigation the surrounding at the working place and conditions of the equipment, in the same conditions, as they were at the moment of accident (unless it threatens to the life and health of the workers, leads to emergency, violates continuous production process in accordance with the technologies).

Undertakes measures aimed on liquidation of other occurred accidents (fire, failure of equipment) taking into account at the same time timeliness and correctness of the undertaken measures, makes corrections. Notifies it to the head of the workshop.

3.40. Carries out training of the newly accepted or transferred workers to the safe methods of labor.

Participates in the work of the commission on examination of the knowledge of the workers of the workshop for granting permit to the independent work.

Controls for timely carrying out briefing, training, examination of the knowledge of the subordinated personnel.

3.41. Submits proposals on stimulation of the subordinated personnel for compliance with the discipline and safe methods of labor, good maintenance and continuous application of the protection means, safety devises and tools, for active participation in rendering aid to the injured persons and prevention of the accidents.

4. Rights

4.1 Stops performance of works and removes from the works the personal subordinated to him in case of violation of the rules of safety measures, rules of fire safety.

4.2. Submits to the deputy head of CCGT workshop on repair materials and stimulation or imposing penalties to the metalworkers on repair of heat and mechanics equipment and cleaning ladies of the production premises.

4.3. Lodges complaint against the instruction of the deputy head of CCGT workshop on repair to the head of the CCGT workshop without stopping its fulfillment until getting final decision by the side of the management of the workshop.

4.4. In case of disagreement with the received instruction foreman on repair of heat and mechanics equipment of the CCGT workshop reports about it, however after receiving confirmation fulfills it, unless it threatens to the safety of the personnel or safety of the equipment. For the purposes of verification of correct understanding of the received instruction obligatorily repeats instruction to the person who gave this instruction.

5. Interactions

5.1. Performs all administrative and technical orders of the head of the CCGT workshop and deputy head on repair.

5.2. In case of receiving the order from the chief engineer or director fulfills it and notifies the deputy head of the CCGT workshop and head of CCGT workshop.

5.3. Issues orders and instructions to the repair and operation personnel of CCGT, receives from them information on all malfunctions and defects in the operation of the equipment of CCGT workshop, undertakes measures aimed on their elimination, attracting repair personnel of the CCGT workshop, Central Repair Workshop and contractor organizations.

5.4. Coordinates the issues of repair of the equipment with the foremen of the centralized repair workshop, electric workshop, workshop of heat automatics and measurement, contractor organizations, resolving the occurred issues, disagreements through deputy head on repair of CCGT.

5.5. In telephone conversations first of all pronounces his surname and position, then shall transfer or receive order or message.

5.6. Orders of the foreman on repair of the heat and mechanics equipment of the CCGT workshop may be cancelled by the deputy head of the workshop on repair of CCGT.

6. Responsibility

6.1. Foreman on repair of the heat mechanics equipment of the CCGT workshop shall ensure compliance with the requirements of the legislation, currently in force in the operation of the subordinated personnel.

6.2. Foreman on repair of the heat mechanics equipment of the CCGT workshop shall bear disciplinary, administrative and other measures of responsibility for failing to fulfill or improper fulfillment of his functional duties, obligations, which lead to occurrence of the accidents and emergencies, damage of the property of the employer and other unfavorable consequences in accordance with the currently in force legislation of the Republic of Uzbekistan.

Information data

Elaborated by the Combined Cycle Gas Turbine Workshop of the Open joint Stock Company NTPS

Head of the workshop	/signature/	I.H. Abdulloev

Coordinated with

Production and technical division		
Head of the division	/signature/	T.H. Soliev
Planning and economic division		
Head of the division	/signature/	K.M. Djumayeva
Service of the reliability of the equipment and industrial safety		
Head of the division	/signature/	H. O. Muminov
Legal Advisor	/signature/	T.A. Toylokov
Staff responsible for standardization	/signature/	O.L. Zelenskaya

KSt 202- 633:2006

COMPANY STANDARD

JOB DESCRIPTION OF A METAL LABORATORY DEFECTOSCOPE WORKER

STOCK COMPANY SC « NTPP »

NAVOI

Introduction

1 DEVELOPED BY The metal laboratory

2 APPROVED AND RUN IN by the order SC «NTPP »

№478 dated 30.11.2006

3 FOR THE FIRST TIME

KSt 202- 633:2006

Approved

SC «NTPP » Director

B. I. Juraev

COMPANY STANDARD

JOB DESCRIPTION OF A METAL LABORATORY DEFECTOSCOPE WORKER (defectoscopeist)

Term of validity from 01.12.2006 till 01.12.2009

1 Application area

This manual is developed based on KSt 202-626: 2006 "Regulations on the unit of metal laboratory of SJC Navoi TPP", the Qualification Reference Book for the positions of managers, employees' specialists in 1987, and is mandatory for defectoscopist of non-destructive methods of testing and supervision of metal.

2 General terms

2.1 Persons who are not younger than 18 years of age who have been specially trained and certified, which should be noted in the qualification certificate for the right to produce these works, are admitted to the position of the defectoscopist of the site of non-destructive methods of control and supervision of metal (hereinafter - defectoscopist).

2.2 Qualification requirements are determined in accordance with the "Qualifications directory of positions of managers, specialists and employees 1987".

2.3 The defectoscopist is appointed to the position, moved and dismissed by the order of the director of JSC "NTPP", on the proposal of the head of the laboratory, in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.4 The defectoscopist is administratively subordinated to the head of the metal laboratory, and in the productional-technical activity - to the engineer.

2.5 Planned tasks for the defectoscopist are established in accordance with the approved plans of the unit.

2.6 The defectosopist must be guided in his work:

- The Law of the Republic of Uzbekistan "On Labor Protection"

- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan", Tashkent 2005.

Section I

Chapter I.

§ -1: p.p. from 1 to 13.

§ -3: p.p.31,33,43,45,46,47,48,51,52,53,54

§ -5: p.p.76,81,82,83,84

§ -6: p.p.85,86,87,87,89,90

§ -7: p.p.94,109

§ -8: p.p.117,119,120,121,122,124,126,128.

§ -13 whole.

§ -14 whole.

§ -15 p.p.236,238,239,240,241,242.

Section II

Chapter 3.

§ 9:p.p.434,435,436,437,442,446,448.

§ -13 whole.

-RD 34.03.201 91 "Rules Safety technique for the operation of thermal mechanical equipment of power plants and heating networks".

-legal documentation, instructions of the agency "Uzstandart", SJSC "Uzbekenergo";

- Orders, directions and instructions of the management of SJSC "Uzbekenergo" and the station;

-KSt 202-626:2006 “Regulations on metal laboratory”

- this manual.

2.7 The defectoscope is certified for compliance with the position in accordance with the established procedure, in accordance with the "Rules for the organization of work with personnel at energy production enterprises."

Approved by the order of the agency "Uzgosenergonadzor" from 10.09.2002 №433 passes the audit of knowledge of the Rules of Safety Technique once a year, according to the rules of technical operation, the Rules of fire safety, job descriptions and directives relevant to the competence of the unit - once in three years..

3 Function and Responsibilities

3.1 Directly performs visual, ultrasonic, magnetic particle testing, vortex control of metal, color flaw detection.

The defectoscopist (having the 2nd level of qualification) issues conclusions on the results of the control carried out.

3.2 Together with the operating personnel, he performs a visual inspection and inspection of the metal condition of the TPP equipment.

3.3 Participates in investigations of metal damage and the development of preventive measures.

3.4 Participates in drafting methodological instructions on issues within his competence.

4 Rights

4.1 To request verbally from the managers and specialists of the power system enterprises the necessary information on the condition and operating conditions of the metal of thermal mechanical equipment.

4.2 Require management of the unit to ensure working conditions that meet the standards of hygiene and industrial hygiene.

4.3 Appeal in the established manner the wrong actions and decisions in relation to themselves of the higher-level personnel of the laboratory.

5 Relationships

5.1 All relationships with other business units are carried out only through the management of the laboratory.

6 Responsibility

The defectoscopist is responsible in the prescribed manner for:

6.1 Quality of work performed on non-destructive testing of metal.

6.2 Timely issuance and reliability of conclusions based on the results of control.

6.3. Personal non-observance of Rules of technical operation, Rules of safety technique, Rules of fire safety, production discipline.

6.4 Material damage caused by his fault.

6.5 Failure to comply with the requirements of these instructions.

6.6 Safety of the equipment entrusted.

Informational data

Designed by metal laboratory

Head of laboratory D. V. Davidenko

Agreed

Production and Technical Department

Head of the department A.P. Nikolaev

Planning and Economic Department

Head of the Department M.I.Zikriyaev

Reliability and safety service

Head of the service I. M. Khamraev

Legal adviser I.B. Norov

Responsible for standardization O.L. Zelenskaya

KSt 202- 816:2012

COMPANY STANDARD

JOB DESCRIPTION OF THE CHEMICAL ENGINEER OF THE CCPP UNIT

STOCK COMPANY SC « NTPP »

NAVOI

Introduction

1 DEVELOPED AND ENTERED IN BY The CCGT UNIT OF OJSC "NTPP"

2 APPROVED AND RUN IN by the order SC « NTPP » №

3 INTRODUCED FOR THE FIRST TIME

Approved

SC « NTPP » Director

K. Kh. Ganiev

COMPANY STANDARD

JOB DESCRIPTION OF THE CHEMICAL ENGINEER OF THE CCPP UNIT

Term of validity from till

1 Application area

This manual is developed based on KSt 202-810: 2011 "Regulations on the unit of combined-cycle combined cycle gas turbine plants", the Qualification Reference Book for the positions of managers, specialists of employees 1987, for the purpose of regulating the functions, duties, rights and responsibilities of the chemical engineer of the combined cycle combined cycle gas turbine plants (CCGTs) and is mandatory for him.

2 General Terms

2.1 The chemical engineer of the CCGT unit must have a higher technical education and work experience in the chemical unit in engineering positions for at least 3 years.

2.2 The chemical engineer is appointed, moved and dismissed from the position by the director of the station upon presentation of the head of the unit of the CCGT, the personnel department in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.3 The chemical engineer of the unit of the CCGT is administratively and technically subject to the head of the CCGT unit.

2.4 The operational staff of the CCGT unit are subordinated to the chemical engineer of the CCGT unit in production and technical terms.

The work of the operational personnel is supervised by the chemical engineer of the CCGT unit, through the shift supervisors.

2.5 The chemical engineer of the CCGT unit must know and be guided in the work:

- Indication of PP - 56;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan of 12.01.1999 No. 140 "On measures to strengthen the performance discipline";

- The Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 from 30.09.2009;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated August 22, 2009 "On Approval of the Rules for the Use of Electric and Thermal Energy";

- "Rules for the organization of work with personnel at energy production enterprises", registered by the Ministry of Justice of the Republic of Uzbekistan No. 1178 of October 4, 2002;

- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan »Tashkent, 2005.

Section I Chapter 1 § 1-10; 13-16;

Section II Chapter 3 § 1, 8;

Chapter 4 § 1, 13, 14.

Annexes No. 1 of Table 3, 4.

- "Safety rules for the operation of thermal mechanical equipment of power plants and heating networks" in the following volume:

Terms and abbreviations.

Section 1

Section 2 subsections 2.1, 2.3;

subsection 2.4 paragraphs 2.4.22, 2.4.29;

Section 3 subsections 3.6, 3.7.

Attachments: 1 - 6.

- "Fire safety rules for energy companies", Tashkent 2004.

Chapter 1;

Chapter 3;

Chapter 4 § 3, 4;

Annex 1 Chapter 1 § 1-3;

Chapter 4 § 1 paras. 256-260;

Chapter 6 § 2 paragraph 414

- "Regulations on the investigation and recording of accidents and other damage to workers' health at work "approved by the Cabinet of Ministers on June 6, 1997;

- KSt 202-036-2007 "Rules of internal labor regulations for employees of OJSC NTPP";

- "Instructions for first aid to victims in connection with accidents while servicing power equipment";

- KSt 202-810: 2011 "Regulations on the unit of combined cycle gas turbine installations";

- KSt 202-038: 2018 "Regulations on incentive payments for managers, specialists, employees and workstations for the main results of economic activity";

- The current job description;

- Orders and orders for the station and the chemical unit;

- Directive materials of SJSC Uzbekenergo, operational and emergency response circulars;

- Production instructions of the CCGT unit;

- Laws of the Republic of Uzbekistan "On labor protection"

"On the protection of nature";

- The Labor Code of the Republic of Uzbekistan, Tashkent, 1996.

2.6 The chemical engineer of the CCGT unit should know:

2.6.1 The thermal scheme of the station, the hydrogen cooling circuit of the generator GT, the scheme of the oil system of turbines and transformers;

2.6.2 Technological processes and water-chemical mode of operation of the thermal mechanical equipment of the CCGT unit;

2.6.3 Technological processes and operating modes of water treatment schemes for CCGT units;

2.6.4 Quality standards of all analyzed substances to the CCGT unit;

2.6.5 Standards, technical conditions, methodologies and instructions on quality control of the substance of the CCGT unit;

2.6.6. Methodological, regulatory and other guidelines for the modernization of technological processes of equipment;

2.6.7. Principle of operation, operation rules and verification period for laboratory instruments and equipment installed at the CCGT unit;

2.6.8 Verification and construction of calibration schedules for KFK devices, conductometers, pH meters;

2.6.9 Schemes of process flows, releases; norms of the VCP for CCGT releases;

2.6.10 Conducting technology and chemical control of chemical leaching of equipment;

2.6.11 The technology of preparation and installation of titers of chemical solutions;

2.6.12 Rules and places of sampling for each analyzed object;

2.6.13 Location of fire extinguishing media.

2.7 The verification of the knowledge of Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY should be carried out:

- primary - before admission to independent work;

- Periodic - on time;

- Extraordinary - in violation of rules and instructions, at the request of the bodies of "Sanoatgeocontechnazorat", State Energy Inspectorate, higher authorities, by decision of the special commission.

Periodic testing of knowledge of Rules of technical operation, RULES OF FIRE SAFETY, production and job descriptions should be made at least once

in 3 years.

Periodicity of verification of RULES OF SAFETY TECHNIQUE knowledge, rules for the device and safe operation of equipment controlled by the Agency "Sanoategeocontechnazorat" - once a year.

2.8 Primary attestation is conducted after 1 year of work in this position.

The subsequent attestations are carried out according to the results of the passed attestation, but not less often than 1 time in 5 years.

3 Functions and responsibilities

3.1 Conducts organizational and technical measures, prepares technical documentation for conducting and monitoring chemical analyzes with personnel of the CCGT Unit.

3.2 Provides laboratory control of the compliance of quality of reagents, reagents, fuel, materials and finished products with the current standards and technical conditions.

3.3. It monitors the correctness of the water regime of the thermal mechanical equipment, takes measures through the heads of the shifts of the CCGT, the chemical unit and the electric unit to the elimination of deviations from the norms for all analyzed objects.

3.4. Performs constant monitoring of the implementation of the analytical control schedules, the correct and timely maintenance of the documentation of the operational personnel of the unit in the chemical fields.

3.5 He leads the work on the development of new and improvement of existing methods of analytical control and their introduction into production.

3.6 Supervises the development of acid wash programs, provides safety briefings for handling chemical reagents and chemical control during flushing.

3.7 Constructs schedules for chemical control of equipment.

3.8 Participates in the work of the commission for the verification of knowledge by the staff of Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY, production and job descriptions.

3.9 Participates in carrying out anti-emergency and fire fighting training and instructing staff of the CCGT unit.

3.10 Organizes carrying out of familiarization of the personnel with changes of chemical norms, modes and so on, makes necessary changes in the relevant documents.

3.11 Conducts activities to upgrade the operational staff of the CCGT unit in the chemical sector.

3.12 Reports on wastewater and the chemical regime of the equipment.

4 Rights

4.1 To give orders and instructions to the operational staff of the CCGT unit in accordance with the methods for improving the chemical analysis of equipment.

4.2. Through the shift supervisor, give instructions to the shift staff of the unit on water management issues.

4.3 To suspend the work to be performed and to remove the unit staff in case of violations of the requirements of Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY.

5 Relationships

5.1 Carries out all orders of the unit manager of the CCGT.

5.2 Carries out the orders of the chief engineer and brings this to the attention of the unit manager of the CCGT.

5.3 Gives instructions to operational personnel through the shift supervisor of the CCGT.

5.4 Orders of a chemical engineer may be revoked by the unit manager of the CCGT, or, in his absence, by the deputy head of the CCGT unit for operation with subsequent notification.

6 Responsibility

6.1 The chemical engineer of the CCGT unit must comply with the requirements of the current legislation in the activities of subordinated personnel.

6.2 The chemical engineer of the CCGT unit is involved in disciplinary, administrative and other measures of responsibility for non-fulfillment or improper performance of its functional duties, which resulted in the occurrence of accidents and accidents, damage to the employer's property and other adverse consequences, in accordance with the current legislation of the Republic of Uzbekistan.

Informational data

Designed by the CCGT Unit of OJSC "NTPP"

Head of unit I. Kh. Abdulloev

Agreed

Production and Technical Department

Head of Department I.S. Murtazaev

Planning and Economic Department

Head of the department F. R. Khozhiev

Service reliability of machinery and industrial safety

Head of the service Kh. O. Muminov

Legal adviser T.A. Toilokov

Responsible for standardization O.L. Zelenskaya

KSt 202- 860:2012

COMPANY STANDARD

JOB DESCRIPTION OF LABORATOR OF CHEMICAL ANALYSIS OF CCPP UNIT

Open Joint-Stock Company “NTPP’
Navoi

KSt 202- 860:2012

INTRODUCTION

1 DEVELOPED AND INDUCED BY CHEMICAL UNIT

2. APPROVED AND ENTRY INTO ACTION BY THE ORDER OF "NTPP" OJSC
dated _____ No.

3 INTRODUCED FOR THE FIRST TIME

KSt 202- 860:2012

APPROVE

Chief Engineer of "NTPP" OJSC

T. G. Nazarov

COMPANY STANDARD

JOB DESCRIPTION OF LABORATOR OF CHEMICAL ANALYSIS OF CCPP UNIT

Validity period from up to

1 AREA OF USE

This instruction was developed on the basis of KSt 202-451: 2003 "Regulations on the chemical unit", the Unified tariff-qualification reference book of works and occupations of workers, for the purpose of regulating the functions, duties, rights and responsibilities of the laborator of chemical analysis of combined cycle gas turbine plants and is mandatory for it.

2 General terms

2.1 The laboratory chemist of chemical analysis conducts precise, time-consuming analyzes that require practical skills and qualifications, with the aim of obtaining additional information on the status of the analyzed objects and timely correction in case of deviations from the norms.

2.2 The laboratory chemist of chemical analysis of the unit of combined cycle gas turbine plants should have a technical education and at least 1 year's work experience in production.

2.3 The laboratory chemist of chemical analysis of the unit of combined-cycle combined cycle gas turbine plants is appointed, moved and dismissed from the position by the director of the enterprise upon presentation of the unit manager of the CCGT, personnel department in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.4 The laboratory chemist of chemical analysis administratively submits to the head of the chemical unit, in production and technical terms, to the head of the chemical laboratory, to the senior engineer and engineer of the chemical laboratory.

2.5 The laboratory chemist of chemical analysis of the station of the combined-cycle combined cycle gas turbine plants should know and be guided in his work:

- "Safety rules for the operation of thermal mechanical equipment of power plants and heating networks"

Section 1;

Section 2 subsections: 2.1, 2.2, 2.8;

Section 3 subsections: 3.6;

subsections: 3.7 point "B";

Applications: 2, 3, 4, 5, 7, 8.

- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan", Tashkent 2005 in the following volume:

Section I Chapter I § 1-10, 13-16;

Section II Chapter 3 § 1, 8;

Chapter 4 § 1, 13, 14;

Applications: tables 3, 4.

- "Fire Safety Rules for Energy Enterprises", Tashkent 2004, in the following volume:

Chapter I;

Chapter II § 3;

Chapter III § 3;

Annex 1: Chapter I § 3;

Chapter IV § 1 paras. 256-260;

Chapter VI § 2 paras. 414-418.

- Indication of PP - 56;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan of 12.01.1999 No. 140 "On measures to strengthen the performance discipline";

- The Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 from 30.09.2009;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated August 22, 2009 "On Approval of the Rules for the Use of Electric and Thermal Energy";

- "Regulations on the investigation and recording of accidents and other damage to workers' health at work "approved by the Cabinet of Ministers on June 6, 1997;

- RH 34-114: 2007 "Regulations on Disciplinary Responsibility of Workers of the Uzbek Energy System";

- KSt 202-036-2007 "Rules of internal labor regulations for employees of OJSC" NTPP ";

- KSt 202-454-94 "Instruction. Chemical regime of boilers ";

- KSt 202-457: 2006 "Instruction. Operational plan for firefighting chemical facilities ";

- KSt 202-458-98 "Instruction. Fire-fighting measures in the chemical unit ";

- KSt 202- 475: 2004 "Instruction. Operational analysis of water and steam at thermal power plants ";

- KSt 202- 490-2006 "Instruction. Regulations on the chemical laboratory ";

- KSt 202-491: 2006 "Instruction. The job description of the laboratory chemist of chemical analysis;

- KSt 202- 493-2007 "Instruction. Safety precautions when working with poisonous substances;

- RH 34-301-489: 2007 "Instruction. Operational analysis of water and steam at TPPs ";

- RH 34-301-703: 2003 "Instruction. Analysis of sewage of thermal power plants ";

- RH 34-301-240: 2007 "Instruction. Exploitation of oil turbine oils";

- "Instructions for first aid to victims in connection with accidents while servicing power equipment";

- Directive materials of SJSC Uzbekenergo, operational and emergency response circulars relating to personnel of the chemical laboratory.

2.6 The chemical laboratory worker should know:

2.6.1 Quality standards of all facilities analyzed by the chemical laboratory.

2.6.2 Rules and technology for the preparation of chemical solutions and reagents, installation of titles.

2.6.3 Places and rules for sampling water, steam, fuel, energy oils, gas in systems of hydrogen cooling of generators, sewage, reagents.

2.6.4 Thermal diagram of thermal power plants, hydrogen cooling schemes generators, schemes of oil systems of turbines and transformers.

2.6.5. Schemes of WPU, COPS, condensate cleaning, evaporation plants, process effluents of OJSC "NTPP".

2.6.6 Principle of operation, operating rules and verification dates laboratory instruments and equipment.

2.6.7 GOSTs, methods for conducting water quality analysis, steam, gas, fuel, energy oils, gas contamination.

2.7 Testing the knowledge of Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY, job description and production instructions must be carried out:

- primary - before admission to independent work;

- periodic - for RULES OF TECHNICAL OPERATION at least once every 3 years, for RULES OF SAFETY TECHNIQUE 1 time per year;

- extraordinary - in case of violation of rules and instructions, at the request of state supervision bodies, State Energy Inspectorate, higher authorities on the decision of a special commission.

Periodic testing of knowledge of RULES OF TECHNICAL OPERATION, RULES OF FIRE SAFETY, production and job descriptions should be carried out at least once every 3 years.

2.8 The location of the laboratory chemist of chemical analysis in the chemical analysis laboratory of the CCGT.

2.9 Service area of the laboratory chemist of chemical analysis unit CCGT: equipment for automatic analysis of CCGT, Chemical water treatment (CWT) of CCGT Unit and UOPS of CCGT.

3 Functions and responsibilities

3.1 Conducts analytical quality control of water, steam, reagents, electrolyte with the frequency, stipulated by the schedule of chemical control of the day laboratory.

3.2 Controls the quality of energy oils of fresh and operational, operation of oil equipment.

3.3 Performs a complete gas analysis in hydrogen cooling generators and an electrolysis plant.

3.4 Controls the quality of all fuels according to the schedule chemical control.

3.5 Controls industrial premises of CCGT for gas contamination at approvals for repair work, gas hazardous wells.

3.6 Prepares the reagents needed for the current operational chemical control, for automatic control devices, determines the and sets the titres of solutions.

3.7 Controls the quality of waste water for all releases.

3.8 Conducts technical documentation for each type of work performed.

3.9 Takes part in receiving equipment after the capital and current repairs for cleanliness, conducts chemical control at chemical cleaning of thermal mechanical equipment.

3.10 Takes part in developing and mastering new techniques chemical control, GOST.

3.11 Maintains the cleanliness of the premises, workplace, chemical utensils, appliances and equipment.

4 Rights

4.1 Make proposals to increase the reliability and economy of the equipment and instruments, improve the working conditions of the laboratory staff.

4.2 Raise his qualification level.

4.3 Participate in the preparation of applications for providing chemical laboratory with utensils, reagents and chemical control devices.

4.4 Appeal to the head of the unit the order of the head laboratory in case of disagreement with it.

5 Relationships

5.1 Performs all orders of the head of the chemical laboratory, a senior engineer, engineer.

5.2 Carries out an order received from the head of the unit or his deputy and informs the head of the chemical laboratory about it.

5.3 In case of disagreement with the order received, the chemical technologist should notify the person who issued the order, but after receiving the confirmation of the order, it fulfills it, if this does not threaten the safety of the personnel or the safety of the equipment.

5.4 On deviations from the quality standards of the analyzed objects and equipment failure laboratory assistant informs the engineer, senior engineer or head of the chemical laboratory.

6 Responsibility

6.1 The laboratory chemist of chemical analysis of the unit of combined cycle gas turbine plants, depending on the degree and nature of the violations, is brought to disciplinary, administrative and other measures of responsibility for failure to perform or improperly performing its functional duties, resulting in accidents and accidents, damage to the employer's property and other adverse consequences, in accordance with the current legislation of the Republic of Uzbekistan.

INFORMATIONAL DATA

Developed by Chemical Unit
Head of unit E. R. Soliev

Agreed

Production and Technical Department
Head of Department I. S. Murtazaev

Planning and Economic Department
Head of the department F. R. Khozhiev

Service reliability of machinery and industrial safety
Head of the service Kh. O. Muminov

Legal adviser T. A. Toilokov

Responsible for standardization O. L. Zelenskaya

KSt 202- 861-2012

COMPANY STANDARD

JOB DESCRIPTION OF THE HEAD OF CHEMICAL WATER TREATMENT (CWT) SECTION OF CCPP

Open Joint-Stock Company “NTPP”
Navoi

KSt 202- 861:2012

INTRODUCTION

1 DEVELOPED AND INDUCED BY CHEMICAL UNIT OF JSC “NTPP”

2. APPROVED AND ENTRY INTO ACTION BY THE ORDER OF "NTPP" OJSC
dated _____ No.

3 INTRODUCED FOR THE FIRST TIME

KSt 202- 859:2012

APPROVE

DIRECTOR of OJSC "NTPP"

K. H. Ganiev

COMPANY STANDARD

JOB DESCRIPTION OF THE HEAD OF CHEMICAL WATER TREATMENT (CWT) SECTION OF CCPP

Validity period from up to

1 AREA OF USE

This instruction was developed on the basis of KSt 202-451: 2003 "Regulations on the chemical unit", the Qualification reference book for the positions of managers, specialists and employees 1987, for the purposes of regulating the functions, duties, rights and responsibilities of the head of the Chemical Water Treatment (CWT) section of the CCGT and is mandatory for him.

2 General Terms

2.1 The head of the CWT section of the CCGT unit should have a higher technical education and work experience in engineering and technical positions for at least 3 years or an average special and work experience in engineering and technical positions for at least 5 years.

2.2 The head of the CWT section of the CCGT unit is appointed, moved and dismissed from the position by the order of the director of the enterprise on the proposal of the head of the CWT section of the CCPP, the personnel department in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.3 The head of the CWT section of the CCGT is administratively and technically subject to the head of the chemical unit, and in production and technical terms to the deputy chemical unit on operation.

2.4 The entire staff of the CWT CCGT site submits to the head of the CWT section of the CCGT.

The head of the site manages the work of the operational personnel through the heads of shifts.

2.5 The head of the CWT section of the CCGT is the direct manager of reliable and economical operation and repair of equipment and the person responsible for the organization of labor by the personnel of the CWT section of the CCGT.

2.6 In the absence of the deputy head of the chemical unit, the head of the section shall perform his duties, in the absence of the head of the section, his duties are assigned to the unit's master.

2.7 The head of the CWT section of the CCGT should know and be guided in his work:

- Indication of PP - 56;
- "Regulations on the investigation and recording of accidents and other damage to workers' health at work "approved by the Cabinet of Ministers on June 6, 1997;
- RH 34-114: 2007 "Regulations on Disciplinary Responsibility of Workers of the Uzbek Energy System";
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan of 12.01.1999 No. 140 "On measures to strengthen the performance discipline";
- The Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 from 30.09.2009;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated August 22, 2009 "On Approval of the Rules for the Use of Electric and Thermal Energy";
- Rules of organization of work with personnel at enterprises of energy production registered by the Ministry of Justice of the Republic of Uzbekistan No. 1178 of October 4, 2002;
- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan", Tashkent 2005 in the following volume:

Section I Chapter 1. § 1 - 8; 12-16;
Section II Chapter 2. § 1, 2, 4;
Chapter 3. § 6, 8, 9.

- "Safety rules for the operation of thermal mechanical equipment of power plants and heating networks", in the following volume:

Section 1;
Section 2;
Section 3;
Section 4.
Applications.

- "Fire Safety Rules for Energy Enterprises", Tashkent 2004, in the following volume:

Chapter I;
Chapter II;
Chapter III;
Chapter IV §1, 3, 4;
Appendix No. 1:
Chapter I § 1, 2, 3;
Chapter IV § 2;
Chapter VI § 1, 2;
Appendix № 8.

- KSt 202-036-2007 "Rules of internal labor regulations for employees of OJSC" NTPP ";

- RN 34-400: 2008 "Regulations on the management system of labor protection in the energy sector.

- "Safety rules in the gas economy of the Republic of Uzbekistan", Tashkent 2004, in the following volume:

Chapter I;

Chapter III § 9;

Chapter VI;

Chapter VII.

- "Rules for the Arrangement and Safe Operation of Vessels Working Under Pressure" Tashkent 1997, in the following volume:

Section 1;

Section 2;

Section 3;

Section 4;

Section 5;

Section 6;

Section 7;

Section 10.

- "Typical instructions for the prevention and elimination of accidents at thermal stations"

- Management documents of SJSC "Uzbekenergo"

- Orders and orders of higher managers of OJSC "NTPP"

- "Regulations on the investigation and recording of accidents and other injuries to workers' health at work" approved by the Cabinet of Ministers on June 06, 1997;

- "Instructions for investigating and recording technological irregularities in the operation of power plants, networks and power systems".

- "Rules for the Arrangement and Safe Operation of Cranes", Tashkent 1994;

- KSt 202-117: 2006 "Instruction of the person responsible for the safe production of work by cranes"

- "Safety rules when working with tools and devices."

- Instructions and regulations concerning the chemical unit.

- Directive materials of higher organizations.

- KSt 202- 038: 20008 "Regulations on incentive payments for managers, specialists, employees and workstations for the main results of economic activity";

- RN 34-114: 2007 "Regulations on Disciplinary Responsibility of Workers of the Uzbek Energy System".

- RN 34-470: 2007 "Regulations on the order of time attendance in the Uzbek energy system".

- "Instructions for first aid to victims in connection with accidents while servicing power equipment";

2.8 Testing the knowledge of Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY should be carried out:

- primary - before admission to independent work;
- Periodic - on time;
- extraordinary - in violation of rules and regulations, at the request of the Sanoatgeocontehnazorat, the State Energy Inspectorate, higher authorities, by decision of the special commission.

Periodic testing of knowledge of Rules of technical operation, RULES OF FIRE SAFETY, production and job descriptions should be carried out at least once every 3 years.

Periodicity of RULES OF SAFETY TECHNIQUE knowledge testing, device rules and safe operation of equipment controlled by the Agency "Sanoatgeocontechnazorat" - once a year.

2.9 Primary attestation is conducted after 1 year of work in this position; further attestations are conducted according to the results of the past, but not less than 1 time in 5 years.

2.10 The location of the site manager is located in the administrative building of the site of CWT CCGT.

2.11 The service area of the site manager is the water treatment plant of the CWT CCGT, the system for dosing the reagents into the recovery boiler and the CCGT cooling tower, the sewage treatment plant and the list of equipment, buildings and structures of the respective units assigned to them.

3 Functions and responsibilities

3.1 The main task of the head of the CWT section of the CCGT is to ensure the uninterrupted operation of the site equipment.

3.2 The head of the CWT section of the CCGT fixes the sections of the CWT of the CCGTs for operational personnel, approves the patrol schedule, requires the maintenance of the equipment clean and technical serviceability, and the performance of the technical and economic performance of the chemical unit.

Controls the maintenance of operational and operational logs of the unit.

3.3 Personally, by patrols, monitors the condition of equipment, the implementation of the rules of RULES OF SAFETY TECHNIQUE, Rules of technical operation, RULES OF FIRE SAFETY personnel at workplaces.

3.4 Ensures timely delivery of materials, equipment, tools, special clothing for operation and maintenance of chemical unit equipment.

3.5 Organizes emergency repairs at any time of the day.

3.6 Organizes technical supervision over the construction and reconstruction of the unit, their testing and commissioning.

3.7 Supervises and participates in the adjustment and testing of unit equipment, regulates the release of water to consumers.

3.8 Organize the study of operational personnel Rules of technical operation, production and job descriptions, systematically checks the knowledge of

personnel rules and instructions. Carry out emergency response training with personnel.

3.9 Develops organizational and technical measures to improve the reliability of work and equipment, the introduction of new technology, mechanization of labor, scientific organization of labor, elimination of the consequences of accidents, saving fuel and electricity, increasing labor productivity in order to reduce the cost of transport, heat and the organization of their implementation.

3.10 Conducts an instruction to the site staff on the rules of Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY.

3.11 Organizes and conducts work with the site staff in accordance with the rules of organization of work with personnel at energy production enterprises.

3.12 Conducts work on certification and rationalization of workplaces for the correct application of forms and systems of wages and material incentives.

4 Rights

4.1 Bring administrative and technical orders to the entire staff of the unit.

4.2 Provides for approval to the head of the unit the proposals on awarding or imposing penalties on persons of subordinate personnel.

4.3 If there is a malfunction in the operation of the equipment, it suspends the operation of the equipment.

4.4 Eliminates the work of persons who violate the rules of Safety technique and fire safety.

4.5 In consultation with the Station shift head and the shift head of the CCGT, sets and changes the operation mode of the equipment.

4.6 Participates in the commissions for the investigation of accidents, irregularities in work and accidents occurring in the unit.

4.7 It records the orders in the order journal.

4.8 Gives out an order for the production of works and is the responsible leader on the side.

4.9 Take concrete measures to save reagents.

5 Relationships

5.1 Agrees all operational shifts with the CCGT shift supervisor.

5.2. Provides requests to the head of the shift station for the withdrawal of equipment for repair, reserve.

5.3 Coordinates with the heads of the CCGT shift and with the CCGT operators all the switchings to the CWT of the CCGT, related to the change in costs.

5.4 Withstands the chemical regime according to the schedule.

5.5 Accepts from the subordinate staff applications for work, rational offers, complaints and claims, for a short time gives a response to the staff.

5.6 Operative personnel notifies the head of the unit section of any equipment malfunction and regime change.

5.7 Operational personnel is administratively subordinated to the head of the site of the unit and carries out his instructions.

6 Responsibility

6.1 The head of a section of the chemical unit of combined-cycle gas turbine plants must comply with the requirements of the current legislation in the activity of subordinated personnel.

6.2 The head of a chemical section of combined cycle gas turbine plants is involved in disciplinary, administrative and other measures of responsibility for non-fulfillment or improper performance of his functional duties that led to the occurrence of accidents and accidents, damage to the employer's property and other adverse consequences, in accordance with the current legislation of the Republic of Uzbekistan .

INFORMATIONAL DATA

Developed by Chemical Unit
Head of unit E. R. Soliev

Agreed

Production and Technical Department
Head of Department I. S. Murtazaev

Planning and Economic Department
Head of the department F. R. Khozhiev

Service reliability of machinery and industrial safety
Head of the service Kh. O. Muminov

Legal adviser T. A. Toilokov

Responsible for standardization O. L. Zelenskaya

COMPANY STANDARD

JOB DESCRIPTION OF THE OPERATOR OF WATER TREATMENT PLANT OF THE CCPP UNIT

OPEN JOINT STOCK COMPANY "NTPP"
Navoi

Preface

1 DEVELOPED AND INTRODUCED by the Chemical unit

2 APPROVED AND put INTO EFFECT by the Order of JSC "NTPP" No. dated

3 INTRODUCED FOR THE FIRST TIME

KSt 202- 837:2012

Approved by

Chief engineer of JSC "NTPP"

T. G. Nazarov

COMPANY STANDARD

JOB DESCRIPTION OF THE OPERATOR OF WATER TREATMENT PLANT OF THE CCPP UNIT

Valid from to

1 Field of application

These regulations have been developed on the basis of KSt 202-451:2003 "Regulations on chemical unit," the Qualifying directory of the positions of managers, experts and employees in 1987, in order to regulate functions, responsibilities, rights and liability of combined cycle steam-gas turbine plant's water treatment plant's operator and is mandatory for him.

2 General terms

2.1 Combined cycle steam-gas turbine plant's water treatment plant's operator must have higher technical education and work experience at least 1 year or vocational education, and work experience at least 3 years. Without special education - work experience at least 5 years.

2.2 Combined cycle steam-gas turbine plant's water treatment plant's operator is appointed, transferred and dismissed by the order of the Company Director on recommendation of chief of CCGT unit, of the human resource in accordance with the requirements of the Labour Code of the Republic of Uzbekistan.

2.3 In the administrative and technical aspects the operator is subordinate to the head of the chemical section of the CCGT, in operational – to the shift supervisor of chemical unit, shift supervisor of CCGT and chemical engineer of the CCGT.

2.4 Combined cycle steam-gas turbine plant's water treatment plant's operator should know and be guided in his work by:

- "Safety rules for the operation of thermal mechanical equipment of power plants and heating networks", 1985, in the following volume:

Section 1

Section 2 subsections 2.1-2.5, 2.8;

Section 3 subsection 3.7;

Section 4 subsection 4.1 paragraphs 4.1.1 to 4.1.3,

Subsection 4.2 items 4.2.1, 4.2.7, 4.2.12;

Appendices 1, 2, 3, 4, 5, 7, 8.

- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan", Tashkent 2005:

Section I Chapter I § 1 paras. 6,12,13;

§ 4 paras. 69-72;

Section II Chapter 3 § 8 paras. 394, 425, 430,431;

Appendix No. 1 of Table 3, 4.

- "Instructions for first aid to victims in connection with accidents in service power equipment ";

- "Fire Safety Rules for Energy Enterprises", Tashkent 2004 in the following volume:

Chapter 1;

Chapter 3;

Chapter 4;

Chapter 5;

Appendix № 5.

- Indication of PP - 56;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan of 12.01.1999 No. 140 "On measures to strengthen the performance discipline";

- The Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 from 30.09.2009;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated August 22, 2009 "On Approval of the Rules for the Use of Electric and Thermal Energy";

- "Regulations on the investigation and recording of accidents and other damage to workers' health at work "approved by the Cabinet of Ministers on June 6, 1997;

- RH 34-114: 2007 "Regulations on Disciplinary Responsibility of Workers of the Uzbek Energy System";

- KSt 202-457: 2007 "Operational plan for fire fighting of CHEMICAL WATER TREATMENT facilities";

- KSt 202-458: 98 "Measures of fire safety in CHEMICAL WATER TREATMENT";

- KSt 202-133: 2007 "Labor protection for CHEMICAL WATER TREATMENT workers";

- KSt 202- 451: 2003 "Regulations on CHEMICAL WATER TREATMENT";

- KSt 202- 463: 2008 "Prevention and elimination of accidents in CHEMICAL WATER TREATMENT";

- KSt 202- 461: 2008 "Operation of mechanical (clarifying) filters";

- KSt 202-464: 94 "Operation of ion-exchange filters of the desalting plant";

- KSt 202- 468: 95: 2008 "Operation of pumps and electric motors";

- KSt 202- 588: 2008 "Operation of a sulfuric acid warehouse".

- KSt 202- 478: 2000 "Operation of an installation for cleaning oily and worn-out effluents";

- KSt 202-455: 98 "Operation of pre-cleaning and neutralization unit";

- KSt 202- 474: 2007 "Instructions for the preparation of solutions of reagents and their supply to production";

- KSt 202-466: 2008 "Job description of the CHEMICAL WATER TREATMENT workers";

- KSt 202-036-2007 "Rules of internal labor regulations employees of OJSC "NTPP".

2.5 The operator of the water treatment plant of the combined-cycle gas turbine plants should know:

- Schemes of water treatment plants: demineralized water and UOPS, pre-cleaning and chemical reagents;

- Limit values of the established quality indicators - coagulated, clarified water, cationized and anionized, demineralized, clarified water from UOPS and wastewater;

- The regime maps of water purification of CHEMICAL WATER TREATMENT, UOPS and pre-cleaning;

- Territorial location of equipment, pipelines of valves and structures of the chemical unit;

- Design and operational characteristics of the equipment of CHEMICAL WATER TREATMENT CCGT, UOPS and pre-cleaning;

- Power supply circuits for electrical equipment, lighting;

- Schemes of technological effluents of CHEMICAL WATER TREATMENT CCGT, UOPS and pre-cleaning;

- Location of fire-extinguishing media;

- Properties of chemical reagents used in the chemical unit, CCGT and reagents prepared to adjust the water and chemical regime of the station;

- Methods for determination of water analysis, regeneration solutions, working solutions of ammonia, phosphate solution, hydrazine, coagulant;

- Schemes for the preparation of chemical reagents and pumping them for production;

- Plans for the discharge, storage and pumping of chemical reagents;
- Schemes of water treatment at the UOPS and pumping them.

2.6 Verification of the knowledge of Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY, job descriptions and production instructions should be carried out:

- primary - before admission to independent work;
- Periodic - on time;
- extraordinary - in case of violation of rules and instructions, at the request of state supervision bodies, State Energy Inspectorate, Supervisory authorities, by decision of a special commission.

Periodic testing of knowledge of Rules of technical operation, RULES OF FIRE SAFETY , production and job descriptions should be made at least once every 3 years.

Periodicity of testing RULES OF SAFETY TECHNIQUE knowledge, rules of the device and Safe operation of equipment controlled by the Agency "Sanoatgeocontechnazorat", the following: for persons directly connected with the management and maintenance of power plants, as well as for workers of all categories, once a year.

2.7 When transferring to another workplace, the workers must undergo an extraordinary briefing and duplication of at least 2 shifts.

2.8. The location of the operator of CCGTs, UOPS is located in the CCGT unit.

2.9 Service area of the CCGT operator: pre-treatment of water from the CCGT, filter room, reagent dilution unit, tank farm and equipment of the UOPS, pumping out the raw water of the CCGT.

3 Functions and responsibilities

3.1 On duty at the workplace according to the schedule approved by the head of the CHEMICAL WATER TREATMENT unit.

3.2 Accept, hand over the shift, in accordance with the Rules for the Technical Operation of Power Stations and Networks of the Republic of Uzbekistan (Section I Chapter I § 4), established for the shifted (operational) personnel.

3.3 Maintain reliable and uninterrupted technological processes of chemical treatment and water treatment, issue demineralized water of established quality for CCGTs:

- Treatment of sewage at the UOPS.

3.4 Maintain technological control over the operating mode of the equipment to be serviced, chemical and visual control of water quality after each stage of its processing.

3.5 To make technological operations of ion-exchange, mechanical filters without deviations from regime maps.

3.6 Monitor the presence of reagent solutions in the supply containers, if necessary, prepare and pump them, check the concentration.

3.7 If necessary, start and stop the equipment, switch in the schemes of the water treatment plant under the supervision of the head of the CCGT site, the chemical engineer.

3.8 Prepare jobs for outfits and orders.

3.9 Maintain records in the daily statements, in the journals of technological operations, in the register of reagent consumption, in the journal of defects, and in CHEMICAL WATER TREATMENT CCGT and COPS - in operational journals.

3.10 Keep the workplace and fixed equipment clean.

3.11 Do not allow unauthorized persons to access the equipment, or repair personnel without proper authorization.

3.12 Monitor the safety of equipment, household and fire equipment.

3.13 In case of accidents in the chemical unit of the CCGT, act in accordance with KSt 202-463: 94 "Prevention and elimination of accidents in the chemical unit".

3.14 In the event of a fire, act in accordance with with KSt 202-457: 2007 Operational plan for firefighting of chemical facilities at the CCGT unit".

4 Rights

4.1 Make proposals for improving the reliability and economy of the equipment.

4.2 Raise your qualification group.

4.3 Require the administration of the unit to provide the tools, devices, reagents, chemical utensils, overalls necessary for the production of work, means of protection, and improvement of working conditions.

4.4 Remove the repair personnel from the workplace that violates the safety rules and the internal labor regulations of the plant and notify the head of the chemical unit shift.

4.5 Independently change the technological regime on the serviced site, the scheme, in accordance with the production need, according to the regime map with the subsequent immediate notification of the head of the chemical unit shift and the shift supervisor of the CCGT, the head of the CCGT unit.

5 Relationships

5.1 Perform all orders of the head and deputy head of the chemical department, the head of the CCGT unit and the operational orders of the chemical engineer of the CCGT.

In case of disagreement with the received order, the operator must notify the person who issued the order, but after receiving the confirmation of the order, it fulfills it, if this does not threaten the safety of the personnel or the safety of the equipment.

To verify the correctness of the understanding or the order received, be sure to repeat it to the person who gave the order.

5.2 In the event that an order is received directly from the superiors of the power plant, the operator must comply with it and inform the chemical engineer of the CCGT and the head of the shift of the CHEMICAL WATER TREATMENT unit.

5.3 In case of operational telephone calls with personnel, call your name, and then transfer or receive orders or messages.

5.4 Operators of the water treatment plant of the CCGT, UOPS notify the head of the CCGT unit about the malfunctions, defects and abnormalities in the operation of the water treatment equipment, and the operator records in the defect log and, if necessary, urgently eliminates defects, directs the locksmith for the maintenance of the chemical unit equipment, duty staff of the CCGT

6 Responsibility

6.1 The operator of the water treatment plant of the combined-cycle plant of the chemical unit, depending on the degree and nature of the violations, is brought to disciplinary, administrative and other measures of responsibility for failure to perform or improperly performing its functional duties, resulting in accidents and accidents, damage to the employer's property and other adverse consequences, in accordance with the current legislation of the Republic of Uzbekistan.

KSt 202- 837:2012

Information data

Developed by

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Agreed by

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KSt 202- 858:2012

COMPANY STANDARD

JOB DESCRIPTION OF PATROL-OPERATOR OF WATER TREATMENT UNIT OF CCPP UNIT

OPEN JOINT STOCK COMPANY "NTPP"
Navoi

Preface

1 DEVELOPED AND INTRODUCED by the Chemical unit

2 APPROVED AND put INTO EFFECT by the Order of JSC "NTPP"
No. dated

3 INTRODUCED FOR THE FIRST TIME

KSt 202- 858:2012

Approved by

Chief engineer of JSC "NTPP"

T. G. Nazarov

COMPANY STANDARD

JOB DESCRIPTION OF PATROL-OPERATOR OF WATER TREATMENT UNIT OF CCPP UNIT

Valid from to

1 Field of application

This instruction was developed on the basis of KSt 202-451: 2003 "Regulations on the chemical unit", the Qualification reference book for the positions of managers, specialists and employees 1987, in order to regulate the functions, duties, rights and responsibilities of the patrol-operator of the water treatment plant of the combined-cycle steam turbine plants, and obligatory for him.

2 General terms

2.1 The patrol-operator of the water treatment plant of the unit of combined cycle gas turbine plants should have a higher technical education and work experience in production not less than 1 year or secondary specialized education and work experience at least 3 years. In the absence of special education, the work experience in the industry is at least 5 years.

2.2 The patrol-operator of the water treatment plant of the combined-cycle steam and gas-turbine plant is appointed, moved and dismissed from the position by the director of the enterprise upon presentation of the manager of the CCGT

unit, the personnel department in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.3 The patrol-operator in the administrative and technical respect submits to the head of the chemical section of the CCGT, and in the operational - to the head of the chemical unit shift, the head of the CCGT shift and the chemical engineer of the CCGT.

2.4 The patrol-operator of the water treatment plant of the combined-cycle gas turbine plants should know and be guided in their work:

- "Safety rules for the operation of thermal mechanical equipment of power plants and heating networks", 1985, in the following volume:

Section 1

Section 2 subsections 2.1-2.5, 2.8;

Section 3 subsection 3.7;

Section 4 subsection 4.1 paragraphs 4.1.1 to 4.1.3,

Subsection 4.2 items 4.2.1, 4.2.7, 4.2.12;

Appendices 1, 2, 3, 4, 5, 7, 8.

- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan", Tashkent 2005:

Section I Chapter I § 1 paragraphs 6, 12, 13;

§ 4 paras. 69-72;

Section II Chapter 3 § 8 paras. 397, 425, 430, 431;

Appendix No. 1 of the table: 3.4.

- "Instructions for first aid to victims in connection with accidents in the maintenance of power equipment ";

- "Fire Safety Rules for Energy Enterprises", Tashkent 2004, in the following volume:

Chapter 1;

Chapter 3;

Chapter 4;

Chapter 5;

Appendix № 5.

- Indication of PP - 56;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan of 12.01.1999 No. 140 "On measures to strengthen the performance discipline";

- The Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 from 30.09.2009;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated August 22, 2009 "On Approval of the Rules for the Use of Electric and Thermal Energy";

- "Regulations on the investigation and recording of accidents and other damage to workers' health at work "approved by the Cabinet of Ministers on June 6, 1997;

- RH 34-114: 2007 "Regulations on Disciplinary Responsibility of Workers of the Uzbek Energy System";

- KSt 202-457: 2007 "Instruction. Operational plan for fire extinguishing of CWT (chemical water treatment) facilities ";

- KSt 202-458: 98 "Instruction. Measures of fire safety in CWT ";

- KSt 202-133: 2007 "Instruction. Labor protection for CWT masters ";

- KSt 202-451: 2003 "Regulations on CWT";

- KSt 202-463: 2008 "Instruction. Prevention and elimination of accidents in CWT ";

- KSt 202- 461: 2008 "Instruction. Operation of mechanical (clarifying) filters ";

- KSt 202-464: 94 "Instruction. Operation of ion-exchange filters of the desalting plant ";

- KSt 202-468: 95 "Instruction. Operation of pumps and electric motors of CWT ";

- KSt 202-588: 2008 "Instruction. Operation of a sulfuric acid storage facility. "

- KSt 202- 478: 2000 "Instruction. Operation of an installation for cleaning oily and worn-out drains ";

- KSt 202-455: 98 "Instruction. Operation of pre-cleaning and neutralization unit ";

- KSt 202-474: 2007 "Instructions for the preparation of solutions of reagents and their supply to production";

- KSt 202-466: 2008 "Job description of the CWT masters";

- KSt 202-036-2007 "Rules of internal labor regulations employees of OJSC "NTPP".

2.5 The patrol-operator of the water treatment plant of the combined-cycle steam turbine-turbine plant should know:

- Schemes of water treatment plants: demineralized water and UOPS, pre-cleaning and chemical reagents;

- The regime maps of water purification of CWT, UOPS and pre-cleaning;

- Limit values of the established quality indicators - coagulated, clarified water, cationized and anionized, demineralized, clarified water from UOPS and wastewater;

- Territorial location of equipment, pipelines of valves and structures of the chemical unit;

- Design and operational characteristics of the equipment of CWT CCGT, UOPS and pre-cleaning;

- Power supply circuits for electrical equipment, lighting;

- Schemes of technological effluents of CWT CCGT, UOPS and pre-cleaning;

- Location of fire-extinguishing media;

- Properties of chemical reagents used in the chemical unit, CCGT and reagents prepared to adjust the water and chemical regime of the station;

- Methods for determination of water analysis, regeneration solutions, working solutions of ammonia, phosphate solution, hydrazine, coagulant;

- Schemes for the preparation of chemical reagents and pumping them for production;

- Plans for the discharge, storage and pumping of chemical reagents;

- Schemes of water treatment at the UOPS and pumping them.

2.6 Verification of the knowledge of Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY, job descriptions and production instructions should be carried out:

- primary - before admission to independent work;

- Periodic - on time;

- Extraordinary - in violation of rules and regulations, at the request of the State Supervision Authority, State Energy Inspectorate, Supervisory authorities, by decision of a special commission.

Periodic testing of knowledge of Rules of technical operation, RULES OF FIRE SAFETY, production and job descriptions should be made at least once every 3 years.

Periodicity of testing RULES OF SAFETY TECHNIQUE knowledge, rules of the device and Safe operation of equipment controlled by the Agency "Sanoatgeocontechnazorat", the following: for persons directly connected with the management and maintenance of power plants, as well as for workers of all categories, once a year.

2.7 When transferring to another workplace, the patrol-operator must undergo an extraordinary briefing and duplication of at least 2 shifts.

2.8. The location of the patrol-operator of the water treatment plant of the CCGT, the UOPS is located in the CCGT unit.

2.9 Service zone of the patrol-operator of the water treatment plant of the CCGT: the preliminary treatment room of the CCGT, the filter room, the reagent dilution unit, the pumping station for raw water from the CCGT Unit.

3 Functions and responsibilities

3.1 On duty at the workplace according to the schedule approved by the head of the CWT unit.

3.2 Accept, hand over the shift, in accordance with the Rules for the Technical Operation of Power Stations and Networks of the Republic of Uzbekistan (Section I Chapter I § 4), established for the shifted (operational) personnel.

3.3 Maintain reliable and uninterrupted technological processes of chemical treatment and water treatment, issue demineralized and clarified water of established quality for CCGTs:

- Treatment of sewage at the UOPS.

3.4 Maintain technological control over the operating mode of the equipment to be serviced, chemical and visual control of water quality after each stage of its processing.

3.5 Produce technological operations of ion-exchange, coal, mechanical filters and ultrafilters without deviating from the regime maps.

3.6 If necessary, prepare and pump reagent solutions, check their concentration.

3.7 If necessary, start and stop the equipment, switch in the schemes of the water treatment plant under the supervision of the head of the CCGT site, the chemical engineer.

3.8 Prepare jobs for outfits and orders.

3.9 Keep records in daily subscriptions, in journals technological operations, in the register of reagents consumption, in the journal of defects, and in the CWT of the CCGT and KOPS - in operational journals.

3.10 Keep the workplace and fixed equipment clean.

3.11 Do not allow unauthorized persons to access the equipment, or repair personnel without proper authorization.

3.12 Monitor the safety of equipment, household and fire equipment.

3.13 In case of accidents in the chemical unit of the CCGT, act in accordance with KSt 202-463: 1994 "Prevention and elimination of accidents in the chemical unit".

3.14 In the event of a fire, act in accordance with KSt 202-457: 2007 "Operational plan for fire fighting of chemical unit facilities".

3.15 If necessary, the operator of the water treatment plant of the CCGT must perform the duties of the operator of the water treatment plant of the CCGT, the operator of the CCGT, the operator of the UOPSS CCGT.

4 Rights

4.1 Make proposals for improving the reliability and economy of the equipment.

4.2 Raise his qualification group.

4.3 Require the administration of the unit to provide the tools, devices, reagents, chemical utensils, overalls necessary for the production of work, means of protection, and improvement of working conditions.

4.4 Remove the repair personnel from the workplace that violates the safety rules and the internal labor regulations of the plant and notify the head of the chemical unit shift.

4.5 Independently change the technological regime on the serviced site, the scheme, in accordance with the production need, according to the regime map with the subsequent immediate notification of the head of the chemical unit shift and the shift supervisor of the CCGT, the head of the CCGT unit.

5 Relationships

5.1 To carry out all orders of the head and deputy head of the chemical unit, the head of the CCGT site and the operational orders of the chemical engineer of the CCGT.

In case of disagreement with the received order, the patrol-operator must declare this to the person who issued the order, but after receiving the confirmation of the order, it fulfills it, if this does not threaten the safety of the personnel or the safety of the equipment.

To verify the correctness of the understanding or the order received, be sure to repeat it to the person who gave the order.

5.2 In the event that an order is received directly from the superiors of the power plant, the operator must comply with it and inform the chemical engineer of the CCGT and the head of the shift of the CWT unit.

5.3 In case of operational telephone calls with personnel, call your name, and then transfer or receive orders or messages.

5.4 Patrol-operators of the water treatment plant of the CCGT, UOPS report to the head of the CCGT shift, the head of the CWT shift, the head of the CCGT section about the faults, defects and abnormalities in the operation of the water treatment equipment, record in the defect log and, if necessary, a mechanic for the maintenance of the equipment of the chemical unit, or calls the duty personnel of the CCGT

6 Responsibility

6.1 Patrol-operator of the water treatment plant of the unit of combined-cycle turbine plants of the chemical unit depending on the degree and nature of the violations, is brought to disciplinary, administrative and other measures of responsibility for non-fulfillment or improper performance of their functional duties that led to the occurrence of accidents and accidents, damage to the employer's property and other adverse consequences, in accordance with the current legislation of the Republic of Uzbekistan.

Information data

Developed by

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Head of service Kh.O. Muminov

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Responsible for standardization O.L. Zelenskaya

KSt 202- 857:2012

COMPANY STANDARD

JOB DESCRIPTION OF OPERATOR OF INSTALLATION FOR CLEANING OF INDUSTRIAL DRAIN OF CCPP UNIT

OPEN JOINT STOCK COMPANY "NTPP"
Navoi

Preface

1 DEVELOPED AND INTRODUCED by the Chemical unit

2 APPROVED AND put INTO EFFECT by the Order of JSC "NTPP"
No. dated

3 INTRODUCED FOR THE FIRST TIME

KSt 202- 857:2012

Approved by

Chief engineer of JSC "NTPP"

T. G. Nazarov

COMPANY STANDARD

JOB DESCRIPTION OF OPERATOR OF INSTALLATION FOR CLEANING OF INDUSTRIAL DRAIN OF CCPP UNIT

Valid from to

1 Field of application

This instruction was developed on the basis of KSt 202-451: 2003 "Regulations on the chemical unit", the Qualification directory of the posts of managers, specialists and employees 1987, for the purpose of regulating the functions, duties, rights and responsibilities of the operator of the plant for cleaning industrial drain of the combined cycle gas turbine plants is mandatory for him.

2 General terms

2.1 The operator of the plant for the treatment of industrial effluents of the combined-cycle combined cycle gas turbine plants should have a higher technical education and at least 1 year or secondary specialized education and work experience at least 3 years. In the absence of a special education, the length of service in production not less than 5 years.

2.2 The operator of the plant for the treatment of industrial effluents of the combined-cycle combined cycle gas turbine plants is appointed, moved and dismissed from the position by the director of the enterprise upon presentation of the unit manager of the CCGT, personnel department in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.3 The operator administratively and technically submits to the head of the chemical section of the CCGT, and in the operational - to the head of the shift

of the chemical unit, to the head of the CCGT shift and to the chemical engineer of the CCGT.

2.4 The operator of the plant for the treatment of industrial effluents of the unit of combined-cycle combined cycle gas turbine plants should know and be guided in their work:

- "Safety rules for the operation of thermal mechanical equipment of power plants and heating networks" 1985, in the following volume:

Section 1

Section 2 subsections 2.1-2.5, 2.8;

Section 3 subsection 3, 7;

Section 4 subsection 4.1 paragraphs 4.1.1 to 4.1.3,

Subsection 4.2 items 4.2.1, 4.2.7, 4.2.12;

Appendices 1, 2, 3, 4, 5, 7, 8.

- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan", Tashkent 2005:

Section I Chapter I § 1 paragraphs 6, 12, 13;

§ 4 paras. 69-72;

Section II Chapter 3 § 8 paras. 394, 425, 430,431;

Appendix No. 1 of Table 3, 4.

- "Instructions for first aid to victims in connection with accidents at service power equipment ";

- "Fire Safety Rules for Energy Enterprises", Tashkent 2004, in the following volume:

Chapter 1;

Chapter 3;

Chapter 4;

Chapter 5;

Appendix № 5.

- Indication of PP - 56;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan of 12.01.1999 No. 140 "On measures to strengthen the performance discipline";

- The Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 from 30.09.2009;

- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated August 22, 2009 "On Approval of the Rules for the Use of Electric and Thermal Energy";

- "Regulations on the investigation and recording of accidents and other damage to workers' health at work "approved by the Cabinet of Ministers on June 6, 1997;

- RH 34-114: 2007 "Regulations on Disciplinary Responsibility of Workers of the Uzbek Energy System";

- KSt 202-457: 2007 "Instruction. Operational plan for fire extinguishing of Chemical water treatment (CWT) facilities ";

- KSt 202-458: 98 "Instruction. Measures of fire safety in CWT ";

- KSt 202- 133: 2007 "Instruction. Labor protection for CWT masters";

- KSt 202- 451: 2003 "Regulations on CWT";

- KSt 202- 463: 2008 "Instruction. Prevention and elimination of accidents in CWT ";

- KSt 202- 461: 2008 "Instruction. Operation of mechanical (clarifying) filters ";

- KSt 202-464: 94 "Instruction. Operation of ion-exchange filters of the desalting plant ";

- KSt 202- 468: 95: 2008 "Instruction. Operation of pumps and electric motors ";

- KSt 202- 588: 2008 "Instruction. Operation of a sulfuric acid storage facility. "

- KSt 202- 478: 2000 "Instruction. Operation of an installation for cleaning oily and worn-out drains ";

- KSt 202-455: 98 "Instruction. Operation of pre-cleaning and neutralization unit ";

- KSt 202- 474: 2007 "Instructions for the preparation of solutions of reagents and their supply to production";

- KSt 202- 466: 2008 "Job description of the CWT masters";

- KSt 202- 036-2007 "Rules of internal labor regulations employees of OJSC "NTPP".

2.5 The operator of the plant for the treatment of industrial effluents of the unit of combined cycle gas turbine plants should know:

- Schemes of water treatment plants: demineralized water and UOPS, pre-cleaning and chemical reagents;

- Limit values of the established quality indicators - coagulated, clarified water, cationized and anionized, demineralized, clarified water from OPSS and wastewater;

- The regime maps of water purification of CWT, UOPS and pre-cleaning;

- Territorial location of equipment, pipelines of valves and structures of the chemical unit;

- Design and operational characteristics of the equipment of CWT CCGT, UOPS and pre-cleaning;

- Power supply circuits for electrical equipment, lighting;

- Schemes of technological effluents of CWT CCGT, UOPS and pre-cleaning;

- Location of fire-extinguishing media;

- Properties of chemical reagents used in the chemical unit, CCGT and reagents prepared to adjust the water and chemical regime of the station;

- Methods for determination of water analysis, regeneration solutions, working solutions of ammonia, phosphate solution, hydrazine, coagulant;

- Schemes for the preparation of chemical reagents and pumping them for production;

- Plans for the discharge, storage and pumping of chemical reagents;

- Schemes of water treatment at the OPSS and pumping them.

2.6 Verification of the knowledge of Rules of technical operation, Rules of safety technique, RULES OF FIRE SAFETY, job descriptions and production instructions should be carried out:

- primary - before admission to independent work;
- Periodic - on time;
- extraordinary - in violation of rules and regulations,

at the request of the State Supervision, State Energy Inspectorate, Supervisory authorities, by decision of a special commission.

Periodic testing of knowledge of Rules of technical operation, RULES OF FIRE SAFETY, production and job descriptions should be made at least once every 3 years.

Periodicity of testing Rules of safety technique knowledge, rules of the device and Safe operation of equipment controlled by the Agency "Sanoatgeocontechnazorat", the following: for persons directly connected with the management and maintenance of power plants, as well as for workers of all categories, once a year.

2.7 When transferring to another workplace, the operator must undergo an extraordinary briefing and duplication of at least 2 shifts.

2.8. The operator's location in the premises of the UOPS of the CCGT.

2.9 Service area of the operator UOPS CCGT: pre-treatment room of water CCGT, filter room, reagent dilution unit, tank farm and equipment, pumping station for raw water CCGT.

3 Functions and responsibilities

3.1 On duty at the workplace according to the schedule approved by the head of the CWT unit.

3.2 Accept, hand over the shift, in accordance with the Rules for the Technical Operation of Electric Power Stations and Networks of the Republic of Uzbekistan (Section I Chapter I § 4), established for the shifted (operational) personnel.

3.3 Maintain reliable and uninterrupted technological processes of chemical treatment and purification of industrial wastes of CCGT.

3.4 Maintain technological control over the operating mode of the equipment to be serviced, chemical and visual control of water quality after each stage of its processing.

3.5. Make technological operations for deposition, neutralization and purification of effluents by filtration, without deviations from regime maps.

3.6 Monitor the presence of reagent solutions in the supply containers, if necessary, prepare and pump them, check the concentration.

3.7 If necessary, start and stop equipment, under the supervision of the head of the CCGT unit, a chemical engineer, switching in the schemes of the CCGT.

3.8 Prepare jobs for outfits and orders.

3.9 To keep records in the daily statements, in the journals of technological operations, in the register of reagents consumption, in the journal of defects, and in the CWT of the CCGT and UOPS - in the operational journals.

3.10 Keep the workplace and fixed equipment clean.

3.11 Do not allow unauthorized persons to access the equipment, or repair personnel without proper authorization.

3.12 Monitor the safety of equipment, household and fire equipment.

3.13 In case of accidents in the chemical unit of the CCGT, act in accordance with KSt 202-463: 94 "Prevention and elimination of accidents in the chemical unit".

3.14 In the event of a fire, act in accordance with KSt 202-457: 2007 "Operational plan for firefighting of chemical facilities at the CCGT".

3.15 If necessary, the operator of the CCGT should perform the duties of the operator of the water treatment plant of the CCGT, the operator of the wastewater treatment plant of the CCGT, the patrol operator of the CCGT

4 Rights

4.1 Make proposals for improving the reliability and economy of the equipment.

4.2 Raise his qualification group.

4.3 Require the administration of the unit to provide the tools, devices, reagents, chemical utensils, overalls necessary for the production of work, means of protection, and improvement of working conditions.

4.4 Remove repair personnel from the workplace that violates safety regulations and internal labor regulations of the plant and notify the head of the chemical unit shift.

4.5 Independently change the technological regime on the serviced site, the scheme, in accordance with the production need, according to the regime map with the subsequent immediate notification of the head of the chemical unit shift and the shift supervisor of the CCGT, the head of the CCGT unit.

5 Relationships

5.1 To carry out all orders of the head and deputy head of the chemical unit, the head of the CCGT site and the operational orders of the chemistry engineer of the CCGT.

In case of disagreement with the received order, the operator must notify the person who issued the order, but after receiving the confirmation of the order, it fulfills it, if this does not threaten the safety of the personnel or the safety of the equipment.

To verify the correctness of the understanding or the order received, be sure to repeat it to the person who gave the order.

5.2 In the event that an order is received directly from the superiors of the power plant, the operator must comply with it and inform the chemical engineer of the CCGT and the head of the shift of the CWT unit.

5.3 In case of operational telephone calls with personnel, call your name, and then transfer or receive orders or messages.

5.4 The operator of the plant for the treatment of industrial effluents of the CCGT, UOPS of the CCGT notifies the CCGT shift supervisor, the head of the CWT shift, the head of the CCGT CWT department about the malfunctions, defects and abnormalities in the operation of the water treatment equipment, make entries in the fault log and, if necessary, directs the fitter to maintain the equipment of the chemical unit, or calls the duty personnel of the CCGT.

6 Responsibility

6.1 The operator of the industrial sewage treatment plant of the combined-cycle plant gas turbine plants depending on the degree and nature of the violations, is brought to disciplinary, administrative and other measures of responsibility for non-fulfillment or improper performance of their functional duties that led to the occurrence of accidents and accidents, damage to the employer's property and other adverse consequences, in accordance with the current legislation of the Republic of Uzbekistan.

KSt 202- 857:2012

Information data

Developed by

Chemical unit

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Agreed by

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Service of equipment reliability and industrial safety

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Legal adviser T.A.Toylokov

Responsible for standardization O.L. Zelenskaya

KSt 202- 859:2012

COMPANY STANDARD

JOB DESCRIPTION OF PATROL-OPERATOR OF THE INSTALLATION FOR THE CLEANING OF THE INDUSTRIAL DRAINS OF CCPP UNIT

Open Joint-Stock Company ”NTPP”

Navoi

KSt 202- 859:2012

INTRODUCTION

1 DEVELOPED AND INDUCED BY CHEMICAL UNIT

2. APPROVED AND ENTRY INTO ACTION BY THE ORDER OF "NTPP" OJSC
dated _____ No.

3 INTRODUCED FOR THE FIRST TIME

KSt 202- 859:2012

APPROVE

Chief Engineer of "NTPP" OJSC

T. G. Nazarov

COMPANY STANDARD

JOB DESCRIPTION OF PATROL-OPERATOR OF THE INSTALLATION FOR THE CLEANING OF THE INDUSTRIAL DRAINS OF CCPP UNIT

Validity period from up to

1 AREA OF USE

This instruction was developed on the basis of KSt 202-451: 2003 "Regulations on the chemical unit", the Qualification Reference Book for the positions of managers, specialists and employees 1987, in order to regulate the functions, duties, rights and responsibilities of the patrol operator, a plant for cleaning industrial effluents of the combined- cycle and is mandatory for him.

2 General terms

2.1 The patrol-operator of the industrial sewage treatment plant of the combined-cycle gas turbine plants should have a higher technical education and work experience at least 1 year or secondary specialized education and work experience at least 3 years. In the absence of special education, the work experience in the industry is at least 5 years.

2.2 The patrol-operator of the plant for the treatment of industrial effluents of the combined cycle gas turbine plants is appointed by the head of the enterprise upon presentation of the head of the unit of the CCGT, the personnel department in accordance with the requirements of the Labor Code of the Republic of Uzbekistan.

2.3 The patrol-operator is administratively and technically subject to the head of the chemical section of the CCGT, and in the operational - to the head of the chemical unit shift, to the head of the CCGT shift and to the chemical engineer of the CCGT.

2.4 The patrol-operator of the plant for the treatment of industrial effluents of the unit of combined-cycle turbine plants, must know and be guided in its work:

- "Safety rules for the operation of thermal mechanical equipment of power plants and heating networks", 1985, in the following volume:

Section 1

Section 2 subsections 2.1-2.5, 2.8;

Section 3 subsection 3.7;
Section 4 subsection 4.1 paragraphs 4.1.1 to 4.1.3,
Subsection 4.2 items 4.2.1, 4.2.7, 4.2.12;
Appendices 1, 2, 3, 4, 5, 7, 8.

- "Rules of technical operation of power plants and networks of the Republic of Uzbekistan", Tashkent 2005, in the following scope:

Section I Chapter I § 1 paragraphs 6,12,13;
§ 4 of paragraph 69-72;
Section II Chapter 3 § 8 points 394, 425, 430 431;
Appendix No. 1 of Table 3.4.

- "Instructions for first aid to victims in connection with accidents in the maintenance of power equipment ";
- "Fire Safety Rules for Energy Enterprises", Tashkent 2004, in the following volume:

Chapter I;
Chapter III;
Chapter IV;
Appendix № 5.

- Indication of PP - 56;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan of 12.01.1999 No. 140 "On measures to strengthen the performance discipline";
- The Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 from 30.09.2009;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated August 22, 2009 "On approval of the rules for the use of electric and thermal energy";
- "Regulations on the investigation and recording of accidents and other damage to workers' health at work "approved by the Cabinet of Ministers on June 6, 1997;
- RH 34-114: 2007 "Regulations on Disciplinary Responsibility of Workers of the Uzbek Energy System";
- KSt 202- 133: 2007 "Instruction. Labor protection for CWT(Chemical water treatment) masters";
- KSt 202- 451: 2003 "Regulations on the chemical unit";
- KSt 202-455: 98 "Instruction. Operation of pre-cleaning and neutralization unit ";
- KSt 202-457: 2007 "Instruction. Operational plan for fire extinguishing of CWT facilities ";
- KSt 202-458: 98 "Instruction. Measures of fire safety in CWT ";
- KSt 202- 461: 2008 "Instruction. Operation of mechanical (clarifying) filters ";
- KSt 202- 463: 2008 "Instruction. Prevention and elimination of accidents in CWT ";
- KSt 202-464: 94 "Operation of ion-exchange filters of the desalting plant";
- KSt 202- 466: 2008 "Job description of the CWT masters";

- KSt 202- 468: 95 "Instruction. Operation of pumps and electric motors of CWT ";

- KSt 202-474: 2007 "Instructions for the preparation of solutions of reagents and their supply to production";

- KSt 202- 478: 2000 "Instruction. Operation of an installation for cleaning oily and worn-out drains ";

- KSt 202- 588: 2008 "Instruction. Operation of a sulfuric acid storage facility. "

- KSt 202- 036: 2007 "Rules of internal labor regulations employees of OJSC "NTPP".

2.5 The patrol-operator of the plant for the treatment of industrial effluents of the combined-cycle turbine plant should know:

- Schemes of water treatment plants: demineralized water and UOPS, pre-cleaning and chemical reagents;

- Limit values of the established quality indicators - coagulated, clarified water, cationized and anionized, demineralized, clarified water from UOPS and wastewater;

- The regime maps of water purification of CWT, UOPS and pre-cleaning;

- Territorial location of equipment, pipelines of valves and structures of the chemical unit;

- Design and operational characteristics of the equipment of CWT CCGT, UOPS and pre-cleaning;

- Power supply circuits for electrical equipment, lighting;

- Schemes of technological effluents of CWT CCGT, UOPS and pre-cleaning;

- Location of fire-extinguishing media;

- Properties of chemical reagents used in the chemical unit, CCGT and reagents prepared to adjust the water and chemical regime of the station;

- Methods for determination of water analysis, regeneration solutions, working solutions of ammonia, phosphate solution, hydrazine, coagulant;

- Schemes for the preparation of chemical reagents and pumping them for production;

- Plans for the discharge, storage and pumping of chemical reagents;

- Schemes of water treatment at the UOPS and pumping them.

2.6 Verification of the knowledge of Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY, job descriptions and production instructions should be carried out:

- primary - before admission to independent work;

- Periodic - on time;

- extraordinary - in case of violation of rules and instructions, at the request of state supervision bodies, State Energy Inspectorate,

Supervisory authorities, by decision of a special commission.

Periodic testing of knowledge of Rules of technical operation, RULES OF FIRE SAFETY, production and job descriptions should be made at least once every 3 years.

Periodicity of testing RULES OF SAFETY TECHNIQUE knowledge, rules of the device and Safe operation of equipment controlled by the Agency "Sanoatgeocontechnazorat", the following: for persons directly connected with the management and maintenance of power plants, as well as for workers of all categories, once a year.

2.7 When transferring to another workplace, the patrol-operator must undergo an extraordinary briefing and duplication of at least 2 shifts.

2.8. The location of the patrol-operator the UOPS of the CCGT is located in the territory of the UOPS CCGT. UOPS.

2.9 Service area of the patrol-operator UOPS CCGT:

hall of preliminary water purification CCGT, filter room, a dilution unit for reagents, a tank farm and equipment for UOPS, pumping out crude water from the CCGT.

3 Functions and responsibilities

3.1 On duty at the workplace according to the schedule approved by the head of the CWT unit.

3.2 Accept, hand over the shift, in accordance with the Rules for the Technical Operation of Electric Power Stations and Networks of the Republic of Uzbekistan (Section I Chapter 4 § 4) established for the shifted (operational) personnel.

3.3 Maintain reliable and uninterrupted technological processes of chemical treatment and purification of industrial wastes of CCGT.

3.4 Maintain technological control over the operating mode of the equipment being serviced, chemical and visual control of water quality after each stage of its processing.

3.5. Make technological operations for deposition, neutralization and purification of effluents by filtration, without deviations from regime maps.

3.6 If necessary, prepare and pump reagent solutions, check the concentration.

3.7 If necessary, start and stop equipment, under the supervision of the head of the CCGT unit, a chemical engineer, switching in the schemes of the CCGT.

3.8 Prepare jobs for outfits and orders.

3.9 Maintain records in the daily statements, in the journals of technological operations, in the register of reagent consumption, in the journal of defects, and in CWT CCGT and UOPS - in operational journals.

3.10 Keep the workplace and fixed equipment clean.

3.11 Do not allow unauthorized persons to access the equipment, or repair personnel without proper authorization.

3.12 Monitor the safety of equipment, household and fire equipment.

3.13 In case of accidents in the chemical unit of the CCGT, act in accordance with KSt 202-463: 94 "Prevention and elimination of accidents in the chemical unit".

3.14 In the event of a fire, act in accordance with KSt 202-457: 2007 "Operational plan for firefighting of chemical facilities at the CCGT".

3.15 If necessary, the patrol-operator of the UOPS CCGT shall perform the duties of the operator of the water treatment plant of the CCGT, the operator of the water treatment plant of the CCGT, the operator of the UOPSS CCGT Unit

4 Rights

4.1 Make proposals for improving the reliability and economy of the equipment.

4.2 Raise his qualification group.

4.3 Require the administration of the unit to provide the tools, devices, reagents, chemical utensils, overalls necessary for the production of work, means of protection, and improvement of working conditions.

4.4 Remove repair personnel from the workplace that violates safety regulations and internal labor regulations of the plant and notify the head of the chemical unit shift.

4.5 Independently change the technological regime on the serviced site, the scheme, in accordance with the production need, according to the regime map with the subsequent immediate notification of the head of the chemical unit shift and the shift supervisor of the CCGT, the head of the CCGT unit.

5 Relationships

5.1 To carry out all orders of the head and deputy head of the chemical unit, the head of the CCGT site and the operational orders of the chemistry engineer of the CCGT unit.

In case of disagreement with the received order, the patrol-operator must declare this to the person who issued the order, but after receiving the confirmation of the order, it fulfills it, if this does not threaten the safety of the personnel or the safety of the equipment.

To verify the correctness of the understanding or the order received, be sure to repeat it to the person who gave the order.

5.2 In the event that an order is received directly from the superiors of the power plant, the operator must comply with it and inform the chemical engineer of the CCGT and the head of the shift of the CWT unit.

5.3 In case of operational telephone calls with personnel, call your name, and then transfer or receive orders or messages.

5.4 Patrol-operator of the industrial sewage treatment plant UOPS CCGT is informed to the shift supervisor of the CCGT, the shift supervisor CWT, the head of the CCGT site about malfunctions, defects and abnormalities in the operation of the water treatment equipment, make entries in the defects log and, if

necessary, eliminate defects immediately, direct the fitter for the maintenance of the chemical unit equipment, or call the duty staff of the CCGT

6 Responsibility

6.1 The patrol-operator of the sewage treatment plant of the combined-cycle plant of the chemical unit, depending on the degree and nature of the violations, is brought to disciplinary, administrative and other measures of responsibility for failure to perform or improperly performing its functional duties, resulting in accidents and accidents, damage property of the employer and other adverse consequences, in accordance with the current legislation of the Republics Uzbekistan.

INFORMATIONAL DATA

Developed by Chemical Unit
Head of unit E. R. Soliev

Agreed

Production and Technical Department
Head of Department I. S. Murtazaev

Planning and Economic Department
Head of the department F. R. Khozhieva

Service reliability of machinery and industrial safety
Head of the service Kh. O. Muminov

Legal adviser T. A. Toilokov

Responsible for standardization O. L. Zelenskaya

COMPANY STANDARD

JOB DESCRIPTION OF SENIOR ELECTRICIAN FOR MAINTENANCE OF ELECTRICAL EQUIPMENT OF GAS-BOOSTING COMPRESSOR STATION (GBCS)

JOINT-STOCK COMPANY “NTPP”
Navoi

INTRODUCTION

1 DEVELOPED AND INTRODUCED BY THE ELECTRIC UNIT

2 APPROVED AND ENTRY INTO ACTION BY THE ORDER OF “NTPP” JSC dated _____ No.

3 REPLACEMENT OF RD 202-

KSt 202-865: 2012

Approve

Production Director of
JSC "NTPP"

S. KH. Fayziev

COMPANY STANDARD

JOB DESCRIPTION OF SENIOR ELECTRICIAN FOR MAINTENANCE OF ELECTRICAL EQUIPMENT OF GAS-BOOSTING COMPRESSOR STATION (GBCS)

Validity period from up to

1 AREA OF USE

This job description is developed on the basis of KSt 202-201-2004 "Regulation on the electrical unit" in order to regulate the functions, duties, rights and responsibilities of a senior electrician for maintenance of electrical equipment of GBCS (Gas boosting compressor station) and is mandatory for him. Knowledge is mandatory for the head of electrical unit, the head of the shift station, the duty of control panel and senior duty electrician of GBCS.

2 General terms

2.1 Senior electrician for maintenance of electrical equipment of GBCS provides a safe, reliable and economical operation of electrical equipment attached to it. It monitors the operation of electrical equipment transformers, switchgears, auxiliary in-house equipment, protection devices, signaling, control and electroautomation of electric equipment of GBCS and provides its accident-free and economical operation.

2.2 For the position of a senior electrician of the GBCS, persons who have sufficient theoretical knowledge and practical experience of the field of operation of electrical installations can be appointed, without having to submit requirements for seniority.

2.4 Senior electrician on duty of GBCS is appointed, relocated or released from work by an order to the General Director of JSC NTPP upon presentation of the head of the electric department in accordance with the current legislation.

2.5 Employment period Senior electrician on duty of GBCS must undergo a medical examination in accordance with the requirements of the "Safety Rules for the Operation of Electrical Installations".

2.6 Before being appointed for independent work Senior electrician on duty of GBCS must pass production training, knowledge testing, duplication in the workplace by the guidance of an experienced worker and play one or two emergency trainings in accordance with the "Rules for the organization of work with personnel at energy production enterprises."

- primary - before admission to independent work.

- Periodic - on time.

- extraordinary - in violation of rules and regulations, at the request of the state supervision bodies of the State Inspectorate for the operation of power plants and networks and higher management bodies by decision of special commissions.

Periodic testing of knowledge of Rules of technical operation, RULES OF FIRE SAFETY, production and job descriptions must pass at least 1 time in 1 year.

2.7 Senior electrician on duty of GBCS administratively subordinate to the head of the electrical department and his deputy for operation, and in operational terms directly subordinate to the head of the shift in the electric department, the head of the station shift and receives operational instructions from them.

In the case of an order from a superior head of Senior electrician on duty of GBCS must timely notify the HEAD OF SHIFT OF ELECTRICAL UNIT.

2.8 Tolerance Senior electrician on duty of GBCS for independent work is executed by the order of the head of the electrical department and his deputy.

2.9 The workplace of the electrician on duty of GBCS located in the operator room must be equipped in accordance with standard projects for the organization of workplaces.

2.10 Into the service area Senior electrician on duty of GBCS includes the following equipment:

2.10.1 Power transformers T-1-GBCS, T-2-GBCS, TCN-GBCS-1, TSN-GBCS -2.

2.10.2 Switchgears 6 kV with vacuum circuit breakers and with all installed equipment RUSN-6-GBCS-1, RUSN-6-GBCS-2.

2.10.3. 0.4 kV switchgears with automatic devices and with all installed equipment RUSN-0,4-GBCS-1, RUSN-0,4-GBCS-2.

2.10.4 Power panels and assemblies of the administrative building, T-1-GBCS, T-2-GBCS, the territory of GBCS.

2.10.5. Electric motors of 6 kV and 0.4 kV of all the above objects.

2.10.6 Premises of AB-GBCS with all the installed equipment of the SHPT, VAZP.

2.10.7 RC-GBCS with all installed protective equipment.

2.10.8 Working, evacuation, emergency lighting of GBCS facilities. Outdoor lighting of GBCS.

2.11 Senior electrician on duty of GBCS should know the following policy documents:

2.11.1 RD 34.20.501 The Rules of technical operation of Chapter 1.1.1.2.1.3.1.4.1.10.1.11.1.13.5.1. 5.2. 5.3, 5.4, 5.5, 5.8, 5.9, 5.10, 5.11, 5.12, 6.7, 6.8, in full.

2.11.2 RD 34.02.202 Safety regulations for the operation of electrical installations in Chapter 1.2.3 in full, Chapter 4 from § 4.1 to § 4.12. chapters 5.7-13,15,16,19-21 in full. Chapter 23§ 23.1 to 23.3, Appendix 1-7. The level of knowledge should correspond not less than IV gr. For electrical safety.

2.11.3 RD 34.03.603 Rules for the application and testing of protective equipment used in electrical installations.

2.11.4 RD 34.03.702 Instruction on rendering first aid to the victims in connection with uncountable cases when servicing power equipment.

2.11.5 RD 34.03.204 Safety rules for working with the tool and the devices § 3.2, 3.3, 5.1, 5.2, 7.6.

2.11.6 RD RUz 34-415-96 Rules of the organization of work with the personnel at the enterprises of power production.

2.11.7 RD 34-03-301-87 Fire safety rules for an energy company. Chapters 1.2.4.15.16.

2.11.8 RD 202-036-98 Rules of internal labor regulations for employees of NTPP.

2.11.9 The Labor Code of the Republic of Uzbekistan. Tashkent, 1996.

2.11.10 RD 202-038-97 Regulations on the awarding of workers, managers, specialists and other workers of the station for the main results of economic activity.

2.12 On technical matters Senior electrician on duty of GBCS should know:

2.12.1. Official and production instructions.

2.12.2 Power supply circuits for 6 and 0.4 kV auxiliary needs within its own plot.

2.12.3. Work, evacuation, emergency lighting schemes and the location of lighting equipment.

2.12.4 Overvoltage protection circuit, scheme and design of equipment grounding devices.

2.12.5. The scheme of power supply of station communication devices.

2.12.6 Principle of operation of relay protection, technological interlocks and automation in the part of the serviced equipment.

2.12.7 Performance characteristics of electrical equipment - electric motors, transformers.

2.12.8 The magnitude and duration of permissible overloads electrical equipment, the maximum permissible temperatures of transformers, electric motors.

2.12.9 Cable facilities of GBCS in the part of the arrangement and arrangement of cable lines and channels.

2.12.10 The territorial arrangement of electrical equipment and its switching equipment.

2.12.11 Methods of detection and elimination of electrical equipment malfunctions.

2.13 Electrician for maintenance of electrical equipment GBCS testing knowledge of the Rules of technical operation, RULES OF SAFETY TECHNIQUE, RULES OF FIRE SAFETY, job descriptions and production instructions must pass

2.14 Performance characteristics and operating principle elegas(SF6) and vacuum switches.

2.15 Performance characteristics and operating principles Soft start system

2.16 Devices and the principle of operation of electromagnetic and mechanical interlocks in the cells of switchgear - 6kV GBCS.

2.17. The principle of operation of automatic fire extinguishing in the premises of a gas compressor unit.

2.18 Principle of management and operation of the internal security system.

2.19 Controls and operation principle of the MRPU (Microprocessor relay protection unit)

3 Functions and responsibilities

3.1 Electrician for maintenance of electrical equipment GBCS is the person responsible for the uninterrupted and economical operation of the electrical equipment of its site and to ensure that these indicators are condition and proper operation of the equipment.

3.2 Senior electrician on duty of GBCS goes to work according to the schedule approved by the head of the electrical department or his deputy for operation. Violation of the schedule is prohibited. Exchange of shifts is allowed in exceptional cases and in each case with the permission of the head of the electrical department or his deputy.

3.3. Duty for two shifts in a row is prohibited. In the absence of a shift. Senior electrician for maintenance of electrical equipment GBCS must report this to the HEAD OF SHIFT OF ELECTRICAL UNIT, and remain on duty until the shift comes.

3.4 Departure from duty without changing the shift, as well as receiving and handing over the shift without proper registration is prohibited.

3.5 It is forbidden to receive and hand over the shift during the elimination of accidents, the production of responsible switching operations or operations for starting and stopping the equipment. Deviation from this rule in exceptional cases is allowed with the permission of the Station shift head and the Electrical unit head.

3.6 Acceptance and delivery of a shift for faulty equipment or an abnormal mode of operation is allowed only with the permission of the electric department head or his deputy.

3.6.1 Observe the cleanliness and order of the secured area.

3.7 When taking shift Senior electrician on duty of GBCS must:

3.7.1. Familiarize yourself with the electrical scheme of the site.

3.7.2 Perform a patrol to determine the condition of the electrical equipment.

3.7.3. Read all the entries in the operational journal made since the last watch.

3.7.4 Find out from the commissioner of shift in all changes in the operation of electrical equipment, about upcoming switching operations, equipment defects, and new operational and administrative orders.

3.7.5 Review the entries in the Hardware Troubleshooter.

3.7.6 Check for the presence of tools, protective equipment, instructions and diagrams at the workplace.

3.7.7 Issue the report of the HEAD OF SHIFT OF ELECTRICAL UNIT and obtain permission to accept the shift.

3.7.8 To register the receipt and delivery of the shift in a record in the operational journal with the signatures of the receiving and transferring shift, indicating the time of reception and delivery of the shift.

3.7.9 In case of failure of relay protection and automation, notify HEAD OF SHIFT OF ELECTRICAL UNIT and ETL personnel.

3.7.10 Check the serviceability of warning and emergency signaling.

3.8 Taking the shift senior duty electrician is obliged:

3.8.1 Before passing the shift, make a patrol of the electrical equipment of his site.

3.8.2 Issue operational documentation

3.8.3 Verbally inform the receiving shift of all changes in the operation of the equipment during the watch, as well as all new operational orders.

3.8.4 Obtain permission from the HEAD OF SHIFT OF ELECTRICAL UNIT to hand over the shift and place the shift-acceptance of the shift in the paintings in the operational journal.

3.9 Senior electrician on duty of GBCS must:

3.9.1 Strictly observe labor and production discipline, prevent violations of Rules of technical operation, RULES OF SAFETY TECHNIQUE, internal labor regulations, instructions and other directives.

3.9.2. Keep in good order tools, tools, protective and fire-fighting equipment.

3.9.3 If it is found that the protective equipment is not suitable, the service personnel must immediately remove them, inform the master of the site and record in the logbook and the contents of the protective equipment or operational documentation.

3.9.4 Keep the workplace, equipment and facilities clean.

3.9.5 Continually improve their production skills.

3.9.6 Patrol and inspect electrical equipment at least 2-3 times per shift.

3.9.7. Keep the workplaces and equipment in good order.

3.9.8 On the instructions of the HEAD OF SHIFT OF ELECTRICAL UNIT or Station shift head, make operational changes (instructions to the HEAD OF SHIFT OF ELECTRICAL UNIT or station shift head can be transmitted via the electrician of the control board of the control room).

3.9.9 All failures to include automats and disconnectors should be recorded in the fault log.

3.9.10 In case of failures to switch on the machine, disconnectors, immediately notify the shift supervisor, make repeated switch-on after inspecting and evaluating the condition of the automatics and disconnectors.

3.9.11 Allow repair personnel to work on orders and orders.

3.9.12 Ensure that the required amount of insulation, wiping material, lamps is replenished regularly in the workplace.

3.9.13 Test the reserve equipment, AVR, inspect the contact connections in accordance with the schedule.

3.9.14 Eliminate defects in equipment, and in case of impossibility of elimination, mark defects in the log.

3.9.15 To comply with all orders of the HEAD OF SHIFT OF ELECTRICAL UNIT, Station shift head and the administration of the unit.

3.9.16 Timely and accurately draw up operational documentation.

3.9.17 In the shift from 0-00 to 8-00 in the operational log, mark the place of installation of portable protective earths.

3.9.18 Portable protective earths shall be stored in fixed locations by numbers.

3.10 During the liquidation of accidents Electrician for maintenance of electrical equipment GBCS is obliged:

3.10.1 Immediately put and fame HEAD OF SHIFT OF ELECTRICAL UNIT, and in its absence station shift head about all violations of the normal equipment regime.

3.10.2 In the event of an accident and a malfunction of the normal operation of the equipment, first of all, it must ensure a reliable supply of its own needs.

3.10.3 In the event of an immediate threat to the life of people or the integrity of the equipment, it is their responsibility to take measures independently and to prevent the danger that has arisen and then immediately inform the HEAD OF SHIFT OF ELECTRICAL UNIT or the station shift head about the incident and the measures taken.

3.10.4 During the liquidation of the accident Electrician for maintenance of electrical equipment GBCS, after taking the necessary independent measures, is acting as directed by the shift head of electrical unit .

Non-fulfillment or inaccurate fulfillment of operational orders by the shift head of electrical unit is not allowed.

When liquidating accidents senior duty electrician should be guided by RD 202-221-94

"Instruction on the liquidation of accidents in the electric part of NTPP".

3.10.5 After the elimination of accidents senior duty electrician is obliged to record in the operational journal a detailed description of the nature of the course of the accident and the sequence of the liquidation operation in chronological order.

4 Rights

4.1. For the performance of the assigned duties senior duty electrician has the following operational rights:

4.1.1. Make operational switching in the GBCS circuitry.

4.1.2 To enter the premises of electrical facilities for patrol and inspection facilities

Electrical equipment, production of operational switching and cleaning.

4.1.3 Make an admission to work in electrical installations for outfits and orders.

4.1.4 Conduct operational negotiations by the operator of the GBCS.

4.1.5 Remove from work the perpetrators of violations of the RULES OF SAFETY TECHNIQUE and the Rules of fire safety.

4.1.6 Make independent decisions in the event of an emergency situation and a threat to people's lives.

4.1.7 Refuse to comply with the order if it is likely to damage the equipment or accidents with people.

5 Relationships

5.1 In case of receipt of an order from a higher authority, the senior electrician must inform the head of the electric unit shift in a timely manner.

5.2 At the direction of the shift supervisor, the head of the electrical unit shift is obliged to disassemble the circuits of the electrical engines CH.

5.3 As instructed by the CCPP-1 shift supervisor, disassemble and assemble the circuits electrical engines with subsequent notification to the HEAD OF SHIFT OF ELECTRICAL UNIT.

6 Responsibility

6.1. At senior duty electrician is personally responsible:

6.1.1 For the performance or unclear and untimely performance of their duties.

6.1.2 For incomplete use of their rights, if as a result of damage to the station.

6.1.3 For violation of current regulations, regulations, Rules of technical operation, RULES OF SAFETY TECHNIQUE, fire safety rules.

6.1.4 For failure to comply with the orders of the station shift head, the head of electrical unit, the head of the electrical department and the deputy head of the unit.

6.1.5 For erroneous actions in the production of operational switching.

6.1.6 For unreasonable and uncoordinated changes in the modes of equipment and electrical circuits.

6.1.7 For incorrect and untimely execution of operational documentation.

6.1.8 For the started, dirty condition of the fixed equipment and the workplace.

6.1.9 For damage and loss of inventory, tools, protective and fire fighting equipment, instructions.

6.1.10 For violation of the rules of internal labor regulations and labor discipline.

6.1.11 Penalties for production omissions the degree and nature of specific omissions are determined. Regulations about bonuses. Rules of internal labor

regulations of Rules of technical operation, RULES OF SAFETY TECHNIQUE, labor and criminal legislation.

INFORMATIONAL DATA

Developed by the Electric Unit

Head of the unit M. M. Pulatov

Agreed

Production and Technical Department
Head of the department T. Kh. Soliev

Planning and Economic Department
Head of the department F. Kh. Nasirov

Head of the Department of labor safety, safety technique and fire safety U. Mavlyanov

Legal adviser Sh. Y. Nazarov

Responsible for standardization N. S. Nurullaeva

COMPANY STANDARD

JOB DESCRIPTION OF THE CLEANER OF PRODUCTIONAL PREMISES OF CCPP UNIT

Open Joint-Stock Company “NTPP”
Navoi

KSt 202- 866:2012

INTRODUCTION

1 DEVELOPED AND INDUCED BY CCPP UNIT OF JSC “NTPP”

2. APPROVED AND ENTRY INTO ACTION BY THE ORDER OF "NTPP" OJSC
dated _____ No.

3 INTRODUCED FOR THE FIRST TIME

KSt 202- 866:2012

APPROVE

Chief Engineer of "NTPP" OJSC

T. G. Nazarov

COMPANY STANDARD

JOB DESCRIPTION OF THE CLEANER OF PRODUCTIONAL PREMISES OF CCPP UNIT

Validity period from up to

1 AREA OF USE

This instruction is based on the Tariff-Qualification Handbook of Work and Occupations of Workers, with a view to regulating the functions, duties, rights and responsibilities of the cleaner of production premises and is mandatory for him.

2 General terms

2.1 According to the Model Service Standards for Industrial Facilities Cleaners, 1986, per person calculated washing floors 710 m2, cleaning 2 toilets, rubbing floors 1820 m2, sweeping 2000 m2.

2.2. The basic management of the cleaner of production premises is maintenance of cleanliness, observance of rules of sanitation and hygiene on a fixed site.

2.3 The cleaner of industrial premises in production and technical respect is subordinated to the deputy head on repair.

2.4 The cleaner of production premises should know and be guided by his work:

- Indication of PP - 56;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan of 12.01.1999 No. 140 "On measures to strengthen the performance discipline";
- The Law of the Republic of Uzbekistan "On Electric Power Industry" No. 225 from 30.09.2009;
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 245 dated August 22, 2009 "On approval of the rules for the use of electric and thermal energy";

- "Regulations on the investigation and recording of accidents and other damage to workers' health at work "approved by the Cabinet of Ministers on June 6, 1997;

- "Safety rules for operation thermal mechanical equipment of power plants and heat networks "in the following volume:

Section 1 subsection 1.2 clauses 1.2.1, 1.2.11, 1.2.12, 1.2.13;

Appendix 2.

- KSt 202-036: 2007 "Rules of internal labor regulations for employees of OJSC" NTPP ";

- "Instructions for first aid to victims in connection with accidents in the maintenance of power equipment ";

- Rules and norms of labor protection, safety precautions, industrial sanitation and fire protection.

2.5 The location of the cleaner of the industrial premises installed in the administrative building of the CCGT.

2.6 The service area of the cleaner of production premises is the fixed sections of the CCGT.

3 Functions and responsibilities

3.1 Cleaning on the Central control room, in the offices of the unit and other production facilities.

3.2 Wiping dust from floors, stairs, windows, walls in production areas.

3.3 Preparation of various detergents and disinfectant solutions.

3.4 Reception and storage of detergents, equipment and wiping material.

3.5 Arrangement and removal of garbage from urns, their cleaning and disinfection.

3.6 Cleaning and disinfection of toilets.

3.7 The cleaner of the production premises should know:

- Requirements of industrial sanitation;
- Purpose and concentration of disinfectant solutions and detergents;
- Rules for cleaning in the premises of existing equipment.

4 Rights

4.1 Suspend and leave the workplace in case of emergency.

4.2 Do not follow instructions that conflict with safety regulations.

4.3 Appeal, in case of disagreement with the order or instruction, without suspending their implementation, if they pose a threat to the health or safety of the equipment.

4.4 Follow the work schedule, according to KSt 202-036: 2007 "Rules of internal labor regulations for employees of OJSC" NTPP ".

5 Relationships

5.1 Carries out all orders of the unit manager and the deputy head of the unit of the CCGT.

5.2 In case of receiving an order from the director, deputy director or chief engineer, it is carried out and brought to the attention of the deputy head of the CCGT repair department.

6 Responsibility

6.1 The cleaner of the production premises, depending on the degree and nature of the violations, is brought to disciplinary, administrative and other measures of responsibility for failure to perform or improperly performing its functional duties, resulting in accidents and accidents, damage to the employer's property and other adverse consequences, in accordance with the current legislation of the Republic of Uzbekistan.

INFORMATIONAL DATA

Developed by CCPP unit of JSC “NTPP”
Head of unit — I. H. Abdulloev

Agreed

Production and Technical Department
Head of Department — I. S. Murtazaev

Planning and Economic Department
Head of the department — F. R. Khozhieva

Service reliability of machinery and industrial safety
Head of the service — Kh. O. Muminov

Legal adviser — T. A. Toilokov

Responsible for standardization — O. L. Zelenskaya

Appendix B

APPROVED
Chief Engineer
JSC "Navoi TPP"
_____Nazarov T.G.
«___»_____2014

PROGRAM
for individual training
for Mechanic of gas turbine equipment at CCPP.

№	TOPICS	Number of hours
1.	Basic information on the production and organization of the workplace. Job description of Mechanic of gas turbine equipment	8
2.	Safety techniques, industrial hygiene and fire safety in the unit of the CCPP. Rules of design and safe operation of vessels, pipelines and gas facilities.	8
3.	Information on heat engineering.	16
4.	Flow sheets of GT, ST, HRSG and auxiliary equipment.	24
5.	Construction and mode of operation of main and auxiliary equipment of GT and HRSG.	32
6.	Commissioning, maintenance and shut-down of main and auxiliary equipment of GT and HRSG. An emergency stop of main and auxiliary equipment of GT and HRSG.	32
7.	Details on electrical engineering. Service and maintenance of GT generator cooling system and generator seal oil system.	16
8.	Methods of economic mode of operation of main and auxiliary equipment of GT and HRSG. Technological protection and blocking of the gas turbine.	24
9	Totally	160

TOPIC 1. Basic information on the production and organization of the workplace.
Thermal power plant, its structure and organization. Main and auxiliary power plant units, their functionality. Interaction between units. Common auxiliaries. Work place, its organization and technical maintenance. Internal regulations .

TOPIC 2. Safety techniques, industrial hygiene and fire safety in the unit of the CCPP.

Safety techniques. Objectives of safety techniques in production. Safety measures within the territory and units of the power plant. Safety regulations for thermal power plants within the requirements of the job description. Rules of conduct within the territory and units of the power plant. Safety regulations for the operation of industrial computers.

Industrial hygiene. Objectives of industrial hygiene. Occupational diseases and their underlying causes. Prevention of occupational diseases.

Personal care. Self-help and first aid in case of accidents. Workplace medical and health care.

Fire-fighting measures. The main causes of fires in the workplace and on the territory of the plant. Inadmissibility of the use of open fire. Fire control stations, fire protection, fire-prevention appliances, devices and alarm. Carbon dioxide fire extinguishers for the premises of GT and gas-control unit, and manuals. Activity indicator of safety extinguisher. Rules of conduct in flammable areas and during the fire. Rules of organization and safe operation of boilers, vessels, piping, steam pipe-lines and gas facilities.

TOPIC 3. Information on heat engineering

Basics of Thermal Technology. Calorie as a unit of thermal energy. The mechanical equivalent of heat. Pressure. The physical and technical atmosphere. Depression (vacuum). Saturated and superheated steam. The dependence of the saturation temperature (boiling temperature) on the pressure. Vaporization heat and its dependence on pressure. The heat content of steam and condensate. Turbine and mode of operation.

Thermal insulation, cushioning and stuffing materials.

Types of materials, their brief characteristics and area of use. Dependence of the materials use on operating parameters (pressure and temperature) and the environment (water, steam, oil). Requirements for thermal insulation, cushioning and stuffing materials.

TOPIC 4. Flow sheets of GT and its auxiliary equipment.

The concept of flow sheets. Conventional notation of hookups in the sheets. Technology (PI & D) sheets for the main and auxiliary equipment and accessories of GT. Assembly drawing and use. Exercises for reading sheets based on studying sheet. Necessary sheets for Inspection Engineer of gas turbine equipment: A-21083-C, A-21082-C, A-21081-A, A-21067-A, A-21066-C, A-21065-C, A-21064-C, A-21063-C, A-21062-C, A-21061-A, A-21010, A-21084-A, A-21085-A, A-21086-A, A-21087-A, A-21088-A, A-21091-A, A-21091-A, A-21131-A, G1-79857, G1-79858,G1-99992, G1-99993, G1-99994, G1-81331, G1-99996,G1-99997, NAV-10-MB-MDL-MTG-003, NAV-10-MKB-MDD-MEL-352, NAV-10-MKB-MDD-MEL-353, NAV-10-LB-BDD-IEM-020, NAV-10-LB-BDD-IEM-025, NAV-10-LB-BDD-IEM-030, NAV-10-LBD-BDD-IEM-035, NAV-10-LA-BDD-IEM-040, NAV-10-LCQ-BDD-IEM-070, NAV-10-PG-BDD-IEM-100, NAV-10-MA-BDD-IEM-110, NAV-10-LAC-MDD-TOR-207, NAV-10-QJ-BDD-IEM-135.

TOPIC 5. Construction and mode of operation of main and auxiliary equipment of GT and HRSG.

Air-intake system of GT (air filters and limits of operation, media evaporator, heat-exchange unit of air boiler), Compressor of GT (AD (air distributor), air bleed for cooling turbine blades, compressor efficiency, pressure and temperature of the incoming and outgoing compressor air, as well as its influence on the GT load). Gas turbine (Rate of blades and their

cooling level, efficiency of the turbine, combustor and cooling system, burners of GT, number of bearings of GT, bypass and anti-surge valves), the exhaust gas system. Lubrication System for GT (characteristics of pump lubrications, oil heating, oil tank, heat exchanger, oil separator, oil for speed increase). The control system for gas valves (regulating oil, electrostatic oil). Fuel gas heater (construction and operating limits). Cooler for cooling air turbine (construction and operating limits). System of blades flushing. Evaporative cooling of the inlet air in compressor. Anti-icing system. System of inlet air heating. Gas distribution unit of GT (control valves for gas flow and pressure, servo motor valves, gas distribution, blow-off valves). The cooling system of the turbine vessel. Instrument Air.

Recovery Boiler (HRSG) (design, performance parameters, operation principles). Range drum, boiler super-heater, economizer, evaporator, safety, regulatory and pre-start valves. Cooling fans for observation windows and flame sensors of HRSG. Drainage system, periodic and continuous blowing down of drums and low points of HRSG. Conservation of HRSG during the repair period. The circulation of water in HRSG. Steam parameters and performance of HRSG. Duct burners of HRSG. The properties and composition of natural gas.

<u>TOPIC 6.</u> Commission and shut-down of main and auxiliary equipment of GT and HRSG. An emergency shut-down of auxiliary equipment of HRSG and GT.

The preparation procedures for launching of CCPP. The order of start-up of auxiliary equipment of GT and HRSG step-by-step (lubrication system, control system, fans for GT premises and gas distribution point/unit, preparing Static Frequency Converter (SFC), inspection of foreign objects in the area of the turbine and gas distribution point, cooling fans for observation windows and flame sensors, etc.). Prepare HRSG for the launching (filling HRSG hookups with water, starting modes, draining of the condensate remain from the steam superheaters).

Chemical mode of recovery boiler.. Saving fuel, heat and electricity. Decommissioning of equipment for repair. Causes and symptoms of emergencies and measures for their elimination and prevention. Personnel responsibility for permitted accidents and defects. Classification of accidents and defects. The technical operation of main and auxiliary equipment, industrial and emergency response instructions. Specifications of thermal and mechanical equipment plant operation in winter conditions.

<u>TOPIC 7.</u> Details of electrical engineering. Service and maintenance of GT generator cooling system and generator seal oil system.

Characteristics of GT generator (rated power, current, voltage, temperature of the cooling water). Normal and emergency operation modes of the generator. Generator cooling scheme. Valid parameters of generator cooling and facilities for direct regulation of cooling. Device for oil supply for generator seals. Regulation of the oil supply to the seals. Boundary parameters for oil supplied to the generator seals. Generator load depending on the type and temperature of the coolant temperature.

The auxiliary circuit for 6 kV and 0.4 kV station. Synchronization and hook up generators into electrical network. Load shedding of generator. The concept of the alarm signaling for equipment at unit switchboard. First aid measures for electric shock. Fire extinguishing in electrical installations.

<u>TOPIC 8.</u> Methods of economic mode of operation of main and auxiliary equipment of GT and HRSG. Technological protection and blocking of the gas turbine.

Mode of operation of heaters and coolers. Technological protection, blocking and automatic transfer circuit-breaker (ATCB). Function and operational procedures. Service and maintenance. Influence of operational indicators of work and technological parameters of the main and auxiliary equipment on operation efficiency. Automatic control of level, burning, feeding, their function, the principle of operation. Technological protection and blocking of main and auxiliary equipment.

Head of department of CCPP Abdulloev I.H.

Chief Process Engineer of CCPP Musaev A.B.

APPROVED
Chief Engineer
JSC "Navoi TPP"
_____Nazarov T.G.
«___»_____2014

PROGRAM
of individual training
for Inspection Engineer on Boiler Equipment at CCPP

№	TOPICS	Number of hours
1.	Basic information on the production and organization of the workplace. Job Description of Inspection Engineer on Boiler Equipment.	8
2.	Safety techniques, industrial hygiene and fire safety in the unit of the CCPP. Rules of design and safe operation of vessels, pipelines and gas facilities.	8
3.	Information on heat engineering.	16
4.	Flow sheets of HRSG and auxiliary equipment.	24
5.	Construction and mode of operation of the main and auxiliary equipment of HRSG.	32
6.	Commissioning, maintenance and shut-down of HRSG and auxiliary equipment of HRSG. An emergency stop of main and auxiliary equipment of HRSG.	32
7.	Methods of economic mode of operation of the main and auxiliary equipment of HRSG and auxiliary equipment of GT and HRSG. Technological protection and blocking of gas turbine.	24
8.	Totally	144

TOPIC 1. Basic information on the production and organization of the workplace.
Thermal power plant, its structure and organization. Main and auxiliary power plant units, their functionality. Interaction between units. Common auxiliaries. Work place, its organization and technical maintenance. Internal regulations.

TOPIC 2. Safety techniques, industrial hygiene and fire safety in the unit of the CCPP.

Safety techniques. Objectives of safety techniques in production. Safety measures within the territory and units of the power plant. Safety regulations for thermal power plants within the requirements of the job description. Rules of conduct within the territory and units of the power plant. Safety regulations for the operation of industrial computers.

Industrial hygiene. Objectives of industrial hygiene. Occupational diseases and their underlying causes. Prevention of occupational diseases.

Personal care. Self-help and first aid in case of accidents.

Fire-fighting measures. The main causes of fires in the workplace and on the territory of the plant. Inadmissibility of the use of open fire. Fire control stations, fire protection, fire-prevention appliances, devices and alarm.

Rules of conduct in flammable areas and during the fire. Rules of organization and safe operation of boilers, vessels, piping, steam pipe-lines and gas facilities.

TOPIC 3. Information on heat engineering.

Basics of thermal technology. Calorie as a unit of thermal energy. Mechanical equivalent of heat. Pressure. Physical and technical atmosphere. Depression (vacuum). Saturated and superheated steam. The dependence of the saturation temperature (boiling temperature) on the pressure. Vaporization heat and its dependence on pressure. The heat content of steam and condensate. Turbine and mode of operation. Recovery boiler and mode of operation. Thermal insulation, cushioning and stuffing materials.

Types of materials, their brief characteristics and area of use. Dependence of the materials use on operating parameters (pressure and temperature) and the environment (water, steam, oil). Requirements for thermal insulation, cushioning and stuffing materials.

TOPIC 4. Flow sheets of HRSG and auxiliary equipment.

The concept of flow sheets. Conventional notation of hookups in the sheets. Technology (PI & D) sheets for the main and auxiliary equipment and accessories of GT. Assembly drawing and use. Exercises for reading sheets based on studying sheet. Necessary sheets for Inspection Engineer: NAV-10-LB-BDD-IEM-020, NAV-10-LB-BDD-IEM-025, NAV-10-LB-BDD-IEM-030, NAV-10-LBD-BDD-IEM-035, NAV-10-LA-BDD-IEM-040, NAV-10-LCQ-BDD-IEM-070, NAV-10-PG-BDD-IEM-100, NAV-10-MA-BDD-IEM-110, NAV-10-LAC-MDD-TOR-207, NAV-10-QJ-BDD-IEM-135.

TOPIC 5. Construction and mode of operation of the main and auxiliary equipment of HRSG.

Instrumentation Air. Recovery Boiler (HRSG) (design, performance parameters, operation principles). Range drum, boiler super-heater, economizer, evaporator, safety, regulatory and pre-start valves. Cooling fans for observation windows and flame sensors of HRSG. Drainage system, periodic and continuous blowing down of drums and low points of HRSG. Conservation of HRSG during the repair period. The circulation of water in HRSG. Steam parameters and performance of HRSG. Duct burners of HRSG. The properties and composition of natural gas.

TOPIC 6. Commissioning, maintenance and shut-down of HRSG and auxiliary equipment of HRSG. An emergency stop of main and auxiliary equipment of HRSG.

The preparation procedures for launching of CCPP. The order of start-up of auxiliary equipment of HRSG step-by-step (drums for feed water, feeding pump of high, medium and low pressure, cooling fans cooling fans for observation windows and flame sensors, etc.). Prepare HRSG for the launching (filling HRSG hookups with water, starting modes, draining of the condensate remain from the steam superheaters). Chemical mode of recovery boiler. Saving fuel, heat and electricity. Decommissioning of equipment for repair. Causes and symptoms of emergencies and measures for their elimination and prevention. Personnel responsibility for permitted accidents and defects. Classification of accidents and defects. The technical operation of main and auxiliary equipment, industrial and emergency response instructions. Specifications of thermal and mechanical equipment plant operation in winter conditions.

TOPIC 7. Methods of economic mode of operation of the main and auxiliary equipment of HRSG and auxiliary equipment of GT and HRSG.

Technological protection and blocking of gas turbine. Technological protection, blocking and automatic transfer circuit-breaker (ATCB). Function and operational procedures. Service and maintenance. Influence of operational indicators of work and technological parameters of the main and auxiliary equipment of turbine on operation efficiency. Automatic control of level, burning, feeding, their function, the principle of operation. Technological protection and blocking of main and auxiliary equipment.

Head of department of CCPP Abdulloev I.H.

Chief Production Engineer of CCPP Musaev A.B.

APPROVED
Chief Engineer
JSC "Navoi TPP"
_____Nazarov T.G.
«___»_____2014

PROGRAM
of individual training
for Inspection Engineer on ST at CCPP

№	TOPICS	Number of hours
1.	Basic information on the production and organization of the workplace. Job Description of operator of ST.	8
2.	Safety techniques, industrial hygiene and fire safety in the unit of the CCPP. Rules of design and safe operation of vessels, pipelines and gas facilities.	8
3.	Information on heat engineering.	16
4.	Flow sheets of ST and auxiliary equipment at CCPP.	24
5.	Construction and mode of operation of the main and auxiliary equipment of ST and auxiliary equipment at CCPP.	32
6.	Commissioning, maintenance and shut-down of the main and auxiliary equipment of ST and auxiliary equipment at CCPP. An emergency stop of the main and auxiliary equipment of ST and auxiliary equipment at CCPP.	32
7.	Details of electrical engineering. Maintenance of generator's cooling system of ST	16
8.	Methods of economic mode of operation of the main and auxiliary equipment of ST and auxiliary equipment at CCPP. Technological protection and blocking of steam turbine.	24
9	Totally	160

TOPIC 1. Basic information on the production and organization of the workplace.
Thermal power plant, its structure and organization. Main and auxiliary power plant units, their functionality. Interaction between units. Common auxiliaries. Work place, its organization and technical maintenance. Internal regulations.

TOPIC 2. Safety techniques, industrial hygiene and fire safety in the unit of the CCPP.

Safety techniques. Objectives of safety techniques in production. Safety measures within the territory and units of the power plant. Safety regulations for thermal power plants within the requirements of the job description. Behavior rules within the territory and units of the power plant. Safety regulations for the operation of industrial computers.

Industrial hygiene. Objectives of industrial hygiene. Occupational diseases and their underlying causes. Prevention of occupational diseases.

Personal care. Self-help and first aid in case of accidents.

Fire-fighting measures. The main causes of fires in the workplace and on the territory of the plant. Inadmissibility of the use of open fire. Fire control stations, fire protection, fire-prevention appliances, devices and alarm. Carbon dioxide fire extinguishers for the premises of GT and gas-control unit, and manuals. Activity indicator of safety extinguisher.

Rules of conduct in flammable areas and during the fire. Rules of organization and safe operation of boilers, vessels, piping, steam pipe-lines and gas facilities.

TOPIC 3. Information on heat engineering.

Basics of thermal technology. Calorie as a unit of thermal energy. Mechanical equivalent of heat. Pressure. Physical and technical atmosphere. Depression (vacuum). Saturated and superheated steam. The dependence of the saturation temperature (boiling temperature) on the pressure. Vaporization heat and its dependence on pressure. The heat content of steam and condensate. Turbine and mode of operation. Recovery boiler and mode of operation. Thermal insulation, cushioning and stuffing materials.

Types of materials, their brief characteristics and area of use. Dependence of the materials use on operating parameters (pressure and temperature) and the environment (water, steam, oil). Requirements for thermal insulation, cushioning and stuffing materials.

TOPIC 4. Flow sheets of ST and auxiliary equipment at CCPP.

The concept of flow sheets. Conventional notation of hookups in the sheets. Technology (PI & D) sheets for the main and auxiliary equipment of ST and auxiliary equipment at CCPP. Assembly drawing and use. Exercises for reading sheets based on studying sheet. Necessary sheets for the Inspection Engineer of ST: NAV-10-MA-MDM-MN-001, NAV-10-MA-MDM-MN-002, NAV-10-MA-MDD-MN-005, NAV-10-MA-MDD-MN-006, NAV-10-MA-MDD-MN-010, NAV-10-MA-MDD-MN-011, NAV-10-MA-MDD-MN-008, NAV-10-MA-MDD-MN-013, NAV-10-MA-MDL-MN-605,NAV-10-LB-BDD-IEM-010, NAV-10-NA-BDD-IEM-015, NAV-10-LC-BDD-IEM-045,NAV-10-MAW-BDD-IEM-055,NAV-10-MAL-BDD-IEM-060,NAV-10-LCQ-BDD-IEM-070,NAV-10-PA-BDD-IEM-080,NAV-10-LFN-BDD-IEM-085, NAV-10-PAH-MDD-GEA-001, NAV-10-GC-BDD-IEM-155, NAV-10-GHC-BDD-IEM-170, NAV-10-GM-BDD-IEM-175, NAV-10-MAJ-BDD-IEM-250, NAV-10-QUA-BDD-IEM-701, NAV-10-MAJ-MDD-NAS-001, NAV-10-EK-MDD-ENI-001/002/003/004,NAV-10-LCP-BDD-IEM-095,NAV-10-PG-BDD-IEM-100, NAV-10-MA-

BDD-IEM-110, NAV-10-QE-BDD-IEM-120, NAV-10-QE-BDD-IEM-125, NAV-10-QE-BDD-IEM-702, NAV-10-SG-BDD-IEM-130,

TOPIC 5. Construction and mode of operation of the main and auxiliary equipment of ST and auxiliary equipment at CCPP.

Steam turbine (construction, performance parameters, regulatory and shut-off valves, the number of bearings). Supply systems of lubricating and control oil (parameters of high, low and emergency oil pumps, servomotors of steam valves, parameters of main oil pump (MOP), oiling system of an automatic stopping). Turbine steam sealing system (steam extraction for sealing, sealing steam condenser, seal types, sealing steam performance parameters). Normal operation of the turbine (temperature and vibration bearings, Relative Rotor Expansion (RRE), the absolute expansion of the turbine, rotor axis, etc.). Electro-hydraulic converter. Drainage system. Irrigation system for Low-Pressure Cylinder (LPC)'s exhaust, air-cooling system of the turbine. Temperature monitoring of the turbine.

The main steaming line. The condenser and condensate pumps, their devices and functionality. Feeding pump. Heating unit, its structure and purpose. Gas distribution and measuring unit of CCPP (RMS). Vacuum pumps, closed cooling system, auxiliary cooling pumps, water circulation system (circulation pumps, water cooling, cooling tower, cooling fans). Condensed steam and circulation water feeding system, demineralized water system. Instrument Air. Drainage system of steam pipelines and turbine.

TOPIC 6. Commissioning, maintenance and shut-down of the main and auxiliary equipment of ST and auxiliary equipment at CCPP. An emergency stop of the main and auxiliary equipment of ST and auxiliary equipment at CCPP.

The procedure of preparation for the launch of CCPP. The order of start-up of auxiliary equipment step-by-step (water circulation system, auxiliary cooling system, closed cooling system, etc.). Preparations for ST start-up (preparation of the permitted limits for start-up, preparation of auxiliary equipment of ST).

Lubrication system. The system of regulation. Starting modes for ST, specifications of start-up turbine under hot conditions. Chemical steam mode. Detection of foreign objects in the area of the turbine. Synchronization of generator with system. Sealing process of steam turbine and a vacuum creation in the condenser. Increasing the load to the nominal value depending on the load of GT and vacuum condenser. Normal mode of shutting down of ST.

Saving fuel, heat and electricity. Decommissioning of equipment for repair. Causes and symptoms of emergencies and measures for their elimination and prevention. Personnel responsibility for permitted accidents and defects. Classification of accidents and defects. The technical operation rules of main and auxiliary equipment, industrial and emergency response instructions. Specifications of thermal and mechanical equipment plant operation in winter conditions.

TOPIC 7. Details of electrical engineering. Maintenance of generator cooling system of ST.

Characteristics of the generator of ST (nominal-rated capacity, current, voltage, temperature of the cooling water). Normal and emergency operation modes of the generator. Generator cooling scheme. Valid parameters of generator cooling and objects of direct cooling control. Generator capacity depending on the type and temperature of the cooling medium. The auxiliary circuit for 6 kV and 0.4 kV station. Synchronization and hook up generators into electrical network. First aid measures for electric shock. Fire extinguishing at electrical installations.

TOPIC 8. Methods of economic mode of operation of the main and auxiliary equipment of ST and auxiliary equipment at CCPP. Technological protection and blocking of steam turbine.

Mode of operation of heaters and coolers. Technological protection, blocking and automatic transfer circuit-breaker (ATCB). Service and maintenance. Influence of operational indicators of work and technological parameters of the main and auxiliary equipment of turbine on operation efficiency. Automatic control of level, burning, feeding, their function, the principle of operation. Technological protection and blocking of main and auxiliary equipment of ST and auxiliary equipment atCCPP.

Head of department of CCPP Abdulloev I.H.

Chief Process Engineer of CCPP Musaev A.B.

APPROVED
Chief Engineer
JSC "Navoi TPP"
_____Nazarov T.G.
«___»_____2014

PROGRAM
of individual training
for Operator of ST

№	TOPICS	Number of hours
1.	Basic information on the production and organization of the workplace. Job Description of Operator of ST.	8
2.	Safety techniques, industrial hygiene and fire safety in the unit of the CCPP. Rules of design and safe operation of vessels, pipelines and gas facilities.	16
3.	Flow sheets of ST and its auxiliary equipment.	24
4.	Construction and mode of operation of the main and auxiliary equipment of ST.	32
5.	Commissioning, maintenance and shut-down of the main and auxiliary equipment of ST. An emergency stop of the main and auxiliary equipment of ST.	32
6.	Details of electrical engineering. Maintenance of generator cooling system of ST.	16
7.	APCS, technological protection and blocking of steam turbine.	24
8.	Methods of economic mode of operation of the main and auxiliary equipment of ST.	8
9	Totally	160

TOPIC 1. Basic information on the production and organization of the workplace.

Thermal power plant, its structure and organization. Main and auxiliary power plant units, their functionality. Interaction between units. Common auxiliaries. Work place, its organization and technical maintenance. Internal regulations.

TOPIC 2. Safety techniques, industrial hygiene and fire safety in the unit of the CCPP.

Safety techniques. Objectives of safety techniques in production. Legislation and regulatory bodies for the labor safety in the Republic of Uzbekistan.

Safety measures within the territory and units of the power plant. Safety regulations for thermal power plants within the requirements of the job description. Rules of conduct within the territory and units of the power plant. Safety regulations for the operation of industrial computers.

Industrial hygiene. Objectives of industrial hygiene. Occupational diseases and their underlying causes. Prevention of occupational diseases.

Basic preventive and protective measures. Personal care. Self-help and first aid in case of accidents. Workplace medical and health care.

Fire-fighting measures. The main causes of fires in the workplace and on the territory of the plant. Inadmissibility of the use of open fire. Fire control stations, fire protection, fire-prevention appliances, devices and alarm. Carbon dioxide fire extinguishers for the premises of GT and gas-control unit, and manuals. Activity indicator of safety extinguisher.

Rules of conduct in flammable areas and during the fire. Rules of organization and safe operation of vessels, piping, and steam pipe-lines.

TOPIC 3. Flow sheets of ST and its auxiliary equipment.

The concept of flow sheets. Conventional notation of hookups in the sheets. Technology (PI & D) sheets for the main and auxiliary equipment and accessories of ST and auxiliary equipment at CCPP. Assembly drawing and use. Exercises for reading sheets based on studying sheet. Necessary sheets for the Operator of ST: NAV-10-MA-MDM-MN-001, NAV-10-MA-MDM-MN-002, NAV-10-MA-MDD-MN-005, NAV-10-MA-MDD-MN-006, NAV-10-MA-MDD-MN-010, NAV-10-MA-MDD-MN-011, NAV-10-MA-MDD-MN-008, NAV-10-MA-MDD-MN-013, NAV-10-MA-MDL-MN-605, NAV-10-MAJ-MDD-NAS-001, NAV-10-QUA-BDD-IEM-701, NAV-10-MAJ-BDD-IEM-001, NAV-10-SG-BDD-IEM-130, NAV-10-PG-BDD-IEM-100, NAV-10-PA-BDD-IEM-080, NAV-10-LCQ-BDD-IEM-070, NAV-10-MAL-BDD-IEM-060, NAV-10-MAW-BDD-IEM-055, NAV-10-LB-BDD-IEM-010, NAV-10-V-BDD-IEM-001.

TOPIC 4. Construction and mode of operation of the main and auxiliary equipment of ST.

Steam turbine (construction, performance parameters, regulatory and shut-off valves, the number of bearings). Supply systems of lubricating and control oil (parameters of high, low and emergency oil pumps, servomotors of steam valves, parameters of main oil pump (MOP), oiling system of an automatic stopping). Turbine steam sealing system (steam extraction for sealing, sealing steam condenser, seal types, sealing steam performance parameters). Normal operation of the turbine (temperature and vibration bearings, Relative Rotor Expansion (RRE), the absolute expansion of the turbine, rotor axis, etc.) Electro-hydraulic converter. Drainage system. Irrigation system for Low-Pressure Cylinder (LPC)'s exhaust, air-cooling system of the turbine. Temperature monitoring of the turbine.

TOPIC 5. Commissioning, maintenance and shut-down of the main and auxiliary equipment of ST. An emergency stop of the main and auxiliary equipment of ST.

Preparations for ST start-up and start-up (preparation of the permitted limits for start-up, preparation of auxiliary equipment of ST).

Lubrication system. The system of regulation. Starting modes for ST, specifications of start-up turbine under hot conditions. Chemical steam mode. Detection of foreign objects in the area of the turbine. Synchronization of generator with system.

Increasing the load to the nominal value depending on the load of GT and vacuum condenser. The interaction between the operators of ST and auxiliary equipment during start-up. Normal mode of shutting down of ST.

Saving heat and electricity. Decommissioning of equipment for repair. Causes and symptoms of emergencies and measures for their elimination and prevention. Personnel responsibility for permitted accidents and defects. Classification of accidents and defects. The technical operation of main and auxiliary equipment, industrial and emergency response instructions. Specifications of thermal and mechanical equipment plant operation in winter conditions.

TOPIC 6. Details of electrical engineering. Maintenance of generator cooling system of ST.

Characteristics of the generator of ST (nominal-rated capacity, current, voltage, temperature of the cooling water). Normal and emergency operation modes of the generator. Generator cooling scheme. Valid parameters of generator cooling and objects of direct cooling control. Generator capacity depending on the type and temperature of the cooling medium.

The auxiliary circuit for 6 kV and 0.4 kV station. Synchronization and hook up generators into electrical network. Emergency unloading generator. The concept of electrical signaling in the control room. First aid measures for electric shock. Fire extinguishing in electrical installations.

TOPIC 7. APCS, technological protection and blocking of steam turbine.

Software APCS of steam turbine. Control logics. Brief description of "DAISYSNETMATION" program. Automatic controls of level, flow, pressure, power; their functions and concept of operation. Technological protection and blocking of main and auxiliary equipment.

TOPIC 8. Methods of economic mode of operation of the main and auxiliary equipment of ST.

Mode of operation of heaters and coolers. Technological protection, blocking and automatic transfer circuit-breaker (ATCB). Service and maintenance. Influence of operational indicators of work and technological parameters of the main and auxiliary equipment of turbine on operation efficiency.

Head of department of CCPP Abdulloev I.H.

Chief Production Engineer of CCPP Musaev A.B.

Chief Engineer
JSC "Navoi TPP"
_____Nazarov T.G.
«___»_____2015

PROGRAM
for individual training
for Shift-Head of Unit of CCPP.

№	TOPICS	Number of days
1.	Basic information on the production and organization of the workplace.	1
2.	Safety, industrial hygiene and fire safety at CCPP unit.	5
3.	Flow sheets for Steam Turbine (ST), HRSG, gas turbine (GT) and auxiliary equipment at CCPP and GBS (Gas Boosting Station).	4
4.	Construction and mode of operation of main and auxiliary equipment at CCPP and GBS, main and auxiliary equipment of GT, the main and auxiliary equipment of ST.	2
5.	Commission and shut-down of HRSG, ST, GT and auxiliary equipment at CCPP and GBS. An emergency shut-down of HRSG and auxiliary equipment at CCPP.	7
6.	Chemical mode of the main and auxiliary equipment at CCPP.	10
7.	Details of electrical engineering.	2
8.	APCS, technological protection and blocking of auxiliary equipment at CCPP.	3
9.	Methods of economic mode of operation of main and auxiliary equipment of GT	4
	TOTALLY	42

TOPIC 1. Basic information on the production and organization of the workplace.

Thermal power plant, its structure and organization. Main and auxiliary power plant units, their functions. Interaction between units. common auxiliaries. Workplace, its organization and maintenance operations. Internal regulations.

TOPIC 2. Safety techniques, industrial hygiene and fire-safety measures for CCPP unit.

Safety techniques. Objectives of safety techniques in production. Legislation and regulatory bodies for the labor safety in the Republic of Uzbekistan.

Safety measures within the territory and units of the power plant. Safety regulations for thermal power plants within the requirements of the job description. Rules of conduct within the territory and units of the power plant. Safety regulations for the operation of industrial computers.

Industrial hygiene. Objectives of industrial hygiene. Occupational diseases and their underlying causes. Prevention of occupational diseases.

Basic preventive and protective measures. Personal care. Self-help and first aid in case of accidents. Workplace medical and health care.

Fire-fighting measures. The main causes of fires in the workplace and on the territory of the plant. Inadmissibility of the use of open fire. Fire control stations, fire protection, fire-prevention appliances, devices and alarm. Carbon dioxide fire extinguishers for the premises of GT and gas-control unit, and manuals. Activity indicator of safety extinguisher. Rules of conduct in flammable areas and during the fire. Rules of organization and safe operation of vessels, piping, steam pipe-lines and gas facilities.

<u>TOPIC 3.</u> Flow sheets for Steam Turbine (ST), Heat Recovery Steam Generator (HRSG), gas turbine (GT) and auxiliary equipment at CCPP and GBS (Gas Boosting Station).

The concept of flow sheets. Conventional notation of hookups in the sheets. Technology (PI & D) sheets for the main and auxiliary equipment and accessories of ST and auxiliary equipment of CCPP. Assembly drawing and use. Exercises for reading sheets based on studying sheet. Necessary sheets for Chief mechanic of CCPP: A-21010, A-21061-A, A-21062-C, A-21083-C,G1-99992,G1-99997,A-21063-C, A-21064-C, A-21065-C, A-21066-C, A-21067-A, A-21081-A, A-21082-C, A-21084-A, A-21085-A, A-21086-A, A-21087-A, A-21088-A, A-21091-A, A-21091-A, A-21131-A, G1-79857, G1-79858, G1-81331, G1-99993, G1-99994, G1-99996, NAV-10-EK-MDD-ENI-001/002/003/004, NAV-10-GC-BDD-IEM-155, NAV-10-GHC-BDD-IEM-170, NAV-10-GM-BDD-IEM-175, NAV-10-HA-MDD-NEI-001, NAV-10-LA-BDD-IEM-040, NAV-10-LAC-MDD-TOR-207, NAV-10-LB-BDD-IEM-010, NAV-10-LB-BDD-IEM-010, NAV-10-LB-BDD-IEM-020, NAV-10-LB-BDD-IEM-025, NAV-10-LB-BDD-IEM-030, NAV-10-LBD-BDD-IEM-035, NAV-10-LC-BDD-IEM-045, NAV-10-LCP-BDD-IEM-095, NAV-10-LCQ-BDD-IEM-070, NAV-10-LCQ-BDD-IEM-070, NAV-10-LCQ-BDD-IEM-075, NAV-10-LFN-BDD-IEM-085, NAV-10-MA-BDD-IEM-110, NAV-10-MAJ-BDD-IEM-001, NAV-10-MAJ-BDD-IEM-250, NAV-10-MAJ-MDD-NAS-001, NAV-10-MAJ-MDD-NAS-001, NAV-10-MAL-BDD-IEM-060, NAV-10-MAL-BDD-IEM-060, NAV-10-MA-MDD-MN-005, NAV-10-MA-MDD-MN-006, NAV-10-MA-MDD-MN-008, NAV-10-MA-MDD-MN-010, NAV-10-MA-MDD-MN-011, NAV-10-MA-MDD-MN-013, NAV-10-MA-MDL-MN-605, NAV-10-MA-MDM-MN-001, NAV-10-MA-MDM-MN-002, NAV-10-MAW-BDD-IEM-055, NAV-10-MAW-BDD-IEM-055, NAV-10-MB-MDL-MTG-003, NAV-10-MKB-MDD-MEL-352, NAV-10-MKB-MDD-MEL-353, NAV-10-NA-BDD-IEM-015, NAV-10-PA-BDD-IEM-080, NAV-10-PA-BDD-IEM-080, NAV-10-PAH-MDD-GEA-001, NAV-10-PG-BDD-IEM-100, NAV-10-PG-BDD-IEM-100, NAV-10-QE-BDD-IEM-120, NAV-10-QE-BDD-IEM-125, NAV-10-QE-BDD-IEM-702, NAV-10-QUA-BDD-IEM-701, NAV-10-QUA-BDD-IEM-701, NAV-10-SA-BDD-IEM-140, NAV-10-SG-BDD-IEM-130, NAV-10-SG-BDD-IEM-130, NAV-10-V-BDD-IEM-001, NAV-10-V-BDD-IEM-001, 032-BCS-PID-001(1-9 pages), 032- BCS -PID-002, 032-BCS -PID-003(1-4 pages), 032- BCS -PID-L&S.

<u>TOPIC 4.</u> Construction and mode of operation of main and auxiliary equipment at CCPP and GBS, main and auxiliary equipment of GT, the main and auxiliary equipment of ST.

HRSG (design, performance parameters, operation principles). Range drum, boiler super-heater, economizer, evaporator, safety, regulatory and pre-start valves. Cooling fans for observation windows and flame sensors of HRSG. Drainage system, periodic and continuous blowing down of drums and low points of HRSG. Conservation of HRSG during the repair period. The circulation of water in HRSG. Steam parameters and performance of HRSG. Duct burners of HRSG. Gas and steam turbine facilities. The main part of the gas and steam turbine

facilities, their purpose, the device interaction. The main steaming line. The condenser and condensate pumps, their devices and functionality. Feeding pump. Heating unit, its structure and purpose. Gas distribution and measuring unit of CCPP (RMS). Vacuum pumps, closed cooling system, auxiliary cooling pumps, water circulation system (circulation pumps, water cooling, cooling tower, cooling fans). Condensed steam and circulation water feeding system, demineralized water system. Instrument Air. Drainage system of steam pipelines and turbine.

Air-intake system of GT (air filters and limits of operation, media evaporator, heat-exchange unit of air boiler), Compressor of GT (AD (air distributor), air bleed for cooling turbine blades, compressor efficiency, pressure and temperature of the incoming and outgoing compressor air, as well as its influence on the GT load). Gas turbine (Rate of blades and their cooling level, efficiency of the turbine, combustor and cooling system, burners of GT, number of bearings of GT, bypass and anti-surge valves), the exhaust gas system. Lubrication System for GT (characteristics of pump lubrications, oil heating, oil tank, heat exchanger, oil separator, oil for speed increase). The control system for gas valves (regulating oil, electrostatic oil). Fuel gas heater (construction and operating limits). Cooler for cooling air turbine (construction and operating limits). System of blades flushing. Evaporative cooling of the inlet air in compressor. Anti-icing system. System of inlet air heating. Gas distribution unit of GT (control valves for gas flow and pressure, servo motor valves, gas distribution, blow-off valves). The cooling system of the turbine vessel. Instrument Air.

Steam turbine (construction, performance parameters, regulatory and shut-off valves, the number of bearings). Oil supply and control system (parameters of high, low and emergency oil pumps, servomotors of steam valves, parameters of main oil pump (MOP), oiling system of an automatic stopping). Turbine steam sealing system (steam extraction for sealing, sealing steam condenser, seal types, sealing steam performance parameters). Normal operation of the turbine (temperature and vibration bearings, Relative Rotor Expansion (RRE), the absolute expansion of the turbine, rotor axis, etc.) Electro-hydraulic converter. Drainage system. Irrigation system for Low-Pressure Cylinder (LPC)'s exhaust, air-cooling system of the turbine. Temperature monitoring of the turbine.

Gas booster compressor (construction, performance, regulatory and shut-off valves, the number of bearings). Input dust collector, filter separator, compressor unit CU-100/200, the compressor C-101/201, Gas Air Cooling Unit and gas separator, Compressors' Dry Gas Seals Unit (DGSU), oil system, compressor of compressed air, Receivers, separator F-501A/B, air dehumidifiers unit.

<u>TOPIC 5.</u> Commission and shut-down of HRSG, ST, GT and auxiliary equipment at CCPP and GBS. An emergency shut-down of HRSG and auxiliary equipment at CCPP.

The procedure of preparation for the launch of CCPP. The order of start-up of auxiliary equipment step-by-step (water circulation system, auxiliary cooling system, closed cooling system, etc.). Preparations for HRSG start-up (water-filling of HRSG hookups, modes of start-up for HRSG, the drain of condensate remainder from the super-heater). Chemical mode of HRSG. Sealing process of steam turbine and a vacuum creation in the condenser.

The procedure of preparation for commissioning and start-up of GT (prepare the permitted limits for start-up, preparing Static Frequency Converter (SFC), lubrication system, control system, generator sealing system, preparing auxiliary equipment of GT, detection of foreign objects/restrictions in the area of the turbine and gas distribution unit). Synchronization of generator system. Increasing the load to the nominal value. The interaction between the operators of ST and auxiliary equipment during increase of load. Normal mode of shutting down GT.

The procedure of preparation for commissioning and start-up of GT (load increasing, preparing auxiliary equipment of GT). Lubrication system. The system of regulation. Starting modes for ST, specifications of start-up turbine under hot conditions. Chemical steam mode. Detection of foreign objects in the area of the turbine. Synchronization generator system. Increasing the load to the nominal value depending on the load of GT and vacuum capacitor. The interaction between the operators of ST and auxiliary equipment during start-up. Normal mode of shutting down of ST.

The procedure of preparation for commissioning and start-up of electrical hot-air heater (EHH 100/200) (prepare the permitted limits for start-up, preparing auxiliary equipment of BBS). Lubrication system. System of regulation. Compressors start-up modes. Detection of foreign objects in the area of the turbine. Soft-start of synchronous motor, increasing the pressure to the nominal value depending on the interaction between operators of BBS and driver-lineman during the commissioning. Normal mode of shutting down of compressor.

Saving fuel, heat and electricity. Decommissioning of equipment for repair. Causes and symptoms of emergencies and measures for their elimination and prevention. Personnel responsibility for permitted accidents and defects. Classification of accidents and defects. The technical operation of main and auxiliary equipment, industrial and emergency response instructions. Specifications of thermal and mechanical equipment plant operation in winter conditions.

TOPIC 6. Chemical mode of the main and auxiliary equipment at CCPP.

Requirements for the quality of steam. Causes of impurities ingress into steam. Norms of boiler water salinity level. Solubility of salts in saturated steam, superheated steam, boiler water. Phosphatization: purpose and scheme. Application of hydrazine. Quality of demineralized water and condensate. Requirements for the feeding water. Causes of the chemical mode disturbances of HRSG and steam turbine, condenser, drums and action to eliminate them. Safety Technique (ST) instructions for maintenance of phosphate and hydrazine pumps. Chemical analysis of the closed cooling system.

TOPIC 7. Details of electrical engineering.

The auxiliary circuit for 6 kV and 0.4 kV station. Synchronization and hook up generators into electrical network. Load shedding of generator. The concept of the alarm signaling for equipment at unit switchboard. First aid measures for electric shock. Fire extinguishing in electrical installations.

TOPIC 8. APCS, technological protection and blocking of auxiliary equipment at CCPP.

Software APCS accessories for auxiliary equipment at CCPP and GBS. Control logics. Brief description of "ABBAC 800 M" and "DAISYSNETMATION" programs. Automatic controls of level, flow, pressure, power; their functions and concept of operation. Technological protection and blocking for main and auxiliary equipment.

TOPIC 9. Methods of economic mode of operation of main and auxiliary equipment of GT.

Mode of operation of heaters and coolers. Technological protection, blocking and automatic transfer circuit-breaker (ATCB). Function and operational procedures. Service and maintenance. Influence of operational indicators of work and technological parameters of the main and auxiliary equipment on operation efficiency.

Head of department of CCPP	Abdulloev I.H.
Chief Process Engineer of CCPP	Musaev A.B.

APPROVED
Chief Engineer
JSC "Navoi TPP"
_____Nazarov T.G.
«___»_____2014

PROGRAM
of individual training
for Auxiliary Equipment (AE) Operator.(BOP)

№	TOPICS	Number of hours
1.	Basic information on the production and organization of the workplace. Job Description of AE operator	8
2.	Safety techniques, industrial hygiene and fire safety in the unit of the CCPP. Rules of design and safe operation of vessels, pipelines and gas facilities.	16
3.	Flow sheets of GT, ST, HRSG and auxiliary equipment of CCPP	24
4.	Construction and mode of operation of main and auxiliary equipment of CCPP	32
5.	Commissioning, maintenance and shut-down of HRSG and auxiliary equipment at CCPP. An emergency stop of HRSG and auxiliary equipment at CCPP.	32
6	Chemical mode of main and auxiliary equipment at CCPP.	8
7.	Details on electrical engineering.	8
8.	APCS, technological protection and blocking of HRSG and auxiliary equipment at CCPP.	24
9.	Methods of economic mode of operation of the main and auxiliary equipment of HRSG and auxiliary equipment at CCPP.	8
10	Totally	160

TOPIC 1. Basic information on the production and organization of the workplace.
Thermal power plant, its structure and organization. Main and auxiliary power plant units, their functionality. Interaction between units. Common auxiliaries. Work place, its organization and technical maintenance. Internal regulations .

TOPIC 2. Safety techniques, industrial hygiene and fire safety in the unit of the CCPP.
Safety techniques. Objectives of safety techniques in production. Legislation and regulatory bodies for the labor safety in the Republic of Uzbekistan.

Safety measures within the territory and units of the power plant. Safety regulations for thermal power plants within the requirements of the job description. Rules of conduct within the territory and units of the power plant. Safety regulations for the operation of industrial computers.

Industrial hygiene. Objectives of industrial hygiene. Occupational diseases and their underlying causes. Prevention of occupational diseases.

Basic preventive and protective measures. Personal care. Self-help and first aid in case of accidents. Workplace medical and health care.

Fire-fighting measures. The main causes of fires in the workplace and on the territory of the plant. Inadmissibility of the use of open fire. Fire control stations, fire protection, fire-prevention appliances, devices and alarm. Carbon dioxide fire extinguishers for the premises of GT and gas-control unit, and manuals. Activity indicator of safety extinguisher. Rules of conduct in flammable areas and during the fire. Rules of organization and safe operation of vessels, piping, steam pipe-lines and gas facilities.

<u>TOPIC 3.</u> Flow sheets for Steam Turbine (ST), Recovery Boiler (HRSG) and auxiliary equipment at CCPP.

The concept of flow sheets. Conventional notation of hookups in the sheets. Technology (PI & D) sheets for the main and auxiliary equipment and accessories of ST and auxiliary equipment of CCPP. Assembly drawing and use. Exercises for reading sheets based on studying sheet. Necessary sheets for Auxiliary Equipment (AE) Operator of CCPP: NAV-10-V-BDD-IEM-001, NAV-10-LB-BDD-IEM-010, NAV-10-NA-BDD-IEM-015,NAV-10-LB-BDD-IEM-020,NAV-10-LB-BDD-IEM-025, NAV-10-LB-BDD-IEM-030,NAV-10-LBD-BDD-IEM-035,NAV-10-LA-BDD-IEM-040,NAV-10-LC-BDD-IEM-045,NAV-10-MAW-BDD-IEM-055,NAV-10-MAL-BDD-IEM-060,NAV-10-LCQ-BDD-IEM-070,NAV-10-LCQ-BDD-IEM-075, NAV-10-PA-BDD-IEM-080,NAV-10-LFN-BDD-IEM-085,NAV-10-LCP-BDD-IEM-095,NAV-10-PG-BDD-IEM-100,NAV-10-MA-BDD-IEM-110,NAV-10-QE-BDD-IEM-120,NAV-10-QE-BDD-IEM-125,NAV-10-QE-BDD-IEM-702,NAV-10-SG-BDD-IEM-130,NAV-10-SA-BDD-IEM-140,NAV-10-GC-BDD-IEM-155,NAV-10-GHC-BDD-IEM-170,NAV-10-GM-BDD-IEM-175,NAV-10-MAJ-BDD-IEM-250,NAV-10-QUA-BDD-IEM-701,NAV-10-MAJ-MDD-NAS-001,NAV-10-LAC-MDD-TOR-207,NAV-10-EK-MDD-ENI-001/002/003/004,NAV-10-PAH-MDD-GEA-001,NAV-10-HA-MDD-NEI-001÷015

<u>TOPIC 4.</u> Construction and mode of operation of main and auxiliary equipment at CCPP.

Recovery Boiler (HRSG) (design, performance parameters, operation principles). Range drum, boiler super-heater, economizer, evaporator, safety, regulatory and pre-start valves. Cooling fans for observation windows and flame sensors of HRSG. Drainage system, periodic and continuous blowing down of drums and low points of HRSG. Conservation of HRSG during the repair period. The circulation of water in HRSG. Steam parameters and performance of HRSG. Duct burners of HRSG. Gas and steam turbine facilities. The main part of the gas and steam turbine facilities, their purpose, the device interaction. The main steaming line. The condenser and condensate pumps, their devices and functionality. Feeding pump. Heating unit, its structure and purpose. Gas distribution and measuring unit of CCPP (RMS). Vacuum pumps, closed cooling system, auxiliary cooling pumps, water circulation system (circulation pumps, water cooling, cooling tower, cooling fans). Condensed steam and circulation water feeding system, dematerialized water system. Instrument Air. Drainage system of steam pipelines and turbine.

TOPIC 5. Commission and shut-down of HRSG and auxiliary equipment at CCPP. An emergency shut-down of HRSG and auxiliary equipment at CCPP.

The procedure of preparation for the launch of CCPP. The order of start-up of auxiliary equipment step-by-step (water circulation system, auxiliary cooling system, closed cooling system, etc.). Preparations for HRSG start-up (water-filling of HRSG hookups, modes of start-up for HRSG, the drain of condensate remainder from the super-heater). Chemical mode of recovery boiler. Sealing process of steam turbine and a vacuum creation in the condenser.

Saving fuel, heat and electricity. Decommissioning of equipment for repair. Causes and symptoms of emergencies and measures for their elimination and prevention. Personnel responsibility for permitted accidents and defects. Classification of accidents and defects. The technical operation of main and auxiliary equipment, industrial and emergency response instructions. Specifications of thermal and mechanical equipment plant operation in winter conditions.

TOPIC 6. Chemical mode of the main and auxiliary equipment at CCPP.

Requirements for the quality of steam. Causes of impurities ingress into steam. Norms of boiler water salinity level. Solubility of salts in saturated steam, superheated steam, boiler water. Phosphatization: purpose and scheme. Application of hydrazine. Quality of demineralized water and condensate. Requirements for the feeding water. Causes of the chemical mode disturbances of HRSG, condenser, drums and action to eliminate them. Safety Technique (ST) instructions for maintenance of phosphate and hydrazine pumps. Chemical analysis of the closed cooling system.

TOPIC 7. Details of electrical engineering.

The auxiliary circuit for 6 kV and 0.4 kV station. Synchronization and hook up generators into electrical network. Load shedding of generator. The concept of the alarm signaling for equipment at unit switchboard. First aid measures for electric shock. Putting out a fire in electrical installations.

TOPIC 8. APCS, technological protection and blocking of auxiliary equipment at CCPP.

Software APCS accessories for auxiliary equipment at CCPP and GBS. Control logic. Brief description of "ABBAC 800 M" program. Automatic controls of level, flow, pressure, power; their functions and concept of operation. Technological protection and blocking for main and auxiliary equipment.

TOPIC 9. Methods of economic mode of operation of main and auxiliary equipment of GT.

Mode of operation of heaters and coolers. Technological protection, blocking and automatic transfer circuit-breaker (ATCB). Function and operational procedures. Service and maintenance. Influence of operational indicators of work and technological parameters of the main and auxiliary equipment on operation efficiency.

Head of department of CCPP Abdulloev I.H.

Chief Production Engineer of CCPP Musaev A.B.

Individual training
PROGRAM of the GT operator

No	Themes	Quantity of hours
1.	Basic information on the production and organization of the workplace. Duty regulations of the GT operator	8
2.	Safety, industrial hygiene and fire safety in the shop of CCGT CS. Facility regulations and safe operation of vessels, pipelines and gas facilities.	16
3.	GT flow charts and its auxiliary equipment	24
4.	Construction and principle of operation of the main and auxiliary GT equipment	32
5.	Startup, service and stop of the main and auxiliary GT. An emergency stop of the main and auxiliary equipment of GT.	32
6.	Information from the electrical engineering. Cooling service of the GT generator and seal oil system of the generator.	16
7.	ACS (automated control system) TS, technological protection and blocking of the gas turbine.	24
8.	Ways of conducting economic mode of the main and auxiliary equipment of GT.	8
9	TOTAL	160

THEME- 1. ***Basic information on the production and organization of the workplace.***

Thermal power plant, its structure and organization. The main and auxiliary shops of the power plant, their assignment. Communication between shops. Balance of plant. Workplace, its organization and maintenance works. Internal regulations.

THEME-2. ***Safety, industrial hygiene and fire safety in the shop of CCGT CS.***

Safety measures. Objectives of safety measures in terms of production. Legislation and supervisory authorities on work safety in the Republic of Uzbekistan.

Safety measures in the territory and in the shops of the power plant. Safety regulations for the thermal power plants within the scope of the job description. Rules of conduct in the territory and in the shops of the power plant.

Safety regulations for the operation of industrial computers.

Industrial sanitation. Objectives of industrial hygiene. Occupational diseases and their main causes. Prevention of the occupational diseases.

Basic preventive and protective measures. Personal hygiene. Self-help and first aid in case of accidents. Medical and health care of the workers in the enterprise

Fire-fighting measures. The main causes of fires in the shops and in the territory of the power plant. Inadmissibility of open fire use. Fire stations, fire protection, fire appliances, devices and alarm. Carbon dioxide fire extinguishers of the GT premises and gas-distributing center and their application rules. For safety activity indicator of the fire extinguisher.

Rules of conduct in flammable areas and during the fire. Facility regulations and safe operation of boilers, vessels, pipelines and gas facilities.

Rules of conduct in flammable places and during the fire. Facility regulations and safe operation of the vessels, boilers, pipelines and gas facilities.

THEME – 3. ***GT flow charts and its auxiliary equipment***.

The concept of flow charts. Symbols of nodes in the diagrams. Flow (PI & D) charts of the main and auxiliary equipment of GT. Assembly drawing and its purpose. Exercises in reading charts on

studied chart. Necessary charts for the GT operator. A-21083-C, A-21082-C, A-21081-A, A-21067-A, A-21066-C, A-21065-C, A-21064-C, A-21063-C, A-21062-C, A-21061-A, A-21010, A-21084-A, A-21085-A, A-21086-A, A-21087-A, A-21088-A, A-21091-A, A-21091-A, A-21131-A, G1-79857, G1-79858,G1-99992, G1-99993, G1-99994, G1-81331, G1-99996,G1-99997, NAV-10-MB-MDL-MTG-003, NAV-10-MKB-MDD-MEL-352, NAV-10-MKB-MDD-MEL-353.

THEME – 4. ***Construction and principle of operation of the main and auxiliary GT equipment***

Air-intake System of GT (air filters and limits of operation, media evaporator, heat exchange of air heater), GT Compressor (AGV (air guide vanes), bleed air to cool the turbine blades, compressor efficiency, pressure and temperature of the inlet and outlet air of the compressor, as well as its influence to the load of GT). Gas turbine (Degree of blades and its cooling, efficiency of the turbine, combustion chamber and its cooling, burners of GT, quantity of the GT bearings, bypass and blow off valves), the exhaust gas system. Lubrication System of GS (characteristic of lubrication pumps, oil heater of the oil tank, heat exchanger, oil separator, oil overstating of the speed). The system of regulation of gas valves (regulating oil, electrostatic oil). Fuel Gas Heater (construction and operation limits). Cooler of the cooling air of the turbine (construction and operating limits). Washing system of the blades. Evaporative cooling of the incoming air of the compressor. System versus-icing. Heater system of the inlet air. Gas distribution center of GT (control valves of gas flow and pressure, servomotor valves, gas distribution, the purge valve). The cooling system of the turbine housing. Air of CMD&A.

THEME – 5. ***Startup, service and stop of the main and auxiliary GT. An emergency stop of the main and auxiliary equipment of GT.***

The procedure to the startup and actual start of GT (prepare permitted limits for starting, SFC preparation, lubrication system, control system, seal system of the generator, preparation of auxiliary equipment of the GT, checking the outside objects in the vicinity of the turbine and gas distribution center). Synchronization of the generator with system. Load increases upto the nominal value. The relationship between GT operators and auxiliary equipment at the load increasing. Normal Stop of GT. Saving of the fuel gas, heat and electricity. Equipment outlet into the repair. Causes and features of emergencies and measures for their elimination and prevention. Personnel's responsibility for the accident and defects. Classification of accidents and defects. Standards of technical operation of the main and auxiliary equipment, industrial and anti-damage instructions. Features of thermal mechanical equipment of the workshop in winter conditions.

THEME – 6. ***Information from the electrical engineering. Cooling service of the GT generator and seal oil system of the generator.***

Generator characteristics of the GT (rated power, current, voltage, temperature, cooling water). Normal and emergency operation of the generator. Cooling scheme of the generator. Allowed parameters of the generator cooling and directly cooling control objects. Oil supply device for seals of the generator. Regulating of the oil supply on the seal. Limited parameters of oil supplied to the seal of the generator. Generator load depending on the type and temperature of the cooling surrounding. Scheme of the auxiliaries of the station 6 kv. and 0.4 kv. Synchronization and switching the generators to the network. Emergency discharge of the generator. The concept of electrical signaling in the unit control desk. First aid measures by electroconvulsive shock. Extinguishing a fire in electrical installations.

THEME – 7. ***ACS TS, technological protection and blocking of the gas turbine.***

Software supply of ACS TS gas turbine. Control logic schemes. Brief description of the program "DAISYS NETMATION". Automatic level controls, combustion, power, their purpose, the principle of operation. Technological protection and blocking of the main and auxiliary equipment.

THEME – 8. ***Ways of conducting economic mode of the main and auxiliary equipment of GT.***

Mode of operation of heaters and coolers. Technological protection, block and ATS, purpose and procedure of operation. Service. Influence of operational parameters works Technological parameters of main and auxiliary equipment, turbine at efficiency work.

Memorandum of the Monthly Meeting **The Project for Establishment of the Combined Cycle Gas Turbine (CCGT) Operation and Maintenance Training Center** **(The First Monthly Meeting)**	**Меморандум ежемесячного собрания** **Проект технического содействия Японии «Создание Учебного Центра по Эксплуатации и Обслуживанию Парогазовых Установок Комбинированного Цикла (ПГУ) в Узбекистане»**
Date: 22nd December 2016 **Place**: Office in CCPP-1 of Navoi Thermal Power Plant (НТЭС)	Дата: 22 декабря 2016 Место: ПГУ-1 Навоийской ТЭС (НТЭС)
Attendees: 1. Navoi Thermal Power Plant (NTPP) Mr. Shukhrat Dostov	Присутствовали: 1. НТЭС Г-н Шухрат Достов
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2. JICA Expert Team (JET) Mr. Hidehito Wakabayashi	2. Группа экспертов JICA (JET) Г-н Хидехито Вакабаяши
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Agenda: What are discussed and agreed between NTPP and JET during the 7th Mission in December 2016.	Повестка дня: Что было обсуждено и согласовано между НТЭС и JET во время 7-й миссии в декабре 2016г.
1. Target Values for Monitoring (1) The number of assigned Trainers who were trained: 10 Trainers (2) The number of Trainees accredited in Uzbekenergo as CCPP O&M Staff: 150 Trainees (3) The number of accredited CCPP O&M Trainers: 10 Trainers	1. Целевые значения для мониторинга (1) Количество назначенных инструкторов, которые прошли обучение: 10 инструкторов (2) Число стажеров, аккредитованных в качестве Персонала по ЭиТО в Узбекэнерго: 150 стажеров (3) Число аккредитованных инструкторов по ЭиТО ПГУ: 10 инструкторов
2. Trainer Candidates (1) 13 Trainer Candidates (2) 8 Trainer Candidates will attend Training of Trainers in Japan in February 2017 (3) 8 more Trainer Candidates will attend Training of Trainers in Japan in December 2017 (4) Interview for the new three Trainer Candidates: To be discussed in January 2017	2. Кандидаты в инструктора (1) 13 Кандидатов в инструктора (2) 8 Кандидатов в инструктора будут проходить обучение инструкторов(ТОТ) в Японии в феврале 2017 года (3) Следующие 8 Кандидатов в инструктора будут проходить обучение инструкторов (ТОТ) в Японии в декабре 2017 года (4) Собеседование для новых трех кандидатов в инструктора: Будет обсуждаться в январе 2017 год

3. Transfer from Tashkent to Navoi What was lectured by JET in Tashkent during May and October 2016 must be transferred by the arrangement and cooperation of Head Office of Uzbekenergo and Navoi Thermal Power Plant including travel expense and allowance and etc.. (1) The number of textbook: No.4, 5, 7, 9 & 10 (2) Correction and improvement of the textbooks of Russian version	3. Передача из Ташкента в Навои Тот материал, который был обучен со стороны JET в Ташкенте в период с мая по октябрь 2016 должен быть передан с помощью Главного офиса Узбекэнерго и Навоийской ТЭС, включая расходы на поездки и пособия и т.д .. (1) Номера учебников: № 4, 5, 7, 9 и 10 (2) Исправление и совершенствование учебников русской версии
4. Schedule of Training of Trainers (TOT) As per attached	4. График обучения инструкторов (ТОТ) Согласно приложенным
5. Layout of Training Center As per attached	5. Схема учебного центра Согласно приложенным
6. Training Equipment List for Electrical Course As per attached	6. Перечень учебного оборудования для электрического курса Согласно приложенным
Next Meeting: January 2017 (End of Memorandum)	Следующее собрание: январь 2017 (Конец Меморандума)

Memorandum of the Monthly Meeting
Меморандум ежемесячного собрания
The Project for Establishment of the Combined Cycle Gas Turbine (CCGT) Operation and Maintenance Training Center

Date: 22nd December 2016 (Revised on 26th December 2016)
Дата: 22 декабря 2016 (Исправлено 26 Декабря 2016г.)

Place: Office in CCPP-1 of Navoi Thermal Power Plant (NTPP)
Место: ПГУ-1 Навоийской ТЭС (НТЭС)
Attendees: Присутствовали:
1. НТЭС
Mr. Shukhrat Dostov _____
2. JICA Expert Team (JET)
Mr. Hidehito Wakabayashi _____

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Agenda: What are discussed and agreed between NTPP and JET during the 7th Mission
Повестка дня: Что было обсуждено и согласовано между НТЭС и JET во время 7-й миссии

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1. Target Values for Monitoring (Reference: Attachment 2-1 PDM)
The number of assigned Trainers who were trained: 10 Trainers
(1) The number of Trainees accredited in Uzbekenergo as CCPP O&M Staff: 150 Trainees
(2) The number of accredited CCPP O&M Trainers: 10 Trainers

1. Целевые значения для мониторинга (Справка: Приложение 2-1 ДПМ)
(1) Количество назначенных инструкторов, которые прошли обучение: 10 инструкторов
(2) Количество обучавшихся, которые будут аккредитованы в АО «Узбекэнерго», как персонал по эксплуатации и обслуживанию ПГУ: 150 стажеров
(3) Количество аккредитованных инструкторов по ЭиТО ПГУ: 10 инструкторов

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2. Trainer Candidates (Reference: Attachment 2-3 Trainer Candidates List)
(1) 13 Trainer Candidates
(2) 8 Trainer Candidates will attend Training of Trainers in Japan in February 2017
(3) 8 more Trainer Candidates will attend Training of Trainers in Japan in December 2017
(4) Interview for the new three Trainer Candidates: To be discussed in January 2017
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2. Кандидаты в инструктора (Справка: Приложение 2-3 Список кандидатов в инструктора)

(1) 13 Кандидатов в инструктора

(2) 8 Кандидатов в инструктора будут проходить обучение инструкторов(ТОТ) в Японии в феврале 2017 года

(3) Следующие 8 Кандидатов в инструктора будут проходить обучение инструкторов (ТОТ) в Японии в декабре 2017 года

(4) Собеседование для новых трех кандидатов в инструктора: Будет обсуждаться в январе 2017 года

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3. Transfer from Tashkent to Navoi (Reference: Attachment 2-2 TOT Schedule)

What was lectured by JET in Tashkent during May and October 2016 must be transferred by the arrangement and cooperation of Head Office of Uzbekenergo and Navoi Thermal Power Plant including travel expense and allowance and etc..

- ✓ The number of textbook: No.4, 5, 7, 9 & 10
- ✓ Correction and improvement of the textbooks of Russian version

3. Переход из Ташкента в Навои (Справка: Приложение 2-2 График ТОТ)

Тот материал, который был обучен со стороны JET в Ташкенте в период с мая по октябрь 2016 должен быть передан с помощью Главного офиса Узбекэнерго и Навоийской ТЭС, включая расходы на поездки и пособия и т.д ..

- ✓ Номера учебников: № 4, 5, 7, 9 и 10
- ✓ Исправление и совершенствование учебников русской версии

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4. Schedule of Training of Trainers (TOT) (Reference: Attachment 2-2 TOT Schedule)

As per attached

4. График обучения инструкторов (ТОТ) (Справка: Приложение 2-2 График ТОТ)

Согласно приложенным

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5. Layout of Training Center (Reference: Attachment 2-4 Case Study on Room Arrangement)

As per attached

5. Схема учебного центра (Справка: Приложение 2-4 Пример по обустройству комнат)

Согласно приложенным

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6. Training Equipment List for Electrical Course (Reference: Attachment 2-5 Equipment List)

As per attached

6. Список учебного оборудования для курсов по электрической части (Справка: Приложение 2-5 Список учебного оборудования)

Согласно приложенным

Next Meeting: January 2017

Следующее собрание: январь 2017

(End of Memorandum)

(Конец Меморандума)

26&27 January 2017

Report of Implementation of "Handover"

The Handover conducted by the Tashkent Trainer Candidates was reconfirmed and agreed by the management of Navoi Thermal Power Plant (NTPP) in the 7th Mission of JET in December 2016.

Implementation of "Handover" is carried out as follows;

1. Purpose

Immediate start of the training for O&M of CCPP ordered by the Chairman of JSC Uzbekenergo

2. Handover implemented Dates

Two days on 26th & 27th of January 2017

3. Venue

Navoi Thermal Power Plant (NTPP), CCPP Unit

4. The persons in charge to carry out "Handover"

Three Trainer Candidates from Tashkent:
Mr.Sobirov Bakhrom -UZE head office
Mr.Khudoyberganov Askar -Tashkent TPP
Mr.Shamsiev Rasul- TashTETS

5. The persons in charge to accept "Handover"

The Trainer Candidates selected from Navoi Thermal Power Plant

6. Handover is held on following textbooks

Handover on Textbooks of No.4, No.5, No.7 was held to the time constraints of "Handover"

7. The contents of "Handover"

7-1. Comprehensive Review of No.4, No.5, No.7
7-2. Discussion including Question & Answer and the scheduling of the remaining subjects
7-3. Tashkent trainer candidates have visited the site of CCPP together with Navoi candidates in order to understand better by themselves. Navoi candidates have explained the all facilities of main and auxiliary equipment of CCPP to Tashkent candidates. To be honest, Handover was

more useful for Tashkent candidates rather than to Navoi candidates. Shamsiev, who works in TashTETS, basically answered the questions of Navoi candidates, because of his operation experience of Gas turbine. But the questions were about the details of Gas turbine, which is installed in TashTETS.

The handover was held at the same dates with Monthly Meeting of January 2017.

(end of “Handover Report ”)

27th January 2017

Agendas of the Monthly Meeting in January 2017

The Monthly Meeting in January 2017 carried out to follow up “Handover” conducted in January 2017 and to identify the best solution for the current problems and matters related to “Handover”.

1. Agendas

(1) The financial arrangement for travel expense, allowance and etc. implemented by Uzbekenergo and Navoi Thermal Power Plant (NTPP)

a. To have comprehensive discussion to carry out the confirmed and agreed action plan of “Handover“ at the 6th Mission in October 2016

(1)-2 The first Handover was held on 26 & 27th January 2017 by three Tashkent trainer candidates to new Navoi trainer candidates at NAVOI TPP, CCPP Unit. Handover was made for Textbooks No4, No5 and No7. Textbook No9 and No10 was not finished yet.

(2) The schedule for the further “Handover” before the 8th Mission, i.e. the next Handover will be held on 03.04.2017, if necessary.

(3) The plan and schedule of training implemented by NTPP

In January training of trainees has not started. Actual training of 150 trainees will be started from April 2017.

(4) The construction of the building of the new Training center is not started yet. But the conclusion of architectural authority of Navoi for construction of New training center in that planned building is received. The building design documentation is being developed now. After that construction will start.

2. Date

AM of 27th of January 2017

3. Venue

Navoi Thermal Power Plant (NTPP), CCPP Unit

4. The persons in charge to attend the Monthly Meeting

Training Center Director: Mr. Shukhrat Dostov

27th January 2017

Mr.Abdullaev Ikhtiyar

JET: Mr. Umid Usmanov / Mr. Hidehito Wakabayashi (telephoning from Tokyo)

The Trainer Candidates from NTPP

(end of “Agenda of the Monthly Meeting”)

Memorandum of the Monthly Meeting

The Project for Establishment of the Combined Cycle Gas Turbine (CCGT) Operation and Maintenance Training Center

(The Second Monthly Meeting)

Date: 13th February 2017
Time: 12:30~13:30
Place: Office in Chugoku EPCO Head Office

Attendees:
1. Navoi Thermal Power Plant (NTPP)
   Mr. Kahramon GANIEV
   Mr. Alisher MUSAEV
   Mr. Bakhodir DJAMALOV
2. JICA
   Ms. Masuya, Ms. Tanaka
3. JET
   Mr. Murata, Mr. Saito, Mr. Nishio, Mr. Miyamoto, Mr. Hasebe, Mr. Umid
   Chairperson: Mr. Wakabayshi
4. Observer
   Mr. Harada (Chugoku EPCO)

Agenda: What are discussed and agreed between NTPP and JET during the TOT in Japan in February 2017.

1. Training Plan
   (1) Answer and Comments to the questionnaires and requests of Head of Navoi Training Center
   (2) Question & Answer

2. Overview of Joint Coordination Committee (JCC)
   (1) Orientation & Guideline
   (2) Date / Venue: May 9~12, 2017 @ Tashkent or Navoi
   (3) Agendas: a New Project Structure
   b Achievement of Project (Each Development, Monitoring Sheet 3)
   c Proposal of Roadmaps (Humanresource Development, Plan, Training Plan, Accreditation System)
   d Support Measures & Advice to Training 150 staffs (including handover to Navoi from Tashkent)

Меморандум ежемесячного собрания

Проект технического содействия Японии «Создание Учебного Центра по Эксплуатации и Обслуживанию Парогазовых Установок Комбинированного Цикла (ПГУ) в Узбекистане»

Дата: 13 февраля 2017
Время: 12:30-13:30
Место: Головной офис Тюгоку Электрик(CEPCO)

Присутствовали:

1. НТЭС
   Г-н Кахрамон ГАНИЕВ
   Г-н Алишер МУСАЕВ
   Г-н Баходир ДЖАМАЛОВ
2. ДЖАЙКА
Г-жа Масуя, Г-жа Танака
3. Группа экспертов ДЖАЙКА
Г-н Мурата, Г-н Сайто, Г-н Нишио, Г-н Миямото, Г-н Хасебэ, Г-н Усманов
Ведущий Г-н Вакабаяши
4. Наблюдатель
Г-н Харада (CEPCO)

Повестка дня: Что было обсуждено и согласовано между НТЭС и JET во время обучения в Японии в феврале 2017г.

1. Учебный план
(1) Ответы и комментарии на вопросы и требования главы учебного центра в Навои
(2) Вопросы и ответы

2. Обзор совместного координационного комитета (СКК)
(1) Ориентация и руководство
(2) Дата/ место: май 9-12 2017г. В Ташкенте или Навои
(3) Повестка: А Новая структура проекта
Б Достижения проекта (каждое достижение, Мониторинг лист 3)
В Предложение Дорожных карт (План подготовки кадров, Учебный план, Системы аккредитации)
Г Меры по поддержке и советы по обучению 150 сотрудников (включая передачи в Навои из Ташкента)

3. Other Issues (1) Support Measures for Handover to Navoi from Tashkent **(2)** New Allowance and Salary Systems to secure Trainers Next Meeting: March 2017 (End of Memorandum)	3. Другие вопросы (1) Меры по поддержке для передаче в Навои из Ташкента (2) Новые системы пособий и окладов для закрепления тренеров Следующее собрание: март 2017 (Конец Меморандума)

Memorandum of the Monthly Meeting

the Project for Establishment of the Combined Cycle Gas Turbine (CCGT) Operation and Maintenance Training Center

(The Third Monthly Meeting)

Date: March 24th, 2017
Venue: Office of CCPP-1 Navoi Thermal Power Plant

Attendees:
1. Navoi Thermal Power Plant (NTPP)
   Mr. Shukhrat Dostov

2. JICA Expert Team (JET)
   Mr. Yukihiro Murata
   Mr. Hidehito Wakabayashi
   Mr. Hideaki Iwashita

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Navoi, March 24th, 2017

1. Navoi Thermal Power Plant(NTPP)
   Mr. Shukhrat Dostov

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2. JICA Expert Team (JET)
   Mr. Hidehito Wakabayashi

Меморандум по ежемесячному совещанию по проекту создания Учебного центра по эксплуатации и техническому обслуживанию парогазовой турбины комбинированного цикла (ПГТ)
(Третье ежемесячное совещание)

Дата: 24 марта 2017 г.
Место проведение: Офис ПГУ-1 Навоийской тепловой электростанции

Участники:
1. Навоийская тепловая электростанция (НТЭС) – г-н Достов Шухрат

2. Группа экспертов JICA (JET)
   Г-н Юкихиро Мурата
   Г-н Хидехито Вакабаяши
   Г-н Хидеаки Ивашита

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Навои, 24 марта 2017 г.

1. Навоийская тепловая электростанция (НТЭС) – г-н Достов Шухрат

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2. Группа экспертов JICA (JET)
Г-н Хидехито Вакабаяши

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Agenda: What are discussed and agreed between NTPP and JET during the March 9th and 31st, 2017 as below;	Повестка дня: Какие вопросы обсуждались и были согласованы между НТЭС и JET в период с 9 по 31 марта 2017 г., как указано ниже;
(1) <u>Management Structure of The New Training Center</u> (1)-1 Mr. Kahramon GANIEV, General Director of JSC «Navoi Thermal Power Plant» was appointed as Project Director of "the Project". (1)-2 Mr. Shukhrat SHERALIEV, Deputy Chairman of the Board of JSC «Uzbekenergo» was appointed as Project Manager of "the Project". (1)-3 Mr. Shukhrat DOSTOV of JSC «NTPP» was appointed as Training Center Director of "the Project". Regarding "Management Structure of The New Training Center" as agreed above will be officially approved by Joint Coordination Committee (hereinafter referred to as "JCC") reviewed and discussed as below;	(1) <u>Структура управления новым Учебным центром</u> (1)-1 г-н ГАНИЕВ Кахрамон, Генеральный директор АО «Навоийская тепловая электростанция» был назначен Директором Проекта. (1)-2 Г-н ШЕРАЛИЕВ Шухрат, Заместитель Председателя правления АО «Узбекэнерго» был назначен Менеджером Проекта. (1)-3 Г-н ДОСТОВ Шухрат от АО «НТЭС» был назначен Директором Учебного центра Проекта. «Структура управления новым Учебным центром», как было договорено выше, будет официально утверждена Совместным координационным комитетом (далее именуемым «СКК»), согласно нижеприведенному обзору и обсуждению;
(2) <u>Joint Coordination Committee (hereinafter referred to as "JCC")</u> Considering the fundamental change of "the Project", i.e. the top management of Uzbekenergo, the location site of the new CCPP training center, trainers' candidates and etc., the following are proposed as the overview of the 2nd JCC. <u>Orientation & Guideline</u> (2)-1 Date/Venue: One day during May 15~19, 2017 at Navoi (2)-2 Agendas (a) New Project Organization (b) Achievement of Project (Each Development: Monitoring Sheet 3) (c) Proposal of Roadmaps (Human Resource Development Plan, Training Plan, Accreditation System) (d) Support Measures & Advice to Training 150 staffs of Uzbekenergo CCPP	(2) <u>Совместный координационный комитет (далее именуемый «СКК»)</u> Учитывая кардинальное изменение «Проекта», т.е., высшего руководства Узбекэнерго, места размещения нового Учебного центра ПГУ, кандидатов в инструкторы и т.д., в качестве обзора 2-го заседания СКК предлагаем следующее. <u>Ориентация и руководство</u> (2)-1 Дата/место проведения Один день между 15 и 19 мая 2017г. в Навои (2)-2 Повестки дня (а) Новая организация Проекта (б) Достижения Проекта (каждое достижение: Мониторинг Лист 3) (в) Предложение сценариев развития (План подготовки кадров, Учебный план, Система аккредитации) (г) Меры поддержки и консультирование в обучении 150 человек персонала ПГУ при Узбекэнерго.
End of the Attachment	*Конец Приложения*

Memorandum of the Monthly Meeting

The Project for Establishment of the Combined Cycle Gas Turbine (CCGT) Operation and Maintenance Training Center

(Monthly Meeting in July/August 2017)

Date: August 1st, 2017
Venue: Office in CCPP-1 of Navoi Thermal Power Plant

Attendees:
1. Navoi Thermal Power Plant (NTPP)
① Mr. Kakhramon GANIEV
Project Director / General Director (as a witness)

2. Navoi Training Center (NTC)
① Mr. Shukhrat DOSTOV
Director of NTC
② Mr. Alisher MUSAEV
CCPP Operational & Principal Engineer

3. JICA Expert Team (JET)
① Mr. Hidehito WAKABAYASHI
② Mr. Takashi SAITO
③ Mr. Kazuaki NEMOTO
④ Ms. Akiko SAKUMA
⑤ Ms. Indira ISKANDOROVA

1. Navoi Thermal Power Plant (NTPP)
Mr. Kahramon GANIEV
Project Director / General Director (As a witness)

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2. Navoi Training Center（NTC）
Mr. Shukhrat DOSTOV
Director of NTC

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3. JICA Expert Team (JET)
Mr. Hidehito Wakabayashi

Меморандум ежемесячного совещания

по Проекту «Создания Учебного Центра по Эксплуатации и Обслуживанию Парогазовых Установок Комбинированного Цикла (ПГУ) в Узбекистане»

(Ежемесячное совещание Июль/Август 2017 года)

Дата: 1 августа 2017 года
Место: ПГУ-1 Навоийской ТЭС (НТЭС)

Присутствовали:
1. НТЭС
- Г-н Ганиев Кахрамон
  Директор Проекта, Генеральный Директор (в качестве свидетеля)

2. Навоийский Учебный Центр (НУЦ)
- Г-н Достов Шухрат
  Директор Навоийского Учебного Центра
- Г-н Мусаев Алишер
  Ведущий инженер ТМО Навоийской ПГУ.

3. Группа экспертов JICA (JET)
- Г-н Вакабаяши Хидехито
- Г-н Сайто Такаши
- Г-н Немото Казуаки
- Г-жа Сакума Акико
- Г-жа Искандарова Индира

1. Навоийская ТЭС (НТЭС)
Г-н Ганиев Кахрамон
Директор Проекта / Генеральный Директор (в качестве свидетеля)

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2. Навоийский Учебный Центр
Г-н Достов Шухрат
Директор Навоийского Учебного Центра

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3. Группа экспертов JICA
Г-н Вакабаяши Хидехито

Agenda: What are discussed and agreed between NTPP, NTC and JET during the July August Monthly Meeting;

1. Official letter from JSC «Uzbekenergo» to NTPP for the document submission

JET reminded JSC «Uzbekenergo» to submit the official letter to provide JET with the following documents;

① Policy of CCPP O&M
② Company Standard
③ Job description

2. The results of TOT attendees in July (as of July 31st, 2017)

As shown in the table, the first session of "Mechanics" is terribly bad. The both average of Trained and non-Trained in Japan are 3.3 persons per day. The first day of the "Mechanics" was not conducted because of the number is only one from the trained trainers in Japan.

Attendees of TOT During the 9th Mission

Month & Date			Field	Trainers JET	Textbooks Number	Category of TOT TOT	Category of TOT Mock-up	Numbers of Attendees Trained in Japan	Numbers of Attendees Not Trained in Japan
July	19	Wed	Mechanics	Mr. Hasebe	No.3	N/A		1	0
	20	Thur	Mechanics	Mr. Hasebe	No.3	◎		3	1
	21	Fri	Mechanics	Mr. Hasebe	No.3	◎		1	2
	22	Sat							
	23	Sun							
	24	Mon	Mechanics	Mr.Hasebe (Mr.Miyamoto)	No.3	◎		1	2
	25	Teue	Workshop						
	26	Wed	Equip.	Watanabe	No.9		◎	2	3
	27	Thur	Equip.	Watanabe	No.10		◎	6	3
	28	Fri	Electric	Mr.Kobayashi /Mr.Suzuki	No.6, No.7		◎	2	3
	29	Sat							
	30	Sun							
	31	Mon	Electric	Mr.Kobayashi /Mr.Suzuki	No.6		◎	6	2
Aug	1	Tues	Electric	Mr.Kobayashi /Mr.Suzuki	No.6		◎		
	2	Wed	Electric	Mr.Kobayashi /Mr.Suzuki	No.7		◎		
	3	Thur	Electric	Mr.Kobayashi /Mr.Suzuki	No.7		◎		

As of July 31st, 2017

On Friday, July 28, 2017, JET complained Mr. GANIEV of NTPP of the less attendees especially on "Mechanics" course during 19 and 24 of July as shown in the table. Mr. GANIEV made clear statement to the Director, Mr. DOSTOV and CCPP Operational & Principal Engineer, Mr. MUSAEV to improve the TOT attendees results by work shift and or work scheduling according to the TOT schedule informed from Japan in advance.

3. Structure to have sustainable TOT in

Повестка дня: Следующее было обсуждено и согласовано между НТЭС, НУЦ и Группой экспертов JICA во время ежемесячного совещания Июля-Августа 2017 года:

1. Официальное письмо от АО «Узбекэнерго» в НТЭС для представления документов

Группа экспертов JICA напомнила АО «Узбекэнерго» о предоставлении официального письма для получения Группой экспертов JICA следующих документов:

1. Политика ПГУ КЦ;
2. Стандарт Предприятия;
3. Должностные Инструкции.

2. Результаты посещаемости ТОТ (Тренинга для Инструкторов) в июле (по состоянию на 31 июля 2017 года)

Как указано в таблице, первая сессия по «Механической части» была крайне неудовлетворительна. Средний показатель обоих групп (тех, кто, прошел обучение в Японии и тех, кто не прошёл) составил 3,3 человека в день. Первый день обучения по «Механической части» не состоялся из-за того, что количество инструкторов было всего 1 человек из обученных в Японии,.

Участники ТОТ во время 9-й миссии

Месяц, день			Область	Эксперты JET	№ учебника	Категория ТОТ ТОТ	Категория ТОТ Практика обучения	Количество участников Обученные в Японии	Количество участников Не обученные в Японии
И	19	Ср	Механическая часть	Г-н Хасебэ	No.3	Не было		1	0
ю	20	Чт		Г-н Хасебэ	No.3	◎		3	1
л	21	Пт		Г-н Хасебэ	No.3	◎		1	2
ь	22	Суб							
	23	Вс							
	24	Пн	Механическая часть	Г-н Хасебэ (Г-н Миямото)	No.3	◎		1	2
	25	Вт	Семинар						
	26	Ср	Оборудовани	Ватанабэ	No.9		◎	2	3
	27	Чт	Оборудовани	Ватанабэ	No.10		◎	6	3
	28	Пт	Оборудовани	Г-н Кобаяши	No.6, No.7		◎	2	3
	29	Суб							
	30	Вс							
	31	Пн	Электрическая часть	Г-н Кобаяши / Г-н Судзуки	No.6		◎	6	2
А	1	Вт	Электрическая часть	Г-н Кобаяши / Г-н Судзуки	No.6		◎		
в	2	Ср	Электрическая часть	Г-н Кобаяши / Г-н Судзуки	No.7		◎		
г	3	Чт	Электрическая часть	Г-н Кобаяши / Г-н Судзуки	No.7		◎		
у									
с									
т									

На 31 июля 2017 г.

В пятницу, 28 июля 2017 года, Группа экспертов JICA пожаловалась г-ну Ганиеву о малом количестве слушателей, особенно на курсах по «Механической части» в период с 19го по 24го июля, как показано в таблице. Г-н Ганиев дал четкое задание директору г-ну Достову и ведущему инженеру ТМО ПГУ г-ну Мусаеву об улучшении результатов участия в Тренинге для Инструкторов путем переброски смены работы и / или планирования работы в соответствии с графиком ТОТ тренингов,

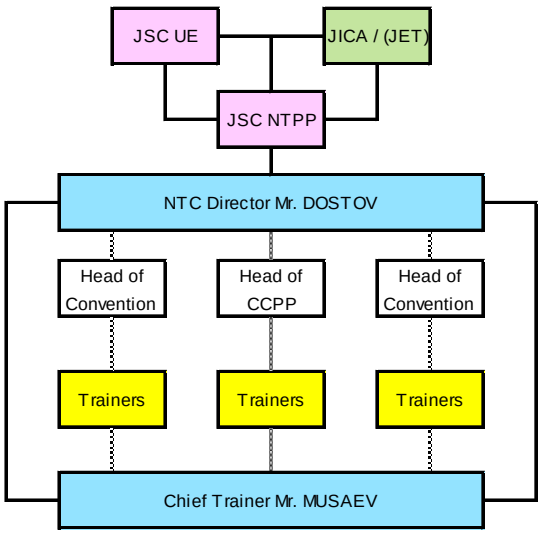
Uzbekistan

After the discussion on the day of July 28th, 2017, between Mr. GANIEV and JET, JET considered and proposed the following solutions to improve the numbers of attendees of TOT.

JET usually informs of TOT schedule to JICA HQ and JICA Uzbekistan Office will submit the official letter to JSC «Uzbekenergo» in advance. In the 9th Mission, JET wondered if the official letter from JSC «Uzbekenergo» was delivered to NTPP for the TOT schedule or not.

Therefore, JET planed the following structure of the TOT schedule and information submission correctly.

The blue colored are the key stakeholders, i.e. NTC Director Mr. DOSTOV and Chief Trainer Mr. MUSAEV. After the TOT schedule was informed to NTPP and NTC, Mr. DOSTOV and Mr. MUSAEV will have to coordinate with the head of each group both of CCPP-1 and Conventional plants, according to the instruction by Mr. GANIEV.



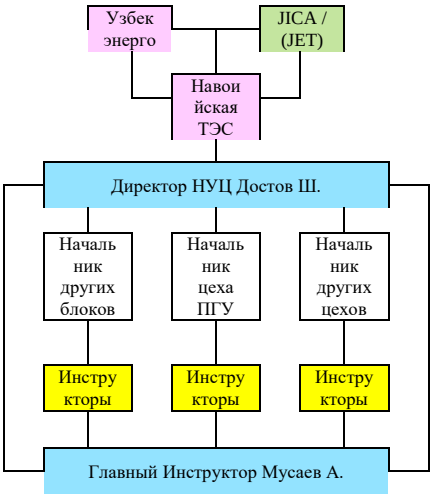
The Project Director of NTPP and the Director of NTC agreed with the structure.

(End of Memorandum)

заранее сообщаемым из Японии.

3. Структура для устойчивого проведения ТОТ Тренингов для Инструкторов в Узбекистане

28 июля 2017 года после обсуждений между г-ном Ганиевым и Группой экспертов JICA, эксперты JICA рассмотрели и предложили следующие решения для улучшения числа участников Тренингов для Инструкторов.
Группа экспертов JICA обычно информирует о расписании ТОТ Тренингов для Инструкторов Штаб-квартиру JICA и Представительство JICA в Ташкенте, в свою очередь, представляет официальное письмо в АО «Узбекэнерго» заранее. В 9-й миссии Группа экспертов JICA задалась вопросом, было ли официальное письмо с расписанием Тренингов для Инструкторов от АО «Узбекэнерго» передано в НТЭС или нет.
В связи с этим, Группа экспертов JICA спланировала следующую структуру расписания тренингов для инструкторов и представления информации.
Синим цветом выделены ключевые заинтересованные стороны, т.е. Директор НУЦ г-н Достов и главный инструктор г-н Мусаев. После того, как график Тренинга для Инструкторов будет выслан в НТЭС и НУЦ, г-н Достов и г-н Мусаев должны будут скоординировать свои действия с руководителями каждого цеха как ПГУ-1, так и остальных блоков ТЭС, согласно поручению г-на Ганиева.



Директор проекта НТЭС и директор НУЦ согласились со структурой.

(Конец Меморандума)

31.10.2017

Меморандум ежемесячного совещания по Проекту «Создания Учебного Центра по Эксплуатации и Обслуживанию Парогазовых Установок Комбинированного Цикла (ПГУ) в Узбекистане»

(Ежемесячное совещание Октябрь 2017года)

Дата: 31 октября 2017 года

Присутствовали:

1. Г-н Шухрат ДОСТОВ（Навоийский Учебный Центр: НУЦ）
2. Г-н Хидехито ВАКАБАЯШИ（JET）/ Г-н Кадзуаки НЕМОТО（JET）
3. Г-н Умид УСМАНОВ（JET）

1. Навоийский Учебный Центр
Г-н Достов Шухрат
Директор Навоийского Учебного Центра

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2. Группа экспертов JICA
Г-н Вакабаяши Хидехито

Повестка дня и протоколы

1. **Статус обучения для подготовки персонала НУЦ**

JET проанализировала ситуацию с пробным обучением (начиная с апреля 2017 года) на семинаре (проведенном 25 июля 2017 года), проведенном на девятой миссии следующим образом.

(1) Для пробного обучения, выбрали целевую аудиторию, для которой можно сделать это наиболее легко (не требует командировочных и др. расходов, имея в виду, что людей можно было легко выбирать). Целевой аудиторией тренинга были 35 человек, отобранных из персонала Навоийской ТЭС.

(2) Обученные предметы № 4, 5, 9, 10. Преподавателями были г-н Алишер Мусаев и другие кандидаты-инструкторы.

(3) Что касается полноценного обучения персонала, последующая за пробным обучением, мы думаем, что должны пройти обучение сотрудники, необходимые для вновь строящихся в ближайшем будущем Навоийской ПГУ-2 и Туракурганской ПГУ.
Однако было установлено, что имена и принадлежность этих сотрудников могут подтвердиться только за шесть месяцев до завершения строительства ПГУ. Поэтому при осуществлении полномасштабного обучения мы указали только численность персонала для обучения персонала в штаб-квартиру УЭ.

————————————————————————————

Исходя из вышеприведенного предположения, JET, Навоийская тепловая электростанция (НТЭС) и НУЦ получили заключения о желаемой подготовке персонала путем обмена мнениями.

Задача	Запрос / вопрос от JET	Реакция НТЭС・НУЦ	Заключение
Цель обучения персонала в течение проектного периода: 150 человек (Крайний срок конец декабря 2018 года)	Полномасштабное обучение после пробного обучения будет проводиться не только для Навои, но и для персонала на тепловых электростанциях под УЭ.	Для этой цели требуются транспортные и командировочные расходы до Навои. Кроме того, лекторам также потребуется пособие для преподавателей	НТЭС / НУЦ предложит следующее предложение в штаб-квартире УЭ и получит одобрение (до конца ноября 2017 года) · Выплата командировочных расходов и пособий персонала до Навои · Институционализация пособия преподавателям
	・Определить 150 человек. · Установить график обучения	・Обсудить с управлением по работе с персоналом и	Подтвердить следующее (до конца ноября 2017 года)

	для 150 человек · Если 150 человек не могут быть обеспечены под УЭ, НТЭС / НУЦ будет вести переговоры для охвата предполагаемых выпускников, университетов и т.д.	управлением эксплуатации электростанций головного офиса УЭ для определения 150 человек. · Если не сможем обеспечить 150 человек под УЭ, то необходимо обсудить с штаб-квартирой УЭ для охвата предполагаемых выпускников, университетов и т.д.	· Определить 150 человек на основе консультаций с головным офисом УЭ. · Если в рамках УЭ насчитывается менее 150 сотрудников, в качестве головного офиса УЭ решить охватить будущих выпускников университетов. · График обучения 150 человек должен выполняться с ответственностью в качестве предметов исключительного решения НУЦ.

2. Статус учебного оборудования

Задача	Запрос / вопрос от JET	Реакция НТЭС・НУЦ	Заключение
Текущее положение проектирования учебного центра	・Продолжают ли выполняться проектные работы учебного центра? ・Или уже завершены проектные работы учебного центра? ・Учитываются ли советы, предоставленные JET в ходе 9-й миссии?		
Тендер, график строительства	・ В 9-й миссии мы слышали, что публичное уведомление о торгах было опубликовано, но был ли проведен тендер? · Был ли выбран победитель торгов? · Как мы слышали в 9-й миссии, правильно ли понимать, что процесс строительства будет завершен к		

	концу марта 2018 года?		
Вопросы, касающиеся поставляемого оборудования Узбекской стороной	• Хотелось бы услышать о текущем состоянии поставляемого оборудования Узбекской стороной. · В частности, просим подготовить и отправить г-ну Немото список для каждого элемента, в котором четко указаны дата поставки / спецификация		

10/31/2017

Memorandum of the monthly meeting of the Project for "Establishment of the Training Center for Operation and Maintenance of Combined Cycle Power Plant (CCPP) in Uzbekistan" (Monthly meeting October 2017)

Date: October 31, 2017

Attendees:
1. Mr. Shukhrat DOSTOV (Navoi Training Center: NTC)
2. Mr. Hidehito WAKABAYASHI (JET) / Mr. Kazuaki NEMOTO (JET)
3. Mr. Umid Usmanov (JET)

1. Navoi Training Center
Mr. Dostov Shukhrat
Director of the Navoi Training Center

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2. The JICA Experts Team
Mr. Wakabayashi Hidehito

Agenda and minutes

1. The status of the training of personnel by NTC

JET analyzed the situation with trial training (beginning in April 2017) at the workshop (held on July 25, 2017), conducted at the ninth mission as follows.

(1) For trial training, they have chosen the target audience for which it can be done most easily (does not require travel and other expenses, meaning that people could be easily chosen). The target audience of the training was 35 people, selected from the staff of Navoi TPP.

(2) Trained subjects No. 4, 5, 9, 10. The instructors were Mr. Alisher Musaev and other trainer candidates.

(3) As regards the full-fledged training of personnel, following the trial training, we think that the staff necessary for the Navoi CCPP-2 and Turakurgan CCPP to be built in the near future must be trained. However, it was found that the names and affiliation of these employees can be confirmed only six months before the completion of the CCGT construction. Therefore, in the implementation of full-scale training, we indicated only the number of staff to train at the UE headquarters.

Based on the above assumption, JET, Navoi Thermal Power Plant (NTPP) and NTC received conclusions on the desired training of personnel through the exchange of opinions.

Task	Request / question from JET	Reaction of NTPP・NTC	Conclusion
The goal of training staff during the project period: 150 people (Deadline end of December	Full-scale training after trial training will be conducted not only for Navoi, but also for personnel in thermal power	For this purpose, transportation and travel expenses are required till Navoi. In addition, the lecturers will also need an allowance	NTPP / NTC to propose the following proposal at the UE headquarters and receive approval (before the end of

2018)	plants under the UE.`	for teachers	November 2017) • Payment of travel expenses and staff allowance to Navoi • Institutionalization of payments for teachers
	・To identify 150 people. • To set a training schedule for 150 people • If 150 people can not be provided under the UE, the NTPP / NTC will negotiate to reach prospective graduates of universities, etc.	Discuss with the HR department and operation of power plants department of the UE head office to identify 150 people. • If UE can not provide 150 people under the UE, it is necessary to discuss with the UE headquarter to reach prospective graduate of universities, etc.	To confirm the following (until the end of November 2017) • To identify 150 people on the basis of consultations with the UE head office. • If the UE has fewer than 150 employees, it is up to the UE's head office to reach out to future university graduates. • The training schedule of 150 people should be carried out with responsibility as subjects of the exclusive decision of the NTC.

2. The status of training equipment

Task	Request / question from JET	Reaction of NTPP・NTC	Conclusion
Current situation of the design of the training center	Are the design works of the training center being continued? · Have the design works of the training center been completed already? · Are the advices provided by JET during the 9th mission taken into account?	The design work of the training center has been completed. All JET advises are taken into account	
Tender, construction schedule	In the 9th mission, we heard that a public notice of the bidding was published, but was a tender held? • Was the winner selected? • As we heard in the 9th mission, is it right to understand that the construction process will be completed by the end of March 2018?	The announcements are published in the newspapers “Dustlik Bayrogi” and “Banner of friendship”. Documentation for the tender is being accepted. The construction will be completed by the end of March 2018	

Issues relating to the supplied equipment by the Uzbek side	・We would like to hear about the current state of the supplied equipment by the Uzbek side. • In particular, please prepare and send to Mr. Nemotot a list for each item that clearly indicates the date of delivery / specification	Order is accepted by the OMTC(Perhaps: Department of Material and Technical Supply) The report is attached	

第 1 回 本 邦 研 修 実 施 報 告 書

「ウズベキスタン国　コンバインドサイクル発電運用保守トレーニングセンター整備プロジェクト」研 修

（講師候補・管理職　研修）

平成 28 年 6 月

独立行政法人国際協力機構

株式会社アジア共同設計コンサルタント

日本工営株式会社

中国電力株式会社

株式会社パワー・エンジニアリング・アンド・トレーニングサービス

目次

添付資料

１．研修コース概要

(1)　研修コース名

「ウズベキスタン国　コンバインドサイクル発電運用保守トレーニングセンター整備プロジェクト」第１回本邦研修

「The Project for Establishment of the Combined Cycle Gas Turbine (CCGT) Operation and Maintenance Training Center」1st Training of Trainers in Japan

(2) 研修期間

平成28年3月31日　～　平成28年4月28日(ウズベキスタン出国3/29帰国4/29)

(内管理職　4月5日　～　4月14日；出国4/3帰国4/15)

(3) 研修員数

今回実施した第１回本邦研修では、ウズベキエネルゴ（以降UE）本社から推薦された講師候補のアプリケーションフォームと面談を通じ研修対象者を決定した。(3項参照)

決定した研修対象者は全員で６名である。(内訳　研修員５名・管理職１名)

研修員	
講師候補	管理職
５名	１名

(4) 研修実施機関

株式会社　パワー・エンジニアリング・アンド・トレーニングサービス（PET）

三菱日立パワーシステムズ株式会社　（MHPS;国内再委託先）

アイ・シー・ネット株式会社　（IC-NET;国内再委託先）

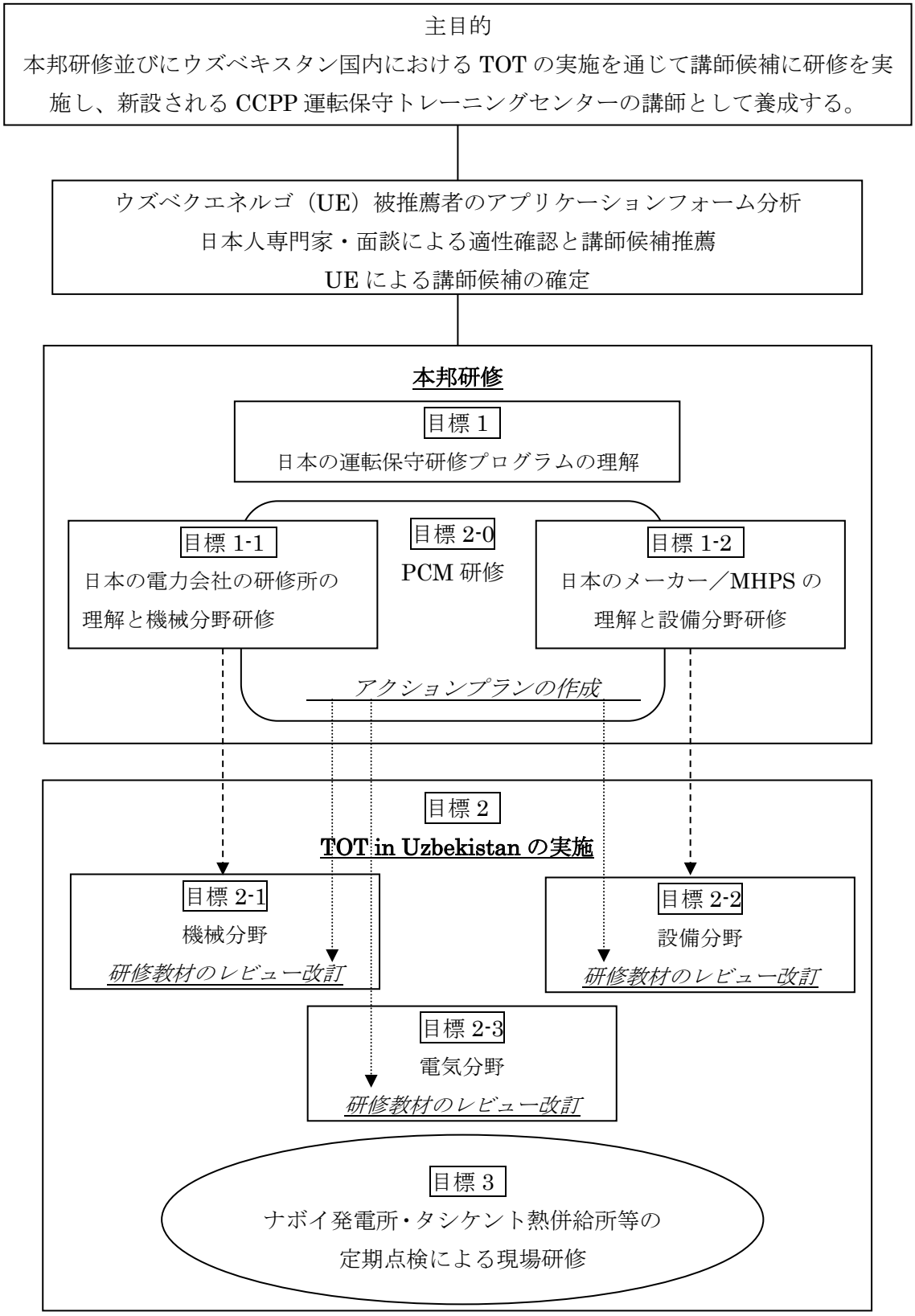
２．研修内容

本プロジェクトにおける講師候補の研修は、「本邦研修」「ウズベキスタンにおけるTOT実施」「運転中コンバインドサイクルの定期点検による現場研修」から構成される。研修の全体概念を次頁(1)に示す。

本邦研修においては日本における研修プログラムの理解を進め、日本人専門家が提供する教材をレビュー改訂する為の基礎知識を学び、帰国後のアクションプラン作成までを検討する。本邦研修の研修日程計画を次々頁以降の(2)(3)に示す。

「ウズベキスタンにおけるTOT実施」「運転中コンバインドサイクルの定期点検による現場研修」は、「本邦研修」で得た知識・経験並びに日本人専門家が提供する教材をベースに、帰国後にウズベキスタンにおいて実施する。

(1) 研修全体概念



－ 図 1 研修全体概念図 －

(2) 講師候補　研修日程計画表 (実績)

－ 表　1　研修日程計画表（講師候補）－

日程 (曜日)	時間	研修項目	講師等	研修場所	到達目標
3 月 31 日 (木)	終日	ブリーフィング プログラム・オリエンテーション		ＪＩＣＡ中国 国際センター	
4 月 1 日 (金)	終日	ジェネラル・オリエンテーション 広島平和研修		ＪＩＣＡ中国 国際センター	
4 月 4 日 (月)	9:00～11:00	研修オリエンテーション	AEC 齋藤 孝史	パワー・エンジニアリング・アンド・トレーニングサービス (PET)	目標 1
	11:00～12:00	電力会社の人材育成	PET 平田 学		目標 1-1
	13:00～18:00	PCM 研修：問題分析から PDM 作成	IC-NET 森田 徹生		目標 2-0
4 月 5 日 (火)	09:00～12:00	PCM 研修：アクションプラン作成	IC-NET 森田 徹生		目標 2-0 目標 1-1
	13:00～16:00	機械分野　研修紹介・設備見学	PET 平田 学		
4 月 6 日 (水)	09:00～12:00 13:00～15:00	電気・発電 研修紹介・設備見学	PET 平田 学		目標 1-1
4 月 7 日 (木)	09:00～12:00	講義：コンバインド基礎	PET 宮本 洋平 福山 晃司	中国電力 柳井発電所	目標 1-1
	13:00～16:00	設備見学　中央制御室・GT 廻り			
4 月 8 日 (金)	09:00～12:00	講義：定期点検・燃焼器点検	PET 宮本 洋平 福山 晃司		目標 1-1
	13:00～16:00	設備見学　予備品倉庫等			
4 月 11 日 (月)	10:00～11:00 11:00～12:00	中国電力 給電指令所　見学 中国電力　火力部と意見交換	PET 平田 学	中国電力 本社	目標 1-1
4 月 12 日 (火)	9:00～12:00	講義：高温部品の基礎	PET 宮本 洋平 福山 晃司	中国電力 水島発電所	目標 1-1
	13:00～16:00	設備見学　中央制御室・GT 廻り			
4 月 13 日 (水)	9:00～12:00	講義：排熱回収ボイラー、ST 等	PET 宮本 洋平 福山 晃司		目標 1-1
	13:00～16:00	設備見学　排熱回収ボイラー等			
4 月 14 日 (木)	9:00～12:00	メーカー工場見学	MHPS 渡辺洋也	MHPS 高砂工場	目標 1-2
	13:00～16:00	GTG Arrangement			
4 月 15 日 (金)	9:00～12:00	GT System Description	MHPS 渡辺洋也		目標 1-2
	13:00～16:00	Aux.Equipments			
4 月 18 日 (月)	9:00～12:00	GTCC Plant Operation	MHPS 渡辺洋也		目標 1-2
	13:00～16:00	Main Features of GT_Aux			
4 月 19 日 (火)	9:00～12:00	GT Maintenance	MHPS 渡辺洋也		目標 1-2
	13:00～16:00	GT Maintenance			
4 月 20 日 (水)	9:00～12:00	GT Auxiliary Equipment	MHPS 渡辺洋也		目標 1-2
	13:00～16:00	GT Control System			
4 月 21 日 (木)	9:00～12:00	GT Control System	MHPS 渡辺洋也		目標 1-2
	13:00～16:00	Operation ‘ Maintenance			
4 月 22 日 (金)	9:00～12:00	GT Maintenance	MHPS 渡辺洋也		目標 1-2
	13:00～16:00	Inspection Procedure			

日程 （曜日）	時間	研修項目	講師等	研修場所	到達目標
4 月 25 日 （月）	9:00～12:00 13:00～16:00	GT Maintenance Pediodical and Philosophy	MHPS 渡辺洋也	MHPS 高砂工場	目標 1-2
4 月 26 日 （火）	9:00～12:00 13:00～16:00	GT Maintenance Electrical and Control package	MHPS 渡辺洋也		目標 1-2
4 月 27 日 （水）	9:00～12:00 午後	GT Commissioning Procedure 東京へ移動	MHPS 渡辺洋也		目標 1-2
4 月 28 日 （木）	13:00～15:00 1600～17:00	アクションプラン発表会 閉講式	司会 AEC 齋藤 孝史	JICA 東京	目標 2-0

(3) 管理職　研修日程計画表 (実績)

－ 表 2 研修日程計画表（管理職）－

日程 （曜日）	時間	研修項目	講師等	研修場所	到達目標
4 月 5 日 （火）	終日	ブリーフィング プログラム・オリエンテーション		ＪＩＣＡ中国 国際センター	
4 月 6 日 （水）	終日	移動日			
4 月 7 日 （木）	9:00～12:00 13:00～16:00	研修オリエンテーション 電力会社の人材育成 研修設備見学	AEC 齋藤 孝史 PET 平田 学	PET	目標 1 目標 1-1
4 月 8 日 （金）	09:00～12:00 13:30～16:30	講義：定期点検・燃焼器点検 設備見学　予備品倉庫等	PET 宮本 洋平 福山 晃司	中国電力 柳井発電所	目標 1-1
4 月 11 日 （月）	10:00～12:00	中国電力 給電指令所見学 中国電力火力部と意見交換	PET 平田 学	中国電力 本社	目標 1-1
4 月 12 日 （火）	9:00～12:00 13:30～15:30	講義：高温部品の基礎 設備見学　中央制御室・GT 廻り	PET 宮本 洋平 福山 晃司	中国電力 水島発電所	目標 1-1
4 月 13 日 （水）	9:00～10:00 17:20～18:30	講義：排熱回収ボイラー、ST 等 設備見学　排熱回収ボイラー等	PET 宮本 洋平 福山 晃司		目標 1-1
4 月 14 日 （木）	8:00～12:00 14:00～	メーカー工場見学 帰国移動	MHPS 渡辺洋也	MHPS 高砂工場	目標 1-2

３．研修員

(1) 講師候補研修員の決定

UE から推薦された候補者にアプリケーションフォーム記載を要請。第 3 次現地業務実施時に UE 側からは 22 名の推薦があり、このうち面談に支障のある遠方の対象者は書類選考により選定し、最終的に 19 名と面談を実施した。面談の結果、UE 本社に講師候補 5 名と、予備候補者として 2 名を報告した。UE 本社側の最終確認により、本邦研修対象者として 5 名の講師候補を決定した。

(2) 管理職研修員の決定

当初、本邦研修の対象となりうる管理職は、本プロジェクトに関係する UE 本社人事部、発電計画部、CCPP を運転中・建設計画中の発電所、旧トレーニングセンターなどの周辺組織がある。受け入れ枠として 5 名を準備していたが、UE 本社側の業務調整上の問題で、今回の推薦は 1 名となった。対象者は本プロジェクトの UE 側の Project Director で新研修所の所長候補者でもある。

(2) 研修参加への意欲・受講態度

研修員全員が全研修予定日程に参加し、講義及び現地視察ともに活発な質疑が実施された。講師候補研修員は、全体を通じて技術面等での質問が多く、受講態度はきわめて良好であった。管理職研修員においては「日本の電力会社の組織や人事」に関する興味が高く、研修内容とは外れる質問も多くあったが、立場上理解できることから休息時間も活用し適宜対応した。

第 1 回本邦研修への参加研修員は以下の表 2 による。

－　表３　第 1 回本邦研修 参加研修員一覧　－

講師候補研修員　氏名	所属	担当分野
Mr. Baxrom K. Sobirov バフロム・ソビロフ氏	Syrdaryo TPP / PIU Manager	Electrical
Mr. Sadriddin A. Xodjaev サドリッディン・ホジャエフ氏	Tashkent TPP / Operation Manager	Electrical
Mr. Rasul T. Shamsiyev ラスル・シャミエフ氏	Tashkent CHPP / Operation Shift Head	Mechanical
Mr. Nozimkhodja Y. Tokhtaev ノジムホジャ・トフタエフ氏	Tashkent TPP / Deputy Head of Dept.	Mechanical
Mr. Asqar I. Xudayberganov アスカル・フダイベルガノフ氏	Tashkent TPP / PIU staff	Electrical
管理職研修員 （研修参加:4 月 5 日～4 月 14 日）		
Mr. Maxmudjan K. Trudiyev マフムジャン・トルディエフ氏	UE Headquarter / Project Director	管理者

下線は通称

４．研修員からの回収質問票、評価コメント

質問票第４部の研修員からの回答内容を記載する。研修実施、進捗状況により若干実施日程に変更が発生している。(以下の評価コメントの実施日時を参照ください)

(1) ①開講式、②オリエンテーション

日時		2016/4/4	①9：00～10:00　②10:00～11：00
講師（職名）		藤本　昭範（（株）PET　代表取締役社長） 奥田　辰典（（株）PET　エンジニアリングセンター長） 西村　豊彦（（株）PET　技術研修事業部長） 平田　学（JET　プラント補機運転・保守／ （株）PET　技術研修事業部　チーフマネージャー） 安藤　真也（（株）PET　技術研修事業部　担当） 齋藤　孝史（JET 副統括／ アジア共同設計コンサルタント　海外事業部課長）	
講義のねらい(実績)		本邦研修実施内容の説明とアクションプラン作成の理解	
講義内容(実績)		①歓迎挨拶（ＰＥＴ・ＡＥＣ），研修員および出席者自己紹介 ②本邦研修日程、研修コース概要説明 PCM 研修の狙い説明、アクションプラン作成の目的理解 質問票記載の注意事項	
講師の自己評価		PPT 資料を３ヶ国語としたため、見にくかった PCM 研修とアクションプランは PCM 研修での説明が重要	
講師の研修員評価		本邦研修概要をある程度事前に理解しており、集中できていた 質問票の理解・記入はウミド氏の事後フォローが必要	
研修員による講義評価	講義内容	評価点(5 人平均) 4.0　（最良 4=5 人）	
	講義量	評価点(5 人平均) 4.0　（最良 4=5 人）	
	講義時間	評価点(5 人平均) 3.6　（最良 4=3 人・良 3=2 人）	
	内容理解度	評価点(5 人平均) 3.6　（最良 4=3 人・良 3=2 人）	
	習得知見・能力	得られた知識：評価点(5 人平均) 3.4　（最良 4=2 人・良 3=3 人）	
		Action Plan 作成に有用か:評価点(5 人平均) 3.6	
		個人の知見・能力向上に有用か:評価点(5 人平均) 3.6	
		講師になるために有用な講義か:評価点(5 人平均) 3.8	
		機材リスト検討へ有効か:評価点(5 人平均) 3.6	
		露語教材レビュー検討へ有効か:評価点(5 人平均) 3.8	
	研修員コメント抜粋	・新人研修方式のヒントを得た ・日本人専門家（平田氏）のサポートを期待している ・JICA の役割に期待している	

(2) 日本の電力会社の人材育成

日時		2016/4/4	11:00～12：00
講師（職名）		平田　学（JET プラント補機運転・保守／ （株）PET　技術研修事業部　チーフマネージャー）	
講義のねらい(実績)		日本の電力会社の人材育成に関する考え方と研修センターの位置付けや果たす役割について学習した。	
講義内容(実績)		日本の電力事情 中国電力の火力系社員教育の流れ ＰＥＴの役割 中国電力向け研修で使用するシステム類の紹介	
講師の自己評価		日本の研修センターの運営実態の理解を図る上で不可欠な研修。 もう 1 時間（計 2 時間）程度あると説明が充実する。 質問も出たものの時間不足で途中切り上げとなった為，研修員にとってやや消化不良ではないかと感じた。	
講師の研修員評価		研修員は集中して研修に取り組んだ。	
研修員による講義評価	講義内容	評価点(5 人平均) 4.0　（最良 4=5 人）	
	講義量	評価点(5 人平均) 4.0　（最良 4=5 人）	
	講義時間	評価点(5 人平均) 3.6　（最良 4=3 人・良 3=2 人）	
	内容理解度	評価点(5 人平均) 3.6　（最良 4=3 人・良 3=2 人）	
	習得知見・能力	得られた知識：評価点(5 人平均) 3.4　（最良 4=2 人・良 3=3 人）	
		Action Plan 作成に有用か:評価点(5 人平均) 3.6	
		個人の知見・能力向上に有用か:評価点(5 人平均) 3.6	
		講師になるために有用な講義か:評価点(5 人平均) 3.8	
		機材リスト検討へ有効か:評価点(5 人平均) 3.6	
		露語教材レビュー検討へ有効か:評価点(5 人平均) 3.8	
	研修員コメント抜粋	・新人研修方式のヒントを得た ・日本人専門家（平田氏）のサポートを期待している ・JICA の役割に期待している	

＊研修員による講義評価；回収アンケートは前述(1)項と共通

(3) PCM 研修（アクションプラン研修）

日時	2016/4/4	13：00～18：00
	2016/4/5	8：40～14：00
講師（職名）	森田　徹生（IC NET　グローバル人材開発グループ／ プロジェクトマネージメント・スペシャリスト）	
講義のねらい(実績)	アクションプラン作成に向けた PCM 手法の概要説明と導き	
講義内容(実績)	PDM の理解と PCM 手法 Work Breakdown Structure（WBS)と Action Plan 作成について PDM の Out Put を訓練実例とした Group Action Plan 作成の実習 個人 Action Plan 展開への導き（*目標２の設定*）	
講師の自己評価	プロジェクトの理解と研修員自身の関わり方をよく整理できた。 PDM の理解にかける時間を削減し、研修員自身のアクションに関する内容を充実させると、よりニーズに合致した内容になる。	
講師の研修員評価	非常にまじめ。前半は時間がかかったが、研修員の自主性により後半の演習速度を上げた。	
研修員による講義評価	講義内容	評価点(5 人平均) 3.8　（最良 4=4 人・良 3=1 人）
	講義量	評価点(5 人平均) 3.8　（最良 4=4 人・良 3=1 人）
	講義時間	評価点(5 人平均) 3.6　（最良 4=3 人・良 3=2 人）
	内容理解度	評価点(5 人平均) 3.4　（最良 4=2 人・良 3=3 人）
	習得知見・能力	得られた知識：評価点(5 人平均) 3.6　（最良 4=3 人・良 3=2 人）
		Action Plan 作成に有用か:評価点(5 人平均) 4.0
		個人の知見・能力向上に有用か: 評価点(5 人平均) 4.0
		講師になるために有用な講義か: 評価点(5 人平均) 3.4
		機材リスト検討へ有効か: 評価点(5 人平均) 3.2
		露語教材レビュー検討へ有効か: 評価点(5 人平均) 3.0
	研修員コメント抜粋	・PCM 研修は興味がわき行動計画準備の知識を得た ・講義は判りやすく理解できた ・講師（森田氏）の教授法からインストラクター・スキルを学んだ ・露語教材作成には直接有効では無い

＊PCM 研修の内容は、教材や機材リスト作成に直接関係するものではないが、アクションプランの作成を通じ各自の業務推進に関係することを理解できた。

(4) 電力会社の研修所紹介（機械・電気制御・発電）

日時	2016/4/5	14：00～17：00
	2016/4/6	9：00～15：00
講師（職名）	松﨑　眞治（(株) PET　技術研修事業部　チーフマネージャー） 長谷部　昌平（(株) PET　技術研修事業部　マネージャー） 安部　真二郎（(株) PET　技術研修事業部　チーフマネージャー） 福濱　謙二（(株) PET　技術研修事業部　担当） 辻野　宏明（(株) PET　技術研修事業部　担当） 藤本　英徳（(株) PET　技術研修事業部　担当） 工藤　英昭（(株) PET　技術研修事業部　チーフマネージャー） 田村　清司（(株) PET　技術研修事業部　マネージャー） 平田　学（JET プラント補機運転・保守／ (株) PET　技術研修事業部　チーフマネージャー）	
講義のねらい(実績)	実習体験を通し，研修習熟度の向上のためには座学だけでは無く実習も必要である点を体感。	
講義内容(実績)	機械関係研修内容の紹介，実習体験 電気制御関係研修内容の紹介，実習体験 発電関係研修内容の紹介，実習体験	
講師の自己評価	発電関係ではシミュレータの実習体験を行ったが，日本と現地の設備仕様に関する考え方の相違から説明に時間を要した。	
講師の研修員評価	本プロジェクトにおいて機械系研修コースは PET が担当する為、現地に導入する機材や実習内容について特に関心が高かった。	
研修員による講義評価	講義内容	評価点(5 人平均) 3.6　（最良 4=3 人・良 3=2 人）
	講義量	評価点(5 人平均) 3.4　（最良 4=2 人・良 3=3 人）
	講義時間	評価点(5 人平均) 3.0　（最良 4=1 人・良 3=3 人・適切 2=1 人）
	内容理解度	評価点(5 人平均) 3.8　（最良 4=4 人・良 3=1 人）
	習得知見・能力	得られた知識：評価点(5 人平均) 3.6　（最良 4=3 人・良 3=2 人）
		Action Plan 作成に有用か：評価点(5 人平均) 3.2
		個人の知見・能力向上に有用か：評価点(5 人平均) 3.8
		講師になるために有用な講義か：評価点(5 人平均) 3.6
		機材リスト検討へ有効か：評価点(5 人平均) 3.4
		露語教材レビュー検討へ有効か：評価点(5 人平均) 3.2
	研修員コメント抜粋	・研修時間が短かった ・現物設備での訓練が理解し易く便利である ・現物の訓練施設は極めて有効で良い ・カットモデルなども理解し易く必要性を感じた

＊研修員は、研修用機材やカットモデル模型に関し、自国の研修所強化に役立つかの意識を持って受講していた

(5)　管理職研修員向け　①日本の電力会社の人材育成；②研修設備見学

日時（対象；管理職研修員）		2016/4/7	①　9：00～12：00　②14：00～16：00
講師（職名）		平田　学（JET プラント補機運転・保守／ （株）PET　技術研修事業部　チーフマネージャー；*4/8 のみ） 奥田　辰典（（株）PET　エンジニアリングセンター長） 西村　豊彦（（株）PET　技術研修事業部長）	
講義のねらい(実績)		日本の電力会社の人材育成に関する考え方と研修センターの位置付けや果たす役割, 研修設備レイアウトや実習設備の運用状況の学習。	
講義内容(実績)		日本の電力事情 中国電力の火力系社員教育の流れ ＰＥＴの役割 研修設備のレイアウト 実習設備の運用状況（機械・電気制御、発電）	
講師の自己評価		日本の研修センターの運営実態の理解を図る上で不可欠。 研修員が 1 名であり時間はちょうど良かったが，人数が多い場合には時間延長が必要と考える。	
講師の研修員評価		研修生の立場上（所長候補），建屋レイアウトへの関心が深かった。建屋や備品等について重点的に説明し好評だった。	
研修員による講義評価	講義内容	評価点(AM/PM 平均)3.5	
	講義量	評価点(AM/PM 平均)3.0	
	講義時間	評価点(AM/PM 平均)3.5	
	内容理解度	評価点(AM/PM 平均)4.0	
	習得知見・能力	得られた知識：評価点(AM/PM 平均)3.5	
		Action Plan 作成に有用か：評価点(AM/PM 平均)3.5	
		個人の知見・能力向上に有用か：評価点(AM/PM 平均)3.5	
		講師になるために有用な講義か：評価点(AM/PM 平均)3	
		機材リスト検討へ有効か：評価点(AM/PM 平均) 3.5	
		露語教材レビュー検討へ有効か：評価点(AM/PM 平均)3.5	
	研修員コメント抜粋	・研修センターの組織運営の観点から有益であった ・研修センターに必要な資機材の参考になる ・電力会社の人事ポリシーと社員研修も参考となる・	

＊アンケート用紙＜①日本の電力会社の人材育成＞と＜②研修設備見学＞が、別々になっていたので評価点はこの平均値を取りだした。

＊昼食後、13 時過ぎに新小野田発電所の外観見学を実施した為、研修設備見学の開始が 14 時となった

(6) コンバインドサイクル発電技術　柳井発電所

日時 (4/8：管理職研修員合流)		2016/4/7	9：00～16：00
		2016/4/8	9：00～16：00
講師（職名）		福山　晃司（(株) PET　技術研修事業部　担当） 宮本　洋平（JET タービン運転・保守／ (株) PET エンジニアリング事業部長　兼　技術研修事業部MG） 平田　学（JET プラント補機運転・保守／ (株) PET　技術研修事業部　チーフマネージャー；*4/8 のみ）	
講義のねらい(実績)		ＧＴＣＣ発電の基礎理論理解	
講義内容(実績)		柳井発電所の設備概要説明 コンバインド基礎理論 ガスタービン基礎理論 現場見学（定期点検設備・燃焼器点検設備・中央制御室他） 柳井発電所技術者との意見交換会	
講師の自己評価		現場において定期点検設備（日立製：Ｈ８０）や燃焼器点検設備（ＧＥ製：７Ｆ）の分解状況が確認でき充実した説明が行えた。	
講師の研修員評価		研修員からの質問も多く，積極性が感じ取られ，規律正しく時間を守り,好印象であった。	
研修員による講義評価	講義内容	評価点(6 人平均) 3.7 （最良 4=4 人・良 3=2 人）	
	講義量	評価点(6 人平均) 3.7 （最良 4=4 人・良 3=2 人）	
	講義時間	評価点(6 人平均) 3.7 （最良 4=4 人・良 3=2 人）	
	内容理解度	評価点(6 人平均) 3.8 （最良 4=5・良 3=1 人）	
	習得知見・能力	得られた知識：評価点(6 人平均) 3.5 （最良 4=3 人・良 3=3 人）	
		Action Plan 作成に有用か：評価点(６人平均) 3.7	
		個人の知見・能力向上に有用か：評価点(6 人平均) 3.8	
		講師になるために有用な講義か：評価点(6 人平均) 3.8	
		機材リスト検討へ有効か：評価点(6 人平均) 3.7	
		露語教材レビュー検討へ有効か：評価点(6 人平均) 3.7	
	研修員コメント抜粋	・コンバインドに関して新しい知識を得ることが出来た ・スペアパーツへの情報を得られた ・タービン内部が見られて、極めて参考になる ・現場研修について研究していきたい	

(7) ①中国電力・中央給電指令所の見学　及び　②火力部門との意見交換

日時　(管理職研修員合同)		2016/4/11	①　10：00～11：00　②11：00～12：00
講師（職名）		平田　学（JET プラント補機運転・保守／ （株）PET　技術研修事業部　チーフマネージャー）	
講義のねらい(実績)		日本の電力会社の系統運用の現状理解。 火力部門の現況と方向性について意見交換。	
講義内容(実績)		中央給電指令所の役割（座学・見学） 火力部門を取り巻く状況（意見交換） 火力部門の今後の方向性（意見交換）	
講師の自己評価		日本の電力会社の運用実態を知る上で，有意義な内容。火力部門（意見交換）については，質疑を途中で打ち切り時間不足であった。	
講師の研修員評価		中央給電指令所では，特に送電畑の研修員から活発な質疑が出た。	
研修員による講義評価	講義内容	評価点(6 人平均) 3.3　（最良 4=2 人・良 3=4 人）	
	講義量	評価点(6 人平均) 3.3　（最良 4=2 人・良 3=4 人）	
	講義時間	評価点(6 人平均) 3.7　（最良 4=4 人・良 3=2 人）	
	内容理解度	評価点(6 人平均) 3.7　（最良 4=4 人・良 3=2 人）	
	習得知見・能力	得られた知識：評価点(6 人平均) 3.4　（最良 4=2 人・良 3=4 人）	
		Action Plan 作成に有用か：評価点(6 人平均) 3.5	
		個人の知見・能力向上に有用か：評価点(6 人平均) 3.5	
		講師になるために有用な講義か：評価点(人 6 平均) 3.3	
		機材リスト検討へ有効か：評価点(6 人平均) 3.5	
		露語教材レビュー検討へ有効か：評価点(6 人平均) 3.2	
	研修員コメント抜粋	・中央給電指令所見学で、最新の制御について勉強できた ・講師の指導技術はハイレベルで参考になった	

＊本研修プログラムには中央給電指令所と火力部のご担当者に多数参加いただき、説明・意見交換に対応いただいた。CCPP 運転保守研修に直接リンクする内容ではないが、知識背景として非常に有用である。

＊午後は水島発電所への移動

(8)　コンバインドサイクル発電技術　水島発電所

日時 (管理職研修員合同)		2016/4/12	9：00～16：00
		2016/4/13	9：00～16：00
講師（職名）		福山　晃司（(株) PET　技術研修事業部　担当） 宮本　洋平（JET タービン運転・保守／ (株) PET エンジニアリング事業部長　兼　技術研修事業部MG）	
講義のねらい(実績)		ガスタービン高温部品の特性理解	
講義内容(実績)		水島発電所の概要説明（コンバインド転換含む） 定期点検・燃焼器点検現場見学（中央制御室・ＧＴ建屋・ＨＲＳＧ・予備品倉庫） 高温部品の管理方法：高温部品の基礎・検査・試験・損傷・修理方法 水島発電所技術者との意見交換会	
講師の自己評価		座学と現場（三菱製：Ｆ３）での説明を組合せる事によって，研修員が退屈することなく，有意義な研修が行えた。	
講師の研修員評価		終始研修員からの質問も多く，前向きな姿勢で研修を受講しており好印象であった。	
研修員による講義評価	講義内容	評価点(6 人平均) 3.7　（最良 4=4 人・良 3=2 人）	
	講義量	評価点(6 人平均) 3.7　（最良 4=4 人・良 3=2 人）	
	講義時間	評価点(6 人平均) 3.3　（最良 4=3 人・良 3=2 人・適切 2=1 人）	
	内容理解度	評価点(6 人平均) 3.3　（最良 4=2・料 3=4 人）	
	習得知見・能力	得られた知識：評価点(6 人平均) 3.7　（最良 4=4 人・良 3=2 人）	
		Action Plan 作成に有用か：評価点(6 人平均) 3.3	
		個人の知見・能力向上に有用か：評価点(6 人平均) 3.7	
		講師になるために有用な講義か：評価点(6 人平均) 3.7	
		機材リスト検討へ有効か：評価点(6 人平均) 3.2	
		露語教材レビュー検討へ有効か：評価点(6 人平均) 3.3	
	研修員コメント抜粋	・部品情報が非常に多く、CCPP 未経験者には難しかった ・燃料の異なる発電ユニットについて学べた ・GT 検査の貴重な技術情報を学べた ・動翼の定期点検、修理が学べた	

(9) メーカー研修・開講式、三菱日立パワーシステムズ（MHPS）高砂工場見学

日時		2016/4/14	9：00～16：00
講師（職名）		渡辺 洋也　MHPS　高砂サービス部 Kollegala Srinidhi 主席　MHPS ガスタービン装置設計課	
講義のねらい(実績)		開講式、コンバインドサイクルメーカーの紹介、	
講義内容(実績)		工場見学（ガスタービン生産ライン）；管理職研修員は工場見学後帰国 ・Operation Guide lines and Safety Features	
講師の自己評価		工場見学は時間の関係で縮小版としたが、一通りの生産設備見学を実施 講義資料中の図面原紙が A3 であるため、縮小版で詳細が見づらかった	
講師の研修員評価		補修工場見学の要望が出たが、日程の関係から実施できなかった。 トレーニングの概要を理解しており、質問内容も適切であった。	
研修員による講義評価	講義内容	評価点(6 人平均) 3.2　（最良 4=1 人・良 3=5 人）	
	講義量	評価点(6 人平均) 3.2　（最良 4=1 人・良 3=5 人）	
	講義時間	評価点(6 人平均) 3.3　（最良 4=2 人・良 3=4 人）	
	内容理解度	評価点(6 人平均) 3.2（最良 4=2 人・良 3=3 人・適切 2=1 人）	
	習得知見・能力 管理職研修員は帰国の為、工場見学のみの評価	得られた知識：評価点(6 人平均) 3.3　（最良 4=2 人・良 3=4 人）	
		Action Plan 作成に有用か：評価点(6 人平均) 3.3	
		個人の知見・能力向上に有用か：評価点(6 人平均) 3.5	
		講師になるために有用な講義か：評価点(6 人平均) 3.3	
		機材リスト検討へ有効か：評価点(6 人平均) 3.3	
		露語教材レビュー検討へ有効か：評価点(6 人平均) 3.0	
	研修員コメント抜粋	・工場見学は非常に短く限られ不十分。次回はもっと時間を増やし詳しく見せて欲しい。 ・タービンブレードの製造工程が学べた ・講義は GT 運転の基本原理の繰り返しであった。 ・印刷教材が不鮮明で見にくかった ・教材は露語版や電子版が欲しい	

＊研修員からの評価は厳しく、工場見学への期待に反し見学時間が短かった点の不満が大きい。

＊資料の図が小さく見にくい点で、講師側の反省点と研修員側のコメントが一致している。

＊管理職研修員は 15 日帰国する為に午後に移動し、工場見学のみの研修となった。

(10) ガスタービンシステム；

日時	2016/4/15	9：00～16：00
講師（職名）	Robert_Murphy　MHPS　高砂プラント設計課 中原　将彦　MHPS　高砂プラント設計課　主任	
講義のねらい(実績)	Operation Guide lines and Safety Features	
講義内容(実績)	・Fuel Gas system, Air & Fule gas system, Anti-Icing system ・Harzardous Area Classification, Operation Procedure ・General Description of Unit interlock	
講師の自己評価	Talimarjan の EPC Training をベースにした内容で、GT に関する機器内容を実施	
講師の研修員評価	研修員で GT 運用経験のある人は一人であったが、皆よく勉強しており、活発に質問が行われた。質問の内容から良く理解していると思われる。	
研修員による講義評価	講義内容	評価点(5 人平均) 3.2　（最良 4=1 人・良 3=4 人）
	講義量	評価点(5 人平均) 2.8　（最良 4=1 人・良 3=2 人・適切=2 人）
	講義時間	評価点(5 人平均) 2.8　（最良 4=1 人・良 3=2 人・適切=2 人）
	内容理解度	評価点(5 人平均) 3.2　（最良 4=1 人・良 3=4 人）
	習得知見・能力 管理職研修員は帰国の為、工場見学のみの評価	得られた知識：評価点(5 人平均) 3.0　（最良 4=1 人・良 3=3 人・適切=1 人）
		Action Plan 作成に有用か：評価点(5 人平均) 3.0
		個人の知見・能力向上に有用か：評価点(5 人平均) 3.2
		講師になるために有用な講義か：評価点(5 人平均) 3.4
		機材リスト検討へ有効か：評価点(5 人平均) 3.4
		露語教材レビュー検討へ有効か：評価点(5 人平均) 3.0
	研修員コメント抜粋	・海外出身技術者が講義説明したのは驚きであった。 ・GT の主要構成と制御新技術が学べた ・理解するための講義時間が少ない ・講義実施方法として、ホワイトボードでの説明・講義手法は参考になった

＊研修員からの評価が厳しい。研修員にはタシケント熱併給所の運転経験者がおり、適切な質問をしたが、充分な理解の為には講義の説明時間が不十分であると指摘がある。

＊講師が外国人である点に驚きを感じているが、講義内容はさておき講師の説明スキルが低いとの意見があった。一方、他の研修員からはホワイトボード活用の講義手法が良いとの評価もある。

(11)　GTCC Plant Operation

日時		2016/4/18	10：00～16：00
講師（職名）		Kollegala Srinidhi　MHPS ガスタービン装置設計課　主席	
講義のねらい(実績)		ガスタービン付属品部分に関係する設計と一般的な構成	
講義内容(実績)		4/14 につづき 3 件の講義プレゼン説明を継続実施 (GT AuxEquipment, GT Air Intake & Exhaust, CO2FF System) 実物紹介；MistEliminator や EvapCoolerMedia の実物による説明	
講師の自己評価		資料は A3-PPT から A4 に縮小印刷しており、小さかった Uzubekistan 実績から詳細に説明できた	
講師の研修員評価		研修員は訓練の概要を理解し、適宜に質問によって訓練に参加しました 彼らの質問には適正に対処できました	
研修員による講義評価	講義内容	評価点(5 人平均) 3.4　(最良 4=2 人・良 3=3 人)	
	講義量	評価点(5 人平均) 3.4　(最良 4=2 人・良 3=3 人)	
	講義時間	評価点(5 人平均) 3.2　(最良 4=2 人・良 3=2 人・適切 2=1 人)	
	内容理解度	評価点(5 人平均) 3.4　(最良 4=2 人・良 3=3 人)	
	習得知見・能力 管理職研修員は帰国の為、工場見学のみの評価	得られた知識：評価点(5 人平均) 3.6　(最良 4=3 人・良 3=2 人)	
		Action Plan 作成に有用か：評価点(5 人平均)3.4	
		個人の知見・能力向上に有用か：評価点(5 人平均) 3.8	
		講師になるために有用な講義か：評価点(5 人平均) 3.6	
		機材リスト検討へ有効か：評価点(5 人平均)3.2	
		露語教材レビュー検討へ有効か：評価点(5 人平均) 3.2	
	研修員コメント抜粋	・プラントオペレーションについては、業務全体を網羅して欲しい ・講師の教育経験が少なそうで、質疑に多少難があった ・高度な訓練の為にシミュレータ導入の必要性が理解できた ・トラブル対策教育は実技訓練との協調が必要と理解した	

＊研修員は「講師候補」としての意識があり、講義内容だけではなく講義手法にも注目し評価している

(12) ガスタービン・メンテナンス

日時		2016/4/19	① 9：00～12：00 ② 13:00～16：00
講師（職名）		①末岡 寛之 MHPS ガスタービンサービス/海外統括部/企画･戦略グループ ②山田　直樹　海外ガスタービン技術 G	
講義のねらい(実績)		①本格定期点検と作業の注意事項についての理解 ②三菱ガスタービンのメンテナンス指針理解	
講義内容(実績)		①本格定検の概要、作業手順の理解、作業時の注意事項 ②三菱ガスタービンのメンテナンス指針、運転時間の考え方、定検概要、高温部品の損傷形態と補修	
講師の自己評価		①GT 模型を利用し部品位置や作業箇所などを理解しやすく説明できた。 ②資料説明が中心であり、より受講者を引き付け理解いただく工夫が必要。	
講師の研修員評価		①講義内容を理解し集中していた。特に模型に興味を持ち意欲的であった。 ②研修員 4 人は GT 初心者だったが理解度が高く、熱心な受講態度で積極的に質問するなど非常に意欲的であった。	
研修員による講義評価	講義内容	評価点(5 人平均) 3.4　（最良 4=2 人・良 3=3 人）	
	講義量	評価点(5 人平均) 3.6　（最良 4=3 人・良 3=2 人）	
	講義時間	評価点(5 人平均) 3.2　（最良 4=1 人・良 3=4 人）	
	内容理解度	評価点(5 人平均) 3.4　（最良 4=2 人・良 3=3 人）	
	習得知見・能力 管理職研修員は帰国の為、工場見学のみの評価	得られた知識：評価点(5 人平均) 3.8　（最良 4=4 人・良 3=1 人）	
		Action Plan 作成に有用か：評価点(5 人平均)3.4	
		個人の知見・能力向上に有用か：評価点(5 人平均)3.6	
		講師になるために有用な講義か：評価点(5 人平均)3.6	
		機材リスト検討へ有効か：評価点(5 人平均)3.4	
		露語教材レビュー検討へ有効か：評価点(5 人平均)3.2	
	研修員コメント抜粋	・内容は非常に勉強になっが、時間が短く理解に影響した ・エアフィルターと CO2 消火器の講義は参考になった ・教材の字が小さく、図の文字など見にくかった ・電子データの供与や、露語教材があれば更に良い	

(13) ①②ブレード洗浄・熱交換器、 ③計装制御、④GT 制御システム、
⑤DIASYS Netmation（三菱制御システム）概要

日時	2016/4/20	① 9:00～10:30
		② 10:30～12:00
		③ 13:00～14：00
	2016/4/20 ； 2016/ 4/21	④ 14:00～16：00； 9:00～10:00
	2016/4/21 ； 2016/ 4/22	⑤ 10:00～16：00； 9:00～16:00
講師（職名）	① 野中 信大朗 電力プラント技術部 高砂プラント設計課 ② 福間 俊吾 高砂熱交換器設計課 ③ 岡 誠司 計装制御設計部 高砂計装制御設計課 主席技師 ④ 八木 泰樹／岸 紀久 MHPS エンジニアリング（株）プラント設計部 岡 誠司 計装制御設計部 高砂計装制御設計課 主席技師 ⑤ 山田 祥子 (株)MHPS コントロールシステムズ横浜 ICT ソリューション部 Netmation 技術グループ主任	
講義のねらい(実績)	① ブレード洗浄機器の概要 ② GT 熱交換器の主要構造及び運転・点検要領 ③ Uzubekistan 実機の GT 制御システム ④ GT 制御概要の理解, ⑤ GT Control System	
講義内容(実績)	① GT Casing Cooling Fan, GT Compressor Blade Washing Device, Fuel Gas Last Chance Net Skid ②TCA with FGH(ラジエータ式)、給水利用の TCA・FGH（Shell&Tube 式)、Lube Oil Cooler（プレート式）の構造及び運転・点検方法 ③ GT 制御システム全体構成概要説明、システム構成装置概要説明 ④ 燃料制御に関する概要説明、シミュレータによる GT 起動/停止動作確認、異常時の GT 制御性確認 ⑤ Netmation 概要、主要機能仕様、操作方法、トラブル初動操作	
講師の自己評価	①Q&A 対応は良好であったが、予定時間は超過してしまった ②時間の都合で駆足だったが、メンテナンス要領説明を詳しくすべだった ③時間制約から机上説明となり、実構成装置をによる説明が必要と感じた ④専用用語など机上説明では理解困難な部分も、シミュレータによる GT 運転確認で理解が深まった。 ⑤研修機材を研修員毎に 1 台準備し、理解の助けとした。準備した研修内容の全を完了できなかった。研修日程計画の再考が必要	
講師の研修員評価	①GT 運転経験者がおり、理解が早かった。熱心に質問があった。 ②基本構造理解は問題なくメンテナンス要領も理解を深めた。 ③研修員は制御システムを理解しようとする姿勢が見られた。 ④シミュレーションにおいて、各人知見からの質問が多く積極的だった ⑤制御装置使用経験もある模様で、理解度に問題ない。システム構成モジュールの実物確認要望があり、高い関心を持って受講した。	

研修員による講義評価	講義内容	評価点(5 人平均) 3.8 （最良 4=4 人・良 3=1 人）
	講義量	評価点(5 人平均) 3.8 （最良 4=4 人・良 3=1 人）
	講義時間	評価点(5 人平均) 3.4 （最良 4=3 人・良 3=1 人・適切 2=1 人）
	内容理解度	評価点(5 人平均) 3.6 （最良 4=3 人・良 3=2 人）
	習得知見・能力 管理職研修員は帰国の為、工場見学のみの評価	得られた知識：評価点(5 人平均) 3.6 （最良 4=3 人・良 3=2 人）
		Action Plan 作成に有用か：評価点(5 人平均)3.6
		個人の知見・能力向上に有用か：評価点(5 人平均)**4.0**
		講師になるために有用な講義か：評価点(5 人平均)3.8
		機材リスト検討へ有効か：評価点(5 人平均)3.6
		露語教材レビュー検討へ有効か：評価点(5 人平均)3.2
	研修員コメント抜粋	・CCPP 制御の論理図と構造とについて知見を得る事ができた ・GT 制御システム講義内容は難しいが、更に修得したい。時間が短い ・CCPP 論理回路パラメーターの講義は今後の業務にも役立つ

＊研修は Uzbekistan の実機ベースで実施された。

＊研修員は講義に非常には満足しているが、内容が難しい事から、時間が少ない点を不満と感じた。

(14)　高温部品補修技術・CPFM 概要　GT 保守(アライメント・クリアランス；計画停止)

日時		2016/4/25	① 9：00～12：00
			② 13:00～16：00
講師（職名）		①山田　直樹　海外ガスタービン技術 G ②末岡 寛之 MHPS ガスタービンサービス/海外統括部/企画･戦略グループ	
講義のねらい(実績)		①GT の長期・安定運用に必要な補修技術・CPFM の理解 ②動翼およびシール部品クリアランス管理と定検計画についての理解	
講義内容(実績)		①高温部品補修プロセス、補修技術及び MHPS の補修拠点、CPFM 概要及びシステム構成、燃焼調整概要 ②動翼およびシール部品クリアランス管理の作業内容と重要性の理解、定検工事の計画、準備、進め方の理解	
講師の自己評価		①時間配分が適切でなく、最後は駆け足となってしまった ②クリアランス管理、定検について充分説明し理解された	
講師の研修員評価		①言語障壁に板書を使っての質問や、休憩中に質問して意欲的であった。 ②研修員は集中し受講し講義内容が理解できた。	
研修員による講義評価	講義内容	評価点(5 人平均) 3.8　（最良 4=4 人・良 3=1 人）	
	講義量	評価点(5 人平均) 3.6　（最良 4=3 人・良 3=2 人）	
	講義時間	評価点(5 人平均) 3.6　（最良 4=3 人・良 3=2 人）	
	内容理解度	評価点(5 人平均) 3.6　（最良 4=3 人・良 3=2 人）	
	習得知見・能力 管理職研修員は帰国の為、工場見学のみの評価	得られた知識：評価点(5 人平均) 3.8　（最良 4=4 人・良 3=1 人）	
		Action Plan 作成に有用か：評価点(5 人平均)3.6	
		個人の知見・能力向上に有用か：評価点(5 人平均)**4.0**	
		講師になるために有用な講義か：評価点(5 人平均)3.8	
		機材リスト検討へ有効か：評価点(5 人平均)3.6	
		露語教材レビュー検討へ有効か：評価点(5 人平均)3.4	
	研修員コメント抜粋	・GT の部品部位ごとのメンテナンスについて学んだ ・GT メンテナンスの知識は将来役立つ ・講師のレベルは非常に高かった ・検査装置に関する多くの知見を得た ・質疑においてホワイトボードの活用など、講義方法がよかった	

＊4/20 以降の GT 制御や 4/25 の保守に関する講義では､密度の高い講義内容に対して研修員全員が＜個人の知見・能力向上に＞に満足度・満点の評価を出している。

・一方、研修員は更に深い知識を取得したい為に、より多くの講義時間を希望している。

(15)　Main Featurews of GT control System

日時		2016/4/26	9：00～13：45　＊
講師（職名）		古田 喜則　高砂電気設計課　課長	
講義のねらい(実績)		ELECTRICAL SYSTEM in GT CONTROL PACKAGE	
講義内容(実績)		GT の電源系統について説明 非常用電源やメンテナンスについて説明 発電機の電源系統についての説明	
講師の自己評価		講義対象が GT 電気系統である点、研修員はプラント電源系統について知見ががあるため、講義はスムースに進んだ。	
講師の研修員評価		研修員の半数は電気関連業務を実施しており、質問内容も的確であった。 発電機保護回路についても積極的に質問してきた	
研修員による講義評価	講義内容	評価点(5 人平均) 3.6 （最良 4=4 人・適切 2=1 人）	
	講義量	評価点(5 人平均)3.6 （最良 4=3 人・良 3=2 人）	
	講義時間	評価点(5 人平均) 3.8 （最良 4=4 人・良 3=1 人）	
	内容理解度	評価点(5 人平均) 3.6 （最良 4=4 人・適切 2=1 人）	
	習得知見・能力 管理職研修員は帰国の為、工場見学のみの評価	得られた知識：評価点(5 人平均) 3.4（最良 4=3 人・良 3=1 人・適切 2=1 人）	
		Action Plan 作成に有用か：評価点(5 人平均) 3.4	
		個人の知見・能力向上に有用か：評価点(5 人平均) 3.4	
		講師になるために有用な講義か：評価点(5 人平均) 3.6	
		機材リスト検討へ有効か：評価点(5 人平均) 3.4	
		露語教材レビュー検討へ有効か：評価点(5 人平均) 3.4	
	研修員コメント抜粋	・Netmation プログラムについて学び GT 動作制御に効果的な点を学んだ ・講義の説明は明確でよかった ・燃焼室の圧力振動測定は我々にとって新分野である ・内容が複雑で講義準備が不十分と感じた	

＊研修中の質疑応答での対応が必要となり、講義は質疑が中心となった。その対応の必要性から、午後は研修終了を早めた。

(16) 試運転手順

日時		2016/4/27	9：00～12：00
講師（職名）		鈴木 真 高砂プラント建設部　試運転技術課	
講義のねらい(実績)		コンバインドサイクルの GT 試運転説明	
講義内容(実績)		試運転フロー、補機試運転、主機試運転の試験内容 緊急時対応、振動調整	
講師の自己評価		通訳を介した為、講義内容が理解されたか判断しにくかった	
講師の研修員評価		積極的に質問をしてくれる研修員の方がいたので、講義のしがいがあった	
研修員による講義評価	講義内容	評価点(5 人平均) 3.4　(最良 4=2 人・良 3=3 人)	
	講義量	評価点(5 人平均) 3.6　(最良 4=2 人・良 3=3 人)	
	講義時間	評価点(5 人平均) 3.4　(最良 4=2 人・良 3=3 人)	
	内容理解度	評価点(5 人平均) 3.4　(最良 4=2 人・良 3=3 人)	
	習得知見・能力 管理職研修員は帰国の為、工場見学のみの評価	得られた知識：評価点(5 人平均) 3.4　(最良 4=2 人・良 3=3 人)	
		Action Plan 作成に有用か：評価点(5 人平均) 3.4	
		個人の知見・能力向上に有用か：評価点(5 人平均) 3.6	
		講師になるために有用な講義か：評価点(5 人平均) 3.4	
		機材リスト検討へ有効か：評価点(5 人平均) 3.2	
		露語教材レビュー検討へ有効か：評価点(5 人平均) 3.0	
	研修員コメント抜粋	・講師の知識レベルは高かった ・建設中 CCPP の業務に行かせる ・GT 起動前の試運転手順について学んだ	

＊本邦研修最終日の為、試運転手順研修の終了後に MHPS 閉講式を実施。

＊午後は MHPS 閉講式の完了後に JICA 東京へ移動

(17) アクションプラン発表会・本邦研修閉講式

約一ヶ月間の本邦研修を完了するにあたり、帰国後に本邦研修の成果を生かす為に、アクションプランを発表した。日本側からの質疑・講評、修了証の授与を経て本邦研修を閉講した。

閉講式　日時　2016 年 4 月 28 日：10 時～13 時

場所　於：JICA 東京　406 号室

以下に閉講式実施日程を示す

－　表　4　本邦研修　閉講式　実施日程－

時間			イベント	場所	発表者・発言者	
10:00	～	10:10	閉講式開始	JICA東京 ４０６号室	JET/AEC	齋藤　（司会進行）
			閉講式開始の挨拶		JICA	田所　専門家
10:10	～	10:21	研修員アクションプラン発表 日本人専門家から質疑・講評 研修監理員・セルゲイ氏（通訳） 発表補佐・AEC　ウミド氏		講師候補 研修員	シャムシエフ・ラスル
10:22	～	10:32				トフタエフ・ノジムホジャ
10:33	～	10:52				ホジャエフ・サドリッディン
10:53	～	11:04				フダイベルガノフ・アスカル
11:05	～	11:30				ソビロフ・バフロム
11:30	～	11:45	Certificate 授与		JICA	相良課長
11:45	～	12;00	本邦研修　感想・謝辞		講師候補者代表：ソビロフ・バフロム	
12:00	～	12:15	閉講式終了の挨拶		JET/AEC	村田　統括
12:15	～	12:30	記念撮影		全員	
12:30	～		閉講式終了後　各自昼食＞帰国準備			

個人別アクションプランは、4 月 4 日／5 日に実施した PCM 研修実習時に作成したグループアクションプランをベースに各自作成した。研修員は、自身の専門分野を考慮しつつ本邦研修から得た知見・経験を元に、講師として担当したい研修科目を選択し、個人別アクションプランに反映させた。研修員は各自のアクションプランの中で、本プロジェクトにおいて、希望科目に関する教材の翻訳修正や機材の選定に関与することを発表した。日本側からは科目選定動機などの質疑が行われた。既にプロジェクトとして決定している研修科目から、以下の表のような希望科目となった。

－　表　5　講師候補研修員の担当希望科目　－

No.	科目名	講師候補者　研修員				
		電気	電気	機械	機械	電気
		Sadriddin Khodjaev (TashTPP)	Askar Khudayberganov (TashTPP)	Tokhtaev Nozimkhodja (TashTPP)	Rasul Shamsiev (TashTETS)	Sobirov Bakhrom (Syrdaryo)
1	Non-destructive testing			3rd		
2	Vibration analysis for rotating machine			6th		
3	Remaining life assessment			4th		
4	Gas Turbine conbined power generation equipment			1st	2nd	
5	Gas Turbine Hot Parts Maintenance			2nd		
6	Overall control system for generator		2nd			1st
7	Control system for generation facilities	2nd				
8	Control & Instrument	4th				
9	Gas Turbine Operation & Maintenance	1st			1st	
10	Gas Turbine Control System	3rd			3rd	
11	Gas Turbine Electrical Control System		1st			2nd
12	Gas Turbine O&M lecture			5th	4th	
		本邦研修Action Plan希望科目順位				

アクションプランの発表、日本側からの質疑コメント・講評指摘を通し、課題として以下

の点が抽出された。

① 研修教材に取り込む写真・図映像などのコンテンツ材料の入手
② 本邦研修では時間が足らないので、ウズベキスタンで座学に時間を取り、現場研の時間を増やす方向を検討して欲しい
③ 12 科目を分担するには、複数科目への対応が必要で、講師候補は不得意分野もチャレンジする必要がある
④ 教授法の勉強も必要

これらの課題について、今後日本人専門家と講師候補の間でコミュニケーションをとりながら対応していく。又、各講師候補の希望科目については、日本側から「今後の意見交換を通し調整が行われる」ことを指摘した。

５．研修員による研修全体へのコメント・評価

JICA 研修監理員による調査票回答からの抜粋

(1) 研修目標（CCPP 運転保守訓練システムの確立）が達成できたか

ほぼ達成できているが、以下のようなコメントがなされた。

- CCPP 運転保守の実習を増やすべき
- 講義によって講師レベルにばらつきがあり、経験豊富な講師を希望
- CCPP の最新モデルに適した機材に更新すべき

(2) 講義科目について

(a) 有益であった科目：

ガスタービン（GT）のシステム、運転管理、制御システム、高温部品、試運転手順、などの科目が有益であった

(b) 不必要な科目：

不必要な科目は無かった・実施した全ての科目が CCPP 運転保守訓練に必要

(c) 追加されると良い科目：

電気機器・補機・ガスコンプレッサー・発電機と励磁システム

GT パーツ修理（高温部品；静翼・動翼・バルブ・パイプなど）

(3) CCPP 運転管理維持方針が準備される

- 基本的知識を得る事ができたが、現場実習を増やして欲しい。
- 日本の電力会社の人事政策について知りたい

(4) CCPP 運転保守の人材育成計画、研修計画、資格認定制度が確立される

- 日本人専門家から引き続いてサポートを受けたい
- 今後の自助努力で向上していきたい

(5) CCPP 運転保守教育の為のカリキュラム、教材、研修機材が準備される

- 露語版テキストがあると研修効果が上がる

(6) CCPP 運転保守教育のインストラクターが育成される

- 計装・制御、電気機器の知識をより多く得たい
- 技術的知識だけではなく、教授法の必要性についても認識を新たにした

(7) 全体に関して

- 電気機器、計装・制御の科目は不十分であった
- 教育心理学、教授法の科目も必要
- 時間の制限があり、研修期間が短く全てを理解するには不十分

メーカー研修は充分に理解するだけの時間が無い。研修期間を伸ばす必要がある

- GT 運転保守の実習を増やして欲しい
- カットモデルなどが、教育研修効果を上げる点で重要な事に気づいた
- プロジェクトの実施体制を PCM（アクションプラン）に合わせ改善したい

６．実施内容に関する所見

(1) PCM 研修

PCM 研修はアイ・シー・ネット株式会社の森田スペシャリストによる講義を実施した。研修は PCM 手法の説明から業務分析・アクションプランの作成についての講義、実習を短時間で実施した。本邦研修は、本プロジェクトの目的である「CCPP 運転保守トレーニングセンターの整備」において、講師育成に位置づけられる。PCM 研修の実習で作成するグループアクションプランは、本プロジェクトの PDM を元に、この目的に沿う内容となるよう、森田氏に事前に進め方を検討いただき実施した。

完成したグループアクションプランの項目として、「研修カリキュラムと教材の開発」、「開発カリキュラムと教材の試行」、「研修用機材の導入」が含まれている。講師候補研修員は、各自本邦研修で得た知見経験を有効に生かすことが可能な担当希望科目を選定し、グループアクションプランの下に個人アクションプランとして展開した。個人アクションプランの作成・発表により、講師候補研修員が自身の責務を認識し、日本人専門家と協力し本プロジェクトを推進する点が明確となった。

森田スペシャリストと「個人アクションプランを導く方向」を事前に相談し、PCM 研修を実施した事により、上記のように狙いの結果を得ることが出来た。今後もプロジェクトを推進して行くにあたり、各講師候補にアクションプランを改善しながら実施する事を意識するよう、日本人専門家の協力フォローアップを進めていく。

(2) 電力会社研修所（PET）による研修

PET による本邦研修は、主に機械分野を中心に電気・発電分野に跨り、発電所の CCPP 定期点検の現場見学を含んだ研修を実施した。研修運営は PET の研修実施実績／経験に基づく時間管理がなされ、座学講義と設備見学・実技実習の時間配分バランスが良く、受講生の集中が継続できる工夫がなされた。実技実習は研修用機材の選定の観点からも重要であり、研修員は PET のカットモデル等の実習機材にも興味を持った。実施した研修内容は、日本の電力会社における研修を実体験してもらう目的もあったが、機械分野が中心であった為、講師候補研修員からは、電気・制御系研修が不足しているとの指摘があった。講義教材は、過去 PET が実施した国別研修の露語教材に加え、今回新たに作成・露語翻訳した資料も準備し研修を実施した。研修員であるウズベク人にとってはこれらの露語教材が理解の助けとなった。

(3) メーカー（MHPS）による研修

MHPS による研修は、設備メーカーの立ち位置で、EPC 契約で実施される運転保守要員育成研修のカリキュラムをベースに実施した。講義内容は EPC 研修ベースと言うことから内容が濃く、2 週間と言う期間内では研修員の理解が追い

つかないという側面もあり、多くの研修員が研修期間についての延長を希望した。又、生産現場見学については更に詳しく説明を受けたいとの要望があった。

研修教材は英語を準備し、通訳を介して研修を実施したが、ウズベク人にとっては若干ストレスがたまるようであった。しかしながら、CCPP メーカーのマニュアルや技術資料は英文が標準であり、講師候補として英語資料を読み下すことは能力向上のための必要な要素である。講師養成の観点からも、英文資料を使用する研修は資料読解力向上の効果があると考える。

(4) アンケートの実施と回収

研修員から研修内容に関するアンケートを講義項目ごとに実施し、講師側からもコメント評価を収集した。前述 4 項に(1)から(16)として纏めた。又、研修監理員による本邦研修全体に関するアンケートについては 5 項に抜粋して記載した。これらの評価コメント内容は、プロジェクトの推進と次回本邦研修の実施改善に役立てる。

アンケートの回収に当たり、実施日程の一部変更があり、日程を固定したアンケートフォームを使用していた為に、アンケート回答内容と講義日程の照合が必要となり、取りまとめに時間を要した。第 2 回本邦研修では日程変更にも対応できるよう、アンケートフォームを工夫したい。

(5) 全般

コンバインドサイクル基礎部分の座学において、ユーザー視点（電力会社）とメーカー視点（MHPS）での説明ストーリーの違いはあるが、PET 研修と MHPS 研修で内容重複があるとのコメントがあり、第 2 回本邦研修での講義内容調整を求められた。実技実習や設備見学の研修増の要望についても、内容や時間調整などクリアすべき課題が多くある。

第 2 回本邦研修では研修内容の重複回避による講義時間圧縮と、実技見学時間の調整対応など、入念な事前準備が必要と考える。

7. その他・特記事項

(1) 新研修所建設へのアドバイス

本邦研修において PET は機械分野の研修を担当したが、中国電力の研修機関として火力発電全般に関する研修を実施してきており、研修設備、内容は充実している。本プロジェクトの目的である「CCPP 運転保守トレーニングセンターの整備」にあたり、ウズベクエネルゴ側では新研修所建屋の建設・整備を計画しており、管理職研修員は PET の研修施設について多くの質問を行った。管理職研修員は日本人専門家からアドバイスを受け、新研修所建設計画の参考となる情報を得た。

(2) 日本の電力会社の人事制度紹介

トレーニングセンター整備の観点から、研修員は日本の電力会社の人事制度、人材育成についても興味を持っており、特に管理職研修員は個別技術の研修説明よりも、こうした周辺情報への関心が強い。今回は Project Director 1 名の本邦研修参加であったが、2 回目以降の管理職研修員に対する研修プログラムについてはこうした要望がある背景を踏まえた対応を検討したい。

(3) ウズベクでの TOT、定期点検現場研修の実施

研修全体概念図で示した TOT の実施（目標２）定期点検現場研修（目標３）については、今回の本邦研修終了後の対応となる。

目標２については、今回作成した個人アクションプランの実施のフォローであり、日本人専門家の渡航によりフォローアップしていく。

目標３については、Navoi 発電所の定期点検（燃焼器点検）が９月に予定されており、ウズベクエネルゴ本社、Navoi 発電所と情報交換し連携する。又、タシケント熱併給所の定期点検日程も参考とし、定期点検現場研修の実施計画については両所の点検日程を比較検討し決定する。

８．第１回本邦研修の総括

来日した研修員は面接を経て優秀な人材を選定しており、本邦研修の受講態度や質問等の積極性など、高い意識が伺われた。

今後はコンバインドサイクル基礎研修内容の重複回避による講義時間圧縮や、実技・現場見学の重点化対応などの要望に対して、団内での検討と事前調整が必要となる。

今回の研修員来日のための事前説明は、日本人専門家との面談と本件プロジェクトの説明を実施し、技術資料については詳細説明をする以前の状況での来日となった。本邦研修が終了し、研修員が帰国後の５月には日本人専門家が渡航し、3 科目の教材を提示した。この 3 教科に対して、目標 2 にあたるウズベキスタン国内の TOT を実施する事により、個人アクションプランを推進する状況に移行した。露語教材の提供については、年内に 3 教科の TOT を終了し教材完成とする。加えて年内には追加で 5 教科の教材原稿を提供する予定で進めている。

ウズベキスタンでの TOT 実施、定期点検現場研修の推進などアクションプランのフォローアップにより、講師候補の能力向上を図り、プロジェクトを推進していく事ができる。

本件プロジェクトにおいては、最終的に 12 科目の教材を準備する予定で進めており、今回来日した講師候補研修員が 5 名であることから、講師候補の追加が必要であり、5 月渡航時に講師候補対象者 5 名を追加決定した。第１回本邦研修では研修員の高い意識により研修内容に理解を深めたが、第２回目以降に本邦研修に来日する研修員は、検討を開始している教材を技術資料として事前に学び、予備知識もって本邦研修に参加するように進めたい。

以上

The Project for Establishment of the CCPP Operation & Maintenance Training Center in Uzbekistan

1st Training of Trainers in Japan

Group action plan

April 28, 2016

Tokyo, Japan

Project PDM (Action 3-1)

3-1. To develop curricula and training materials for CCPP O&M training.

Sub-activity Под-деятельность	Implementing personnels	Products Продукты		4				5				6				7				8				9				10				11				12				1				2				3			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Training in operating power plants in order to learn the organization of operation and maintenance of CCPP	JICA	Training completion certificate	Plan План																																											
			Actual Фактический																																												
Allocation of the courses by instructors	JET and Instructors	Instructors responsibilites allocation list approved by JET	Plan План																																											
			Actual Фактический																																												
Provision of room with necessary conditions for the instructors work	Project director	Room with all necessary facilities (office furniture, computer appliances, internet access)	Plan План																																											
			Actual Фактический																																												
To receive translated training materials and training curricula	JET and Instructors	Training materials and training curricula including digital version	Plan План																																											
			Actual Фактический																																												
Organisation of additional TOT in Uzbekistan	JET	JET members approved visit schedule (TOT)	Plan План																																											
			Actual Фактический																																												
If necessary, make changes and improve training materials and curricula	Instructors	Final training curricula and materials	Plan План																																											
			Actual Фактический																																												
To provide training curricula and materials for approval to the Uzbekenergo and JICA	Instructors and PD	JSC Uzbekenrgo's approval	Plan План																																											
			Actual Фактический																																												
Obtaining permission of Uzbekenergo during the visit of Japanese experts for at least 5-7 days	Project director	Uzbekenergo's decree on dispatch of instructors	Plan План																																											
			Actual Фактический																																												

Project PDM (Action 3-2)

3-2. To try out curricula and training material developed through training

Sub-activity Под-деятельность	Implementing personnels Исполняющий	Products Продукты		5				6				7				8				9				10				11				12				1				2				3				4			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Distribution of the training courses between the instructors	Instructors	Individual training course	Plan План																																											
			Actual Фактически																																												
Conducting a trial teaching of selected training courses to the rest instructors	Instructors	Lecture of training course	Plan План																																											
			Actual Фактический																																												
Record your mistakes during the training	Instructors	Written mistakes	Plan План																																										
			Actual Фактически																																												
Discussion between instructors after the trial training	Instructors	Exchange of opinions	Plan План																																										
			Actual Фактически																																												
Repeated carrying out training with the participation of Japanese experts	Instructors	Repeated training course	Plan План																																											
			Actual Фактический																																												
Discussion of training results with Japanese experts	Instructors and JET	Written comments	Plan План																																										
			Actual Фактически																																												
Determination of homework for self-development	Instructors	Individual task for self-development	Plan План																																										
			Actual Фактически																																												
The revision of the textbook	Instructors	Final textbooks	Plan План																																										
			Actual Фактически																																												

Project PDM (Action 3-3)

3-3. To make an installation plan of necessary training equiments for O&M of CCPP

Sub-activity Под-деятельность	Implementing personnels	Products Продукты		5				6				7				8				9				10				11				12				1				2				3				4			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
To receive a list of the necessary equipment	Instructors and PD	Preliminary training equipment list	Plan План																																												
			Actual Фактический																																												
To check and select the list of the necessary equipment	Instructors	Revised training equiment list	Plan План																																											
			Actual Фактический																																												
To create the final list	Instructors and PD	Final training equipment list	Plan План																																											
			Actual Фактический																																												
To approve the final list	JSC Uzbekenergo	JSC Uzbekenergo's decision	Plan План																																											
			Actual Фактический																																												
To create a draft for the delivery schedule	Instructors	Delivery schedule	Plan План																																										
			Actual Фактический																																												
To submit the draft of the delivery schedule to JICA	Instructors	Letter	Plan План																																										
			Actual Фактический																																												

Project PDM (Action 3-4)

3-4. To install necessary training equipments for O&M of CCPP.

Sub-activity Под-деятельность	Implementing personnels	Products Продукты		5				6				7				8				9				10				11				12				1				2				3				4			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
To make a plan for equipment placement	Instructors	Plan for equipment placement	Plan План																																												
			Actual Фактический																																												
To approve the plan for equipment placement	JSC Uzbekenergo and Instructors	Uzbekenergo's decree	Plan План																																												
			Actual Фактический																																												
Obtaining of necessary equipments	JSC Uzbekenergo Training Centre	Equipments	Plan План																																												
			Actual Фактический																																												
Installation, assembly and adjustment of the equipment	JICA, Supplier and instructors	Connection Diagram	Plan План																																											
			Actual Фактический																																												
Testing and commissioning of the equipment	JICA, Supplier and instructors	The protocol of acceptance	Plan План																																											
			Actual Фактический																																												
Training on the use of equipment	JET	Manuals	Plan План																																												
			Actual Фактический																																												
To develop the manuals for maintenance of the equipment	JET and instructors	Manuals	Plan План																																											
			Actual Фактический																																												

Individual Action Plan

Name: Shamsiev Rasul

The training course I would like to be in charge of is; 1) 9 Gas Turbine Operation& Maintenance
2) 4 Gas Turbine combined power generation equipment
3) 10 Gas Turbine Control System
4) 12 Gas Turbine O&M lecture
Because; I am engaged in the operation of the gas turbine made by Hitachi H25 with a capacity of 27 MW. Selected courses are closer to my profession.

添付2

Individual Action Plan

Greatest gap:	*I do not have experience of work in the CCPP with capacity of 450 MW, which are being built in our country.*
Specific supports needed:	1. Provision of the necessary materials, documents on these courses in electronic form, in English and Russian. 2. Organization of OJT in operating power plants with CCPP of 450 MW. 3. Providing training simulator for the CCPP. 4. Cut model of Gas Turbine.
My commitments:	1. Checking the correctness and adjustment of training materials translation. 2. Training the workers of our energy system. 3. Teamwork during the arrival of a Japanese experts team, if my management allows. 4. I will try to develop my own methodology for training.

Individual Action Plan

Name: Tokhtaev Nozim

The training course I would like to be in charge of is;
1) 4 Gas Turbine combined power generation equipment
2) 5 Gas Turbine Hot Parts Maintenance
3) 1 Non-destructive testing
4) 3 Remaining life assessment
5) 12 Gas Turbine O&M lecture
6) 2 Vibration analysis for rotating machine

Because; I am connected with all these courses directly on the production.

Individual Action Plan

Greatest gap:	*1. In the practice of modern methods of diagnostics and non-destructive testing.* *2. In practice, i was not associated with operation and maintenance of CCPP.*
Specific supports needed:	1. Conducting TOT in Uzbekistan. 2. Providing the necessary equipment for training and lectures. 3. In view of the training layouts, posters, diagrams, working models, photos and video files. 4. The necessary visual details of new and defective parts in the actual size. 5. Help in the study on the working methods of provided training equipment for training together with instructors of training center "PET"
My commitments:	1. Correction of training materials in Russian translation provided by the «JET» 2. To transfer all my knowledge and skills to trainees 3. To improve the content of all lectures on my selected courses.

添付3

Individual Action Plan

Name: Khodjaev Sadriddin

The training course I would like to be in charge of is;
1) 9 Gas Turbine Operation& Maintenance
2) 7 Control system for generation facilities (except as GT and Generator)
3) 10 Gas Turbine Control System
4) 8 Control & Instrument

Because; The course N9 is close to me since I have been working in this field. Courses under the numeration - 7,8,10 are those courses in which I have only basic knowledge. It would be desirable in the future to study the control system (courses 7,8,10) deeply with the help of the Japanese side.

Individual Action Plan

Greatest gap:	*I don't have experience of work with control system. Also I don't have enough material on control system for my self-development. But I am very interested in control system. Also I don't have skills on GT maintenance.* *For the one month of trainings in Japan we have learnt different matters about GT, but it is not enough for being the instructor of GT courses. During the study in Japan we basically learnt the theoretical part, but we feel that we need more practical learning. I thought that firstly we had to learn the GT basics in Uzbekistan, and after that we should study in Japan more detailly. It is well-known that Japan has a huge experience in GT operation and maintenance, so we could get more experience training directly in production process. We can suggest to collaborate the work of MHPS and PET instructors, to avoid the re-conduct of the similar courses.*
Specific supports needed:	1. OJT (including theoretical and practical) from experienced Japanese specialists on control system and maintenance of GT. 2. Training material (including photo and video material) 3. Long time experience on chosen courses together with Japanese experts
My commitments:	1. Timely learning of provided by Japanese side training material 2. Responsibility when checking the translation of training materials

添付4

Individual Action Plan

Name: Khudayberganov Askar

The training course I would like to be in charge of is;
1) 11 Gas Turbine Electrical Control System
2) 6 Overall control system for generator
Because; I am engaged in electrical maintenance at power plant. I would like to explore new technologies for the electrical part of the gas turbine and expand my knowledge.

Individual Action Plan

Greatest gap:	*A detailed understanding of modern electric power generation and distribution. In order to work as an instructor I need to work at CCPP.*
Specific supports needed:	1. Organizing TOT in Uzbekistan. 2. Providing all materials for the electrical system in electronic form in Russian. 3. Support from the Japanese instructors of PET, to enhance the experience of teaching. 4. Providing training equipment for arranging the lessons. 5. Learning to work with the simulator which will be installed in training centre.
My commitments:	1. The study of the provided material for further training of young specialists. 2. Preparation of training materials. 3. Training of employees of our power plants. 4. I am interested in C&I course. Further I want to learn and to teach this course.

添付5

Individual Action Plan

Name: Sobirov Bakhrom

The training course I would like to be in charge of is;
1) 6 Overall control system for generator
2) 11 Gas Turbine Electrical Control System
Because; I have experience in electrical and electric protection of the generator in thermal power plant. For the teaching the young professionals I would like to get more detailed knowledge about modern electrical gas turbine control system.

Individual Action Plan

Greatest gap:	*Detailed view of the modern gas turbine electric control system.*
Specific supports needed:	1. Providing educational materials, circuit diagrams and drawings for the electrical control system of the gas turbine in electronic form in Russian and English. 2. Providing useful video materials and 3D models for training as far as possible. 3. Teaching the theory of gas turbine electrical control systems. 4. The principle of operation of modern devices and sensors used in the electrical system of the gas turbine. 5. Methods for adjustment of GT electric system. 6. Working with adjustment devices. 7. Cooperation with specialists of PET in order to improve the courses. 8. Training in the Mitsubishi Electric company on topics related to the generator

添付6

Individual Action Plan

My commitments:	1. Checking and correcting translated training materials. 2. Training of employees our energy system. 3. Participation in the construction of 2 CCPP with a total capacity of 900 MW in the Syrdarya TPP, followed by participation in the commissioning, operation in order to strengthen the knowledge and enhance the experience. 4. Continuous improvement of my knowledge on the CCPP in order to transfer it to young professionals of our energy system.

添付6

第 2 回 本 邦 研 修 実 施 報 告 書

「ウズベキスタン国　コンバインドサイクル発電運用保守トレーニングセンター整備プロジェクト」研 修

（講師候補・管理職　研修）

平成 29 年 3 月

独立行政法人国際協力機構

株式会社アジア共同設計コンサルタント

日本工営株式会社

中国電力株式会社

株式会社パワー・エンジニアリング・アンド・トレーニングサービス

目次

添付資料

１．研修コース概要

(1)　研修コース名

「ウズベキスタン国　コンバインドサイクル発電運用保守トレーニングセンター整備プロジェクト」第２回本邦研修

「The Project for Establishment of the Combined Cycle Gas Turbine (CCGT) Operation and Maintenance Training Center」2nd Training of Trainers in Japan

(2) 研修期間

平成 29 年 1 月 31 日　～　平成 29 年 3 月 2 日（ウズベキスタン出国 1/29 帰国 3/3）

（管理職　2 月 7 日　～　2 月 16 日；出国 2/5 帰国 2/17）

(3) 研修員数

今回実施した第２回本邦研修では、ウズベキエネルゴ（以降 UE）から推薦された講師候補者の面談を通じ研修対象者を決定した。（3 項参照）

決定した研修対象者は全員で 9 名である。（内訳は下表の通り）

研修員	
講師候補	管理職
8 名	1 名

(4) 研修実施機関

株式会社　パワー・エンジニアリング・アンド・トレーニングサービス（PET)

三菱日立パワーシステムズ株式会社　（MHPS;国内再委託先）

アイ・シー・ネット株式会社　（IC-NET;国内再委託先）

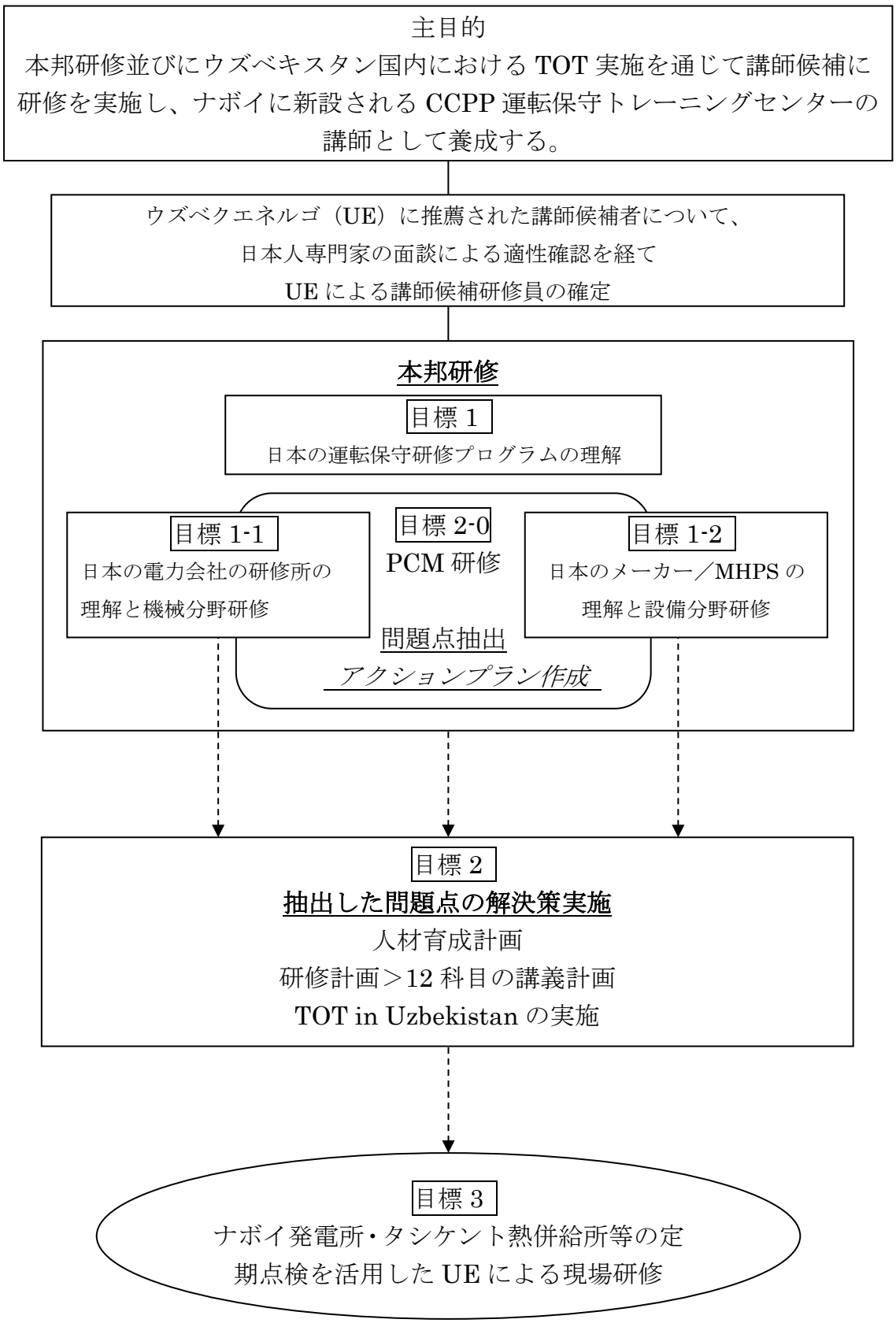
２．研修内容

本プロジェクトにおける講師候補の育成は、「本邦研修」「ウズベキスタンにおける TOT 実施」「運転中コンバインドサイクルの定期点検を活用した UE による現場研修の実施」から構成される。研修の全体概念を次頁(1)に示す。

本邦研修においては日本における電力分野人材育成の教育研修プログラムの理解を進め、日本人専門家が提供する教材をレビュー改訂する為の基礎知識を学び、帰国後のアクションプランの作成までを行う。本邦研修の研修日程計画を次々頁以降の(2)(3)に示す。

「ウズベキスタンにおける TOT 実施」「運転中コンバインドサイクルの定期点検を活用した UE による現場研修の実施」は、「本邦研修」で得た知識・経験並びに日本人専門家が提供する教材をベースに、帰国後にウズベキスタンにおいて実施する。

研修全体概念



－　図　1　研修全体概念図　－

(2) 研修員　研修日程実績表

－　表　1　研修日程（研修員・講師候補）－

日程（曜日）	時間	研修項目	講師等	研修場所	到達目標
1 月 31 日（火）	09:00～16:00	ブリーフィング プログラム・オリエンテーション	ＪＩＣＡ 中国	JICA 中国国際センター	
2 月 1 日（水）	9:00～12:00	ジェネラル・オリエンテーション	ＪＩＣＡ 中国		
	13:00～18:00	プロジェクト・オリエンテーション	AEC 佐久間 晶子		背景理解
		PCM 研修：問題分析	IC-NET 森田 徹生		目標 2-0
2 月 2 日（木）	9:00～15:00	PCM 研修：アクションプラン作成	IC-NET 森田 徹生		目標 2-0
2 月 3 日（金）	09:00～11:00	PET 開講式･オリエンテーション	PET 荒木・福山	パワー･エンジニアリング･アンド･トレーニングサービス（PET）	目標 1-1
	11:00～16:00	日本の火力発電の人材育成	PET 西村 豊彦		
2 月 6 日（月）	09:00～16:00	電力会社（機械・電気・発電）の研修紹介・設備見学	PET 長谷部 昌平 各分野専門家		
2 月 7-8 日（火-水）	09:00～16:00	非破壊検査： 講義研修・実技研修	PET 長谷部 昌平		
9-10 日（木-金）	09:00～16:00	コンバインドサイクル発電技術 トラブル事例・高温部品余寿命	PET 宮本 洋平 福山 晃司	中国電力柳井発電所	目標 1-1
		現場見学　定期点検・中央制御室・予備品倉庫			
2 月 13 日（月）	10:00～11:00	中国電力　給電指令所　見学	PET 長谷部昌平	中国電力本社	目標 1-1
	11:00～12:00	中国電力　火力部と意見交換	中国電力 久保田・西尾		
14-15 日（火-水）	14 日；9:00～16:00 15 日；9:00～15:30	コンバインドサイクル発電技術 高温部品基礎、検査、修理 現場見学 中央制御室・GT 廻り・HRSG・予備品倉庫	PET 宮本 洋平 福山 晃司	中国電力水島発電所	目標 1-1

日程 （曜日）	時間	研修項目	講師等	研修場所	到達目標
2 月 16 日 （木）	9:00～11:40	MHPS 開講式・GT 工場見学	MHPS 渡辺　洋也	MHPS 高砂工場	目標 1-2
	13:30～ 16:00	GT Auxiliaries Arrangement Air Inlet Systems	Kollegala Srinidhi		
2 月 17 日 （金）	9:00～12:00 13:00～ 16:00	ガスタービンシステム 配管・計装図、防爆範囲、操作手順、標準インターロック	MHPS 待井、原田		目標 1-2
2 月 20 日 （月）	9:00～10:50	Air Inlet Systems	MHPS Kollegala Srinidhi		目標 1-2
	10:50～ 16:00	GT and Auxiliaries Equipments Co2 Fire Fighting System			
2 月 21 日 （火）	9:00～12:00	Blade Washing; HRSG;	MHPS 野中、伊藤		目標 1-2
	13:00～ 16:00	GT Control System	MHPS 岡、岸、森		
2 月 22 日 （水）	9:00～10:00	GT Control System 起動停止制御	MHPS 岸、森		目標 1-2
	10:00～ 16:00	DIASYS Netmation	MHPS ｺﾝﾄﾛｰﾙ ｼｽﾃﾑｽﾞ 山田		
23-24 日 （木-金）	9:00～16:00 9:00～16:30	DIASYS Netmation (23 日; Blade Hot Parts Repair Shop 見学／24 日;社員訓練所見学)	MHPS ｺﾝﾄﾛｰﾙ ｼｽﾃﾑｽﾞ 山田		目標 1-2
2 月 27 日 （月）	9:00～16:00	GT Design & performance	MHPS 河原		目標 1-2
2 月 28 日 （火）	9:00～12:00	GT Periodical Maintenance	MHPS-SC 山本		目標 1-2
	13:00～ 16:00	Electrical & Control Package	MHPS 稲垣		
3 月 1 日 （水）	9:00～12:00	GT Commissioning Procedure	MHPS 田村		目標 1-2
		閉講式	MHPS 渡辺　洋也		
3 月 2 日 （木）	9:45～12:40	アクションプラン発表会 閉講式	司会進行 AEC 齋藤 孝史	JICA 東京	目標 2-0

(3) 管理職　研修日程実績表

－ 表 2 研修日程（管理職）－

日程（曜日）	時間	研修項目	講師等	研修場所	到達目標
2 月 7 日（火）	9:00～12:00	プロジェクト・ブリーフィング 本邦研修の目的とプロジェクト理解	AEC 村田・若林	JICA 中国国際センター	背景理解
2 月 8 日（水）	9:00～16:00	ブリーフィング オリエンテーション	ＪＩＣＡ中国		
2 月 9 日（木）	09:00～12:00	プロジェクト・オリエンテーション 講師候補者 PCM 研修の実施状況	AEC 齋藤 孝史		背景理解 目標 2-0
2 月 10 日（金）	9:00～16:00	中国電力の火力発電人材育成 PET の研修紹介・研修施設見学	PET 長谷部 昌平 荒木・西村	PET	目標 1-1
2 月 13 日（月）	10:00～11:00	中国電力　給電指令所　見学	PET 長谷部 昌平	中国電力本社	目標 1-1
	11:00～12:00	中国電力　火力部と意見交換	中国電力 久保田・西尾		
14-15 日（火-水）	14 日；9:00～16:00 15 日；9:00～15:30	コンバインドサイクル発電技術 高温部品基礎、検査、修理 現場見学　中央制御室・GT 廻り・HRSG・予備品倉庫	PET 宮本 洋平 福山 晃司	中国電力水島発電所	目標 1-1
2 月 16 日（木）	9:00～11:40	メーカー工場見学	MHPS 渡辺　洋也	MHPS 高砂工場	目標 1-2
	13:30～14:30	修了証授与　GT General			

３．研修員

(1) 講師候補研修員の決定

UE・ナボイ発電所から推薦された候補者 20 名の面談を実施した。第 6 次現地業務（2017 年 10 月）では 10 名の推薦者について検討し、既に第 4 次現地業務にて講師候補者として決定していた 2 名に関しては引き続き講師候補者となる事を確認した。その他の 8 名については面談により、その知識、専門分野、講師になる意欲などを確認し全員適切であると判断した。

第 7 次現地業務（2017 年 12 月）において、第 6 次に決定した講師候補者へ設備、電気、機械各分野の TOT を実施した。同時に UE・ナボイ発電所から推薦された追加の 10 名講師候補者について、面談に代えて TOT に参加してもらい、UE・ナボイ発電所側の判断も含め電気・制御分野の 3 名について講師候補者として追加認定した。残りの認定外の 7 名については、CCPP についての知見を向上させる為に、以降の TOT にオブザーバーとして参加頂く頂く事とした。

以上 2 回の講師候補者選定により、第 2 回本邦研修への参加対象者として 13 名を決定したが、UE・ナボイ発電所側の最終確認により、第 2 回本邦研修対象者として 8 名の研修員を確定した。

尚、今回の本邦研修に参加していない講師候補者については、今後実施する予定の第 3 回本邦研修に参加する方向で調整する。

(2) 管理職研修員の決定

本邦研修の対象となる管理職は、直接のカウンターパートであるプロジェクトダイレクター(PD)や新研修所の社長予定者に加え、本プロジェクトに関係する UE 本社対外経済投資部（アドバイザー）、人事部、発電計画部、CCPP を運転中・建設計画中の発電所、旧トレーニングセンターなどの周辺組織に所属する管理職が相当する。

第 1 回本邦研修では、PD であり同時に新研修所の社長候補者が本邦研修に参加したが、2016 年 10 月の体制変更により PD が交代したことも踏まえ、第 2 回本邦研修の管理職参加者については、UE 本社から 1 名と新 PD、補充要員として新研修所の社長候補者の参加を要請した。

日本側の要請に基づき、管理職については UE 本社の判断で UE 本社の対外経済投資部長と新 PD（ナボイ発電所長）の２名が推薦され参加する予定となった。しかしながら、最終的に業務の都合で管理職の参加は、新 PD（ナボイ発電所長）の 1 名のみとなった。新研修所の社長予定者については、今後実施する予定の第 3 回本邦研修に参加する方向で調整する。

(3) 研修参加への意欲・受講態度

研修員全員が全研修予定日程に参加し、講義及び現地視察ともに活発な質疑が実施された。今回の研修員は特にナボイ CCPP の運転経験者が多いため、全体を通じて技術面で専門的、具体的な質問が多く、受講態度はきわめて良好であった。又、「日本の電力会社の組織や人事」に関する興味も高く、研修講義内容とは直接関係が無い質問も多くあったが、彼らの業務上の必要性や理解欲に応えるため休息時間も活用し可能な限り回答対応した。

とりわけ管理職研修員は事前に 20 問以上の質問項目を準備し、受講意欲・要求は高いものであった。特に CCPP 導入前後の経済指標については、詳細データの要求があり、データ非公開の部分についての不満を強く指摘されたが、日本側講師陣は講義内容に拠る説明に加え、講義には含まれていない質問に対しても数日内で別途回答を準備し、対応に概ね満足をいただいた。

第２回本邦研修への参加研修員は次頁の表３による。

－　表３　第２回本邦研修 参加研修員一覧　－

講師候補研修員　氏名	所属	担当分野
Mr. PARMONOV, Azim パルマノフ　アズーィム	ナボイ CCPP 電気系主任技術者	電気分野
Mr. ASLONOV, Aslon アスロノフ　アスロン	ナボイ CCPP シフトヘッド	機械分野
Mr. BAYLIEV, Shukhrat バイリエフ　シュフラット	ナボイ CCPP GT オペエーター	機械分野
Mr. DJAMALOV, Bakhodir ジャマロフ　バホディル	ナボイ CCPP サービス保修	機械分野
Mr. MUSAEV, Alisher ムサエフ　アリシェル	ナボイ CCPP 機械系主任技術者	機械分野
Mr. NARZIEV, Akmal ナルズィエフ　アクマル	ナボイ CCPP 電子系技術者	電気分野
Mr. TOSHOV, Sanjar トショフ　サンジャル	ナボイ CCPP 電気系試験職長	電気分野
Mr. KHASANOV, Latif ハサノフ　ラティフ	ナボイ CCPP プログラム主任技術者	制御分野
管理職研修員　（研修参加：2 月 7 日～2 月 16 日）		
Mr. GANIEV, Kahramon カフラモン ガニエフ	ナボイ TPP 発電所長	経営者 管理職

４．研修員／講師候補者の研修実施実績　回収質問票、評価コメント

講師側からのコメント、並びに研修員からの質問票回答内容を整理して記載する。研修実施、進捗状況により実施予定日程から若干変更が発生している。（以下実施日時を参照）

尚、研修員による講義評価点では、3.50 以下の点を赤字表記した。又、＜習得知見・能力：得られた知識＞の項目は回答者が少ないので評価点を二重取消線 ~~あり~~ で無効とした。

(1)　プロジェクト・オリエンテーション、PCM 研修（アクションプラン研修）

日時	2017/2/1	①13：00～14：00 ②14：00～18：00
	2017/2/2	②9:00～15：00
講師（職場名）	①佐久間　晶子（JET 業務調整／AEC） ②森田　徹生（IC NET　グローバル人材開発グループ／ プロジェクトマネージメント・スペシャリスト）	
講義のねらい(実績)	①プロジェクト背景の理解･プロジェクト概要と研修計画 ②アクションプラン作成に向けた問題点抽出と導き・目標設定	
講義内容(実績)	①プロジェクト概要説明（プロジェクト目標・研修計画・講義計画） ②PCM 研修（問題点抽出・グループディスカッション・アクションプラン作成の導き：目標２の設定）	
講師の自己評価	①トレーニングセンターの建設場所変更など、研修員とプロジェクト概要の一端を共有できたのは有効であった。 ②講義計画のアクションプラン作成と PCM 研修の知識等により、研修員が講師としてトレーニングセンターを運営する為に必要な業務の関連付けが出来た。	
講師の研修員評価	グループディスカッションでは議論が停滞する場面もあったが、アクションプラン作成に当たっては集中して取り組んでいた。	
研修員による講義評価（質問票 5-1）	講義内容	評価点(8 人平均) 3.88　（最良 4=7 人・良 3=1 人）
	講義量	評価点(8 人平均) 3.75　（最良 4=6 人・良 3=2 人）
	講義時間	評価点(8 人平均) 3.38　（最良 4=5 人・良 3=1 人・可 2=2 人）
	内容理解度	評価点(8 人平均) 3.75　（最良 4=6 人・良 3=2 人）
	習得知見・能力	~~得られた知識：回答 3 人（最良 4=2・良 3=1 人）~~
		Action Plan 作成に有用か:評価点(8 人平均) 3.88
		個人の知見・能力向上に有用か: 評価点(8 人平均) 3.88
		講師になるために有用な講義か: 評価点(8 人平均) 3.75
		機材リスト検討へ有効か: 評価点(8 人平均) 3.75
		露語教材レビュー検討へ有効か: 評価点(7 平均) 3.71
	研修員コメント抜粋	・時間が少ないのに簡潔で判りやすく問題分析について理解した。 ・問題分析とディスカッションで解決策が見出せる事を理解した。 ・ナボイの業務でも問題分析の手法を取り入れるべき。

JET：（JICA Expert Team；JICA プロジェクト専門家チーム）

＊　JICA プロジェクトの問題解決を目的として議論を進めたが、手法そのものへの評価も高く、今後研修員自身の業務改善で問題解決の手法を活用する意識が見られた。

＊　講義時間に関して短いとの意見が若干あった

講義資料：添付 1 プロジェクトの進捗状況と課題 rev.1

添付 2 Action Planning PPT Eng161221　(PPT)

(2) ①開講式、②オリエンテーション
③日本の電力会社の人材育成

日時		2017/2/3	①9：00～9:30　②9:30～11：00
講師（職場名）		奥田　辰典（㈱PET　エンジニアリングセンター長） 荒木　昇　（㈱PET　技術研修事業部長） 西村　豊彦（㈱PET　技術研修事業部部長） 宮本　洋平（JET タービン運転・保守／ ㈱PET エンジニアリング事業部部長） 長谷部 昌平（JET プラント補機運転・保守／㈱PET 技術研修事業部 企画・運営グループチーフマネージャー） 福山　晃司（㈱PET　技術研修事業部　担当） 安藤　真也（㈱PET　技術研修事業部　担当）	
講義のねらい(実績)		①開講式　②オリエンテーション	
講義内容(実績)		①歓迎挨拶、PET、研修員および出席者自己紹介 ②PET 研修コース概要説明、PET 研修施設の概要説明	
講師の自己評価		研修員とのコミュニケーション形成に効果があった	
講師の研修員評価		研修員はみな礼儀正しく、ルールと時間を守り行動した	
日時		2017/2/3	③11:00～16：00
講師（職名）		西村　豊彦（㈱PET　技術研修事業部部長）	
講義のねらい(実績)		③日本の電力会社の人材育成に関する考え方と、 研修センターの位置付けや果たす役割の理解。	
講義内容(実績)		日本の電力会社における人材育成について 中国電力の火力系社員教育の流れ PET の役割（研修体制等も含む） 講師としての指導上のポイント・アドバイス等	
講師の自己評価		日本の研修センターの理解には不可欠で、 研修運用について興味深く聴講し有意義であった	
講師の研修員評価		質問も多く、目的を持ち受講している様子が伺えた	
研修員による講義評価（質問票 5-2）	講義内容	評価点(8 人平均) 3.88　（最良 4=7 人・良 3=1 人）	
	講義量	評価点(8 人平均) 4.0　（最良 4=8 人）	
	講義時間	評価点(8 人平均) 3.63　（最良 4=5 人・良 3=3 人）	
	内容理解度	評価点(8 人平均) 3.88　（最良 4=7 人・良 3=1 人）	
	習得知見・能力	~~得られた知識：回答 3 人（最良 4=2 人・良 3=1 人）~~	
		Action Plan 作成に有用か:評価点(8 人平均) 4.0	
		個人の知見・能力向上に有用か: 評価点(8 人平均) 4.0	
		講師になるために有用な講義か: 評価点(8 人平均) 3.88	
		機材リスト検討へ有効か: 評価点(8 人平均) 3.88	
		露語教材レビュー検討へ有効か: 評価点(8 人平均) 3.88	
	研修員コメント抜粋	講義は簡潔で判り易く、研修所開設と人材育成の情報を多く得、 受講生徒への対応姿勢等の心理面などについても学習できた。	

＊　人材育成、研修所に関する説明を実施頂いた講師に対し、人材育成経験に基づく講義内容であり、高い評価を得た。

(3) 電力会社の研修所紹介（機械・電気制御・発電）

日時	2017/2/6	9：00～16：00
講師（職場名）	松﨑　眞治（㈱PET　技術研修事業部　マネージャー） 安部　真二郎（㈱PET　技術研修事業部　チーフマネージャー） 辻野　宏明（㈱PET　技術研修事業部　担当） 藤本　英徳（㈱PET　技術研修事業部　担当） 工藤　英昭（㈱PET　技術研修事業部　チーフマネージャー） 田村　清司（㈱PET　技術研修事業部　マネージャー） 長谷部 昌平（JET プラント補機運転・保守／㈱PET 技術研修事業部 企画・運営グループチーフマネージャー）	
講義のねらい(実績)	UE 新研修所の講師となるにあたり、日本の電力会社の研修所やその設備見学について学ぶ	
講義内容(実績)	機械関係 研修内容の紹介、設備見学 電気制御関係 研修内容の紹介、設備見学 発電関係 研修内容の紹介、設備見学	
講師の自己評価	特に電気制御の教材紹介（電磁誘導やモーターの原理など）は研修員の興味を引いたようである	
講師の研修員評価	目的意識が高く、有用な情報を吸収する為に活発な質問をした	
研修員による講義評価（質問票 5-3）	講義内容	評価点(8 人平均) 3.63 （最良 4=5 人・良 3=3 人）
	講義量	評価点(8 人平均) 3.38（最良 4=5 人・良 3=1 人・可 2=2 人）
	講義時間	評価点(8 人平均) 3.38（最良 4=4 人・良 3=3 人・可 2=1 人）
	内容理解度	評価点(8 人平均) 3.63 （最良 4=5 人・良 3=3 人）
	習得知見・能力	~~得られた知識：回答 3 人（良 3=3 人）~~
		Action Plan 作成に有用か:評価点(8 人平均) 3.75
		個人の知見・能力向上に有用か: 評価点(8 人平均) 3.63
		講師になるために有用な講義か: 評価点(8 人平均) 3.75
		機材リスト検討へ有効か: 評価点(8 人平均) 3.75
		露語教材レビュー検討へ有効か: 評価点(8 人平均) 3.50
	研修員コメント抜粋	振動研修の時間が短く不満 振動シミュレータの実技機材導入を期待している 講師として実技研修実施に役立つ内容であった

＊ 振動研修について講義量・時間とも不足を感じている＝第 3 回本邦研修で検討したい

＊ 振動実技のシミュレータは、新研修所に同等のものを導入する予定であり、講師候補研修員の要望に答えられる状況にある

＊ 「露語教材のレビュー検討へ有効か」のポイントがやや低いが、プロジェクトとしてはウズベクで実施している TOT により継続対応していく。

(4) 非破壊検査　講義・実習

日時	2017/2//7	9：00～16：00
	2017/2/8	9：00～16：00
講師（職場名）	長谷部 昌平（JET プラント補機運転・保守／㈱PET 技術研修事業部 企画・運営グループチーフマネージャー）	
講義のねらい(実績)	プロジェクト教科書（No1）を使用し演習を含めた研修内容を確認する	
講義内容(実績)	非破壊検査　講義　PT・FPT・MT・ET・UT・RT 非破壊検査　実習　PT・MT・UT・RT	
講師の自己評価	座学で時間を掛け説明したが、超音波探傷についてはやや難しかったか	
講師の研修員評価	溶接に関して充分な知識・経験を持ち合わせ、 質疑も的を射ており理解度が高い	
研修員による講義評価（質問票 5-4）	講義内容	評価点(8 人平均) 3.75（最良 4=6 人・良 3=2 人）
	講義量	評価点(8 人平均) 3.75（最良 4=6 人・良 3=2 人）
	講義時間	評価点(8 人平均) 3.75（最良 4=6 人・良 3=2 人）
	内容理解度	評価点(8 人平均) 3.63（最良 4=5 人・良 3=3 人）
	習得知見・能力	~~得られた知識：回答 4 人（最良 4=1 人・良 3=3 人）~~
		Action Plan 作成に有用か：評価点(8 人平均) 3.63
		個人の知見・能力向上に有用か：評価点(8 人平均) 3.75
		講師になるために有用な講義か：評価点(8 人平均) 3.63
		機材リスト検討へ有効か：評価点(8 人平均) 3.75
		露語教材レビュー検討へ有効か：評価点(8 人平均) 3.50
	研修員コメント抜粋	・非破壊検査は新研修所で取り上げる重要な科目 ・実習を体験し、研修指導に役に立つ ・非破壊検査の手法は有用である ・講義も実習も興味深かった

＊　実際のプロジェクトで研修科目として取り上げている内容であり、研修員のアンケート回答では、この背景を意識し受講している姿勢が見らる。

(5) コンバインドサイクル発電技術　柳井発電所

日時		2017/2//9	9：00～16：00
		2017/2/10	9：00～16：00
講師（職場名）		福山　晃司（㈱PET　技術研修事業部　担当） 宮本　洋平（JET タービン運転・保守／ ㈱PET エンジニアリング事業部部長　兼　技術研修事業部 MG）	
講義のねらい(実績)		GTCC 発電のトラブル事例及び高温部品管理方法の理解	
講義内容(実績)		柳井発電所の設備概要説明 蒸気タービン設備説明　トラブル事例説明　高温部品の余寿命診断説明 現場見学　（定期点検設備・中央制御室･予備品倉庫　他）	
講師の自己評価		現場において定期点検の分解状況が確認でき、充実した説明が行えた （説明対象機　1 号機 H100・2 号機 F7）	
講師の研修員評価		質問が多くあり、研修に積極的にとりくんんでいた	
研修員による講義評価（質問票 5-5）	講義内容	評価点(8 人平均) 3.63　（最良 4=5 人・良 3=3 人）	
	講義量	評価点(8 人平均) 3.63　（最良 4=5 人・良 3=3 人）	
	講義時間	評価点(8 人平均) 3.50　（最良 4=4 人・良 3=4 人）	
	内容理解度	評価点(8 人平均) 3.75　（最良 4=6 人・良 3=2 人）	
	習得知見・能力	~~得られた知識：回答 3 人（最良 4=1 人・良 3=2 人）~~	
		Action Plan 作成に有用か：評価点(8 人平均) 3.75	
		個人の知見・能力向上に有用か：評価点(8 人平均) 3.75	
		講師になるために有用な講義か：評価点(8 人平均) 3.75	
		機材リスト検討へ有効か：評価点(8 人平均) 3.75	
		露語教材レビュー検討へ有効か：評価点(8 人平均) 3.50	
	研修員コメント抜粋	・ナボイ発電所と運用の違いを理解できた ・柳井は日本にとっても重要な研修場所と理解した ・講義・見学で得た知見を新研修所に役立てて行きたい ・職員同士の人間関係が良い	

＊　現場見学で様々な点に興味があり、研修時間について少ないと感じた模様。

(6) ①中国電力・中央給電指令所の見学　及び　②火力部門との意見交換

日時　(管理職研修員合同)	2017/2/13	① 10：00～11：00　②11：00～12：00
講師（職場名）	長谷部 昌平（JET プラント補機運転・保守／㈱PET 技術研修事業部 企画・運営グループチーフマネージャー） 西尾　新介（中国電力㈱　電源事業本部 海外事業グループ） 久保田　晴仁（中国電力㈱電源事業本部 火力事業計画 マネージャー）	
講義のねらい(実績)	①日本の電力会社の系統運用の現状理解。 ②火力部門の現況と方向性について意見交換。	
講義内容(実績)	①中央給電指令所の役割（座学・見学） ②火力部門を取り巻く状況・今後の方向性（意見交換）	
講師の自己評価	日本の電力会社の運用実態を知る上で，有意義な内容。 両国の燃料入手性の違いを実感する良い機会であった	
講師の研修員評価	発電単価、太陽光の買い取り価格など電気料金に関する質問が多く出た。 発電所の運営人数についても高い興味を示した。	
研修員による講義評価（質問票 5-6）	講義内容	評価点(8 人平均) 3.50　（最良 4=4 人・良 3=4 人）
	講義量	評価点(8 人平均) 3.50　（最良 4=4 人・良 3=4 人）
	講義時間	評価点(8 人平均) 3.63　（最良 4=5 人・良 3=3 人）
	内容理解度	評価点(8 人平均) 3.50　（最良 4=4 人・良 3=4 人）
	習得知見・能力	~~得られた知識：回答 3 人（最良 4=1 人・良 3=2 人）~~
		Action Plan 作成に有用か：評価点(7 人平均) 3.43
		個人の知見・能力向上に有用か：評価点(8 人平均) 3.63
		講師になるために有用な講義か：評価点(人 8 平均) 3.38
		機材リスト検討へ有効か：評価点(8 人平均) 3.38
		露語教材レビュー検討へ有効か：評価点(7 人平均) 3.43
	研修員コメント抜粋	いくつかの情報が開示されなかった（売買電力価格や全発電所配置人数） 中央給電指令所は最新技術で、整理整頓も行き届いていた 中国電力本社、中給で多くの情報を得た

＊　電力価格や発電所人員構成などの質問は資料を出せる情報ではないが、後日 PET さんから 2/15 に口頭で補足概略説明を行い、回答の代わりとした。

＊　本研修プログラムは講師の講義実施の為の研修と言うよりも周辺知識としての情報であり、研修員からは自国と日本の違いを認識するために貪欲に質問が出た。研修所設立とは直接リンクしないが電力会社の経営面・人材育成面から必要な情報交換であり、今後の本邦研修プログラムとしても実施する方向で考えておきたい。

＊　研修終了後の 12:00～13:30 に、本邦研修とは別に管理職、講師候補研修員代表 2 名とプロジェクトメンバーによりプロジェクト月例会議を実施し、その後に翌日水島発電所の研修のために倉敷に移動。

(7)　コンバインドサイクル発電技術　水島発電所

日時　(管理職研修員合同)	2017/2/14	9：00～16：00
	2017/2/15	9：00～16：00
講師（職場名）	福山　晃司（㈱PET　技術研修事業部　担当） 宮本　洋平（JET タービン運転・保守／ ㈱PET エンジニアリング事業部部長　兼　技術研修事業部 MG）	
講義のねらい(実績)	ガスタービン高温部品の特性理解	
講義内容(実績)	水島発電所の概要説明（コンバインドへのリノベーション転換含む） 高温部品の管理方法：高温部品の基礎・検査・試験・損傷・修理方法 現場見学（中央制御室・GT 建屋・HRSG・予備品倉庫） 水島発電所技術者との意見交換会	
講師の自己評価	座学と現場（三菱製：F3）での説明を組合せる事によって研修員の集中力を継続させ、有意義な研修が行えた。	
講師の研修員評価	終始研修員からの質問も多く，前向きな姿勢で研修を受講し好印象。	
研修員による講義評価（質問票 5-7）	講義内容	評価点(8 人平均) 3.63　（最良 4=5 人・良 3=3 人）
	講義量	評価点(8 人平均) 3.63　（最良 4=5 人・良 3=3 人）
	講義時間	評価点(8 人平均) 3.75　（最良 4=6 人・良 3=2 人）
	内容理解度	評価点(8 人平均) 3.63　（最良 4=5 人・良 3=3 人）
	習得知見・能力	~~得られた知識：回答 3 人（最良 4=1 人・良 3=2 人）~~
		Action Plan 作成に有用か：評価点(8 人平均) 3.25
		個人の知見・能力向上に有用か：評価点(8 人平均) 3.63
		講師になるために有用な講義か：評価点(8 人平均) 3.63
		機材リスト検討へ有効か：評価点(8 人平均) 3.50
		露語教材レビュー検討へ有効か：評価点(8 人平均) 3.50
	研修員コメント抜粋	翼毎に等価運転時間を計算管理している点は驚いた。この点についてさらに掘り下げて研修をして欲しかった。 石炭・LNG を燃料として混燃使用する石炭火力設備に興味が持てた 講義レベルは高く、研修は面白かった。

＊　柳井発電所の研修、現場見学に比較し、講義内容や時間などは同等であるのに、得られた知識に対する評価が低い。講義レベルが高いとの評価もあり、混燃石炭火力等も有った為 GTCC に集中できなかった側面があるのでは無いかと推測する。

＊　2/13 に中国電力本社で質問があった発電所の人員構成､GTCC へのリノベーションによる経済指標の比較など、研修員の疑問に対し口頭説明により回答した。

＊　又長期保守について、メンテナンス契約やパーツ契約の現状についても説明した。

(8) 三菱日立パワーシステムズ（MHPS）開講式　GT 生産工場・研究所見学
ガスタービンと補機構成　講義

日時　(管理職研修員合同)	2017/2/16	9：00～11：40
講師（職場名）	渡辺 洋也　MHPS　高砂サービス部	
講義のねらい(実績)	開講式、高砂工場見学	
講義内容(実績)	開講式・高砂工場（GT 生産工場）の紹介、高砂工場見学	
講師の自己評価	ガスタービンの開発、設計、製造、検証までを一括して行う高砂工場の紹介と、主要な工場の見学を実施し、MHPS の技術品質を理解頂いた。	
講師の研修員評価	講師になることを目的とし、見学先は MHPS 側で選定。いろいろな質問があり積極性が見られたが、工場見学後にあれもこれも見たい知りたいとの希望があり、見学許可の都合上事前に連絡を頂きたかった。	
日時　(管理職研修員合同)	2017/2/16	13：00～16：00
講師（職場名）	Kollegala Srinidhi 主席　MHPS ガスタービン装置設計課	
講義のねらい(実績)	ガスタービンと補機構成（GT Auxiliaries Arrangement）講義	
講義内容(実績)	Air inlet System（管理職研修員は 15 時に帰国に向け移動）	
講師の自己評価	他プロジェクトの経験をもとに詳細に説明し、又ナボイとタリマジャンのプラントの違いも比較した。質問に基づいてフィルターについて説明するために、関連資料コピーを別途準備し活用した。	
講師の研修員評価	彼らは訓練の概要を理解し適切な質問をした。質問により不明な点が明確になり、回答により理解が促進された。	
研修員による講義評価（質問票 5-8）	講義内容	評価点(8 人平均) 3.75　（最良 4=6 人・良 3=2 人）
	講義量	評価点(8 人平均) 3.38　（最良 4=5 人・良 3=1 人・可 2=2 人）
	講義時間	評価点(8 人平均) 3.38　（最良 4=5 人・良 3=1 人・可 2=2 人）
	内容理解度	評価点(8 人平均) 3.63　（最良 4=5 人・良 3=3 人）
	習得知見・能力 管理職研修員は帰国の為、工場見学のみの評価	~~得られた知識・回答 4 人（最良 4=2 人・良 3=2 人）~~
		Action Plan 作成に有用か：評価点(8 人平均) 3.63
		個人の知見・能力向上に有用か：評価点(8 人平均) 3.75
		講師になるために有用な講義か：評価点(8 人平均) 3.38
		機材リスト検討へ有効か：評価点(8 人平均) 3.38
		露語教材レビュー検討へ有効か：評価点(8 人平均) 3.38
	研修員コメント抜粋	現場見学時間が少ない。詳しく見学できれば講師として知見が増え役立つ。 簡単なパーツ写真すら撮影許可が下りない GT Hot Parts 製造、修理工場等を更に詳しく見たかった（以下注記参照）

＊　管理職への修了証授与は午後講義開始前に行い、帰国退出は講義小休止の 15 時とした。

＊　講師候補からの要望に基づき、GT Hot Parts 棟については 2/23 に現場見学を追加し対応した。加えて 2/24 には人材育成の教育設備を案内し、MHPS の高い技術と品質について理解いただいた。

＊　見学場所や、講義内容に関する要望が非常に多くあり、運転経験者と言うことから講師育成の為の研修コンテンツ枠からはみ出す要求も多くあった。

＊　不具合対応の実例説明や質問事項対応についても次回事前に準備する必要があり、本邦研修前に研修内容についての事前ヒアリング実施などが重要と再認識した。

＊　研修員から、ナボイにおけるパルスフィルターの可能性や、不具合例などの情報など、多数の質問があり、熱心に議論された。

(9) ガスタービンシステム；

日時	2017/2/17	① 9：00～12：00 ② 13：00～16：00
講師（職場名）	①町井　耕太郎　MHPS　プラント技術部プラント設計課 ②原田　良弘　MHPS　プラント技術部プラント設計課 (ナボイ 2・トラクルガン担当)	
講義のねらい(実績)	GT、アラーム制御の理解	
講義内容(実績)	・P&I Diagram, Air, Fuel, Gas, Anti-Icing system の構成と監視制御 ・Operation Procedure　起動停止 ・Harzardous Area Classification　防爆 ・インターロック、安全停止	
講師の自己評価	①通訳が居たので日本語で説明が可能で ②全体説明や専門分野の説明は問題なかったが、ナボイ 1 について事前に資料準備がなく、質問対応に苦労した。	
講師の研修員評価	①質疑が活発で積極性を感じた ②ナボイ 1 と他プラントの違いを理解しようとする姿勢が見えた	
研修員による講義評価（質問票 5-9）	講義内容	評価点(8 人平均) 3.38　（最良 4=4 人・良 3=3 人・可 2=1 人）
	講義量	評価点(8 人平均) 3.50　（最良 4=4 人・良 3=4 人）
	講義時間	評価点(8 人平均) 3.63　（最良 4=5 人・良 3=3 人）
	内容理解度	評価点(7 人平均) 3.29　（最良 4=4 人・良 3=1 人・可 2=2 人）
	習得知見・能力 管理職研修員は帰国の為 15 時に退出	~~得られた知識・回答 4 人（最良 4=1 人・良 3=1 人・可 2=2 人）~~
		Action Plan 作成に有用か：評価点(8 人平均) 3.25
		個人の知見・能力向上に有用か：評価点(8 人平均) 3.13
		講師になるために有用な講義か：評価点(8 人平均) 3.13
		機材リスト検討へ有効か：評価点(8 人平均) 3.13
		露語教材レビュー検討へ有効か：評価点(8 人平均) 3.13
	研修員コメント抜粋	オペレーションと保護の設計思想を理解するには有益 各オペレータが知るべき重要な内容 講師が熱交換専門家で、P&I や防爆の説明には不適格な人材 講師の専門性と講義内容を事前にチェックして配置して欲しい

＊　全体的に丁寧な説明ではあったが、プラント相互間の違いなど俯瞰的説明に欠けるきらいがあったが、GT の複雑な制御システムの基本的な制御・操作と機械保護の理解が目的であり、一定の理解は得られた。

＊　インターロック動作の説明は充分だが、設備そのものの動作やアラーム設定値の意味について説明が出来ないケースがあった為、研修員から「講師は専門家として欲しい」との声が上がった。研修員の質問は多岐にわたることと、インターロックは今までのプラント運転の経験から機械保護の為に設定されており、即答対応ができない場面もあり、「何故アラーム設定値をそこに決定したか」については別途回答とする必要性を感じた。

＊　制御システムは巨大複雑で、設計も分野ごとに分業されている。些細な質問に納得いく回答が得られないからと言ってその分野の第一線の専門家の能力を否定するような発言は大変残念であり、「詳細はプラント別に設定作成されている運転ロジックを確認し自ら学ぶべき内容である」と言う点を理解頂く事が必要である。

(10) ガスタービンと補器システム（GT and Auxiliaries System）

日時		2017/2/20	9：00～16：00
講師（職場名）		Kollegala Srinidhi　MHPS ガスタービン装置設計課	
講義のねらい(実績)		ガスタービンの補機の理解　その 2	
講義内容(実績)		Air Inlet System（2/16 の続き） GT and Auxiliaries Equipments CO2 Fire Fighting (FF) System	
講師の自己評価		配布したパワーポイント 3 ファイルを日本語で説明を実施し、露語に通訳講義中にナボイ・タリマルジャンを比較し説明	
講師の研修員評価		彼らは訓練の概要を理解し適切な質問をした。質問により不明な点が明確になり、回答により理解が促進された。	
研修員による講義評価（質問票 5-10）	講義内容	評価点(8 人平均) 3.63　（最良 4=6 人・良 3=1 人・可 2=1 人）	
	講義量	評価点(8 人平均) 3.75　（最良 4=6 人・良 3=2 人）	
	講義時間	評価点(8 人平均) 3.88　（最良 4=7 人・良 3=1 人）	
	内容理解度	評価点(8 人平均) 3.88　（最良 4=7 人・良 3=1 人）	
	習得知見・能力	~~得られた知識：回答 4 人（最良 4=2 人・良 3=1 人・可 2=1 人）~~	
		Action Plan 作成に有用か：評価点(8 人平均) 3.38	
		個人の知見・能力向上に有用か：評価点(8 人平均) 3.63	
		講師になるために有用な講義か：評価点(8 人平均) 3.63	
		機材リスト検討へ有効か：評価点(8 人平均) 3.75	
		露語教材レビュー検討へ有効か：評価点(8 人平均) 3.50	
	研修員コメント抜粋	講義内容は良かったが、質疑ディスカッションの時間が足らない 今後の GT 補機の説明資料作成に習得した内容を生かして行きたい 講義方法、質疑対応が良く、講師の授業の進め方として参考となった 講師は専門家として優れていて講義は判りやすかった。	

＊　本来、本邦研修や研修所設立の JICA プロジェクト対象外の資料請求が数多くあり、対応はお断りした。＜例えば、タリマルジャンの Lube Oil 系統詳細図の要求＞

＊　2/16PM に質問があった、フィルターの国際規格（En799/1822）の回答説明を行った

(11) 翼洗浄装置、熱交換器、計装制御システム概要 1

日時	2017/2/21	9:00～10:30
講師（職場名）	野中 信大朗 プラント技術部　プラント設計課	
講義のねらい(実績)	翼洗浄装置の概要と理解	
講義内容(実績)	下記 3 つの機器について目的・運用方法等の概要説明 ・GT Casing Cooling Fan ・GT Compressor Blade Washing Device ・Fuel Gas Last Chance Net Skid	
講師の自己評価	講義中の質問には全て回答し、他担当者へ宿題質問へも対応した。研修員は充分に理解をした。	
講師の研修員評価	疑問があると熱心に質問をし、受講態度はまじめである。	
日時	2017/2/21	10:30～12:00
講師（職場名）	伊藤　正彦　熱交換器設計課	
講義のねらい(実績)	熱交換器の目的・構造・メンテナンスについて理解を深める	
講義内容(実績)	対象熱交換器 -TCA Cooler with FGH（空冷式）、 -TCA Cooler（給水式） -FGH（給水式）、 -GT LUBE OIL COOLER（プレート式）	
講師の自己評価	研修員の質問にも適宜回答した。プレート熱交器の模型には非常に関心を持って頂き持参して良かった。	
講師の研修員評価	現場の経験豊富な研修員も多々おり、よく理解頂いた。質疑も多々あり、積極的に参加頂いた。	
日時	2017/2/21	13:00～16:00
講師（職場名）	岡　誠司 計装制御設計部 計装制御設計課	
講義のねら(実績)	ナボイ、タリマルジャンに納入した GT 制御概要の理解	
講義内容(実績)	Instrument and Control system MHPS-GT 制御システム全体構成に関する概要説明 MHPS-GT 制御システムを構成装置に関する概要説明	
講師の自己評価	実際にナボイで当社システムを理解しており、円滑に進められた。	
講師の研修員評価	当社製制御システムを理解しようとする姿勢が見られた。	
研修員による講義評価（質問票 5-11） 講義内容	評価点(8 人平均) 3.63　（最良 4=6 人・良 3=1 人・可 2=1 人）	
講義量	評価点(8 人平均) 3.75　（最良 4=6 人・良 3=2 人）	
講義時間	評価点(8 人平均) 3.88　（最良 4=7 人・良 3=1 人）	
内容理解度	評価点(8 人平均) 3.88　（最良 4=7 人・良 3=1 人）	
習得知見・能力	~~得られた知識：回答 2 人（良 3=2 人）~~	
	Action Plan 作成に有用か：評価点(8 人平均) 3.5	
	個人の知見・能力向上に有用か：評価点(8 人平均) 3.75	
	講師になるために有用な講義か：評価点(8 人平均) 3.75	
	機材リスト検討へ有効か：評価点(8 人平均) 3.75	
	露語教材レビュー検討へ有効か：評価点(8 人平均) 3.63	
研修員コメント抜粋	タービン冷却システムの講義が面白かった 講義方法、質疑対応方法が良かった	

＊　燃焼異常検知と対象ノズルの特定方法の説明が有意義な講義であった。

＊　研修員の要望により、研修所での講義に使用する目的で、MHPS よりプレート熱交器の模型実物の縮尺模型で分解点検を体験できる）を 2 個贈呈した

(12) 計装制御システム概要 2

日時		2017/2/22	9：00～10：00
講師（職場名）		森　翔平／岸　紀久　MHPS エンジニアリング㈱プラント設計部 岡　誠司 計装制御設計部 計装制御設計課	
講義のねらい(実績)		MHPS の GT 制御に関する概要の理解	
講義内容(実績)		GT Control System　：　GT の燃料制御に関する概要説明とシミュレータを用いた GT 起動/停止の動作確認	
講師の自己評価		シミュレータを用い、具体的 GT 運転動作が確認できたことから，理解が深まった。	
講師の研修員評価		シミュレーション実施時に、各人の経験、知見からの質問が多くあり、積極的にトレーニングに参加し、当社 GT 制御を理解しようとする姿勢が見られた。	
研修員による講義評価（質問票 5-12）	講義内容	評価点(8 人平均) 3.88　（最良 4=7 人・良 3=1 人）	
	講義量	評価点(8 人平均) 3.63　（最良 4=6 人・良 3=1 人・可 2=1 人）	
	講義時間	評価点(8 人平均) 3.50　（最良 4=6 人・良 3=1 人・不適 1=1 人）	
	内容理解度	評価点(8 人平均) 3.75　（最良 4=6 人・良 3=2 人）	
	習得知見・能力	~~得られた知識：回答 2 人（良 3=2 人）~~	
		Action Plan 作成に有用か：評価点(8 人平均) 3.5	
		個人の知見・能力向上に有用か：評価点(8 人平均) 3.88	
		講師になるために有用な講義か：評価点(8 人平均) 3.88	
		機材リスト検討へ有効か：評価点(8 人平均) 3.88	
		露語教材レビュー検討へ有効か：評価点(8 人平均) 3.63	
	研修員コメント抜粋	GT 制御システムを独学で学ぶのは難しく、有益な講義である。 質問には全て回答を貰い、GVCSO,LDCSO 制御について理解できた シミュレータソフトは良いものであった。	

＊　2/21 講義を元に PC シミュレーションによりデモンストレーションし、研修生に理解しやすい講義を実施した。

(13) DIASYS・Netmation

日時	2017/2/22 2017/2/23 ～ 2/24	10：00～16：00 9：00～16：00
講師（職場名）	山田　祥子　(株)MHPS コントロールシステムズ　Netmation 技術 G	
講義のねらい(実績)	GT/ST コントロールシステム：DIASYS Netmation の概要および主要な機能の機能仕様、操作方法、HW またはロジックの変更方法、およびトラブル発生時の初動操作についてトレーニング用機材の使用を通し理解する。	
講義内容(実績)	DIASYS・Netmation　(Overview, OPS, EMS, Maintenance, A-CPFM)	
講師の自己評価	理解促進のため、トレーニング機材を準備し実際に操作してもらった。 A-CPFM について沢山質問が出たが、全て回答し理解してもらった。	
講師の研修員評価	研修員は熱心で、I&C 要員以外もきちんと操作できていた。研修生同士で教え合ったり話し合ったりして、理解を深めるべく行動していた。また質問も活発だった。	
研修員による講義評価（質問票 5-13）	講義内容	評価点(8 人平均) 3.88　（最良 4=7 人・良 3=1 人）
	講義量	評価点(8 人平均) 3.75　（最良 4=6 人・良 3=2 人）
	講義時間	評価点(8 人平均) 3.88　（最良 4=7 人・良 3=1 人）
	内容理解度	評価点(8 人平均) 3.75　（最良 4=6 人・良 3=2 人）
	習得知見・能力	~~得られた知識：回答 2 人（良 3=2 人）~~
		Action Plan 作成に有用か：評価点(8 人平均) 3.5
		個人の知見・能力向上に有用か：評価点(8 人平均) 3.88
		講師になるために有用な講義か：評価点(8 人平均) 3.88
		機材リスト検討へ有効か：評価点(8 人平均) 3.88
		露語教材レビュー検討へ有効か：評価点(8 人平均) 3.5
	研修員コメント抜粋	次回の本邦研修では本テーマの時間を増やして欲しい シミュレータソフトは良いものであった。

＊　研修生には制御プログラム担当者もいたが、全体の知識ベースがばらついていた。

＊　より質の高い講義内容を求める研修生もいて、操作をよく知っている研修生は、最終日の A-CPFM に対する質問を多くしており、この部分の時間を増やして欲しいとの不満が出ていた。

＊　2/23 の 16 時以降に、2/16 に要望の合った Blade Hot Parts Repair Shop の現場見学を追加した。

＊　2/24 の 12 時半～13 時には、MHPS・MHI の社員訓練所見学を追加実施した。この研修所では高卒・高専卒の新入社員が入社後 1 年間訓練を受け、工作技能等を上達させる目的のもので、その後職場配属され OJT によって数年かけて育成されていく教育システムの説明があり、これらは MHPS の製品品質・信頼性を支える源である。

(14) ガスタービンの設計と性能　GT Design and Performance

日時		2017/2/27	9：00～16:00
講師（職場名）		河原 克行：高砂ガスタービン技術部	
講義のねらい(実績)		MHPS ガスタービンの本体構造について理解を深める	
講義内容(実績)		Design construction and performance ガスタービンの部位毎に構造、働き、特徴の詳細 ガスタービン性能と効率の定義及び気温特性	
講師の自己評価		予定していた講義テキストは全て完了 質問には全て回答した	
講師の研修員評価		講義内容を自分の担当プラントに当てはめて質問し、関心の高さが伺えた。 研修生は講義を熱心に聴講した	
研修員による講義評価（質問票 5-14）	講義内容	評価点(8 人平均) 3.75　（最良 4=6 人・良 3=2 人）	
	講義量	評価点(8 人平均) 3.75　（最良 4=6 人・良 3=2 人）	
	講義時間	評価点(8 人平均) 3.75　（最良 4=6 人・良 3=2 人）	
	内容理解度	評価点(8 人平均) 3.88　（最良 4=7 人・良 3=1 人）	
	習得知見・能力	~~得られた知識：回答 2 人（良 3=2 人）~~	
		Action Plan 作成に有用か：評価点(8 人平均) 3.63	
		個人の知見・能力向上に有用か：評価点(8 人平均) 3.88	
		講師になるために有用な講義か：評価点(8 人平均) 3.88	
		機材リスト検討へ有効か：評価点(8 人平均) 3.88	
		露語教材レビュー検討へ有効か：評価点(8 人平均) 3.5	
	研修員コメント抜粋	ナボイで採用していない GT 冷却システムについて勉強できた 講義方法、質疑対応が良かった	

MHPS でガスタービンの基本計画設計に携わるエンジニアが、発電プラントスタッフ向けの講義を行ったが、性能や効率などのプラント運営に関する本質的な質問はあまり出なかったことから、少々難易度が高かった可能性が考えられる。

(15) 定期点検・GT 電気制御パッケージ

日時	2017/2/28	9：00～12：00
講師（職場名）	山本 眞比人 ： MHPS ガスタービンサービス 海外統括部	
講義のねらい(実績)	定検工事における事前計画の重要性理解	
講義内容(実績)	定検工事の計画、準備、進め方説明 工具管理の説明・異物管理の説明・レイダウン計画の説明	
講師の自己評価	事前配布資料は、全て説明し理解頂いた。 開始時の PC 準備の遅れ、写真等の補足資料の準備が滞った点は反省材料	
講師の研修員評価	研修内容は機械メンテナンスについてであり、過去の経歴や担当などで関係無い職種の方の興味が薄かった。	
日時	2017/2/28	13:00～16:00
講師（職場名）	稲垣 賢則 ： 電気設計部 高砂電気設計課	
講義のねらい(実績)	GT Electrical & Control Package 及び MCC,DC system, AC 分電盤の理解	
講義内容(実績)	GT の電源系統の説明・非常用電源やメンテナンスの説明	
講師の自己評価	研修員がナボイ発電所現場を熟知しているので、より詳細な盤内機器の説明を準備し、丁寧な説明で満足した、と受講者の感想を得られた。	
講師の研修員評価	発電所ベテラン電気主任技術者の Parmonov 氏が非常に熱心に質問されていた。その他の受講者も、質問こそ少ないが、集中して講義を聴講し真面目と感じた。	
研修員による講義評価（質問票 5-15）	講義内容	評価点(8 人平均) 3.75 （最良 4=6 人・良 3=2 人）
	講義量	評価点(8 人平均) 3.75 （最良 4=6 人・良 3=2 人）
	講義時間	評価点(8 人平均) 3.75 （最良 4=6 人・良 3=2 人）
	内容理解度	評価点(8 人平均) 3.88 （最良 4=7 人・良 3=1 人）
	習得知見・能力	~~得られた知識：回答 2 人（最良 4=1 人・良 3=1 人）~~
		Action Plan 作成に有用か：評価点(8 人平均) 3.5
		個人の知見・能力向上に有用か：評価点(8 人平均) 3.63
		講師になるために有用な講義か：評価点(8 人平均) 3.5
		機材リスト検討へ有効か：評価点(8 人平均) 3.75
		露語教材レビュー検討へ有効か：評価点(8 人平均)3.63
	研修員コメント抜粋	メンテナンスが設備だけでなく工具に及ぶことを学んだ 定期点検の計画の立て方を理解できた 質問への対応が適切であった

＊ 発電所の主要スタッフが基礎知識として持ってほしい内容の講義であるが、講師／研修員双方からのコメント内容に比べ、研修員による＜講師になるために有用な講義＞のポイントが低く、全体として定期点検に対する受講意識が低く、又 GT が動作する為の発電所の電気システムに関する興味が低いのではと推測する。今回 PET で先に発電所の定期点検を見学しているが、例えば講義順番を見直す事で受講意識を上げられないか等を検討したい。

＊ ST 復水器についてはナボイ 2 で空冷式を導入する予定あり、工場内の実証発電設備で空冷式の実機例の見学を行った。Navoi からの研修員から、空冷式についてより詳細な技術説明の要求があった為、別途研修外のテーマとして設計者による空冷式のシステムや実機例について図面を用いて説明行うと共に質疑対応を行った。研修員の質問について回答資料と共に空冷式の参考図を提出済み。

(16) 試運転手順　Commissioning Procedure

日時		2017/3/1	9：00～12：00
講師（職場名）		田村 惇　：　高砂プラント建設　試運転技術課	
講義のねらい(実績)		コンバインドサイクルプラントでの GT 試運転について	
講義内容(実績)		試運転フロー： 補機試運転、主機試運転の試験内容	
講師の自己評価		今回は初歩的な講義という事で、分かりやすく説明出来、質問に対しても満足してもらえる回答が出来た。予定していた講義「緊急時の対応・振動調整について」が時間の都合で実施できなかった。	
講師の研修員評価		皆さん真剣にﾒﾓ等をとり、積極的に取り組まれていた印象 積極的に質問をしてきていたので、意欲が感じられた。	
研修員による講義評価（質問票 5-16）	講義内容	評価点(8 人平均) 3.75　（最良 4=6 人・良 3=2 人）	
	講義量	評価点(8 人平均) 3.75　（最良 4=6 人・良 3=2 人）	
	講義時間	評価点(8 人平均) 3.75　（最良 4=6 人・良 3=2 人）	
	内容理解度	評価点(8 人平均) 3.88　（最良 4=7 人・良 3=1 人）	
	習得知見・能力	~~得られた知識：回答 2 人（最良 4=1 人・良 3=1 人）~~	
		Action Plan 作成に有用か：評価点(8 人平均) 3.5	
		個人の知見・能力向上に有用か：評価点(8 人平均) 3.63	
		講師になるために有用な講義か：評価点(8 人平均) 3.88	
		機材リスト検討へ有効か：評価点(8 人平均) 3.88	
		露語教材レビュー検討へ有効か：評価点(8 人平均)3.50	
	研修員コメント抜粋	質問への対応が適切であった	

＊　ナボイからの研修員にとって試運転手順はある程度既知の情報ではあるが、試運転の専門家に対して通常の発電所運転における質疑対応が多々あり、研修員の疑問の解消に役立ったと思われる。「緊急時の対応」と「振動調整について」が実施の希望があったが、いずれも試運転に関する基礎固めが必要である。特に振動調整については、タービン交換後の起動時に必要な場合があるが、試運転 TA が対応し、通常の運転時には発生しない。

(17) アクションプラン発表会・本邦研修閉講式

約一ヶ月間の本邦研修を完了するにあたり、PCM 研修の成果として、帰国後に実施するアクションプランを発表した。日本側からの質疑・講評、修了証の授与を経て本邦研修を閉講した。

閉講式　日時　2017 年 3 月 2 日：10 時～12 時半

場所　於：JICA 東京　305 号室

以下に閉講式実施実績日程を示す

－　表　3　第 2 回本邦研修　閉講式　実施実績日程－

司会進行；JET/AEC・齋藤

時間			イベント	場所	発表者・発言者　（敬称略）	
9:45	～	10:10	閉講式　開式の挨拶 参加者・自己紹介	JICA東京 ３０５号室	JET/AEC	村田　統括
10:10	～	11:20	研修員代表者： アスロノフ・アスロン アクションプラン発表 質疑・日本側参加者コメント：		講師候補 研修員	パルマノフ・アズーィム アスロノフ・アスロン バイリエフ・シュフラット ジャマロフ・バホディル ムサエフ・アリシェル ナルズィエフ・アクマル トショフ・サンジャル ハサノフ・ラティフ
					研修監理員	朝山氏　通訳
					JET/AEC	ウミドジョン・ウスマノフ　発表補佐
11:20	～	11:30	休憩			
11:30	～	11:45	Certificate 授与		JICA	相良課長／桝谷
11:45	～	12:00	本邦研修　感想・謝辞		研修員代表	ムサエフ・アリシェル
12:00	～	12:15	閉講式終了の挨拶		JICA	相良課長
12:15	～	12:40	記念撮影		全員	
12:40	～		閉講式終了後　各自昼食＞帰国準備			

参加者

研修員／講師候補者　上記実施実績日程表（発表者・発言者）欄による

JICA 産業開発・公共政策部 資源エネルギーグループ

相良冬木氏/課長、桝谷有希氏/専門員

JICA 研修監理員　朝山 昭子氏

研修同行者　JET/AEC 現地コンサルタント　ウミドジョン・ウスマノフ氏

JET 団員

AEC 村田氏/統括、齋藤氏/副統括、若林氏/モニタリング、佐久間氏/業務調整

PET 宮本氏/タービン運転管理　長谷部氏/プラント補機・保守

日本工営 小林氏/電気機器・運転

1) 村田統括・開式挨拶 概要

挨拶の中で今回の本邦研修成果として以下の 2 点を挙げた。

①　本邦研修中に実施した内容・基本知識の習得

②　約一ヶ月間の団体生活の中で得た人脈

今後の新研修所運営開設に当たり、いずれの成果も活用し研修所運営に役立てて欲しい。

2) 自己紹介挨拶

アクションプランの発表・質疑をスムーズに行う為に参加者全員の自己紹介挨拶を行い、参加者のバックボーンの相互理解を図った。

3) アクションプランの発表・質疑

本邦研修の開始時に PCM 研修を行い、研修員の抱えている問題点の抽出と分析から帰国後のアクションプランを作成し、閉講式において代表者によるアクションプランの発表、日本人専門家と質疑を行いその内容を相互に確認した。

アクションプランは＜添付 3 Navoi PP Планы действий 5＞＜添付 4 Action plan format170228＞によるが、概要は本報告書第 7 項に示す。

５． 管理職研修員の研修実施実績

(1) プロジェクト・ブリーフィング

日時	2017/2/7	9：00～12：00
講師（職場名）	村田　幸裕（JET 統括／AEC） 若林　英人（JET モニタリング／AEC）	
講義のねらい(実績)	本邦研修の目的とプロジェクトの理解	
講義内容(実績)	本邦研修の位置付けについて説明した。併せてモニタリングシート 3 により、プロジェクトの概要、プロジェクトの進捗について説明した。また、2017 年 5 月開催予定の JCC の主催者としての UZE・NTPP の主体的なかかわり方、役割について説明した。	
講師の自己評価	本邦研修の位置付けに関しては、十分に理解され、かつ深い感謝の意が伝えられた。またモニタリングシート 3 によるプロジェクト概要、プロジェクト進捗状況のブリーフィングに対しては、的確な理解に基づく積極的な質問があり、働きかけが十分であったことが確認された。JCC の主催者としての自覚と役割の理解も十分に確認された。本プロジェクトを推進する為にはウズベキエネルゴ・ナボイ火力発電所の主体的な行動が不可欠であることについて、十分な理解を促すことができた。	
講師の研修員評価	2016 年 10 月のナボイ研修センター構想の発表に伴い、急遽プロジェクトダイレクターに推薦され、同研修員は第 1 フェーズを残すところ 1 年足らずの 2016 年 12 月から実質的活動を開始した。同研修員は、所長という重職にあり、ナボイ CCPP2 号機の建設、ナボイ CCPP3 号機の計画・建設の陣頭指揮を執る立場にあり、ナボイ火力発電所だけでなく今後急速に設置が計画されているウズベキエネルゴ傘下の全CCPP にとって必要で十分な要員育成を目指す立場に立って、CCPP の運転維持管理・保守の研修コースと、その講師の育成が重要であることについて、自らの言葉で、我々講師にフィードバックした。上級管理職として、本プロジェクトに関する今後の貢献度は間違いないということを確認できたことは意義のあることである。	

(2) プロジェクト・オリエンテーション

日時	2017/2/9	9：00～12：00
講師（職場名）	齋藤　孝史（JET 副統括／AEC）	
講義のねらい(実績)	プロジェクト背景の理解･プロジェクト概要と研修計画	
講義内容(実績)	プロジェクト概要説明（プロジェクト目標・研修計画・講義計画） 2/1～2/2 に講師候補者研修員に実施した PCM 研修の状況説明と作成中のアクションプランの情報共有	
講師の自己評価	講師候補者が作成しようとしているアクションプランについて、狙いを説明し、概要とその実現に向け協力する方向で合意を得た。	
講師の研修員評価	問題点抽出の課程や解決すべき問題点を理解し、アクションプラン実施にマネージャー判断が必要な点も理解し、推進協力する意欲があり、2/12 日曜日合流後に講師候補者に直接ヒアリングする事を決断するなど、積極的に関わる姿勢があった。	

講義資料：添付 1 プロジェクトの進捗状況と課題 rev.1、添付 5 RUS-Explanation for manager on 9th　February

(3) ①中国電力・中央給電指令所の見学　及び　②火力部門との意見交換

(4) コンバインドサイクル発電技術　水島発電所

(5) MHPS 開講式・GT 生産工場・研究所見学・GT 補機構成　講義

以上の(3)～(5)項は講師候補者研修員と合同研修のため、4 項の(6)項～(8)項を参照の事

６．研修員による研修全体へのコメント・評価

今回、研修員／講師候補者への質問票は JICA フォーマットの質問票 1～3 に加え,アクションプラン作成へ関連する質問票 4、本邦研修の各研修項目についての質問票 5 により評価アンケートを実施した。これらの回収アンケートの翻訳・取り纏めは JICA 研修監理員にお願いした。質問票 5 については、前出の第 4 項(1)～(16)に記載した。（＜添付 6 クエスチョネア集計表＞＜添付 7 アンケート No.5　コメント和訳＞＜添付 8 J1692058_質問票集計　管理職＞を　参照）

(1) 管理職研修員の質問票 1～3 の回答

管理職研修員への質問票は、質問票 1～3 のみを実施し JICA 研修監理員に翻訳をお願いした。

1) 有益だった科目

アクションプラン作成に向け以下の科目は有益であった。

(a)　PCM 研修（IC-NET）

(b)　火力発電所の人材育成（PET）

(c)　PET の組織体制

(d)　火力発電所（水島発電所）の大規模改修

2) 含むべきだった科目（含んで欲しかった科目）

ナボイ新研修所の実技実習の実施に必要であるが、今回の本邦研修には含まれていなかった。

(a)蛍光探傷試験の実習

(b)過電流探傷試験の実習

(c)振動、バランシングに関わる検査方法の実習

3) 研修デザインについて特筆すべきコメントは無いが改善提言として「MHPS においてデータの非公開により必要な情報が得られなかった」とコメントがある。

(a)火力発電所の技術・経済指標

(b)発電所の GT 導入前、導入後の事業実績（経済指標や効率改善など）

これらの要望に対しては、水島発電所において PET さんから相応の情報を回答しており、指摘されたコメントには多少誤解があるようである。

4) 本邦研修での＜気付き＞として以下の点を挙げ今後の参考とする模様

(a)ST・GT 装置の為の要員養成

(b)アクションプラン作成により問題解決の共同作業実施

(c)日本の要員の業務遂行の正確さ、訓練程度の高さ

来日した管理職・研修員は発電所長と言うことも有り、事前に 20 点以上の質問事項を纏めてから来日した。基本的に、本邦研修中にこれらの質問事項について、講義や質疑の中で全て解決した状態で研修を終了した。

不満として上げられた＜情報の非開示＞については、質問内容などを事前に要望を貰い、可能であれば研修プログラムに取り込む対応に加え、主に＜他社との守秘義務契約＞等による対応不可の理由を早い段階で研修員が理解する必要がある。

管理職研修員、講師候補者研修員から講師への口頭質問では、新トレーニングセンターに本当に必要な情報であるかの判断は難しく、守秘義務等を考慮した回答を行うには会社として検討する必要があるので即答できない場面がある。新研修所のトレーニングに必要な情報については、具体的な質問内容と質問が必要な理由を整理した質問票を事前に作成いただき、それを基に研修受け入れ側の各社内が検討の上で回答を行うような対応の工夫が必要と思われる。

また講義は専門技術や発電所運用に関する技術用語が多用されていることから、通訳上の表現により聞きたいことが正しく講師に伝わらない、または講師の回答が正しく研修員に伝わっていない、といった事が原因である可能性も考えられる。

(2) 研修員／講師候補者の質問票 1～4 への回答

講師候補者研修員への質問票は、質問票 1～4 を実施し JICA 研修監理員に翻訳と纏めをお願いした。8 名の研修員からの回答は、きわめて詳細に記入されており、本邦研修への積極的姿勢を伺わせる。同時に実際の CCPP 運転を視点にした質問も多くあり、プロジェクト本来の目標である「新研修所の立上げ」とその「研修教育コンテンツ」から外れるコメント要望も見受けられる。

1) 有益だった科目

本邦研修での知識経験は、新研修所講師となる為に役に立ち、新研修所立上げのアクションプラン作成にも有益であった。

(a) PET の火力発電の人材育成・研修紹介(6 人)

(b) 柳井・水島における発電技術・発電所現場見学(6 人)

(c) MHPS 工場見学 (3 人)

(d) PCM 研修（3 人）

(e) 非破壊検査(2 名)

(f) GT 制御(2 人)

(g) 中央給電指令所 (1 人)

2) 必要ではなかった教材

1 名から「MHPS の数点の教材について不必要」との回答があるが、他の研修員からは「全て必要だった」とのコメント。不必要とする教材については「初級レベルの教材は不要」との見解であるが、教材そのものは新研修所に必要なものである。本人は高いレベルの研修を希望しているが、後日意見交換をして考え方を確認したい。

3) 含むべきだった科目・含んで欲しかった科目（アンケートに対する JET 側意見）

ナボイ新研修所の講義や実技実習の実施に必要であるが、含まれて居なかった

(a) GT のトラブル事例と対応方法 (2 人)

（アンケートでは 2 名から記載があったが、研修現場での要望は多かった）

(b) シミュレータの事故設定内容とオペレータの対応方法の詳細説明(1 人)

（シミュレータ導入時に検討すべき項目と考える）

(c) PID 制御(1 人)

（発電プラント制御の教育内容に含めるには詳細過ぎ、運転保守要員教育を目的とした教材としては不適）

(d) 蛍光浸透探傷試験・FPT (2 人)

（PT 実習を実施しており、FPT 実習については理解できる範疇）

(e) 過電流探傷試験・ET (3 人)

(f) X 線探傷検査・RT (2 人)

（ET/RT は特殊な検査の為導入研修用機材対象外、机上教育で理解できるようテキストを充実する）

(g) 振動・バランシング (3 人)

（振動試験関連の教材は未導入であり、教材が揃う予定の次回以降、第 3 回本邦研修時に実施することを検討する）

(h) 電気設備関連の研修

発電機・変圧器・開閉器・励磁機・電動機・電気保護・ケーブル・計測器等

（本プロジェクトは GTCC を対象としており、タシケント既存研修所で対応可能な電気分野の内容は、本邦研修の対象外：但し一部関連する電気分野の教育項目は教材 6 に含まれている）

(j) その他

ホットパーツ検査の知識と、今後検査設備が必要となる点のコメントあり。

4) 研修デザインに関する提言

(a) 通訳：技術通訳として満足いくレベルでは無かった。

技術通訳の実績がある通訳が良い。

(b) 研修期間：研修期間が短い。特に実習を充実させる方向で考えて欲しい

(c) 滞在先：倉敷のホテルは良くなかった。＞（次回はホテル変更要検討）
(d) 移動：移動が多く、荷物を盛っての列車移動は大変である。
(e) 研修講師が講義内容の専門家でない時があり、トラブル事例の対応などの質疑を充実にしたものにする為に検討願いたい

5) 本邦研修での気付き・学び
(a) 研修後に受講生に対しテストを実施する。
(b) アクションプラン作成時に集団（チームプレー）で問題解決にあたる

6) 日本・日本人の印象
(a) 時間に正確、規律を守る
(b) 勤勉・勤労、礼儀正しい
(c) 親切

7) 本邦研修成果とアクションプランの難易度

アクションプランを実際に実施するのは、やや困難と感じている研修員が多い。研修の目的や内容が組織方針と一致している点はみな認めているが、実施が困難とする理由のうち大きなものは以下の 2 点である

(a) 自分自身が意思決定権限を有していない
(b) 予算確保が難しい

これらはマネージャーマターであり、実際に作成したアクションプランでは上層部に実施了解を得る工程を含む計画としている。

7．アクションプラン概要と発表

(1) 第 1 回本邦研修で作成したアクションプラン

第 1 回本邦研修で作成したアクションプランは、グループアクションプランと個人別アクションプランを作成し、5 人の担当する研修科目を決定した上で各人の担当する科目について、研修用機材リストの完成、TOT の実施、教材作成と露語訳版の完了などを実施項目としてあげ、2016 年 10 月まで順調に計画を進めてきた。

2016 年 10 月に新研修所の設立場所がナボイに変更となったことから、8 名の講師候補者が辞退することなった。第 2 回本邦研修においては、第 1 回のアクションプランを新講師候補者に引き継ぐ必要があり、実施内容のうち機材リストにつては、既に 12 月現地業務実施時にリスト合意を完了した。

(2) 今回、第 2 回本邦研修で作成したアクションプラン

1) 第 1 回作成アクションプランの科目別担当者について明確にする為、今回のアクションプランでは全 12 科目の講義計画作成の実施責任者と目標日程を明確にした。TOT 実施や教材の露語翻訳版のチェックは引き続いて進める。

2) 上記 1)項は＜第 1 回本邦研修で作成したアクションプラン＞の後段に相当するが、これとは別にプロジェクトとしての問題点を議論し、問題解決のためのアクションプランを検討した。その概要を以下に記す

(a)問題点の抽出

8 名の研修員から各自一点ずつ問題点を挙げ「CCPP の Staff が不足している」と言うテーマから議論を重ね、結論の一つとして「適切な時期の人員雇用計画の決定」が必要であることを確認した。

(b)対応策の検討

「適切な時期の人員雇用計画の決定」は管理職が行う内容であり、講師候補者研修員はその責にない事から以下を行動することとした。

a) 管理者に「人員配置・雇用計画の早期発表」をお願いする

今回の本邦研修の管理職研修員がナボイ発電所長で同時にプロジェクトダイレクター(PD)である事から、2/9 に PCM 概要として 5(2)項により日本側から事前に概要説明し、2/12（日）には研修員のみの打合せで講師候補者研修員から管理職研修員にアクションプラン作成について説明し大枠での理解を得た。

b) 大学・高専等の各学校に CCPP の出張教育、技術宣伝を行い、技術系学生の入社希望者を増やす

各ステップで必要とするマネージャーの承認を含めて、社外学校への広報活動～インターンシップの実施までをアクションプランとして纏めた。

3) 本邦研修閉講式でのアクションプラン発表

3 月 2 日に実施した本邦研修閉講式において、作成したアクションプランを発表、プレゼンを実施した。アクションプランは帰国後に PD へ詳細説明を行い、計画を実行する予定である。

８．第 2 回本邦研修の総括

(1) 研修員の積極性

第 1 回本邦研修の総括の中では「第 2 回目以降に本邦研修に来日する研修員は、検討を開始している教材を技術資料として事前に学び、予備知識もって本邦研修に参加するよう」に要望を述べている。今回来日した講師候補者研修員はナボイ発電所の CCPP 勤務者が中心で CCPP への意識が非常に高く、質問内容や意見交換の場においても主題の詳細に関して深い議論を行い、第 1 回本邦研修の時以上に密度の濃い研修が実施出来た。今回来日していない他の講師候補者についても同様であると考えられる。

管理職研修員についても、来日前に 20 以上の質問項目を準備するなど積極的であった。

(2) 研修内容への認識

一方、CCPP 勤務者が中心で基礎について既知の内容が多い事から、高度な技術的質問に集中し、＜研修教育コンテンツを学ぶ＞と言う本来の目的から逸脱する場面が見られた。ナボイに設立する新研修所で教育する受講生は、今回来日したような専門家のようなベースはないので「新人は基礎教育が重要である」という視点を再認識してもらう必要がある。講師候補者にとっては容易に理解できる内容であっても、新人やベースの無い運転保守要員にとって講義内容は始めて触れるものであり、今後も理解させるという視点で講師候補者が基礎確認する訓練が必要である点を強調しなければならない。

今後プロジェクトを進めるに当たっては、今回 PET で実施したように「講師候補者に移管した教科の授業を実際に行わせ」適正な授業を実施できるかの確認が必要であり、ウズベキスタンで実施する TOT や次回の本邦研修の中でチェックして行く。

(3) 研修内容への要望

アンケートのコメントや本邦研修中に出てくるコメントでは、「トラブル事例を多く学習したい」との要望が非常に多くあった。トラブル事例集を作成する場合、メーカーが掌握している内容と発電所側ユーザーが掌握している内容に分けられるが、メーカーが掌握している内容は基本的にユーザー情報であるため情報開示については問題がある。ユーザーが掌握しているトラブル事例は、メーカーに通知しない軽微なものから通知せざるを得ない大きな事例を全て含むが、公開可能かは内容によっては難しい。アンケートのコメントにある「シミュレータの事故設定内容と対応方法の詳細説明」については、別プロジェクトで進めているシミュレータ導入の過程で対応される。こうした講義内容の性格から、又 4(15)項でも定期点検研修についてコメントしたように、次回の本邦研修の研修順番を「メーカー研修⇒ユーザー研修」の順にする事を検討したい。

(4) アクションプランの実施に向け

今回作成したアクションプランは 1) 全 12 科目の講義計画作成の実施責任者と日程､TOT 実施や教材の露語翻訳版のチェック、2)大学・高専等の各学校に CCPP の出張教育、技術宣伝であり、今後の実施状況については月例会議等でフォロー確認していく。

(5) 次回の本邦研修対象者に対する事前調査

今回の本邦研修で感じた点として、日本側で準備したプロジェクトの目的に則した研修内容が､研修員の求める内容とが合致していない点がある｡研修員を決定する際に第 1 回、第 2 回本邦研修の事前準備では、研修員の経歴・専門・資質と面談を実施して決定しているが、研修員が希望する講義内容などのヒアリングは行っていない。又、本プロジェクトの目的と本邦研修の狙いが理解されていない事も、双方の思惑の乖離を生む原因かと考えられ、事前の面談ヒアリングに可能な限り時間を掛けることが肝要で、本邦研修で実施する内容の事前理解により研修成果がよりよい方向となる事を期待できる。

(6) その他

研修に参加頂いた研修監理員の方には、研修の内容がかなり専門的である為、可能な範囲で事前に研修資料を提供し対応準備をお願いした。しかし実際の研修中には質疑が多数発生し、中には研修資料から外れるような内容も多くあり、通訳対応に苦慮されていた。又、6(1)項にも記載しましたが「通訳する事が難しい技術用語が使用され、質問が正しく講師に伝わりにくい、または講師の回答が正しく研修員に伝わりにくい」場面があった。講師としては技術用語を使用せず説明する事は非常に難しく、やはり通訳の方の「技術用語スキル」に頼らざるを得ない。

今回研修監理員の方には＜アンケートの取り纏め＞までもご協力頂き、研修をスムーズに進める事が出来ましたが、次回以降、「技術用語スキル」についてより高度なものが期待できる対応をお願いしたいと考えている。

９．謝辞

今回の本邦研修実施に当たり、JICA 産業開発・公共政策部 桝谷様、JICA 中国国際センター 木村様、西村様、JICA 研修監理員 朝山様、田中様、実際に講義を実施頂いた IC-NET の森田様、PET、MHPS の講師の皆様、並びに「CCPP 発電運用保守トレーニングセンター整備プロジェクト」の関係者の皆様に、多大なるご協力を頂きました事を感謝申し上げます。

以上

コンバインドサイクル発電運用保守トレーニングセンター
整備プロジェクト

プロジェクトの進捗状況と課題

第2回　本邦研修　2017年2月1日

1. プロジェクトの概要

（1）上位目標

CCPPの運転・維持管理能力が強化される。

（2）プロジェクト目標

CCPPの運転・維持管理に関する研修体制が確立される。

（3）期待される成果

成果１：CCPPの運転・維持管理にかかる方針が策定される。

成果２：CCPPの運転・維持管理にかかる人材育成計画、研修計画、資格認定制度が開発される。

成果３：CCPの運転・維持管理研修のカリキュラム、教材、研修機材が整備される。

成果４：CCPPの運転・維持管理研修の講師が育成・確保される。

1. プロジェクトの概要

（4）活動の概要

【成果3に係る活動】

1. CCPPの運転・維持管理のカリキュラム・教材を開発する。
2. 開発されたカリキュラム・教材を研修で試行する。
3. CCPPの運転・維持管理研修に必要な機材の設置計画を策定する。
4. CCPPの運転・維持管理研修に必要な機材を設置する。
5. ウズベクエネルゴによる研修施設の改善に助言を行う。

1. プロジェクトの概要

（4）活動の概要

【成果4に係る活動】

1. 成果3に係る活動1および2の協働を通じ、講師を育成する。
2. ウズベキスタンでの研修や本邦研修を通して研修に必要な講師を育成する。
3. 外部リソースに講師確保の可能性を検討する。
4. 講師の認定制度を確立する。

1. プロジェクトの概要

（5）対象地域

ウズベキエネルゴ本社、トレーニングセンター、関連発電所

（6）関係官庁・機関

ウズベクエネルゴ、同公社傘下の発電運転部、人事部、トレーニングセンター、ナボイ火力発電所及び他部・他発電所からの講師候補者

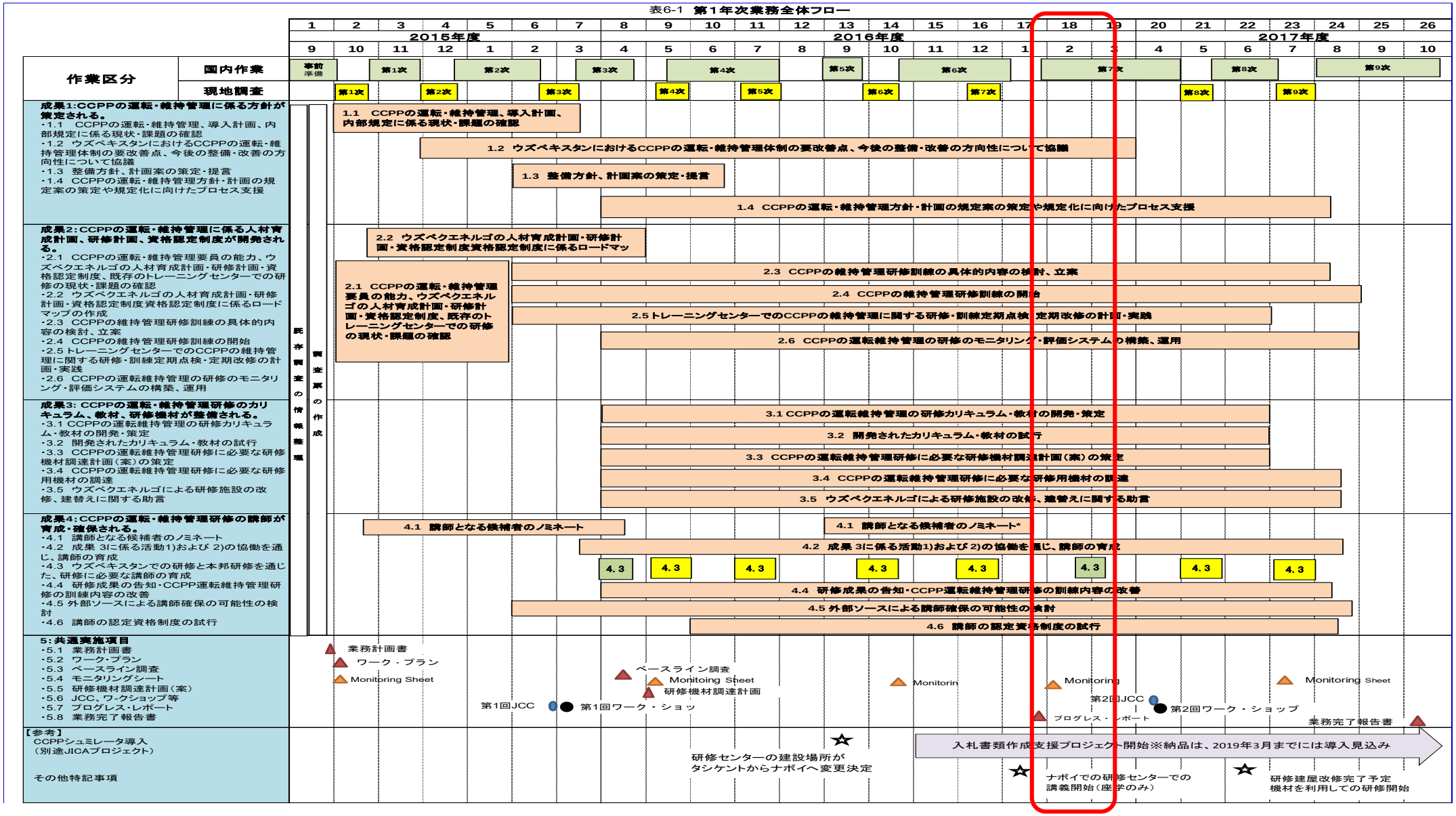
（7）本事業の受益者（ターゲットグループ）

直接受益者：ウズベクエネルゴのCCPP発電所における運転・維持管理要員
関節受益者：ウズベクエネルゴ全体

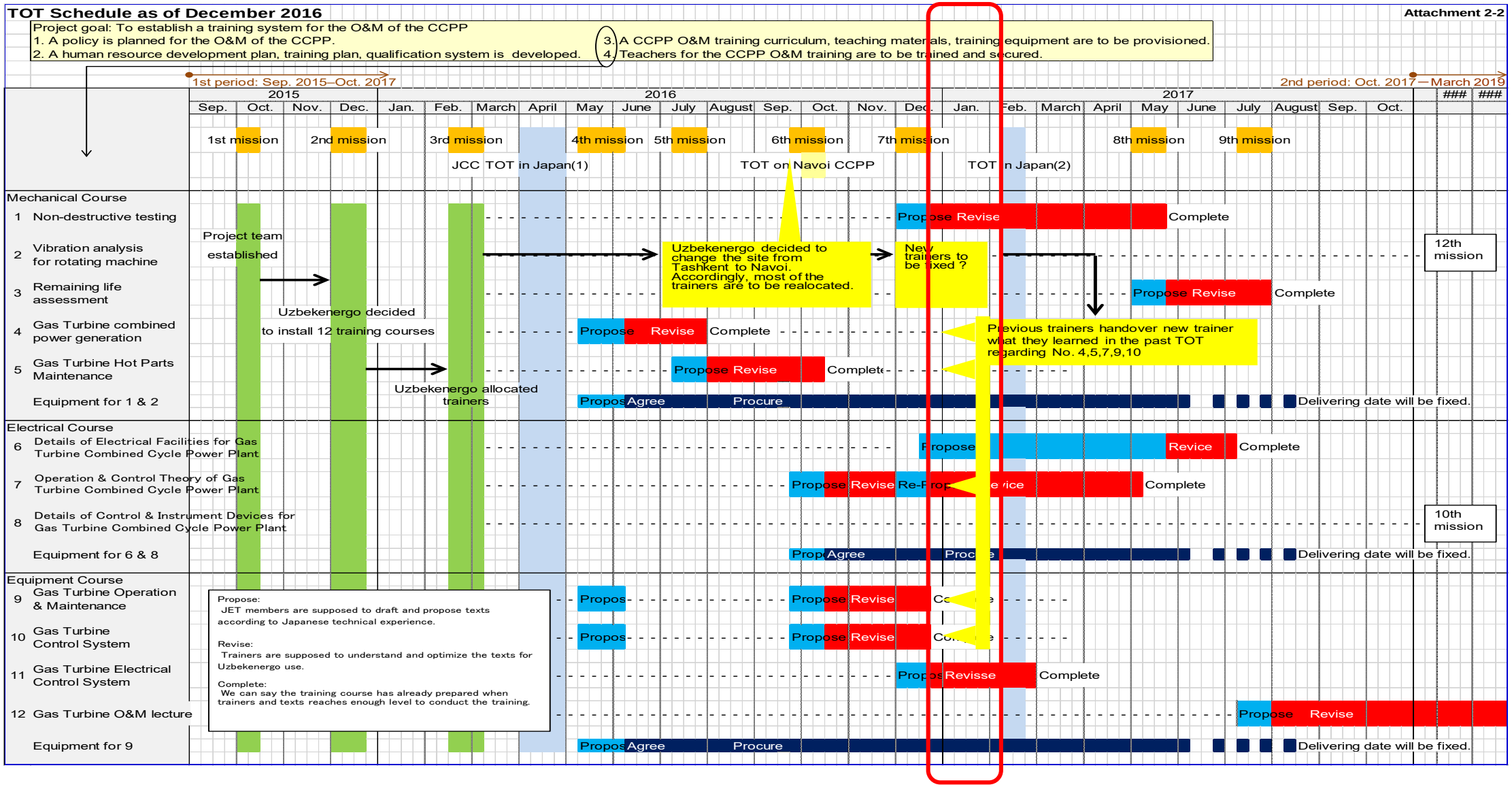
（8）協力期間

2015年9月～2019年3月

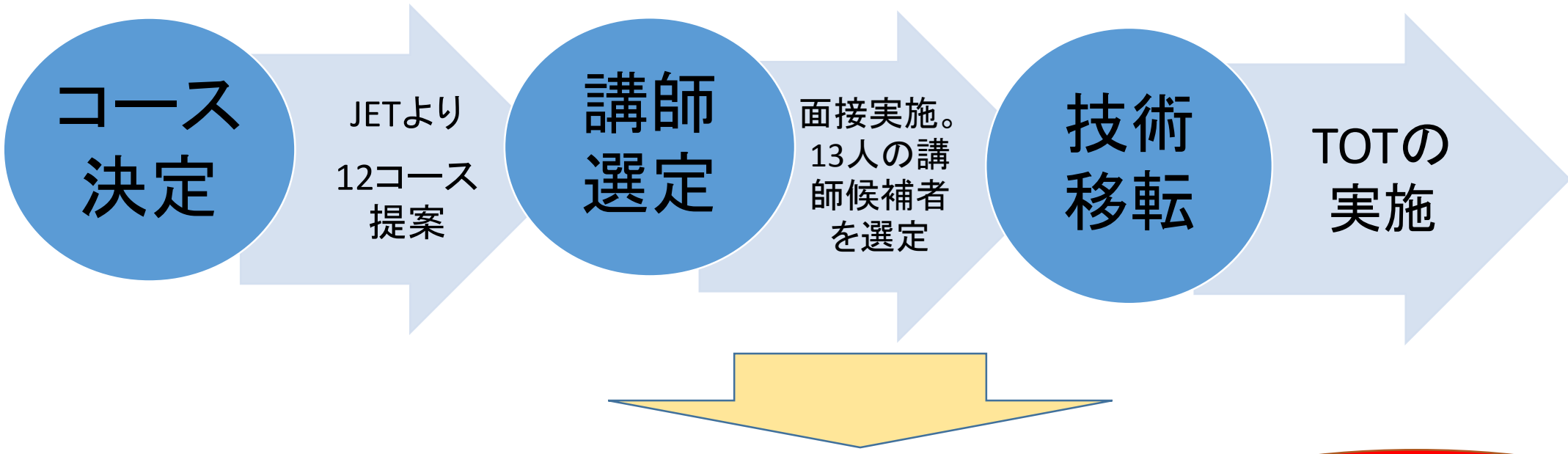
2. プロジェクトの進捗状況



2. プロジェクトの進捗状況



3. トレーニングセンターの運用開始に向けて

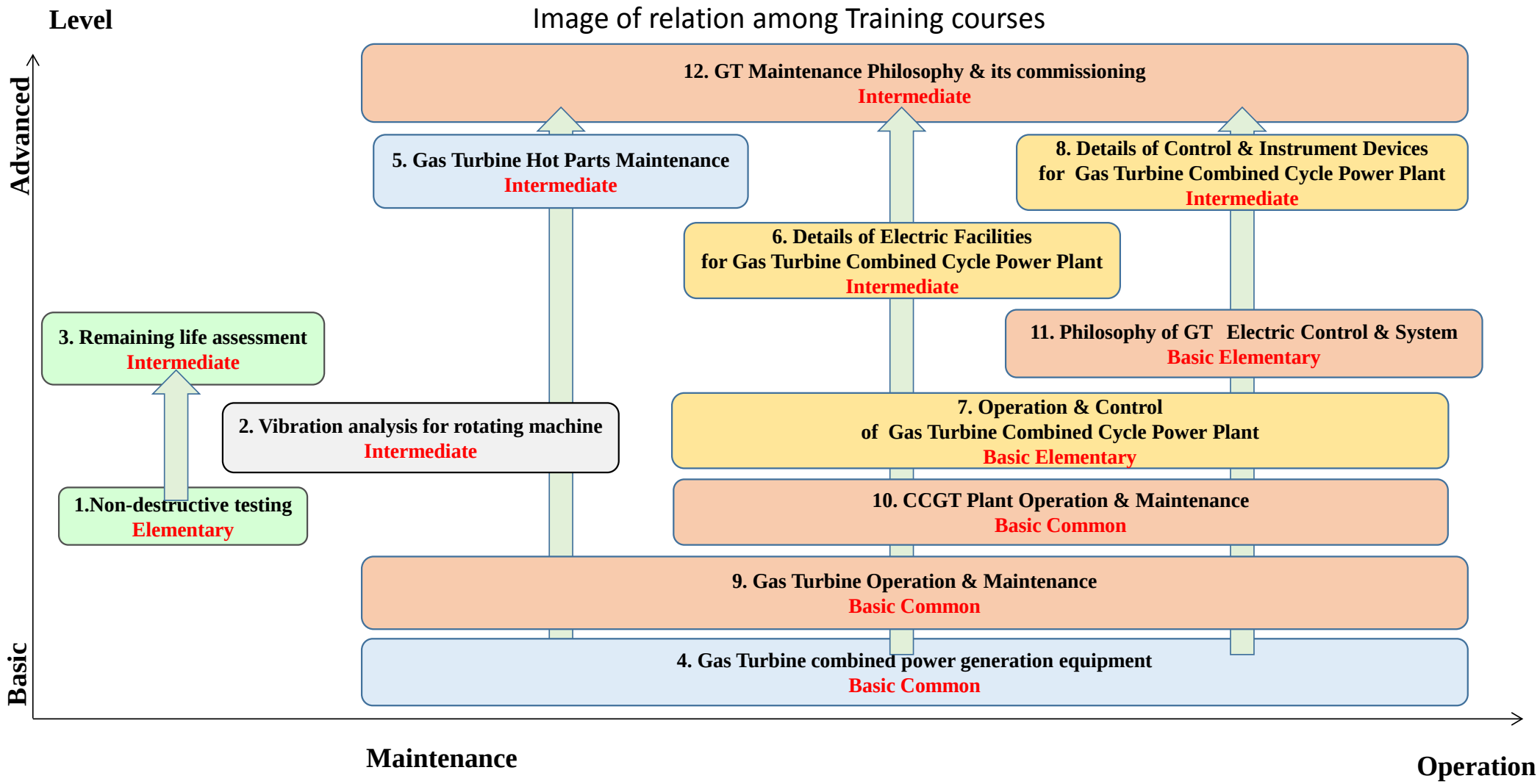


上記のプロセスを経て、
ウズベキスタンでの講義が開始

実施計画が重要

3. トレーニングセンターの運用開始に向けて

1. コースの相関性の整理



3. トレーニングセンターの運用開始に向けて

Training Course Class, Certificate & Trainer

Preferable Conditions for Certificate is as under

24th November, 2016
rev.8 by T. Saito/ JET

Proposal: Certificate of training for O&M personnel by authorized organization *1/ *2
*1 Training Course of No4, No5, from No7, and from No9 to No12, should be certified by Sanoatgeokonteknazorat
*2 All of training course should be certified by New Training Center

Chief Trainer should manage and implement the Training Course
Sub Trainer should be alternative for Chief trainer
Assistant Trainer should help practical training of the Course.
*Recommended Period, Course Period might be extended by Chief Trainer to achieve.

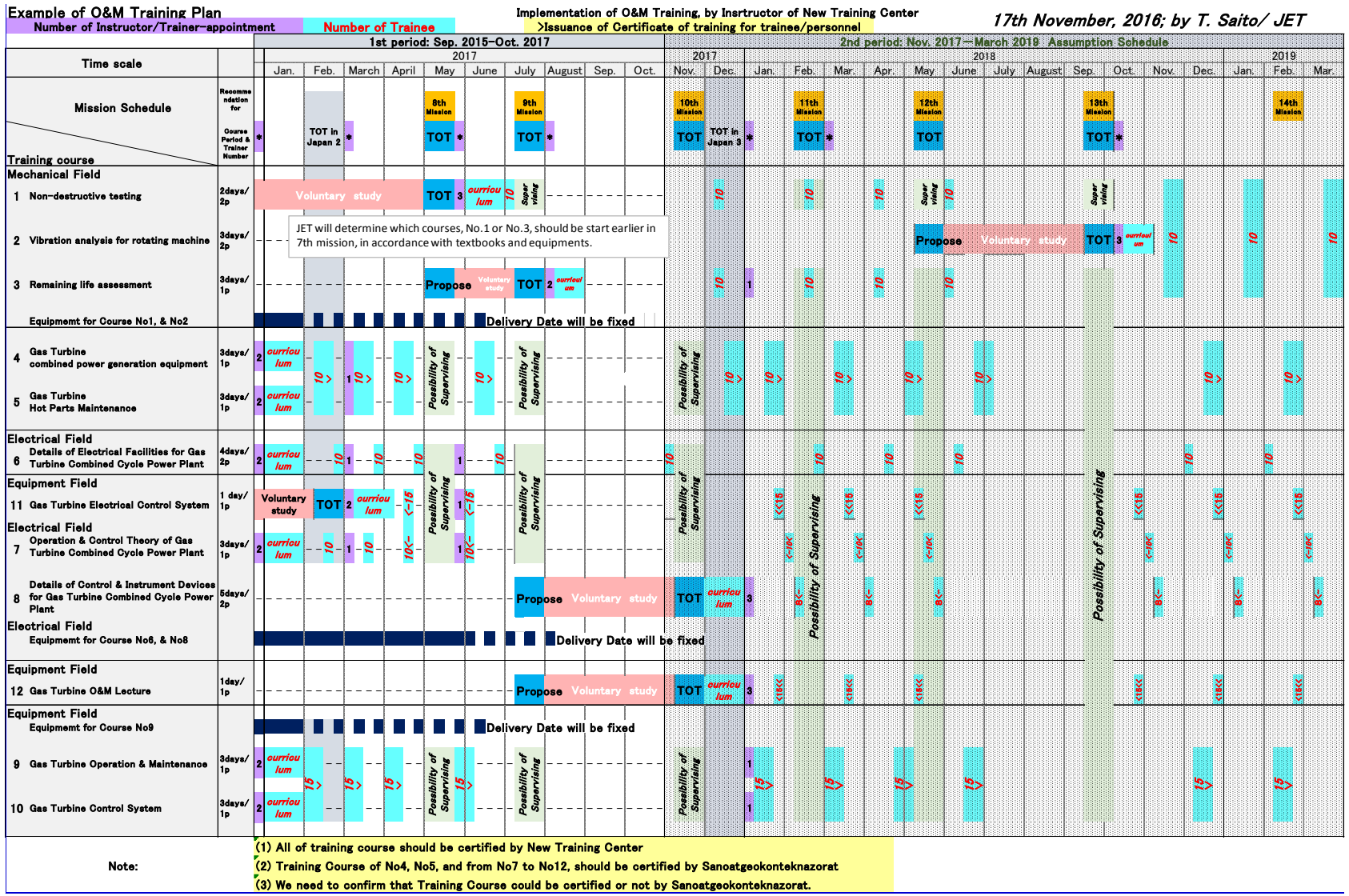
Text No. / Training course		*Certificate of Training Course acknowledged by		Training Level	Target field of trainee		Effect of training at on-site	Course & Step No.	Recomended Period by JET	Trainees Number	JICA Procured Equipment	Required Number of Trainer for each course			Ideal Number of Trainer	Traget Number of Trainer by JET TOT
		*1	*2									Chief Trainer	Sub Trainer	Assistant Trainer		
Mechanical Field																
4	Gas Turbine; Combined power generation equipment	*1	*2	Basic Common	Mechanist & Electrician	Maintenance & Operation	effective	A1	3	10	–	1	1	–	2	2
5	Gas Turbine; Hot Parts Maintenance	*1	*2	Intermediate	Mechanist	Maintenance	effective	A2	3	10	–	1	1	–		
1	Non-destructive testing		*2	Elementary	Mechanist	Maintenance	–	B1	2	10	○	1	1	1	3	2
2	Vibration analysis for rotating machine		*2	Intermediate	Mechanist	Maintenance	–	B2	3	10	○	1	1	1		
3	Remaining life assessment		*2	Intermediate	Mechanist	Maintenance	–	B3	3	10	–	1	1	–		
Equipment Field																
9	Basic Gast Turbine Gas Turbine Operation & Maintenance	*1	*2	Basic Common	Electrician & Mechanist	Maintenance & Operation	effective	C1	3	15	○	1	1	–	2	2 Mechanist and/or C&I
10	CCGT Plant Operation & Maintenance Gas Turbine Control System	*1	*2	Basic Common	Electrician & Mechanist	Maintenance & Operation	effective	C2	3	15	–	1	1	–		
11	Philosophy of GT electrical system and GT control Gas Turbine Electrical Control System	*1	*2	Basic Elementary	Electrician & Mechanist	Maintenance & Operation	effective	D1	1	15	–	1	1	–	2	
12	Gas Turbine Maintence Pholsophy and its commissioning Gas Turbine O&M Lecture	*1	*2	Intermediate	Electrician & Mechanist	Maintenance & Operation	–	D2	1	15	–	1	1	–		
Electrical Field																
7	Operation & Control Theory of Gas Turbine Combined Cycle Power Plant	*1	*2	Basic Elementary	Electrician & Mechanist	Maintenance & Operation	effective	D3	3	10	–	1	1	–	3	2
8	Details of Control & Instrument Devices for Gas Turbine Combined Cycle Power Plant		*2	Intermediate	Electrician	Maintenance	effective	D4	5	8	○	1	1	1		
6	Details of Electrical Facilities for Gas Turbine Combined Cycle Power Plant		*2	Intermediate	Electrician	Maintenance	–	E	4	10	○	1	1	1	3	2
										Total		24+4			15	10

2. 基本情報のまとめ

- コースのレベル
- 対象者
- 機材の利用

...etc.

3. トレーニングセンターの運用開始に向けて



2. 研修計画の作成-1

- 研修を実施するまでにどれくらいの準備期間が必要か？（機材、教科書・・・）
- 研修後に必要な作業にどれくらいかかるか？

研修実施可能のサイクルが決定

3. トレーニングセンターの運用開始に向けて

Outline of training schedule/ example — **17th November, 2016; by T. Saito/ JET** — Existing Training Schedule were from November to June

Planned number of trained O&M personnel | Planned Number of Instructor/Trainer | TOT Japan | JET Mission | TOT in UZ | No training Class between this period in existing system

Time scale	1st period: Sep. 2015–Oct. 2017											2nd period: Nov. 2017 – March 2019																	Total number of trained person	Recommended condition of course		
	Dec	2017 Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	2017 Nov.	Dec.	2018 Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	2019 Jan.	Feb.	Mar.		Course Period (Days)	Number of Trainees	Number of Trainers/ Instructors during course period
JET mission / TOT			TOT Japan			8th Mission TOT in UZ		9th Mission TOT in UZ				10th Mission TOT in UZ	TOT Japan		11th Mission TOT in UZ			12th Mission TOT in UZ				13th Mission TOT in UZ					14th Mission					
Schedule of Inspection・ *New CCPP Start* ✱		・Baroscope inspection Tashkent CHP ✱ *Talimarjan CCPP-1,2*												・Periodical inspectio Tashkent CHP									・Periodical inspection Navoiy CCPP-1 *? → ✱ Navoiy CCPP-2 →?*									
1 Non-destructive testing													10		10		10		10					10		10		10	70	2	10	2
						3																							3			
2 Vibration analysis for rotating machine																								10		10		10	30	3	10	2
																							3						3			
3 Remaining life assessment													10		10		10		10					10		10		10	70	3	10	1
									2					1															3			
4 Gas Turbine combined power generation equipment			10	10	10		10						10	10		10		10	10						10		10		110	3	10	1
		2		1																									3			
5 Gas Turbine Hot Parts Maintenance			10	10	10		10						10	10		10		10		10					10		10		110	3	10	1
		2		1																									3			
6 Details of Electrical Facilities for Gas Turbine Combined Cycle Power Plant			10	10	10		10								10		10		10						10		10		90	4	10	2
		2		1																									3			
7 Operation & Control Theory of Gas Turbine Combined Cycle Power Plant			10	10	10		10								10	10		10						10		10		10	100	3	10	1
		2		1																									3			
8 Details of Control & Instrument Devices for Gas Turbine CCPP															8		8	8						8		8		8	48	5	8	2
														3															3			
9 Gas Turbine Operation & Maintenance			15	15	15	15								15		15	15		15						15		15		150	3	15	1
		2																											2			
10 Gas Turbine Control System			15	15	15		15							15		15		15	15						15		15		150	3	15	1
		2																											2			
11 Gas Turbine Electrical Control System					15		15							15		15		15					15		15		15		120	1	15	1
				2		1																							3			
12 Gas Turbine O&M Lecture														15		15		15					15		15		15		90	1	15	1
														3															3			

Cumulative number of person

Trained O&M Personnel (man x course)	0	70	140	225	240	310	310	310	310	310	310	350	430	478	568	621	704	774	784	784	784	814	862	952	1000	1090	1138	1138
Cumulative Instructor/ Trainer (man x course)	12	12	18	18	22	22	22	24	24	24	24	24	31	31	31	31	31	31	31	31	31	34	34	34	34	34	34	34
minimum Target of Instructor/ Trainer	*12*		*14*		*16*			*18*					*22*									*24*						*24*

2. 研修計画の作成-2

1.を踏まえて、全体の研修計画を作成

- 合計で年間、何人の受講生を教育できるのか？

・・・etc.

3. トレーニングセンターの運用開始に向けて

Sample Form of
Training Plan/ Lesson Plan

* red color character is only for sample
Dated xxth January,2017
CCGT Operation & Maintenance Training Center, Navoiy

signature
approved by Mr. Dustovr Shukrat
President of Training Center

1 No & Title of Training Course
No.4 Gas Turbine combined power generation equipment
Responsible Instructor/ Trainer for this course
Main Mr. Musaev Alisher Baxtiyorovich
Sub Mr. Aslonov Aslon
others Mr. Djamolov Bakhodir/ Mr. Maksudov Laziz/ Mr. Boyliev Shukhrat
2 Standard Number of Trainee
10 trainees
Target Trainee
New employee for CCPP/CCGT of UE
3 Course period/ time*
3 days/ 21 hours*
4 Course contents & time

No	Subtitle	date	hours*
1 & 2	Overview of Navoiy TPP	1st	2
3	Basics of Combined Cycle Power Generation	1st	3
4	Basic knowledge of Gas Turbines	1st & 2nd	7.5
5	Periodical and Combustor Inspection	2nd	1.5
6	Heat Recovery Steam Generator	3rd	1
7	Steam Turbine	3rd	1
8	Trouble Example	3rd	5

5 Required equipment for this course
no equipment for this course
6 Check point of this training

No	Check point in detail
1 & 2	
3	
4	
5	
6	
7	
8	

7 Question & typical answer for the completion examination of training
Q&A should be prepared by Instrucotr

8 Evaluation criteria of trainee
(a) Attendance rate of training
(b) Attitudes in training
(c) Aggressiveness, Number of questions etc.
(d) Understanding of lecture, pertinence for course
(e) Results of the completion test
(a) - (e) are examples of criteria
* JET predicted period/time if Japanese Instructor implemented this training.
Instructor should plan the course period/ time by himself including details.

3. 講義計画（Lesson Plan）の作成

- コースの実施期間（何時間×何日？）
- 単元別の目安時間
- 必要な教材・機材の準備
- 修了テスト＆合格のポイント

・・・etc.

Action Planning

IC Net Limited

0-1. What is an action plan?

An action plan is an operation plan of a small project

- It has to be relevant to this training course
- It has to improve some area of your work
- It has to be conducted by you and your colleagues (NOT a Nation-wide project)
- At the end of the training in Japan, there will be an action plan presentation

0-2. Format of the action plan

Цель:

деятельность	Исполняющий персонал	Продукты		4				5				6				7				8				9				10				11				12				1				2				3			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
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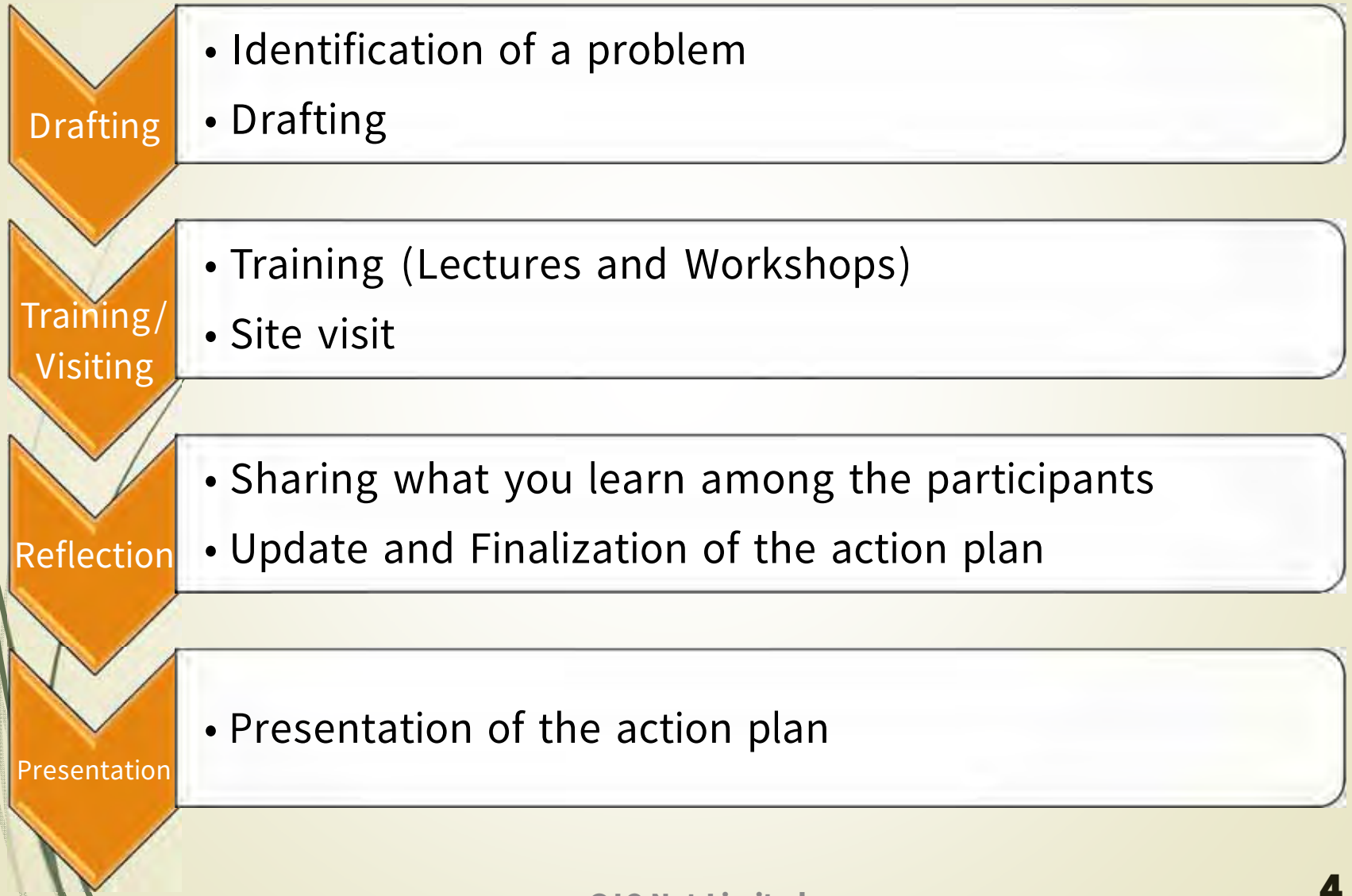
0-3. Steps to make an action plan



0-4. Why identify a problem?

We identify a goal of the action plan by restating a problem as desired result

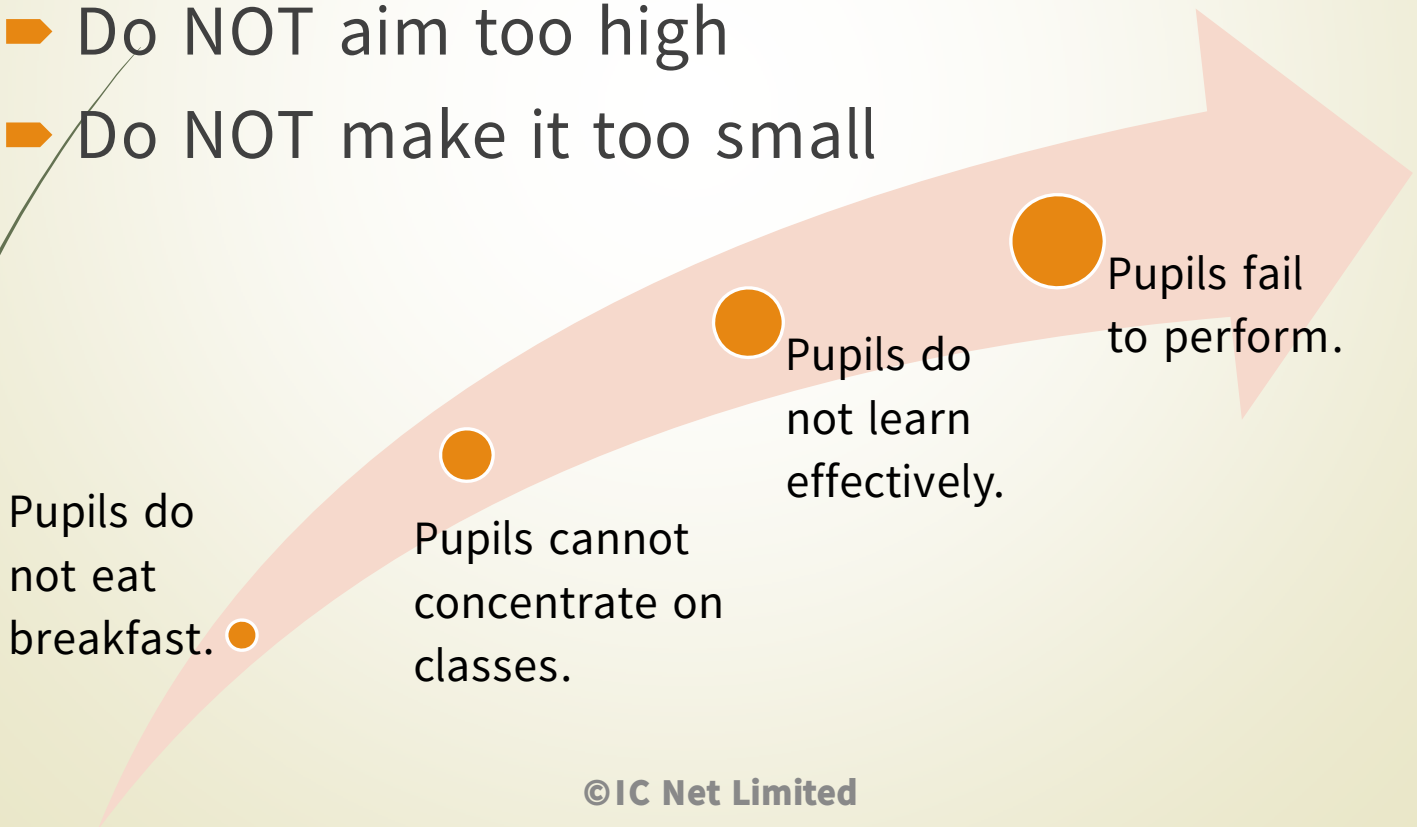
Problem
I cannot walk

Goal
I can walk

0-5. Choosing the problem

The problem must be selected carefully

- It has to be relevant to this training course
- It has to improve some area of your work
- Do NOT aim too high
- Do NOT make it too small



0-6. Choosing the problem that you can tackle

When choosing the problem, consider;

- The area (size)
- Time frame
- Who can commit
- Authority
- Budget

SEEKING THE TRUE SHAPE OF THE PROBLEM

1. What is the problem to be solved?

Write down one problem you want to solve after this training course in Japan

- A problem that exists
- A problem you really want to solve
- A problem that is relevant to your work and this training course
- A problem that can possibly be solved by your own or your colleagues' effort
- A problem that can be solved within a set time frame

2. How do we seek?

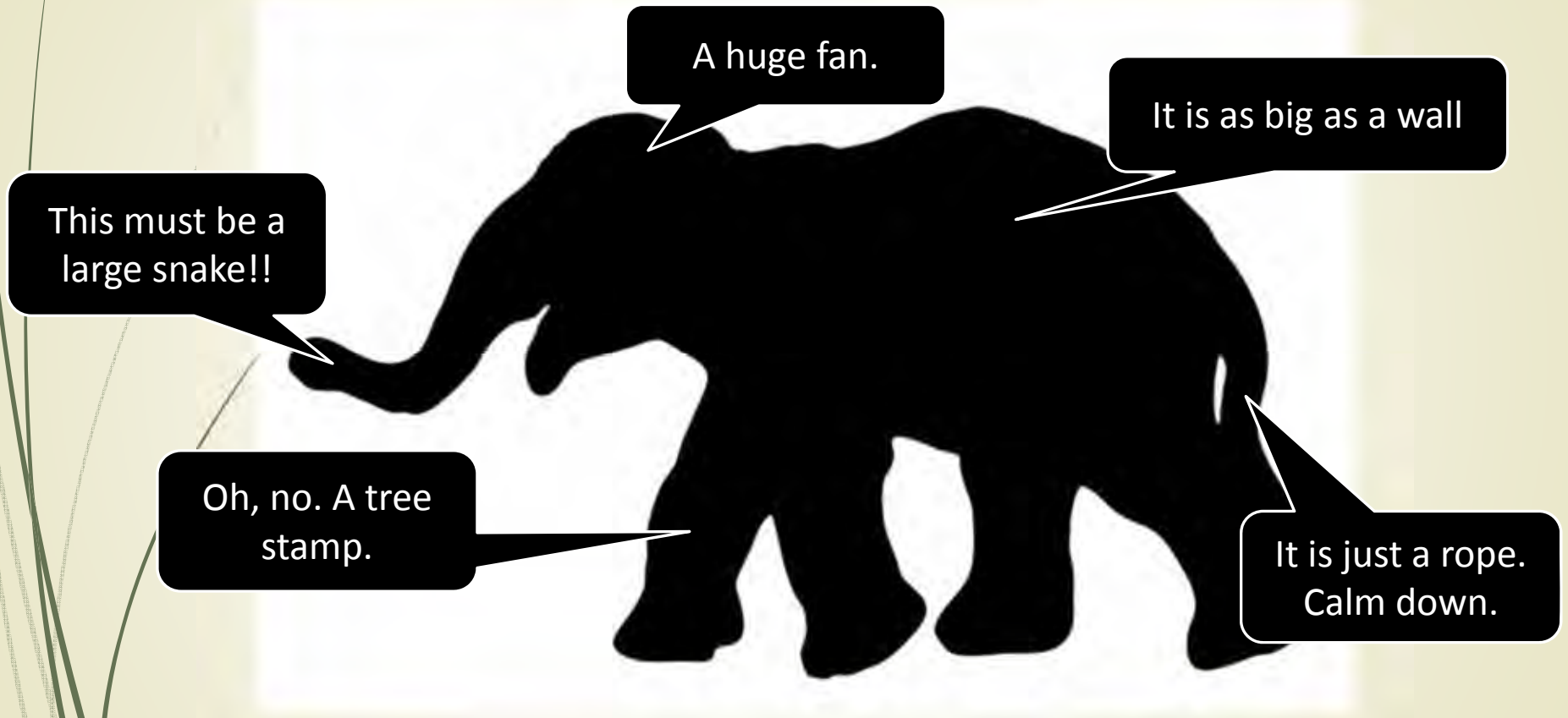
- By QUESTIONING and ANSWERING
- The questioning session is held in small groups
- In a session, group members discuss one proposer's problem
- The problem can be re-defined at some stages of the session
- Process of the discussion is managed by a facilitator
- No visualization tool is used

3.The purpose of the discussion

The purpose of this session is

To find the true shape of the problem which you have to overcome in order to make a change

4. Why questioning?



To find true shape of your problem by looking at it from various different direction.

5.The features of the discussion

The features of this session ;

1. The sessions consist only of short questions and short answers
2. The sessions have some short self-reflection time
3. The facilitator has the authority to intervene at any time
4. The facilitator will not be involved in the content of the discussion
5. Always think about team's norm
   - Confidentiality
   - Commitments for the problem solving
   - Respect and support
   - Focus on the problem, not to blame someone

6. Features in detail 1

The sessions consist only of short questions and short answers

- Do NOT talk your opinion without being asked
- Ask one question at a time
- Ask many short questions
- Avoid to have one person talking too much
- Listen to each other carefully
- Create friendly atmosphere to welcome diversity
- Questions can bigger than what you can do

6. Features in detail 2

The sessions have some short self-reflection time

- Check if you are too serious or too relaxed
- Pay attention to the group's atmosphere and balance
- Look for different angles to questions

6. Features in detail 3

The facilitator has the authority to intervene at any time

The facilitator will cut into the discussion to;

- Have a self-reflection time
- Let you re-define the problem

It looks a little obstructive but necessary.

6. Features in detail 4

The facilitator will not be involved in the discussion

The discussion consists only of the questions and answers by the participant.

If the facilitator asks or answers, it can give an unnecessary large impact on the following questions and answers.

6. Features in detail 5

Always think about team's norm

- Confidentiality
- Commitments for the problem solving
- Respect and support
- Focus on the problem, not to blame someone

You could create some new norms.

Ex.：Don't forget your smile （*^_^*）

This norm needs for everyone talks relaxed and comfortable.

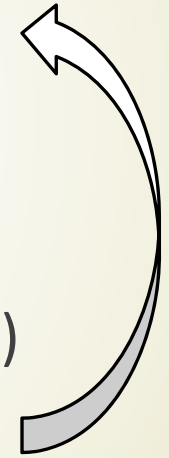
7. Role of the facilitator

The facilitator

- reminds the norm
- manages the progress of the discussion (by telling you what to do next)
- manages the time
- (gives comment after every session)

8. Process of the session

1. Determining one person who proposes the problem
2. Reminding the norms
3. Presentation of the problem by the Proposer
4. Questioning and answering
5. Re-definition of the problem
   （by Proposer and group members）
6. Re-definition of the problem (by Proposer)
7. Agree or disagree （by group members）
8. Setting the goal (by Proposer)
9. Listing necessary actions to achieve the goal (by Proposer)
10. Feedback from group members



If there is still room for further questioning

9. What will we gain from the sessions?

- Diverse aspects to look at a problem
- A true shape of the problem
- New ideas to strengthen your action plan
- A lot of encouragement
- Relief feeling when you find that you are not only person who is struggling on the problem
- Joy to work in a team

10. Rough Scratch of the action plan

The goal is set by rephrasing “the newly defined problem” in the session.

Based upon what is discussed in the session and the feedback given, the necessary actions to solve the problem are listed.

Goal (Ideal situation after the problem is solved) :
Necessary Actions 1. 2. 3. 4. 5. . . . . . .

Developing an Action Plan

1. Why to be developed

Rough Scratch of an action plan is not a complete action plan because;

- the goal may be too long
- activities are still ambiguous (not specific)
- schedule is not determined

To develop an sustainable management system in the light of KAIZEN in order to realize an effective management system and good communication and teamwork and • • • • ?????

Necessary Actions

1. To improve team work
2. To develop a management system
3. TOT

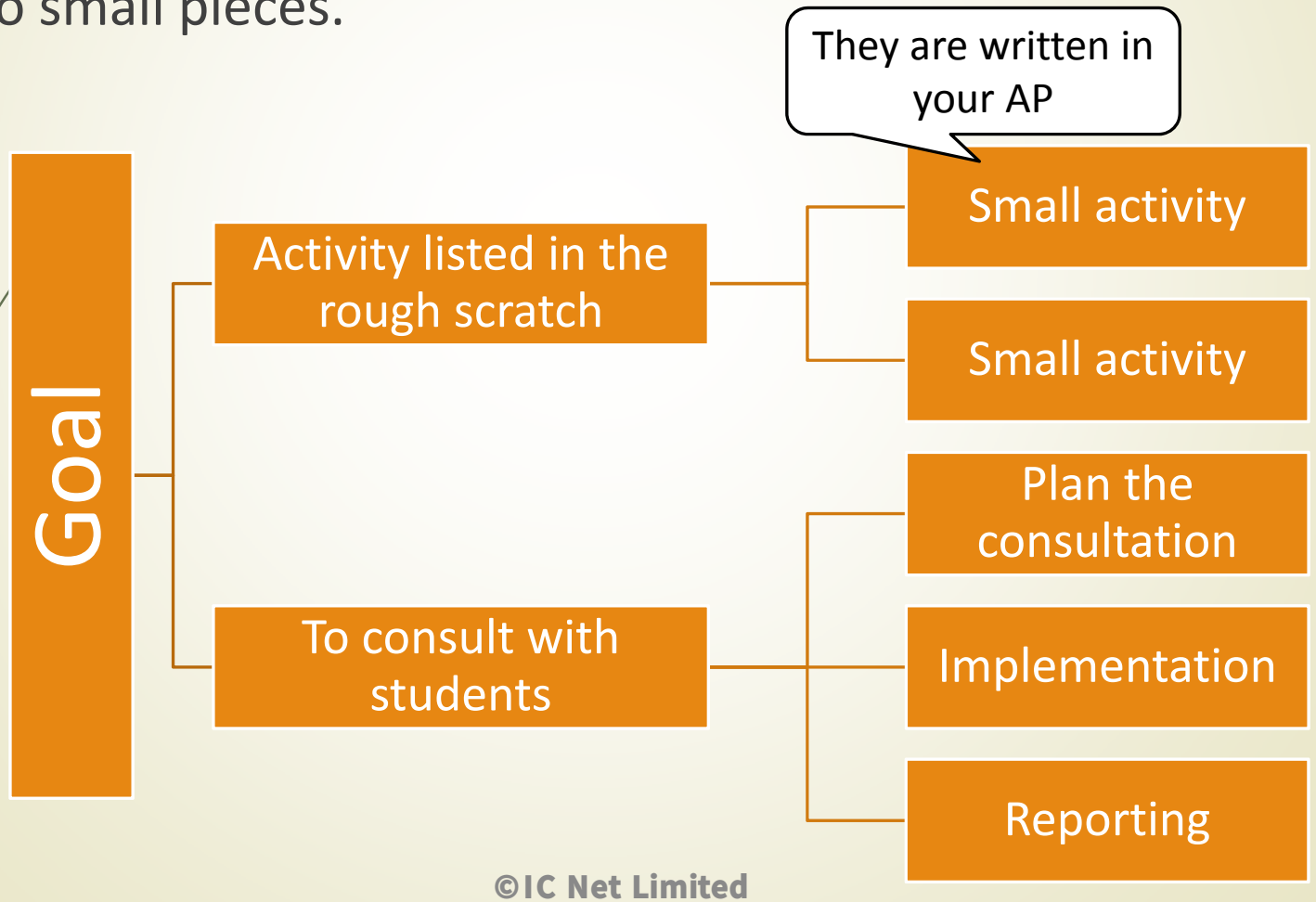
2. Optimizing the goal

The goal has to;

- reflect the former discussion
- be as simple and specific as possible so anyone can understand
- drop items what are included in the activities

3. Making activities more explicit 1

Activities can be made more explicit as they are broken into small pieces.



4. Making activities more explicit 2

Activities can be made more explicit by determining individual outputs.

An output is an expected product (evidence) that is produced when the activity is complete.

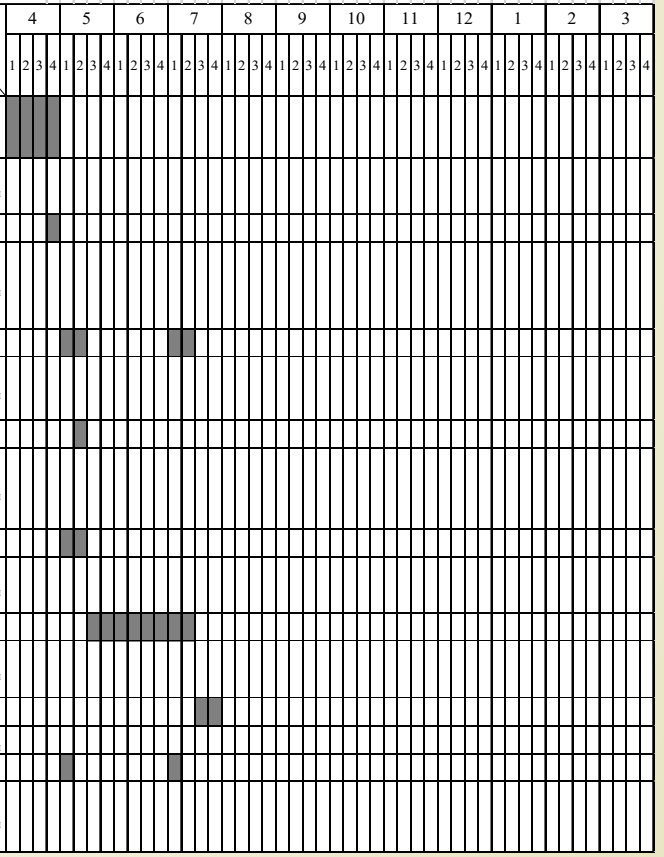
Activities	Outputs
Plan the consultation	Yearly basis students consultation plan
Implementation	Planned number of students consultation is conducted
Reporting	Students consultation report

5. Drawing a bar chart

A bar chart is a graph that visualizes when each activity starts and terminates.

3-1. Разработка учебной программы и учебных материалов для обучения по ЭиТО ПГУ

Sub-activity Под-деятельность	Implementing personnels Исполняющий персонал	Products Продукты
Стажировка в действующих электростанциях с целью ознакомление организации эксплуатации и ремонта ПГУ	ДЖАЙКА	Сертификат стажировка
Распределение инструктров по направлением	ДЖАЙКА и инструкторы	Утвержденный ДЖАЙКА список инструкторов по распределенному обязанности
Предоставление помещений и необходимых условий для ведения работы инструкторов	Руководитель проекта	Помещение со всеми условиям и (офисные мебели, оргтехника, интернет)
Получить переведенные учебные материалы и учебные программы	ДЖЕТ и инструкторы	Учебные материалы и учебные программы в том числе электронном виде
Организация дополнительное обучение инструкторов в Узбекистане	ДЖЕТ	Утвержденная программа посещения специалистов ДЖЕТ (ТОТ)
При необходимости вести изменения и усовершенствовать учебных материалов и программ	Инструкторы	Готовая Учебная программа и материалы
Предоставить учебных программ и материалов на согласование ГАК и ДЖАЙКА	Инструкторы и РП	Утверждение ГАК
Получение разрешение с Узбекэнерго во время приезда японских экспертов минимум на 5-7 дней	Руководитель проекта	Приказ Узбекэнерго о командирование инструкторов




Good Luck!!

ПЛАН ДЕЙСТВИЙ

АО «Навоийская ТЭС»

НА ТЕМУ:

Подготовка кадров для новостроящихся ПГУ КЦ

UzbekEnergo

АО «Навоийская ТЭС»

ОПИСАНИЕ ПЛАНА ДЕЙСТВИЯ

1. Пропаганда в ВУЗах и в колледжах

2. Провести короткую программу обучения ПГУ для потенциальных кандидатов в Учебном центре станции

3. Программа стажировки на станции

Деятельность Activities	Исполняющий персонал Implementation personel	Результат		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Пропаганда ВУЗах и колледжах																																								
Получение разрешения с руководства ТЭС	Эшов Х, *Мусаев А	Приказ станции	План																																				
			Фактический																																						
Согласование с руководством ВУЗ и колледжа	*Эшов Х, Мусаев А	Разрешение руководства ВУЗ	План																																				
			Фактический																																						
Составление презентационных материалов	*Аслонов А, Мусаев А, *Пармонов А, Нарзиев А, Хасанов Л, Джамалов Б	Презентационные материалы	План																																				
			Фактический																																						
Проведение презентации	*Аслонов А, *Пармонов А	Список участников	План																																				
			Фактический																																						
Приглашение студентов на ознакомление с ПГУ	*Мусаев А, Хасанов Л, *Пармонов А	Список желающих	План																																				
			Фактический																																						
Анке			План																																				
			Фактический																																						
Провести короткую программу обучения по ПГУ для потенциальных кандидатов в Учебном центре станции																																							
Создание программы обучения	Аслонов А, *Мусаев А, Пармонов А, Нарзиев А, Хасанов Л, Джамалов Б, Тошов С, Байлиев Ш	программа обучения	План																																				
			Фактический																																						
Получение разрешения с руководства ТЭС	Эшов Х, *Мусаев А	приказ станции	План																																				
			Фактический																																						
Согласование с руководством ВУЗ и колледжа	*Эшов Х, Мусаев А	разрешение руководства ВУЗ	План																																				
			Фактический																																						
Создание учебных материалов	*Аслонов А, Мусаев А, *Пармонов А, Нарзиев А, Хасанов Л, Джамалов Б, Тошов С, Байлиев Ш	материалы	План																																				
			Фактический																																						
Проведение обучения	*Аслонов А , *Пармонов А, Нарзиев А, Хасанов Л, Джамалов Б	список участников	План																																				
			Фактический																																						
Отбор способных студентов	*Мусаев А, Аслонов А, Хасанов Л, Джамалов Б, Нарзиев А, *Тошов С	список стажеров	План																																				
			Фактический																																						
Анкетирование по учебным материалам	*Аслонов А, Пармонов А	итог анкет	План																																				
			Фактический																																						
Программа стажировки на станции																																							
Составление программы обучения для студентов	Аслонов А, *Мусаев А, Пармонов А, Нарзиев А,	утвержденная программа	План																																				
			Фактический																																						
Получение разрешения с руководства ТЭС	Эшов Х, *Мусаев А	приказ станции	План																																				
			Фактический																																						
Согласование с руководством ВУЗ и колледжа	*Эшов Х, Мусаев А	разрешение руководства ВУЗ	План																																				
			Фактический																																						
Проведение стажировки на блоке ПГУ КЦ	Мусаев А, Аслонов А, Пармонов А, Байлиев Ш, Хасанов Л, Джамалов Б, Нарзиев А, Тошов С	список участников	План																																				
			Фактический																																						
Анкетирование	*Аслонов А, Пармонов А	итог анкет	План																																				
			Фактический																																						

Деятельность Activities	Исполняющий персонал	Результат		3				4				5				6				7				8				9			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Пропаганда ВУЗах и колледжах																															
Получение разрешения с руководства ТЭС	Эшов Х, *Мусаев А	приказ станции	План																												
			Фактический																												
Согласование с руководством ВУЗ	*Эшов Х, Мусаев А	разрешение руководства ВУЗ	План																												
			Фактический																												
Составление презентационных материалов	*Аслонов А, Мусаев А, *Пармонов А, Нарзиев А, Хасанов Л, Джамалов Б	презентационные материалы	План																												
			Фактический																												
Проведение презентации	*Аслонов А, *Пармонов А	список участников	План																												
			Фактический																												
Приглашение студентов на ознакомление с ПГУ	*Мусаев А, Хасанов Л, *Пармонов А	список желающих	План																												
			Фактический																												
Анкетирование	*Аслонов А, Пармонов А	итог анкет	План																												
			Фактический																												

Деятельность Activities	Исполняющий персонал Implementation personel	Результат		3				4				5				6				7				8				9			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Пропаганда ВУЗах и колледжах																															
Получение разрешения с руководства ТЭС	Эшов Х, *Мусаев А	Приказ станции	План																												
			Фактический																												
Согласование с руководством ВУЗ и колледжа	*Эшов Х, Мусаев А	Разрешение руководства ВУЗ	План																												
			Фактический																												
Составление презентационных материалов	*Аслонов А, Мусаев А, *Пармонов А, Нарзиев А, Хасанов Л, Джамалов Б	Презентационные материалы	План																												
			Фактический																												
Проведение презентации	*Аслонов А, *Пармонов А	Список участников	План																												
			Фактический																												
Приглашение студентов на ознакомление с ПГУ	*Мусаев А, Хасанов Л, *Пармонов А	Список желающих	План																												
			Фактический																												
Анкетирование	*Аслонов А, Пармонов А	Итог анкет	План																												
			Фактический																												
Провести короткую программу обучения по ПГУ для потенциальных кандидатов в Учебном центре станции																															
Создание программы обучения	Аслонов А, *Мусаев А, Пармонов А, Нарзиев А, Хасанов Л, Джамалов Б, Тошов С, Байлиев Ш	программа обучения	План																												
			Фактический																												
Получение разрешения с руководства ТЭС	Эшов Х, *Мусаев А	приказ станции	План																												
			Фактический																												
Согласование с руководством ВУЗ и колледжа	*Эшов Х, Мусаев А	разрешение руководства ВУЗ	План																												
			Фактический																												
Создание учебных материалов	*Аслонов А, Мусаев А, *Пармонов А, Нарзиев А, Хасанов Л, Джамалов Б, Тошов С, Байлиев Ш	материалы	План																												
			Фактический																												
Проведение обучения	*Аслонов А , *Пармонов А, Нарзиев А, Хасанов Л, Джамалов Б	список участников	План																												
			Фактический																												
Отбор способных студентов	*Мусаев А, Аслонов А, Хасанов Л, Джамалов Б, Нарзиев А, *Тошов С	список стажеров	План																												
			Фактический																												
Анкетирование по материалам	*Аслонов А, Пармонов А	итог анкет	План																												
			Фактический																												
Программа стажировки на станции																															
Составление программы обучения для студентов	Аслонов А, *Мусаев А, Пармонов А, Нарзиев А,	утвержденная программа	План																												
			Фактический																												
Получение разрешения с руководства ТЭС	Эшов Х, *Мусаев А	приказ станции	План																												
			Фактический																												
Согласование с руководством ВУЗ и колледжа	*Эшов Х, Мусаев А	разрешение руководства ВУЗ	План																												
			Фактический																												
Проведение стажировки на блоке ПГУ КЦ	Мусаев А, Аслонов А, Пармонов А, Байлиев Ш, Хасанов Л, Джамалов Б, Нарзиев А, Тошов С	список участников	План																												
			Фактический																												
Анкетирование	*Аслонов А, Пармонов А	итог анкет	План																												
			Фактический																												

Деятельность Activities	Исполняющий персонал	Результат		3				4				5				6				7				8				9			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Провести короткую программу обучения по ПГУ для потенциальных кандидатов в Учебном центре станции																															
Создание программы обучения	Аслонов А, *Мусаев А, Пармонов А, Нарзиев А, Хасанов Л, Джамалов Б, Тошов С, Байлиев Ш	программа обучения	План																												
			Фактический																												
Получение разрешения с руководства ТЭС	Эшов Х, *Мусаев А	приказ станции	План																												
			Фактический																												
Согласование с руководством ВУЗ	*Эшов Х, Мусаев А	разрешение руководства ВУЗ	План																												
			Фактический																												
Создание учебных материалов	*Аслонов А, Мусаев А, *Пармонов А, Нарзиев А, Хасанов Л, Джамалов Б, Тошов С,	материалы	План																												
			Фактический																												
Проведение обучения	*Аслонов А , *Пармонов А, Нарзиев А, Хасанов Л, Джамалов Б	список участников	План																												
			Фактический																												
Отбор способных студентов	*Мусаев А, Аслонов А, Хасанов Л, Джамалов Б, Нарзиев А, *Тошов С	список стажеров	План																												
			Фактический																												
Анкетирование по учебным материалам	*Аслонов А, Пармонов А	итог анкет	План																												
			Фактический																												

Деятельность Activities	Исполняющий персонал Implementation personel	Результат		3				4				5				6				7				8				9			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Пропаганда ВУЗах и колледжах																															
Получение разрешения с руководства ТЭС	Эшов Х, *Мусаев А	Приказ станции	План																												
			Фактический																												
Согласование с руководством ВУЗ и колледжа	*Эшов Х, Мусаев А	Разрешение руководства ВУЗ	План																												
			Фактический																												
Составление презентационных материалов	*Аслонов А, Мусаев А, *Пармонов А, Нарзиев А, Хасанов Л, Джамалов Б	Презентационные материалы	План																												
			Фактический																												
Проведение презентации	*Аслонов А, *Пармонов А	Список участников	План																												
			Фактический																												
Приглашение студентов на ознакомление с ПГУ	*Мусаев А, Хасанов Л, *Пармонов А	Список желающих	План																												
			Фактический																												
Анкетирование	*Аслонов А, Пармонов А	Итог анкет	План																												
			Фактический																												
Провести короткую программу обучения по ПГУ для потенциальных кандидатов в Учебном центре станции																															
Создание программы обучения	Аслонов А, *Мусаев А, Пармонов А, Нарзиев А, Хасанов Л, Джамалов Б, Тошов С, Байлиев Ш	программа обучения	План																												
			Фактический																												
Получение разрешения с руководства ТЭС	Эшов Х, *Мусаев А	приказ станции	План																												
			Фактический																												
Согласование с руководством ВУЗ и колледжа	*Эшов Х, Мусаев А	разрешение руководства ВУЗ	План																												
			Фактический																												
Создание учебных материалов	*Аслонов А, Мусаев А, *Пармонов А, Нарзиев А, Хасанов Л, Джамалов Б, Тошов С, Байлиев Ш	материалы	План																												
			Фактический																												
Проведение обучения	*Аслонов А , *Пармонов А, Нарзиев А, Хасанов Л, Джамалов Б	список участников	План																												
			Фактический																												
Отбор способных студентов	*Мусаев А, Аслонов А, Хасанов Л, Джамалов Б, Нарзиев А, *Тошов С	список стажеров	План																												
			Фактический																												
Анк м	*Аслонов А, Пармонов А	итог анкет	План																												
			Фактический																												
Программа стажировки на станции																															
Составление программы обучения для студентов	Аслонов А, *Мусаев А, Пармонов А, Нарзиев А,	утвержденная программа	План																												
			Фактический																												
Получение разрешения с руководства ТЭС	Эшов Х, *Мусаев А	приказ станции	План																												
			Фактический																												
Согласование с руководством ВУЗ и колледжа	*Эшов Х, Мусаев А	разрешение руководства ВУЗ	План																												
			Фактический																												
Проведение стажировки на базе ПГУ КЦ	Мусаев А, Аслонов А, Пармонов А, Байлиев Ш, Хасанов Л, Джамалов Б, Нарзиев А, Тошов С	список участников	План																												
			Фактический																												
Анк			План																												
			Фактический																												

Деятельность Activities	Исполняющий персонал	Результат		3				4				5				6				7				8				9			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Программа стажировки на станции																															
Составление программы обучения для студентов	Аслонов А, *Мусаев А, Пармонов А, Нарзиев А,	утвержденная программа	План																												
			Фактический																												
Получение разрешения с руководства ТЭС	Эшов Х, *Мусаев А	приказ станции	План																												
			Фактический																												
Согласование с руководством ВУЗ	*Эшов Х, Мусаев А	разрешение руководства ВУЗ	План																												
			Фактический																												
Проведение стажировки на блоке ПГУ КЦ	Мусаев А, Аслонов А, Пармонов А, Байлиев Ш, Хасанов Л, Джамалов Б, Нарзиев	список участников	План																												
			Фактический																												
Анкетирование	*Аслонов А, Пармонов А	итог анкет	План																												
			Фактический																												

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Формат План действий

Деятельность Activities	Исполняющий персонал Implementation personel		3				4				5				6				7				8				9				10		
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3
1. Неразрушающий контроль	Аслонов А. Джамалов Б. *Хамраев И.	План									■	■																					
		Фактический																															
2. Анализ вибрации во вращающихся механизмах	Мусаев А. *Тошов И.	План																									■	■					
		Фактический																															
3. Оценка остаточного ресурса	Аслонов А. Джамалов Б. Байлиев Ш. *Хамраев И.	План																											■	■			
		Фактический																															
4. Оборудование комбинированной генерации Газовой Турбины	*Мусаев А. Байлиев Ш. Аслонов А. Джамалов Б.	План					■	■																									
		Фактический																															
5. Техобслуживание горячих частей ГТ	*Джамалов Б. Мусаев А. Байлиев Ш.	План													■	■																	
		Фактический																															
6. Детали электротехнического оборудования для газотурбинной электростанции комбинированного цикла	*Пармонов А. Тошов С. Эшов Х.	План																							■	■							
		Фактический																															
7. Теория эксплуатации и управления газотурбинной электростанции комбинированного цикла	Тошов И. *Мусаев А. Саидов К. Аслонов А. Пармонов А.	План											■	■																			
		Фактический																															
8. Детали КИП приборов для газотурбинной электростанции комбинированного цикла	*Тошов И. Нарзиев А. Хасанов Л. Саидов К.	План																															
		Фактический																															
9. Эксплуатация и техобслуживание ГТ	Байлиев Ш. *Аслонов А. Мусаев А. Джамалов Б. Нарзиев А.	План							■	■																							
		Фактический																															
10. Система управления ГТ	*Хасанов Л. Нарзиев А. Тошов И.	План							■	■																							
		Фактический																															
11. Система электрического управления ГТ	*Пармонов А. Тошов С. Эшов Х. *Тошов И. Мусаев А. Саидов К.	План									■	■																					
		Фактический																															

НАШИ БЛОГОДАРНОСТИ

JICA

Japan International Cooperation Agency(JICA)

PET

Energia

アジア共同設計コンサルタント
Asia Engineering Consultant Co., Ltd.

THE CHUGOKU ELECTRIC POWER CO., INC.

MH

IC Net Limited
アイ・シー・ネット株式会社

UzbekEnergo

АО «Навоийская ТЭС»

アクションプラン　フォーマット

活動	実施者		3				4				5				6				7				8				9				10				11				12			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. 非破壊検査	Aslonov A, Djamalov B, *Khamraev I	計画									■	■																														
		実施																																								
2. 回転体の振動分析	Musaev A. *Toshov I.	計画																									■	■														
		実施																																								
3. 余寿命診断	Aslonov A, Djamalov B, *Khamraev I	計画																											■	■												
		実施																																								
4. ガスタービンコンバインドサイクル発電設備	*Musaev A. Bayliev Sh. Aslonov A. Djamalov B.	計画					■	■																																
		実施																																								
5. ガスタービン・ホットパーツ保守	*Djamalov B. Musaev A. Bayliev Sh.	計画													■	■																										
		実施																																								
6. ガスタービンコンバインドサイクル発電プラント電気設備	*Parmonov A. Toshov S. Eshov Kh.	計画																							■	■																
		実施																																								
7. ガスタービンコンバインドサイクル発電設備運転制御理論	Toshov I. *Musaev A. Saidov K. Aslonov A. Parmonov A.	計画											■	■																												
		実施																																								
8. ガスタービンコンバインドサイクル発電設備計測器	*Toshov I. Narziev A. Khasanov L. Saidov K.	計画																																				■	■			
		実施																																								
9. ガスタービン運転・保守	Baiyiev Sh. *Aslonov A, Musaev A . Djamalov B. Narziev A.	計画							■	■																																
		実施																																								
10. ガスタービン制御システム	*Khasanov L. Narziev A. Toshov I.	計画							■	■																																
		実施																																								
11. ガスタービン電気制御	*Parmonov A. Toshov S. Eshov Kh. *Toshov I. Musaev A. Saidov K.	計画									■	■																														
		実施																																								
12. 講義・ガスタービン運転・保守	Bayliev Sh. * Aslonov A. Musaev A. Djamalov B.	計画																																					■	■		
		実施																																								

アクションプラン　フォーマット

目的：新設GTCC設備のための人材育成

活動	実施者	成果		3				4				5				6				7				8				9			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
大学・専門学校への広報活動																															
発電所管理者から許可を得る	Eshov Kh. , *Musaev A	**発電所の許可**	計画			■	■																								
			実施																												
大学と専門学校の管理者の同意を得る	*Eshov Kh, Musaev A	**大学・専門学校の許可**	計画			■	■																								
			実施																												
プレゼンテーション資料の作成	*Aslonov A, Musaev A, *Parmonov A, Narziev A, Khasanov, Djamalov B	**プレゼンテーション資料**	計画				■	■	■	■																					
			実施																												
プレゼンテーションの実施	*Aslonov A, *Parmonov A.	**参加者名簿**	計画									■	■																		
			実施																												
学生を招待してGTCCについて知ってもらう（説明会）	*Musaev A., Khasanov L., *Parmonov A	**希望者名簿**	計画									■	■																		
			実施																												
学生向けGTCC説明会について参加者にアンケートをとる	*Aslonov A, Parmonov A	**アンケート集計結果**	計画									■	■																		
			実施																												
発電所への就職に興味を示す学生を対象に、発電所の研修センターでGTCCに関する短期研修を実施する。																															
研修プログラムの作成	Аслонов А, *Мусаев А, Пармонов А, Нарзиев А, Хасанов Л, Джамалов Б, Тошов С, Байлиев Ш	**研修プログラム**	計画					■	■	■	■	■	■	■	■																
			実施																												
発電所管理者の許可を得る	Eshov Kh, *Musaev A	**発電所の許可**	計画											■	■																
			実施																												
大学・専門学校の管理者の同意を得る	*Eshov Kh , Musaev A	**大学・専門学校の許可**	計画											■	■																
			実施																												
研修教材の作成	*Aslonov A, Musaev A, *Parmonov A, Narziev A, Khasanov L, Djamalov B, Toshov S, Bayliev Sh	**研修教材**	計画					■	■	■	■	■	■	■	■																
			実施																												
研修の実施	*Aslonov A , *Parmonov A, Narziev A, Khasanov L, Djamalov B	**参加者名簿**	計画													■	■	■	■												
			実施																												
優秀な学生のリストアップ	*Musaev A, Aslonov A, Khasanov L, Djamalov ,Narziev A, *Toshov S	**研修参加者名簿**	計画															■													
			実施																												
研修教材に関するアンケートの実施	*Aslonov A, Parmonov A	**アンケート集計結果**	計画													■	■	■	■												
			実施																												
発電所での研修プログラム																															
学生向け研修プログラムの作成	Aslonov A, *Musaev A, Parmonov A, Narziev A,	**承認済みプログラム**	計画													■	■	■	■												
			実施																												
発電所の管理者の許可を得る	Eshov Kh, *Musaev A	**発電所の許可**	計画															■	■												
			実施																												
大学・専門学校の管理者の同意を得る	*Eshov Kh, Musaev A	**大学・専門学校の許可**	計画															■	■												
			実施																												
GTCC発電設備での研修の実施	Musaev A, Aslonov A. Parmonov A, Bayliev Sh, Khasanov L, Djamalov B, Narziev A, Toshov S	**参加者名簿**	計画																	■	■	■	■	■	■	■					
			実施																												
アンケートの実施	*Aslonov A, Parmonov A	**アンケート集計結果**	計画																							■	■				
			実施																												

Explanation of Action Plan by 8 Trainer Candidate for manager on 9th February/ 2017

8 Trainer candidate discussed to seek for their problem on 1st and 2nd of February at JICA Chyugoku.

Proposal problem/issue for discussion

1 : Job motivation of some staff are low
2 : Training material in Uzbek language are necessary
3 : Low interest of workers for training
4 : No assistant for trainer is not nominated
5 : **Staff member for Navoi CCPP2 are shortage to start operation**
6 : Good ability students intend to get other job different from TPP/CCPP
7 : they need how to repair with low cost.
8 : There are no alternative person to support 8 Trainer candidate for implementation of CCPP Training

8 person chose the No.5 issue to discuss
Many points to solve were discussed among 8 member, 6 JET member and Mr. Morita

a) Staff in CCPP-1 and TPP are too small to change his position to CCPP-2
b) New employ will be needed for CCPP2
c) More than 80 new employee are needed before construction end.
d) New employee need to train about CCPP.
e) Trainer need to know how many trainee need to train about CCPP
f) Employment plan are not clear now.
g) Employment plan should be announced as soon as possible.
h) Employment plan/schedule and budget should be permitted by UE Headquarter
j) Candidate of employee should be increased.

Conclusion of request for manager
Employment plan should be announced as soon as possible.

Conclusion of their opinion for what they can do.
8 member will make **action plan to attract University students to new CCPP employees**.

Also, JET request to make action plan for making lesson plan by them for making training plan

※自由記述回答欄におけるコメントは要点をまとめて翻訳し、似通ったコメントは１つにまとめ、国名や研修員名連名（番号等）で表記する。

英語コースの場合は、案件担当の判断により英語のままの記載も可。ただし、その場合でも要点をまとめ、似通ったコメントは１つにまとめること。

全訳する必要はなく、代表的なコメントや研修改善への参考となる意見を取り上げて翻訳することとする。

集計年月日：2017　/　2　/ 26　　(アンケート回収日 2017 年 2 月 24 日)

質問集計表/Questionnaire

研修コース名	ウズベキスタン　講師候補向け CCPP 研修 （J１６９２０５９）
研修期間	2017/ 1 / 30　～　2017/ 3 / 3
受入人数	8　名

パート 1：研修成果について/ PART Ⅰ　Program output

1.　案件目標を達成しましたか？

案件目標：

ウズベキスタン国の電力公社であるウズベクエネルゴに CCPP 運転保守トレーニングセンターが新設されることに伴い、CCPP 運転維持管理の教育を実施する講師陣を育成し、運転保守要員を教育する体制を整え、ウズベクエネルゴが自律的に運営できる体制を整える。

←　十分達成できた		達成していない　→	
4	3	2	1
2	6		

2.　コメントや提言（特に評価が 1 または 2 の場合）

3.　「科目」について、以下の質問に答えてください。

特に有益であった科目

〈Subject〉科目

（Mr　Parmonov Azim）

- 講義、実習、発電所見学
- PET が実施する火力発電部門の研修ついての紹介
- ガスタービンの運転・保守

(Mr Aslonov Aslon)

1. 「火力発電所の人材育成」
2. GTCC 発電技術（柳井発電所）
3. 中国電力中央給電指令所視察、中国電力火力発電部門の事業紹介
4. GTCC 発電技術（水島発電所）
5. MHPS；工場見学、GT 付属設備配置
6. ガスタービン制御システムの概要

（Mr Bayliev Shukhrat）

- GTCC の運転、メンテナンス
- パーツの余寿命診断のための非破壊検査
- 工場及び発電所の見学

（Mr Djamalov Bakhodir）

1. PCM
2. 火力発電所の人材育成（PET）
3. MHPS の設備生産
4. 非破壊検査実習

(Mr Musaev Alisher)

1. PCM
2. 火力発電所の人材育成
3. PET が実施している研修の種類の紹介
4. 柳井発電所での定期検査見学

(Mr Narziev Akmal)

1. 計装制御システム概要
2. PCM
3. ガスタービン制御
4. 火力発電所の人材育成

(Mr Toshov Sanjar)

- GTCC に関する講義、見学
- GTCC の運転、メンテナンス

（Mr Khasanov　Lativ）

1. PET が実施している研修の種類の紹介
2. 柳井発電所での定期検査見学

〈Reason〉理由

（Mr　Parmonov Azim）

　トレーニングセンターの講師はその専門分野における高度な知識と十分な経験が求められている。本邦研修での講義・実習はトレーニングセンターの講師の知識を深めた。本邦研修で得た知識により自分の体験がある程度深まった。

(Mr Aslonov Aslon)

私はナヴォイ発電所でシフト長をしている。来日前、トレーニングセンターの講師として、日本の発電所の実際の仕事について知りたいと思っていた。有益であった科目として挙げたものは、トレーニングセンターの講師の立場から見て、面白くかつ有益であった。発電所の人材教育体制について理解が深められた。

（Mr Bayliev Shukhrat）

- 他国の発電所の稼働状況、GTCC の制御・修理、発電所での研修が有益であった。

（Mr Djamalov Bakhodir）

- 来日の目的はナヴォイ発電所に作られるトレーニングセンターの講師の知識技能の向上である。そのためには MHPS の製造プロセス、及び PET で行われた「火力発電所の人材育成」は必要なものであった。得られた情報を基にナヴォイのトレーニングセンターのためのアクションプランを作りたいと思う。

(Mr Musaev Alisher)

ナヴォイ発電所に作られるトレーニングセンターの講師養成のために来日したので、柳井発電所の人材養成にすいて知る必要があった。得られた情報を基にナヴォイのトレーニングセンターのためのアクションプランを作りたいと思う。

(Mr Narziev Akmal)

私は自国のトレーニングセンターでは計装制御システムを担当するので、日本で用いられている GTCC の新しい制御システムについて詳細に学ぶ必要があった。

(Mr Toshov Sanjar)

私は電気エンジニアとして二次回路のメンテナンス、そして発電機の保護を担当している。私はエンジニアであるが、常に新しいテクノロジーを学んでいる。今回日本の電力関係者から多くの知識を得ることができたと思っている。

(Mr Khasanov Latif)

私は PET と柳井発電所でたくさんのことを学んだ。

必要ではなかった科目

〈Subject〉科目

(Mr Aslonov Aslon)

MHPS での幾つかの教材

（Mr Bayliev Shukhrat）

- どの科目も GTCC に関する分野であり、全ての科目は有益で、学ぶべきだと思う。

（Mr　Toshov Sanjar）

- 全ての科目が重要であると思う。

〈Reason〉理由

(Mr Aslonov Aslon)

MHPS での教材は初級レベルであった。私たちは基本的な知識ではなく、起こりうる技術的な問題について知りたかった。なぜならば、私たちはトレーニングセンターの講師としては、自国の受講生の質問に答えられるよう準備を進める必要があるためである。可能であるなら、次回の日本での研修では、設備の不具合・故障にフォーカスを当ててもらいたい。

（Mr Bayliev Shukhrat）

- 不必要な科目はいということに尽きる。

（Mr　Toshov　Sanjar）

- 今回の講義、発電所や実験施設で行われた実習は、私の専門知識をもう一度復習するのに役立った。

扱われなかったが、含むべき科目

〈Subject〉科目

（Mr　Parmonov Azim）

1. 電気設備について
   1.1 発電機の制御、運転、メンテナンス
   1.2 変圧器の制御、運転、メンテナンス
   1.3 高圧及び中圧開閉器の制御、運転、メンテナンス
   1.4 励磁機の制御、運転、メンテナンス及び運転中の重大なトラブル回避
   1.5 電動機の運転、メンテナンス。振動、軸受けの交換
   1.6 電気的保護
   1.7 高圧中圧ケーブルの選択と、チェック方法

(Mr Aslonov Aslon)

- ガスタービン M701F4 のトラブル・故障

（Mr Bayliev Shukhrat）

- シミュレータに設定された個々の事故状況と、それに対するオペレータの対応　（より詳しく）

（Mr Djamalov Bakhodir）
MHPS のテキストの中に、GTCC の運転時間が増えるにつれ現れる具体的なトラブルの実例が含まれていれば良かったと思われる。また、下記についての実習が含まれるのが望ましい。
1. 蛍光浸透探傷試験（FPT）
2. 渦流探傷試験（ET）
3. X 線探傷検査 （RT）
4. 振動とバランシング
5. 実測による探傷

(Mr Musaef Alisher)
1. 蛍光浸透探傷試験（FPT）
2. 渦流探傷試験（ET）
3. X 線探傷検査 （RT）
6. 振動とバランシング

(Mr Narziev Akmal)
PID 制御に関する科目。
下記についての実習
1. 計測器
2. 渦流探傷試験（ET）
3. 振動とバランシング

(Toshov Sanjar)
GTCC に関する科目はこれで充分であったと思われる。

〈Reason〉 理由
（Mr Parmonov Azim）
これらの科目の研修をナヴォイで行うことはとても有益であるため。

(Mr Aslonov Aslon)
このテーマについての説明がなかった。ガスタービン M701F4 のトラブル・故障について多くの情報を得、ナヴォイ発電所で同様の問題が生じないよう手段が講じられれば良いと思った。また、本テーマはトレーニングセンターの講師にとっても有益なものである。

（Mr Bayliev Shukhrat）
- 私はウズベキスタンのトレーニングセンターで講師を務めるので、新しいシミュレータの原理、内容、について知っておくべきである。

（Mr Djamalov Bakhodir）
- 私はトレーニングセンターでは機械部門の講師を務めるので、ホットパーツのトラブル事例と、それを防ぐための各種検査に関する講義・実習は有益である。

(Mr Musaef Alisher)
ナヴォイで実際の研修を行うときには、上述のホットパーツの検査に関する十分な知識と検査設備が必要になると思われる。

(Mr Narziev Akmal)
ナヴォイのトレーニングセンターで計測器に関する研修を実施する際には十分な知識と実習設備が必要になると思われる。

(Toshov Sanjar)
私は初来日である。この GTCC についての専門コースは、基礎的知識及び教育に必要なものを十分に含んでいると考える。

(Mr Khasanov Latif)
全ての科目が今回の JICA 研修に含まれていたと思う。

単元目標

1）日本の運転保守研修プログラムを理解し、講師として説明できる基礎知識を整理する。

2）**帰国後に本プロジェクト（「ウズベキスタン国　コンバインドサイクル発電運用保守トレーニングセンター整備プロジェクト」）において自らが実施する活動について、アクションプランを作成し、日本人専門家チームと目標を共有する。**

1. 単元目標を達成しましたか？

	← 十分達成できた		達成していない →	
	4	3	2	1
単元 1	3	5		
単元 2	7	1		

2. コメントや提言（特に評価が **1** または **2** の場合）

【単元 1】

【単元 2】

3. 全単元目標を通じて、「科目」について、以下の質問に答えてください。

特に有益であった科目

〈Subject〉科目

(Mr Parmonov Azim)

1. GTCC についての講義、実習
2. 火力発電所の人材育成
3. 施設更新を行った発電所の見学と、メーカー工場の見学

（Mr. Aslonov Aslon）

非破壊検査実習、発電所見学

（Mr Vayliev Shukhrat）

- 現場での研修(特に発電所)
- 主要設備の原理、効率の高い運転についての説明

（Mr Djamalov Bakhodir）

1. PCM
2. 火力発電所の人材育成（PET）
3. MHPS の設備生産
4. 非破壊検査実習

(Mr Musaev Alisher)

1. PCM
2. 火力発電所の人材育成
3. 柳井発電所での定期検査見学

4. PET が実施している研修の種類の紹介

(Mr Narziev Akmal)
1. 計装制御システム概要
2. PCM
3. ガスタービン制御
4. 火力発電所の人材育成

(Mr Toshov Sanjar)
- 振動、計装制御システム
- MHPS での研修

（Mr Khasanov Lativ）
1. 火力発電所の人材育成
3. が実施している研修の種類の紹介

〈Reason〉理由
(Mr Parmonov Azim)
ナヴォイ発電所のトレーニングセンターの講師養成のため。

（Mr. Aslonov Aslon）
日本での研修の目的はトレーニングセンターの人材育成である。私は人材育成について良い知識技能を得た。日本では、まず座学を実施し、次に講師と受講者が共に実習を行うことが分かった。

（Mr Vayliev Shukhrat）
ウズベキスタンの講師は座学・実習いずれにおいても研修内容を習得しようと努力した。特に PET の宮本さん、福山さんには感謝している。運転、保守・修理に関する私たちのいかなる質問にも必ず答えてくれた。実は、保守・修理と余寿命診断については以前私たちの発電所で実習が行われたことがあった。そのため、私たちはパーツのライフサイクルについて最も効率的なパターンを選択する方法について多くの質問を出すことができた。

（Mr Djamalov Bakhodir）
- 来日の目的はナヴォイ発電所に作られるトレーニングセンターの講師の知識技能の向上である。そのためには MHPS の製造プロセス、及び PET で行われた「火力発電所の人材育成」は必要なものであった。得られた情報を基にナヴォイのトレーニングセンターのためのアクションプランを作りたいと思う。

(Mr Musaev Alisher)
ナヴォイ発電所に作られるトレーニングセンターの講師養成のために来日したので、柳井発電所の人材養成にすいて知る必要があった。得られた情報を基にナヴォイのトレーニングセンターのためのアクションプランを作りたいと思う。

(Mr Narziev Akmal)
私は自国のトレーニングセンターでは計装制御システムを担当するので、日本で用いられている GTCC の新しい制御システムについて詳細に学ぶ必要があった。

(Mr Toshov Sanjar)
これらは面白いばかりでなく、特に重要なものである。私たちのトレーニングセンターでは日本で学んだ知識を活用するからである。

(Mr Khasaonv Latif)
私たちにとっては PET の研修の在り方が好例になる。

必要ではなかった科目

〈Subject〉科目
（Mr. Aslonov Aslon）
ガスタービンに関する基本的な科目

（Mr　Toshov Sanjar）
- 全ての科目が重要であると思う。

〈Reason〉理由
（Mr. Aslonov Aslon）
先にも述べた通り、私たちはこの分野で既に５年も仕事をしており、私たちの経験がまだ十分ではないにしても、ガスタービンの基礎コースは既にある。

（Mr　Toshov　Sanjar）
- 今回の講義、発電所や実験施設で行われた実習は、私の専門知識をもう一度復習するのに役立った。

扱われなかったが、含むべき科目

〈Subject〉科目
（Mr Parmonov Azim）
実習。案件目標 3-(3)で記載した科目であり、電気関係の職員の知識と経験を深めるものである。

（Mr. Aslonov Aslon）
先に述べたように、M701F4no トラブル、運転時の故障

（Mr Djamalov Bakhodir）
MHPS のテキストの中に、GTCC の運転時間が増えるにつれ現れる具体的なトラブルの実例が含まれていれば良かったと思われる。また、下記についての実習が含まれるのが望ましい。
7.　蛍光浸透探傷試験（FPT）
8.　渦流探傷試験（ET）

9.　X 線探傷検査　（RT）
10. 振動とバランシング
11. 実測による探傷

(Mr Musaef Alisher)
1. 蛍光浸透探傷試験（FPT）
2.渦流探傷試験（ET）
3　X 線探傷検査　（RT）
4　振動とバランシング

(Mr Narziev Akmal)
PID 制御に関する科目。
下記についての実習
1　計測器
2　渦流探傷試験（ET）
3　振動とバランシング

（Mr Toshov Sanjar）
電気関係についてもっと多く学びたかった。

〈Reason〉理由
（Mr Parmonov Azim）
これらの科目はナヴォイで研修を実施する際に必要である。ガスタービンに関する各講義を受けながら、受講者は何かしら自分のためになるもが得られる。

（Mr. Aslonov Aslon）
トレーニングセンターの講師として、トラブルの解決、設備の欠陥の見極めを知っておかなければならない。

（Mr Djamalov Bakhodir）
- 私はトレーニングセンターでは機械部門の講師を務めるので、ホットパーツのトラブル事例と、それを防ぐための各種検査に関する講義・実習は有益である。

(Mr Musaef Alisher)
ナヴォイで実際の研修を行うときには、上述のホットパーツの検査に関する十分な知識と検査設備が必要になると思われる。

（Mr Toshov Sanjar）
今回の研修内容はガスタービンの機械部門の学びに焦点が当てられていた。電気に関する講義が含まれてはいたが、その量はガスタービンの運転より少なかった。

(Mr Khasanov Latif)
全ての科目が今回の JICA 研修に含まれていたと思う。

パート 2：研修デザインについて/ PART Ⅱ Program Design

1. あなたもしくは所属組織が案件目標を達成する上で、プログラムのデザインは適切だと思いますか？
(※プログラムのデザイン: プログラムの構成、バランス)

← 適切である			適切ではない →
4	3	2	1
4	4		

2. 研修期間は適切でしたか？

長い	適切	短い
	4	4

3. 本研修の参加者人数は適切だと思いますか？

多い	適切	少ない
	8	

4. 本研修において研修参加者の経験から学ぶことができましたか？

← できた			できなかった →
4	3	2	1
6	2		

5. 視察や実習など直接的な経験を得る機会が十分ありましたか？

← 十分あった			なかった →
4	3	2	1
2	6		

6. 討議やワークショップなど、主体的に参加する機会が十分ありましたか？

← 十分あった			なかった →
4	3	2	1
2	6		

7. 講義の質は高く、理解しやすかったですか？

← 良かった			良くなかった →
4	3	2	1
5	3		

8. テキストや研修教材は満足するものでしたか？

← 満足した			満足していない →
4	3	2	1
2	6		

9. 本邦研修で得た日本の知識・経験は役立つと思いますか？

A	6	はい、業務に直接的に活用することができる。
B	2	直接的に活用することはできないが、業務に応用できる。
C		直接的に活用、応用することはできないが、自分自身の参考になる。
D		いいえ、全く役立たない。

10. 目標を達成するための適切なファシリテーション（講義内容の理解促進、AP 等の作成にかかる助言等）を受けることができましたか？

← 満足した			満足していない →
4	3	2	1
8			

11. 研修監理員の通訳および研修監理サービス（調整・手配）には満足しましたか？

	← 満足した			満足していない →	
通訳	4	3	2	1	通訳はなかった
		8			
調整業務	4	3	2	1	
	8				

12. 日本の社会的・文化的背景を理解できたと思いますか？

← 十分できた			できなかった →
4	3	2	1
6	2		

13. 宿泊施設に関する以下の項目について、満足であったかお答えください。

	← 満足した			満足していない →	X
JICA センターの設備	4	3	2	1	
	8				
JICA センターの食事	4	3	2	1	
	8				
JICA センターのサービス	4	3	2	1	
	8				
ホテルの設備	4	3	2	1	
	6	2			
ホテルのサービス	4	3	2	1	
	7	1			

14. Q1～Q13 に関して、改善のための提言

(Mr Parmonov Azim)
問 2 - もし、研修期間を長くするのであれば、もう少し実習を増やしてほしい。実習に関する経験を多く積むことができる。

問 8 - 電気関係のテキストに案件目標 3-(3)で述べた項目を入れる。
問 11　-　通訳のレベルはあまり満足のいくものではなかった。技術通訳に十分な実績のある通訳を雇えば良かったと思われる。

（Mr Aslonov Aslon）
研修プログラム：私たちはトレーニングセンターの講師養成のために日本の研修に参加した。技能の高い専門家との研修やディスカッションが不足していたと思われる。私たちはガスタービンの運転故障についてディスカッションしたかった。
ホテルのサービスについて：批判的な意見で申し訳ないが、倉敷のホテルはとてもひどかった。部屋は寒くエアコンの調子も悪かった。

（Mr Bayliev）
研修にはどんなクレームもない。しかし、もっと学びたかった。研修期間は短すぎる。研修期間を伸ばしてもらいたい。

（Mr Djamalov Bakhodir）
研修内容を部分的に変更すれば良いと思われる。即ち、他の多くの発電所や工場を訪問し、研修期間を伸ばし、実習を増やし、GTCC 運転中に起こる具体的なトラブルについての資料を添えることである。通訳は悪くなかったが、もう少しロシア語の技術用語を学んでもらいたい。心からのことばである。
倉敷のホテルは悲惨だった。さらに正直に言って、都市から都市へ移動するときはバスであれば良かったと思う！！

（Mr　Musaev Alisher）
問 1 – 日本側の講師がその科目に関する分野の専門家であれば良かったと思われる。そうすれば目標に容易に達せられであろう。例えば、質問しても有益な答えが得られるであろう。
問 2－研修期間を長くするのであれば、実習を多くして、実習に関する経験を多く積めるようにするのが良いと思われる。
問 5－実習、ガスタービンの製造工場、ガスタービンホットパーツ修理工場見学が追加されれば良いと思われる。
問 8 - MHPS のテキストに GTCC 運転中に起こり得る具体的なトラブルについての情報が加えられていたら良かったと思われる。

(Mr Narziev Akmar)
都市間の移動が多くあった。幾つもの荷物を持って列車で移動するのは大変だった。倉敷のホテルは、寒く住環境は良くなかった。研修プログラムについては、実習が少なかった。

（Mr　Toshov　Sanjar）
電気部門の実習が不足していると思う。座学ばかりでなく、電気関係の実習を多く入れてほしい。

（Mr　Khasanov　Lativ）
特に提案はない。

パート 3：日本での気づき・学びについて/ PART Ⅲ Findings and Learnings

1~4.(必須):"日本での学びとその活用について"

1.研修を通じて学んだ知見の中で、自国の課題解決に貢献しうる知見（手法、業務・組織、制度、概念）、技術、技能を挙げてください。

(Mr Parmonov Azim)

1. PET で技術研修の後で受講生に対してテストを行うこと。
2. MHPS の座学と発電所見学

(Mr Aslonov Aslon)

- 電力会社の研修を紹介すること （非破壊検査の講義と実習）
- MHPS の座学と工場見学

(Mr Aslonov Aslon)

- 第 1 にガスタービンの運転・メンテナンスを理解するために、（トレーニングセンターの）受講者はこのテーマの基礎コースを知る必要がある。第 2 に基本コース終了後に受講者は実習で座学の知識を強化する必要がある。

（Mr Bayliev Shukhrat）

GT の運転・メンテナンスに関する科目が、帰国後の私たちの仕事に一番役に立つと思う。

（Mr Djamalov Bakhodir）

1 GTCC の人材育成条件
2 アクションプランを作成時にグループワークで問題を解決にあたること。
3 仕事の正確さ
4 PET で、研修後又は技能向上後に受講者の知識をチェックしていること
5 MHPS の座学、実証発電設備の見学

(Mr Musaev Alisher)

1 GTCC の人材育成
2 アクションプランを作成時に、みんなで（集団で）で問題解決にあたること。
3 仕事の正確さ
4 PET で、受講者のスキルアップ後に到達度をテストすること
5 MHPS の座学、実証発電設備の見学

(Mr Narziev Akmal)

1. 仕事の正確さ
2. MHPS の座学、実証発電設備の見学
3. アクションプランの作成時に、みんなで問題解決にあたること。
4. PET で、受講者のスキルアップ後に到達度をテストすること
5. GTCC の人材育成

(Mr Toshov Sanjar)
PET と MHPS での研修

(Mr Khasanov Latif)
職場における秩序、仕事の正確さ

2.なぜそれが有用であるか述べてください。

(Mr Parmonov Azim)
PET の研修センターでは各コースの終了後にテストを実施するというのが大変良いと思った。

（Mr Aslonov　Aslon）
私は、理論-実技-ディスカッションという順序で授業が行われるのが良いと思う。その後、簡単な質問票かテストで到達度を確認できる。

（Mr Bayliev Shukhrat）
MHPS はナヴォイ発電所の GT の納入者なので、MHPS でしっかり学ぶ必要がある。そしてそこで得た知識を実際の運転に活かしたい。

（Mr　Djamalov Bakhodir）
PET の研修センターでは、火力発電所の新入社員向け研修、発電所の職員のスキルアップ研修が随時行われている。PET のシミュレータが、運転時の事故や非常事態を設定していていたことがとても気に入った。MHPS で GT・GT 周りの設備の設計を担当している専門家から得た理論的な知識は、今後の仕事に大変有益である

(Mr Musaev Alisher)
火力発電所の新入社員研修は特別な研修センターで行われている。また、発電所の職員も各自のスキルを向上させる。PET にトレーニング用の操作盤があるのがとても良いと思った。オペレータは事故時や非常時を経験することができ、オペレータの機動性も高められる。MHPS の高砂工場ではわが国で建設されているタービンの設計者も働いていた。そうした設計担当者から知識を習得することは、これから大変役に立つと思われる。

(Mr Narziev Akmal)
目標に到達するためには、人材に知識を授けるばかりではなく、自分の仕事をプロフェッショナルとして行うという心構えを涵養することが必要である。

(Mr Toshov Sanjar)
私たちのトレーニングセンターではエネルギー分野の様々な受講生を対象とした研修が実施される予定である。そのため日本でのこのような研修は、新トレーニングセンターにとって好例となる。

(Mr Khasanov Latif)
トレーニングセンターの講師の仕事にも、こうした特性は必要である。

3.どのように自国に採用もしくは適用するか述べてください。また、採用もしくは適用において課題があれば記述してください。

(Mr Parmonov Azim)
人材育成では研修コースの理解度を把握するためにより多くテストをする必要があると思う。

（Mr Djamalov Bakhodir）
ナヴォイ発電所のトレーニングセンターが作られたら、国内で GTCC の人材が効率よく育成できると思う。

（Mr Musaev Alisher）
トレーニングセンター設立によって、わが国でも効率的に発電分野の人材育成が行われるようになる。

(Mr Narziev Akmal)
わが国は開発途上国と見なされており、国の開発、発展のためにはプロフェッショナルの視点から人材育成・研修を実施することが必要である。私たちの知識がわが国の電力分野の発展に寄与すると確信している。

(Mr Toshov Sanjar)
今日私たちの職場では、主任技師が認可する研修日程に基づいた研修が行われている。発電所の管理者に対して日本での知見を提案したいと思う。おそらく私の提案を発電所の研修プログラムに採用してもらえると思う。特に実験室での研修もより広く取り入れるよう提案するつもりである。

（Mr Khasaonv Latif）
適用するのに特に問題はない。

4. 日本滞在中に強く印象に残った日本人の特徴や日本の特性にマークをしてください。

親切	6	細部までこだわる	6
時間に正確	8	文化と歴史が素晴らしい	8
規律を守る	8	食事がおいしい	
勤労・勤勉	7	清潔・きれい	6
礼儀正しい	7	治安が良い	8
物静かである	1	交通渋滞が激しい	5
働きすぎである	4	自然豊か	7
その他(　　)			

具体的なエピソード　その他の特徴・特性

(Mr Parmonov Azim)

1. 規律正しさ
2. 礼儀正しさ、几帳面さ

(Mr Aslonov Aslon)

1. バスを待つ列で、店や玄関で順序を守り礼儀正しい。例えば毎日 MHPS に通っているが、バスを待つ人の長い列が見られる。これは大変驚きだった。
2. 職場や道路での規律正しさ。時々、講義の始まる時間より早く教室に到着することがあったが、講師の先生方はいつもスケジュール通りの決まった時間に授業を始めた。
3. 私たちのコーディネータについて書きたい。彼女がロシア語を勉強したのは、ロシア語に興味があったからだと聞いて大変驚いた。ロシア語はとても難しい言語である。正直に言って、彼女は若くはないが大変努力家で熱心であり、自分の力で全力を尽くしていると思われる。

(Mr Djamalov Bakhodir)

1. 和食、規律
2. ホスピタリティ、節約、仕事に対する責任感、献身的にまで打ち込む態度、礼儀正しさ
3. 名所旧跡

(Mr Musaev Alisher)

1. 集団で行動する
2. 規律正しさ、節約、探求心
3. 権力権威に忠実である
4. 礼儀正しさ、几帳面さ、冷静さ

(Mr Narziev Akmal)

1. チームプレーの仕事（集団で行う仕事）
2. お互いを尊敬する
3. 自分の言葉に誠実であろうとすること
4. 礼儀正しさ、几帳面さ、冷静さ

(Mr Toshonov Sanjar)

日本は自然が豊かで都市の景観も美しい。日本人の驚くべき特性はお互いへの尊敬だ。姫路城（訳注：及び好古園）に行った時、日本人が自然を母親のように大切にしているのを見た。

5.(任意):“日本での経験について”

（Mr Bayliev Shukhrat）
日本の文化を知ったことは私の人生における最も驚くべき発見の一つである。私は私を取り囲む世界について何も知らないということを、人生で初めて認識した。自然を愛する心の他にも、日本人が歴史を敬虔なまでに大切にする態度にも驚かされた。どのような人を選んでいくか、ということは人事の要諦である。広く知られていることだが、日本には愛社精神があり、職場のトラブルはほとんどなく、仕事は整然と行われる。職員の和は集団主義的職場で大切にされる。

(Mr Djamalov Bakhodir, Mr Narziev Akmal)
私は広島・長崎の被爆後の復興期の話に驚きを感じた。当時人々は団結し国の発展のために尽力した。それから世界平和を願う平和教育にも感銘を受けた。その他に私が気に入っているのは、日本人の礼儀正しさ、ホスピタリティ、文化、名所旧跡、仕事の正確さ・時間厳守、献身的態度、仕事への責任感、勤勉さ仕事へ熱意、これが日本人の重要な特性だと思う。

(Mr. Musaev Alisher)
日本は、行動規範、日常生活のルールが社会の構成員にとって大きな意味を有するだけではなく、もし個人が社会から爪弾きされたくないなら、これらのルールの遵守が義務となっている唯一の国であると思う。日本人の礼儀作法は時折ヨーロッパ人によく分からないことがある。よそ者が大切な組織の中にいることは望ましいことではなく、そんな時には微妙な空気が醸し出され、「面目ない」ことになり、その面目なさは日本人には死にも等しいのだ。暗黙のルールの遵守は、法律の遵守より厳しく求められる。

日本人の国民性として挙げられるのは、

a) 勤勉、研ぎ澄まされた美的感覚、自然への愛情、伝統を大切にすること、いろいろな文化を上手に取り入れること、エスノセントリズム（自民族中心主義）、実際主義。
b) 集団行動 - 規律正しさ、権威に忠実であること、義理の感情
c) 日常生活に見られる特性　-　礼儀正しさ、几帳面さ、自制（冷静さ）、節約、知識欲が強い（知的好奇心）

勤勉及び仕事への熱意、これは日本の国民性の重要な点である。例えばドイツ人、アメリカ人、イギリス人が日本人に比べて勤勉でないと言うつもりはない。しかし、ドイツ人の勤勉は全く別のものだ。ドイツ人は規則正しく、経済性を考えて働く。全て計算され規定された通りに働く。日本人は仕事に我を忘れて没頭することが喜びなのだ。日本人固有の、素晴らしいという感情は仕事の過程で現れる。日本語には「風流」ということばがあって、それぞれ「風」と「流れ」という漢字が充てられている。これは「すばらしい」という感情を伝えている。作家の谷川徹三によれば、美意識は日本の国民性の基であり、最も重要な特質であり、他の特性は美意識の周辺にあるという。

※あなたの回答は JICA が事業改善のために使用させて頂きます。ご協力ありがとうございます。

第 4 部 本邦研修後の成果活用に関する質問

ЧАСТЬ 4 Вопросы, касающиеся использования результатов обучения после возвращения на родину

1. 研修で作成した Action Plan を帰国後に実施するのは易しいですか？

Q1. Будет ли Вам просто реализовать составленный в ходе обучения план действий после возвращения на родину?

← ← Да, очень просто（容易）			Нет, очень трудно（困難）→ →
□4	□3	□2	□1
1 名(Mr Aslonov)	1 名（Mr Vayliev）	6 名	

Если Вы ответили 3 или 4, перейдите к вопросу Q2-1. Если Вы ответили 1 или 2, перейдите к вопросу Q2-2.

2-1. 活用することが容易と感じる場合、なぜですか？

Q2-1. Почему Вы считаете применение простым? Дайте ответы по следующим пунктам.

	Причины（理由）	←Очень согласен（同意）		Не согласен→（同意しない）	
A	Потому что я обладаю полномочиями принятия решений. 自分が意思決定の権限を有しているため	□4	□3	□2 1 名	□1 1 名
B	Потому что цель и содержание этой программы совпадают с направлениями деятельности моей организации. 研修の目的･内容と組織の方針とが合致しているため	□4 2 名	□3	□2	□1
C	Потому что у меня не будет проблем с обеспечением необходимых финансовых ресурсов. 活用するうえで必要となる予算の確保が容易なため	□4	□3	□2 1 名	□1 1 名
D	Потому, что мне будет просто заручиться пониманием и сотрудничеством со стороны моих коллег. 同僚の理解と協力を得ることが容易なため	□4 2 名	□3	□2	□1
E	Потому что ситуация в моей стране очень похожа на ситуацию в Японии. 日本の経験が自国の状況と近いため	□4	□3	□2 2 名	□1
F	Прочие причины (изложите, пожалуйста, кратко). 他の理由（記述） （Mr. Aslonov Aslon, Mr Toshov Sanjar） 私は財政の専門家ではないが、運転に関するエンジニアである。なので、私たちのプロジェクトがより良い形で実現するよう全力を尽くすつもりである。				

2-2. 活用することに困難を感じる場合、なぜですか？

Q2-2. Почему Вы считаете применение сложным? Дайте ответы по следующим пунктам.

	Причины（理由）	←Очень согласен（同意）		Не согласен→（同意しない）	
A	Потому что я не обладаю полномочиями принятия решений. 自分が意思決定の権限を有していないため	□4 5名	□3	□2 1名	□1
B	Потому что цель и содержание этой программы не совпадают с направлениями деятельности моей организации. 研修の目的・内容と組織の方針とが合致しないため	□4	□3	□2 1名	□1 5名
C	Потому что у меня будут проблемы с обеспечением необходимых финансовых ресурсов. 活用するうえで必要となる予算の確保が難しいため	□4 2名	□3 4名	□2	□1
D	Потому, что мне будет трудно заручиться пониманием и сотрудничеством со стороны моих коллег. 同僚の理解と協力を得ることが難しいため	□4	□3 1名	□2 4名	□1 1名
E	Потому что ситуация в моей стране очень отличается от ситуации в Японии. 日本の経験が自国の状況と大きく相違しているため	□4	□3 1名	□2 5名	□1
F	Прочие причины (изложите, пожалуйста, кратко). 他の理由（記述） （Mr Parmonov Azim, Mr Djamalov Bakhodir, Mr Musaev Alisher, Mr Khasanov Latif） 管理者に対して、私たちのアクションプランの実施に関して提案することができるのみである。もし管理が私たちのプランを採用するならば、喜んで自主的にアクションプランを実施する。				

Each questionnaire for the each daily content

集計

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月日 Date	研修コース名 Modules Tytle	Please describe new knowledge/skills and useful advice, getting from this program. Any comments or suggestions, to make your own Action Plan
2017/2/1 PM & 2017/2/2	PCM研修 Обучение по "Управлению проектным циклом"	(Mr. Parmonov Azim)　本プロジェクトで新たな知見を得て、私の専門性を高めることができる。 (Mr. Aslonov Aslon, Mr Musaev Alisher)　この科目はとても面白かった。時間が少なかったにもかかわらず、講師はできるだけ簡潔に分かり易く授業を進めてくれた。この講義から学んだことは、問題は分析を進めていくことで解決されるということである。関係者が活動を実施し問題が解決される。 (Mr Djamalov Bakhodir)　問題解決及びアクションプラン作成のプロセスでディスカッションが取り入れられているのが良かった。どんな問題の解決にもこの優れた手法は適用できると思う。 (Mr Toshov Sanjar)　ナヴォイ発電所でもこのような優れた手法は取り入れられるべきだと思う。
2017/2/3	オリエンテーション 日本の電力会社の人材育成 Инструктаж Кадровая подготовка в Японской энергетической компании	(Mr Aslonov Aslon) 私はこのテーマに関して普段より多くの質問をした。講義の時間は少なかったが、PETの講師はトレーニングセンターの開設と人材育成に役立つ多くの情報を与えようと努力してくださった。講師には人材育成の分野での十分な経験があると思う。研修一般についてだけではなく、講師が受講生にどのように対応していくかという心理面についても話を聞くことができた。 (Mr Djamalov Bakhodir)　この講義は私が良い講師になるために役立つ情報を多く与えてくれた。 (Mr Toshov Sanjar)　講義は分かり易く簡潔であった。
2017/2/6	電力会社の研修紹介 （機械・電気制御・発電） Ознакомление с обучением в энергетической компании （Механическая・Электрическая контрольная・Генерационная части）	(Mr Aslonov Aslon, Mr Musaev Alisher) 今回の研修に参加することは 私たちのトレーニングセンターの今後にとって大変良い機会である。しかし、「振動」についてはあまり満足していない。時間が非常に短かったからだ。このテーマについてもう一度授業に参加したかった。講師は専門知識を備えた優秀な人だった。シミュレータを使った実習はとても面白かった。私たちの振動のシミュレータもPETで使われているものと同じようなものであることを願う。 (Mr Djamalov Bakhodir) この講義は私が講師となって実習をするのに役に立つ。 (Mr Toshov Sanjar)　日本は大きな国ではないが、経済とエネルギー部門の規模は大きい。全てよくわかった。
2017/2/7 & 2017/2/8	電力会社の研修 非破壊検査　講義・実習	(Mr Aslonov Aslon) 非破壊検査はトレーニングセンターで取り上げる重要な科目の一つである。私たちは十分な知識を得ているが、実習については十分な経験を積んでいない。実習を体験出来て感謝している。 (Mr Djamalov Bakhodir)　PETでの講義と実習は私が自国で実習を正しく行うのに役立つ。 (Mr Toshov Sanjar)　私は電気の専門家だが、これらの非破壊検査の手法は私たちに大変役に立つ。 (Mr Khasanov Latif)　講義も実習も面白かった。
2017/2/9 & 2017/2/10	コンバインドサイクル発電技術 （柳井発電所） Технология генерации комбинированного цикла （Электростанция Янаи）	(Mr Parmonov Azim)　見学できて大変良かった。ナヴォイ発電所との運用の違いを理解することができた。 (Mr. Aslonov Aslon)　柳井発電所は我々にとってだけではなく日本人にとっても大きな学校だと言える。柳井発電所からたくさんの情報を得、その経験から多くを学んだ。私たちのコーディネータと講師の努力は素晴らしかった。（PETの）講師の経験から得たものを私たちのトレーニングセンターで活用していきたい。 (Mr Djamalov Bakhodir)　柳井発電所の講義と見学はとても面白く今後の仕事に役立つものだった。 (Mr Toshov Sanjar)　素晴らしい会社である。職員も仲が良い。 (Mr khasanov Latif)　柳井発電所について知ることができ大変有益であった。

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月日 Date	研修コース名 Modules Tytle	Please describe new knowledge/skills and useful advice, getting from this program. Any comments or suggestions, to make your own Action Plan
2017/2/13 AM	中国電力中央給電指令所及び火力部見学 Посещение Центрального диспетчерского центра и тепловой части Тюгоку Электрик	(Mr. Aslonov Aslon) 全て良かった。しかしいくつかの点について情報が開示されなかった。電力系統の運用については大変驚いた。給電指令所の設備には最新のテクノロジーが使われていた。整理整頓が行き届いているのも素晴らしかった。 (Mr Djamalov Bakhodir) 中央給電指令所を見られてとても面白かった。 (Mr Narziev Akmal) 中国電力の本社で多くの有益な情報が得られた。 (Mr Toshov Sanjar) 多くの知識が得られた。 (Mr Khasanov Latif) 講師養成には有益な講義だった。
2017/2/14 & 2017/2/15	コンバインドサイクル発電技術（水島発電所） Технология генерации комбинированного цикла (Электростанция Мидзушима)	(Mr Parmonov Azim)水島発電所の見学もとても良かった。今後役立つであろう多くのことを学ぶことができた。 (Mr. Aslonov Aslon)水島発電所は石炭とLNGを燃料としている。職員はみな規律正しかった。水島発電所のガスタービンに特に興味があった。各翼ごとに等価運転時間が計算されていることを知り驚いた。このやり方についてもっと知りたかったが時間が足りなかった。 (Mr Djamalov Bakhodir) 石炭もLNGも燃料として用いることのできる石炭火力発電設備が見られて面白かった。 (Mr Narziev Akmal) 今日の研修はとても面白かった。 (Mr Toshov Sanjar) 今日の講義のレベルは高かった。
2017/2/16	メーカー研修 MHP開校式・工場見学 Церемония начала учебы в MHPS・Осмотр завода・GT & Auxiliaries Arrangement	(Mr. Aslonov Aslon) ガスタービンのパーツ製造の見学は驚くべきことであり、MHPSに感謝する。パーツが出来上がるまでには多くの努力と時間が必要で、熟練が求められる。ガスタービンパーツの研究施設は大変気に入った。MHPSとの協力に感謝する。 (Mr Bayliev Shukhrat) 工場見学の時間が少なかった。MHPSの製造についてもっと知ることができれば、トレーニングセンターで説明する時に役に立つ。 (Mr Djamalov Bakhodir) MHPSの設備を見るのは面白かったがGTホットパーツ製造工場、修理工場をもっと見られれば良かった。 (Mr Musaev Alisher) 工場見学の際、トレーニングセンターで使う最も簡単なパーツでさえも写真を撮ることが許可されなかった。次の研修グループには必要な工場の見学を日程に入れてほしい。 (Mr Narziev Akmal) 今日はMHPSの工場で多くの新しい情報を得ることができた。 (Mr Toshov Sanjar) 講義は大変良かった。
2017/2/17	メーカー研修 ・P&I Diagram, Hazardous Area ・Operation Procedure, General Interlock	(Mr. Aslonov Aslon)私にとって本テーマは復習であった。タリマルジャン発電所でもナヴォイ発電所同様F701F4が設置された。オペレーションと保護についての設計思想を理解するのに今回の研修は有益であった。しかし、研修内容と講師の専門が合っていなかった。P&I線図、防爆範囲、についての講義を担当した講師の専門は熱交換器であった。正直言って少しがっかりした。次回からは講師の専門分野と専門性についてチェックしてほしい。 (Mr Bayliev Shukhrat) 私たちはGTCCで発電しており、基礎的な知識は十分に持っている。私たちに必要なのはもっと高次元の（深い）知識である。 (Mr Djamalov Bakhodir) 講師が講義のテーマについての専門家であれば良かったと思われる。 (Mr Musaev Alisher) 講師が講義内容の分野の専門家ではなかった。 (Mr Toshov Sanjar) それぞれのオペレータが必ず知っておかなければならない重要な講義であった。
2017/2/20	メーカー研修 ・GT & Auxiliaries System	(Mr Parmonov Azim) 講義は良かったが、技術に関する質問をディスカッションする時間が少なかった。 (Mr. Aslonov Aslon) この授業はとても面白かった。Shrinidhaさんは優秀な専門家であり教師である。このような人からは素晴らしい知見が得られると思う。講義のテーマはガスタービン周りの補機で、大変有益であった。研修教材について良いアイディアが浮かんだ。日本での研修終了後にガスタービンについての研修スケジュールを作成する予定である。これらの資料を補機の説明に使いたい。 (Mr Djamalov Bakhodir) 講師の教え方、質問への答え方が良かった。 (Mr Narziev Akmal) 今日の講義は分かり易く面白かった。 (Mr Toshov Sanjar) 私は全ての授業がとても気に入った。

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月日 Date	研修コース名 Modules Tytle	Please describe new knowledge/skills and useful advice, getting from this program. Any comments or suggestions, to make your own Action Plan
2017/2/21	メーカー研修 ・Blade Washing Device, etc. & Heat Exchanger ・General Description of C&I System	(Mr. Aslonov Aslon) タービンの冷却システムが特に面白かった。このようなシステムは運転の条件に従って最適なものが選択されるということだ。そのような特性に今後注意を払いたいと思う。 (Mr Djamalov Bakhodir, Mr Musaev Alisher)講師の教え方、質問への答え方が良かった。 (Mr Toshov Sanjar) 今日の講義内容は私の専門ではないが、興味深く講義を聴くことができた。
2017/2/22 & 2017/2/23 AM	メーカー研修 ・Gneral Description of GT Control System	(Mr. Aslonov Aslon) ナヴォイ発電所ではこのGTコントロールシステムを使って運転を行っているが、講師は初めから私たちが理解している段階まで改めて説明しようと努めていた。コントロールのスキームについて多くの質問があったが、全ての質問に答えてもらえた。GVCSOとLDCSOについてよく分かっていなかったが、講義の中でそれらがどういうシステムであるのか明確に理解することができた。 (Mr Bayliev Shukhrat) 全ての講義の中で最も難しく有益で、独学では学べない分野であるのが「GTコントロールシステム」である。このプログラムはMHPSが作ったものである。もし設計者が私たちを教えたならば研修の目的は達せられるだろう。 (Mr Djamalov Bakhodir, Mr Musaev Alisher) 講師の教え方、質問への答え方が良かった。また教材のシュミレータ(ソフト)も良かった。 .(Mr Toshov Sanjar) 少しよく分からなかったが、このシステムはとても大切なもので今後もしっかり学ぶ必要があると思った。 (Mr Khasanov Latif) 特に私にとっては有益なテーマであった。
2017/2/23 PM & 2017/2/24	メーカー研修 ・GT Control System Operation & Maintenance	(Mr. Aslonov Aslon) 講義はとても面白かったが、とても短かった。次回の日本での研修では、このテーマに充てる時間を多くしてほしい。 (Mr Djamalov Bakhodir Mr Musaev Alisher) 講師の教え方、質問への答え方が良かった。また教材のシュミレータ(ソフト)も良かった。 (Mr Narziev Akmal) この研修はとても良かった。 (Mr Toshov Sanjar) 全て良く分かった。ありがとうございます。
2017/2/27	メーカー研修 ・Design construction and performance	(Mr. Aslonov Aslon) この講義は私にとって復習であった。しかしナヴォイ発電所で採用されていないガスタービンの新しい冷却手法について知ることができた。このようなシステムについてもっと知りたいと思う。 (Mr Djamalov Bakhodir Mr Musaev Alisher) 講師の教え方、質問への答え方が良かった。 (Mr Toshov Sanjar) ガスタービンは技術であるばかりではなく、人間が作り出した芸術であると思う。
2017/2/28	メーカー研修 ・Perodical Maintenance ・GT Electrical & Control Package	(Mr. Aslonov Aslon)メンテナンスが設備にだけ必要なのではなく、パーツや工具についても必要だとは考え及ばなかった。日本のメーカーはパーツ・工具のメンテナンスにも十分な経験を有しており、わが国の人材育成でもその点について日本の例に学びたい。 (Mr Djamalov Bakhodir Mr Musaev Alisher) 設備の定期検査の計画をどのようにたてていくのが良いのか知ることができ面白かった。質問に対する答えも適切であった。 (Mr narziev Akmal) 今日の講義はとても面白かった。 (Mr Toshov Sanjar) この研修には良い印象を持った。
2017/3/1 AM	メーカー研修 ・GT Commissioning Procedure	(Mr Djamalov Bakhodir Mr Musaev Alisher) 講師の教え方、質問への答え方が良かった。

※自由記述回答欄におけるコメントは要点をまとめて翻訳し、似通ったコメントは１つにまとめ、国名や研修員名連名（番号等）で表記する。

英語コースの場合は、案件担当の判断により英語のままの記載も可。ただし、その場合でも要点をまとめ、似通ったコメントは１つにまとめること。

全訳する必要はなく、代表的なコメントや研修改善への参考となる意見を取り上げて翻訳することとする。

集計年月日：2017/2/17

質問集計表/Questionnaire

研修コース名	**管理職向け CCPP 研修　（J1692058）**
研修期間	**2017 / 2 / 7　～　2017 / 2 / 17**
受入人数	**1　名**

パート１：研修成果について/ PART Ⅰ　Program output

案件目標・単元目標は各研修にて設定

1. 案件目標を達成しましたか？

「ウズベキスタン国の電力公社であるウズベクエネルゴに CCPP 運転保守トレーニングセンターが新設されることに伴い、CCPP 運転維持管理の教育を実施する講師陣を育成し、運転保守要員を教育する体制を整え、ウズベクエネルゴが自律的に運営できる体制を整える。」

←　十分達成できた		達成していない　→	
4	3	2	1
1			

2. コメントや提言（特に評価が 1 または 2 の場合）

3. 「科目」について、以下の質問に答えてください。

特に有益であった科目

〈Subject〉科目

1. プロジェクトサイクルマネージメント
2. 火力発電所における人材育成
3. 株式会社パワー・エンジニアリング・アンド・トレーニングサービス(PET)の組織体制
4. 火力発電所の大規模改修

〈Reason〉 理由
・新トレーニングセンターのアクションプランを作成するため。

必要ではなかった科目

〈Subject〉 科目

〈Reason〉 理由

扱われなかったが、含むべき科目

〈Subject〉 科目
以下のテーマに関する実習
1. 蛍光探傷検査
2. 過電流による探傷法
3. 振動、及び、バランシングにかかわる検査法

〈Reason〉 理由
・ナボイトレーニングセンターにおける講義・実習の実施に必要である。

※案件目標に加え単元目標（例 3 つ）も設定されている場合

1. 単元目標を達成しましたか？

単元目標 **1.**「日本の運転保守研修プログラムを理解し、講師として説明できる基礎知識を整理する。」

単元目標 **2.**「帰国後に本プロジェクト（「ウズベキスタン国　コンバインドサイクル発電運用保守トレーニングセンター整備プロジェクト」）において自らが実施する活動について、アクションプランを作成し、日本人専門家チームと目標を共有する。」

	← 十分達成できた		達成していない →	
	4	3	2	1
単元 1		1		
単元 2		1		

2. コメントや提言（特に評価が **1** または **2** の場合）

【単元 1】

【単元 2】

【単元 3】

3. 全単元目標を通じて、「科目」について、以下の質問に答えてください。

特に有益であった科目

〈Subject〉 科目

〈Reason〉 理由

必要ではなかった科目

〈Subject〉 科目

〈Reason〉 理由

扱われなかったが、含むべき科目

〈Subject〉 科目
〈Reason〉 理由

パート 2：研修デザインについて/ PART Ⅱ Program Design

1. あなたもしくは所属組織が案件目標を達成する上で、プログラムのデザインは適切だと思いますか？
(※プログラムのデザイン: プログラムの構成、バランス)

← 適切である			適切ではない →
4	3	2	1

(無回答)

2. 研修期間は適切でしたか？

長い	適切	短い
	1	

3. 本研修の参加者人数は適切だと思いますか？

多い	適切	少ない
	1	

4. 本研修において研修参加者の経験から学ぶことができましたか？

← できた			できなかった →
4	3	2	1
	1		

5. 視察や実習など直接的な経験を得る機会が十分ありましたか？

← 十分あった			なかった →
4	3	2	1
	1		

6. 討議やワークショップなど、主体的に参加する機会が十分ありましたか？

← 十分あった			なかった →
4	3	2	1
	1		

7. 講義の質は高く、理解しやすかったですか？

← 良かった			良くなかった →
4	3	2	1
	1		

8. テキストや研修教材は満足するものでしたか？

← 満足した			満足していない →
4	3	2	1
	1		

9. 本邦研修で得た日本の知識・経験は役立つと思いますか？

A	1	はい、業務に直接的に活用することができる。
B	1	直接的に活用することはできないが、業務に応用できる。
C		直接的に活用、応用することはできないが、自分自身の参考になる。
D		いいえ、全く役立たない。

10. 目標を達成するための適切なファシリテーション（講義内容の理解促進、AP 等の作成にかかる助言等）を受けることができましたか？

← 満足した			満足していない →
4	3	2	1
1			

11. 研修監理員の通訳および研修監理サービス（調整・手配）には満足しましたか？

	← 満足した			満足していない →	
通訳	4	3	2	1	通訳はなかった
	1				
調整業務	4	3	2	1	
	1				

12. 日本の社会的・文化的背景を理解できたと思いますか？

← 十分できた			できなかった →
4	3	2	1
1			

13. 宿泊施設に関する以下の項目について、満足であったかお答えください。

	← 満足した			満足していない →	X
JICA センターの設備	4	3	2	1	
	1				
JICA センターの食事	4	3	2	1	
		1			
JICA センターのサービス	4	3	2	1	
	1				
ホテルの設備	4	3	2	1	
	1				
ホテルのサービス	4	3	2	1	
	1				

14. Q1～Q13 に関して、改善のための提言

各発電所及び三菱日立パワーシステムズ株式会社(MHPS)では、極めて多くのデータが非公開であり、必要なデータを得ることができない。
例えば、
1. 火力発電所の技術・経済指標

2. 発電所の CC 発電導入前、導入後の事業実績等

パート 3：日本での気づき・学びについて/ PART Ⅲ Findings and Learnings

1~4.(必須):“日本での学びとその活用について”

1.研修を通じて学んだ知見の中で、自国の課題解決に貢献しうる知見（手法、業務・組織、制度、概念）、技術、技能を挙げてください。

1. 蒸気ガスタービン装置のための要員の養成 2. アクションプランの作成による、問題解決のための共同作業 3. 要員の業務遂行の正確さ、また、要員訓練の程度の高さ

2.なぜそれが有用であるか述べてください。

3.どのように自国に採用もしくは適用するか述べてください。また、採用もしくは適用において課題があれば記述してください。

4. 日本滞在中に強く印象に残った日本人の特徴や日本の特性にマークをしてください。

親切	1	細部までこだわる	1
時間に正確	1	文化と歴史が素晴らしい	1
規律を守る	1	食事がおいしい	
勤労・勤勉	1	清潔・きれい	1
礼儀正しい	1	治安が良い	1
物静かである		交通渋滞が激しい	1
働きすぎである	1	自然豊か	1
その他(　　)			

具体的なエピソード　その他の特徴・特性

（1） （2） （3）

5.(任意):“日本での経験について”

※あなたの回答は JICA が事業改善のために使用させて頂きます。ご協力ありがとうございます。

第 3 回 本 邦 研 修 実 施 報 告 書

〈要 約 版〉

「ウズベキスタン国　コンバインドサイクル発電運用保守トレーニングセンター整備プロジェクト」研 修

（講師候補・管理職　研修）

平成 28 年 6 月

独立行政法人国際協力機構

株式会社アジア共同設計コンサルタント

日本工営株式会社

中国電力株式会社

株式会社パワー・エンジニアリング・アンド・トレーニングサービス

第 3 回本邦研修の実施結果について、以下の通り報告する。報告書の作成にあたり、報告書の正式版は英語版の「Implementation Report of 3rd TOT in Japan The Project for Establishment of the Combined Cycle Gas Turbine (CCGT) Operation and maintenance Training Center」とし、日本語版は要約版とする。

1. 研修コース概要

(1)　研修コース名

「ウズベキスタン国　コンバインドサイクル発電運用保守トレーニングセンター整備プロジェクト」第 3 回本邦研修

(2) 研修期間

講師候補コース：平成 30 年 3 月 11 日　～　平成 30 年 4 月 12 日

管理職コース　：平成 30 年 3 月 20 日～平成 30 年 3 月 29 日

（※詳細のスケジュールについては、正式版を参照）

(3) 研修員数

ナボイ発電所内で講師候補者として推薦されたもののうち、第２回本邦研修に参加していない講師候補者を主な参加対象とした。

研修員	
講師候補	管理職
7 名	1 名

(4) 研修実施機関

株式会社　パワー・エンジニアリング・アンド・トレーニングサービス（PET)

三菱日立パワーシステムズ株式会社　（MHPS;国内再委託先）

アイ・シー・ネット株式会社　（IC-NET;国内再委託先）

２．研修内容

本プロジェクトにおける講師候補の育成は、「本邦研修」「ウズベキスタンにおける TOT 実施」「運転中コンバインドサイクルの定期点検を活用した UE による現場研修の実施」から構成される。本邦研修においては日本における電力分野人材育成の教育研修プログラムの理解を進め、日本人専門家が提供する教材をレビュー改訂する為の基礎知識を学び、帰国後に「ウズベキスタンにおける TOT 実施」及びナボイ新研修センターの立ち上げに貢献することが期待されている。

３．研修員

参加者氏名	現職	専門分野
講師候補コース		
トショフ　イスタム	CCPP 主任技師（計装制御）	C&I
マフムードフ　アジズ	火力発電所　非破壊検査員	機械
エシェフ　ハムダム	火力発電所　産業技師	電気
イスラーモフ　イスマイル	CCPP　修理技師（熱工学設備）	機械
フドイクーロ　フ　ルトフィロー	CCPP　ガスタービン・オペレーター	機械
バゾーラフ　ファフリディン	CCPP　バランスオブプラント・オペレーター	機械
ピルナザロフ　ヌラリー	CCPP　上級オペレーター	機械
管理職コース		
ドストフ　シュフラット	研修センター所長	所長

４．研修実績・評価・コメントなど

本プロジェクトで実施した本邦研修アンケート（JICA 指定）及びプロジェクト独自の各研修コースに関するアンケート結果については､正式版の 4 章及び 5 章に結果を集約した。

第 3 回本邦研修の参加者は、これまでウズベキスタンでの TOT の活動に参加し続けてきたこともあり､本邦研修の意義や帰国後の活動についても深く理解し､研修期間を通して熱心に講義や現場見学に参加する姿が特に目立っていた。特に、工場見学や施設見学においては、これから建設される新しい研修センターの運用に向けて、様々に興味を示す姿が見受けられた。

本プロジェクトにおけるナボイ新研修センターの講師候補者 15 名及びタシケント在住の第 1 回本邦研修参加者は、ウズベキスタン国内での定期点検を活用した現場研修は行えていないものの､本邦研修期間中に日本での定期点検の現場研修を通して､それに相当する研修を行うことが出来た。今後の活動において、引き続き研修センターの開設に向けて TOT の実施や運転中コンバインドサイクルの定期点検を活用した UE による現場研修の活用について期待したい。

最後に、第 1 回～第 3 回の本邦研修の実施を含むこれまでのプロジェクト全体の活動については、正式版の添付資料 2 に総括した。

Implementation Report of 3rd TOT in Japan

The Project for Establishment of the Combined Cycle Gas Turbine (CCGT) Operation and Maintenance Training Center

（Trainer Course / Management Course）

June 2018

Japan International Cooperation Agency (JICA)

Asia Engineering Consultant Co., Ltd.

Nippon Koei Co., Ltd.

The Chugoku Electric Power Co., Inc.

Power Engineering and Training Services, Inc.

Table of Contents

1．Outline of 3rd TOT (Training of Trainers)

(1) Training Course Title

「The Project for Establishment of the Combined Cycle Gas Turbine (CCGT) Operation and Maintenance Training Center」 3rd Training of Trainers in Japan

(2) Training Period

Trainer Candidates Course: From 11 Mar. 2018 to 12 Apr. 2018

Management Course: From 20 Mar. 2018 to 29 Mar. 2018

(3) The numbers of Trainees/Participants

Trainer Candidates Course: 7 persons

Management Course: 1 person

(4) Training implementing agency

Power Engineering and Training Service, Inc.

Mitsubishi Hitachi Power Systems, Ltd

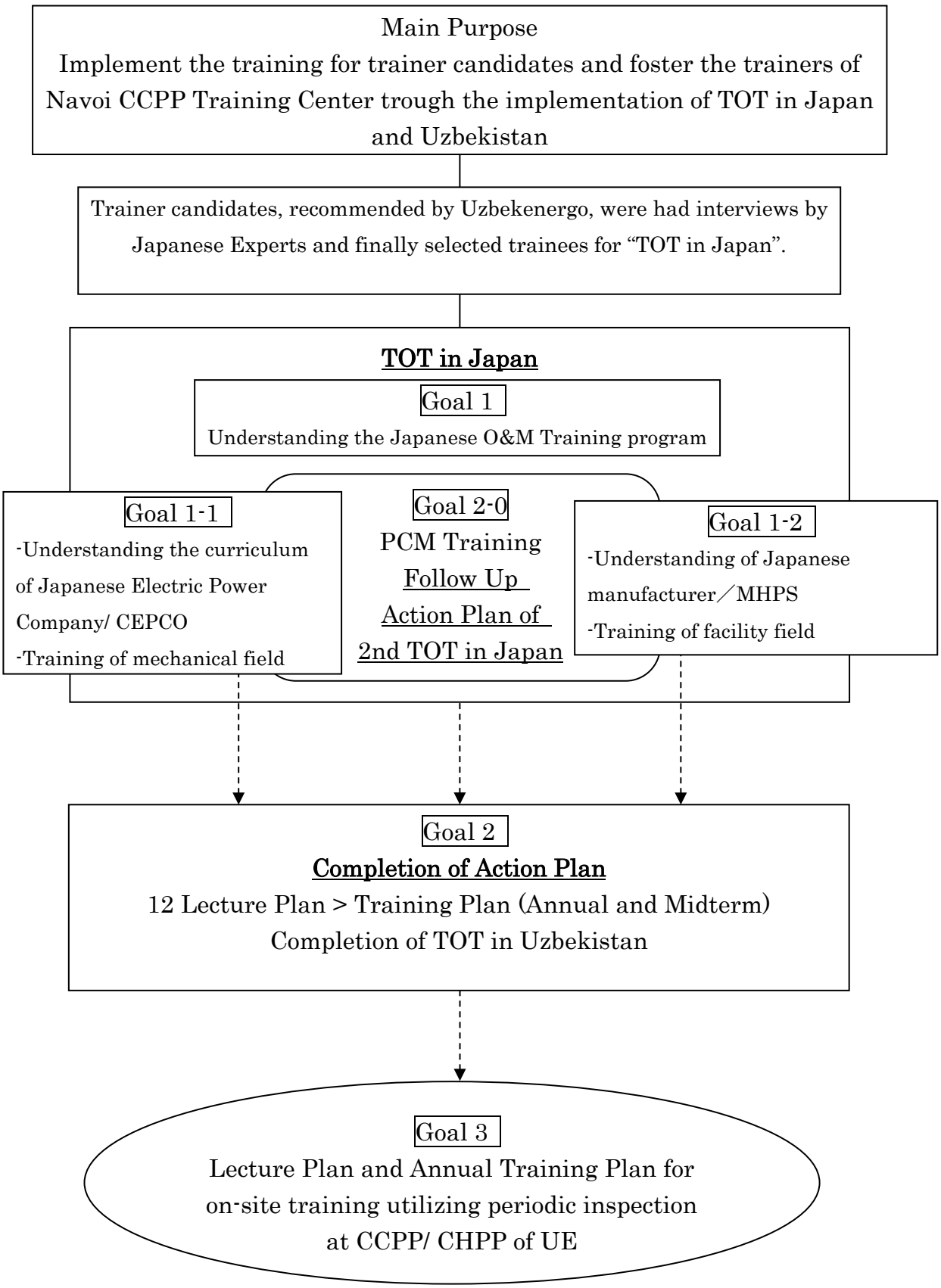
IC Net Limited

2．Program of 3rd TOT in Japan

Training program of trainer candidates in this project is composed of “Training of Trainers (TOT) in Japan”, “Implementation of TOT in Uzbekistan” and “Implementation on-site training by UE utilizing periodic inspection of combined cycle”. The whole concept of training program of TOT in Japan is shown in below.

Through TOT in Japan, trainees are expected to understand educational training program of Japanese electric power company, learn the basic knowledge of reviewing the Russian training materials which provided from Japanese experts, and after returning their country they reflect it to be effective.

“Implementation of TOT in Uzbekistan” and “Implementation on-site training by UE utilizing periodic inspection of combined cycle” will be done in accordance with the experience and knowledge which trainees are learned in this TOT in Japan.



－ Figure 1 Concept of whole Training －

(2) Training Schedule for trainer candidates <Implemented result>

－ Table 1 Training Schedule （Trainer Candidates Course）－

Date	Time	Training Curriculum	Lecturer	Site	Target
11-Mar（Sun）	10:00-15:00	Project Briefing	AEC Akiko Sakuma	JICA (Chugoku International Center)	Background Understanding
12-Mar（Mon）	09:00-12:00	Program Orientation	JICA Chugoku		
	13:00-16:00				
13-Mar（Tue）	10:00-15:00	PCM Method	IC-NET Atsuyuki Kado		Goal 2-0
14-Mar（Wed）	09:00-11:00	PET: Orientation	PET Shinya Ando	Power Engineering and Training Services, Incorporated （PET）	Goal 1
	11:00-16:00	Human Resource Development for Japanese Thermal Power Plant	PET Noboru Araki		
15-Mar（Thu）	09:00-16:00	Introduction of Training Course of PET	PET Shohei Hasebe		
16,19,20-Mar (Fri / Mon/ Tue)	09:00-16:00	Vibration analysis for rotating machine (Lecture / Practice)	PET Shohei Hasebe		Goal 1-1
22,23-Mar（Thu/Fri）	09:00-16:00	Site-Tour of Yanai Power Plant Mock-UP Training (Basic of GT generation, Hot parts)	PET Yohei Miyamoto Kouji Fukuyama	Yanai Power Plant	Goal 1-1
26-Mar（Mon）	10:00-11:00	Site-Tour of Central Load Dispatching Office	PET Shohei Hasebe	Chugoku Electric Power Co, Inc. (CEPCO) Head office	Goal 1
	11:00-12:00	Discussion with Power Generation Div.	PET Shohei Hasebe		
27,28-Mar (Tue /Wed)	09:00-16:00	Site-Tour of Mizushima Power Plant, Mock-UP Training (Non-destructive testing, Remaining Life Assessment Technology)	PET Yohei Miyamoto Kouji Fukuyama	Mizushima Power Plant	Goal 1-1
29-Mar (Thu)	9:00-12:00	MHPS Orientation Site-Tour of Takasago Factory	MHPS Hiroya Watanabe	MHPS Takasago Factory	Goal 1-2
	13:00-16:00	GT and Auxiliaries System	MHPS Shikari Swapankuma		
30-Mar (Fri)	9:00-12:00	P&I Diagram	MHPS Shintaro Nonoaka		
	13:00-16:00	Hazardous Area, Operation Procedure, General Interlock	MHPS Robert Murphy		Goal 1-2

Date	Time	Training Curriculum	Lecturer	Site	Target
2-Apr (Mon)	9:00-16:00	GT and Auxiliaries System	MHPS: Shikari Swapankuma		Goal 1-2
3-Apr （Tue）	9:00-10:30	Blade Washing Device, etc.	MHPS Kotaro Matsui		Goal 1-2
	10:30-12:00	Heat Exchanger	Masahiko Ito		
	13:00-16:00	General Description of Instruction and Control System	Hirotaka Ishikawa Norihisa Kishi		
4,5,6-Apr (Wed/Thu/Fri）	9:00-16:00	GT Control System Operation and Maintenance	MHPS Shoko Yamada		Goal 1-2
9-Apr（Mon）	9:00-16:00	Design construction and performance	MHPS Yuka Takagi		Goal 1-2
10-Apr（Tue）	9:00-10:40	Periodical Maintenance	MHPS Naoki Yamada		Goal 1-2
	10:50-11:55	Periodical Maintenance	MHPS Hayato Nishizaki		
	13:00-16:00	GT Electrical & Control Package	MHPS Yuto Matsui		
11-Apr （Wed）	9:00-12:00	GT Commissioning Procedure	MHPS Yoshihito Kobayashi		Goal 1-2
12-Apr（Thu）	10:00-13:00	Closing ceremony for 3rd Training in Japan	AEC Takashi Saito	JICA Tokyo	Goal 2-0

(3) Training Schedule for management <Implemented result>

－ Table 2 Training Schedule（Management Course）－

Date	Time	Training Curriculum	Lecturer	Site	Target
20-Mar（Tue）	9:00-16:00	Program Orientation	JICA Chugoku	JICA (Chugoku International Center)	
21-Mar（Wed）	10:00-16:00	Project Monthly Meeting	AEC Wakabayasi Hidehito		
22-Mar（Thu）	09:00-12:00	Project Briefing / Discussion	AEC Takashi Saito		Background Understanding (Goal 2-0)
23-Mar（Fri）	9:00-16:00	Introduction of Training Course of PET	PET Shohei Hasebe	PET	Goal 1
26-Mar（Mon）	10:00-13:00	Site-Tour of Central Load Dispatching Office	PET Shohei Hasebe	Chugoku Electric Power Co, Inc. (CEPCO) Head office	Goal 1
	14:30-16:00	Discussion with Power Generation Div.	PET Shohei Hasebe		
27-Mar（Tue）	10:00-15:00	Outline of management plan Efforts to Stable Supply and Strengthening Competitiveness in Thermal Division	PET Shohei Hasebe		Goal 1
28-Mar (Wed)	09:00-16:00	Site-Tour of Mizushima Power Plant Mock-UP Training (Non-destructive testing)	PET Yohei Miyamoto Kouji Fukuyama	Mizushima Power Plant	Goal 1-1
29-Mar（The）	9:00-15:00	MHPS Orientation Site-Tour of Takasago Factory	MHPS Hiroya Watanabe	MHPS Takasago Factory	Goal 1-2
		GT and Auxiliaries System	MHPS Shikari Swapankuma		

3. Trainees

— Table 3 Participants of 3rd TOT in Japan —

Participants Name	Division	Field
Trainer Candidates Course		
Mr. TOSHOV Istam	Leading engineer Instrumentation and Control	C&I
Mr. MAKHMUDOV Aziz	Non-destructive worker 4th Range	Mechanical
Mr. ESHEV Hamdam	Electrical Engineer	Electrical
Mr. ISLAMOV Ismail	Maintenance Master	Mechanical
Mr. KHUDOYKULOV Lutfillo	Operator GT	Mechanical
Mr. BAZAROV Fakhriddin	Operator BOP	Mechanical
Mr. PIRNAZAROV Nurali	Local Operator Gas Compressor	Mechanical
Management Course		
Mr. DOSTOV Shukhrat	Director Navoi Training Center	Director

4. Training Record & Evaluation Comments of 7 Trainer candidates

Date		**11th Mar, 2018**	**10：00～11：30** **13：00～15：00**
Lecturer Name/Affiliation		Ms. Akiko Sakuma / Asia Engineering Consultant Co., Ltd.	
Course (5-1)		Project Briefing	
Aim of Lecture		The Comprehension of the whole of this project Implementation items after TOT within the project period	
Contents of Lecture		Outline of the project; Project Goal, Challenges and future implementation items	
		Preparation for the establishment of the Navoi New Training Center ; Lesson Plan, Training Plan and Accreditation System	
Lecturer's self evaluation		In order to encourage trainer candidates to understand that TOT is a part of whole this project activity, we introduced them the discussion matters with managers of Uzbekenergo and Navoi New Training center.	
		We emphasized the importance of cooperation between trainer candidates and UE headquarters and managers of training centers for the future.	
Trainees' evaluation by lecturer		During the project briefing, the participants seemed to be concentrating. They understood the indicators of the project, the Lesson Plan, and the necessity of organizing the training courses in accordance with the training plan to be created in the future with the director of training center.	
Evaluation by trainees	**Contents**	Evaluation Score (7 pers. average) 4.00	
	Amount	Evaluation Score (7 pers. average) 4.00	
	Time	Evaluation Score (7 pers. average)3.57	
	Comprehension	Evaluation Score (7 people average) 4.00	
	Acquired knowledge and ability	Acquired knowledge ：Evaluation Score 3.86	
		Useful to make Action Plan：Evaluation Score 4.00	
		Helpful to improve your knowledge and ability：Evaluation Score 4.00	
		Valuable lecture to become a trainer：Evaluation Score 4.00	
		Effective for considering equipment lists: evaluation point 3.71	
		Effective for reviewing Russian training materials. 3.71	
	Trainees' comments	The presenter detailed the role and further operation of the project. The lesson was clear and understandable. The lesson was satisfying, the information was very useful, all the time of the study was planned and passed accurately according to plan. During the lesson, slides and examples were shown.	

＊The lecture was focused on the project activities within the remaining 1 year, especially of the collaboration with the managers of the training center.

Date		**13th Mar, 2018**	**10:00～15:00** **09:00～15:00**
Lecturer Name/Affiliation		Mr.Atsuyuki Kado IC NET Limited /Consultant Facilitator	
Course (5-2)		PCM Method	
Aim of Lecture		Understand the PCM Method and PDM.	
Contents of Lecture		Explanation of Introduction to PCM, problem analysis / purpose analysis, extraction of project activities.	
Lecturer's self evaluation		The trainees were motivated and aggressive, the participatory training was done. In order to understand PDM, I tried to deepen the understanding of PDM of their projects, using the case study. The lecture was able to operate smoothly and on time.	
Trainees' evaluation by lecturer		Throughout the whole lecture, participants actively participated and cooperated in many occasions. Since the lecture was progressing faster than planned, it was possible to carry out the purpose analysis etc. scheduled to be omitted.	
Evaluation by trainees	**Contents**	Evaluation Score (7 pers. average) 4.00	
	Amount	Evaluation Score (7 pers. average) 4.00	
	Time	Evaluation Score (7 pers. average) 3.86	
	Comprehension	Evaluation Score (7 people average) 3.86	
	Acquired knowledge and ability	Acquired knowledge ：Evaluation Score 4.00	
		Useful to make Action Plan Evaluation Score 4.00	
		Helpful to improve your knowledge and ability：Evaluation Score 4.00	
		Valuable lecture to become a trainer：Evaluation Score 3.86	
		Effective for considering equipment lists: evaluation point 3.43	
		Effective for reviewing Russian training materials. 3.43	
	Trainees' comments	I really liked the method of conducting the lesson and planning the time. this all indicates the literacy of the teacher and how should be the future instructor. To be honest, I really liked the lesson, especially the practical part was wonderful I think this knowledge will be very necessary to us.	

＊Regarding the participatory training on PDM methods / logic, questionnaire evaluation was very high.

＊ Because trainees' understanding was very earlier, we had a time to explain the purpose analysis which was not planned original.

Date		**14th Mar, 2018**	**9：00～11:00** **11:00～16:00**
Lecturer Name/Affiliation		Mr. Hiroshi Shimada / PET, PRESIDENT Mr. Kouji Fujii / PET, General Manager Mr. Shinji Fujimoto / PET, Deputy General Manager Mr. Noboru Araki / /PET, Technical Training Dept. Senior Manager Mr. Yohei Miyamoto / PET, Engineering Dept. Senior Manager Mr. Shohei Hasebe / PET, Technical Training Dept. Planning & Administration Group Chief Manager Mr. Yohei Okamoto / PET, Technical Training Dept. Mechanical Group Mr. Shinya Ando / PET, Technical Training Dept. Planning & Mr. Kouji Fukuyama / PET, Technical Training Dept. Mechanical Group Mr. Hikaru Iwai / PET, Technical Training Dept. Planning &	
Course (5-3)		Orientation and /Human Resource Development in thermal power plant	
Aim of Lecture		Contents of implemented training / Acquisition of ideas of human resource development of thermal power plants in CEPCO and role of training center	
Contents of Lecture		Welcome greetings, Self-introduction of trainees and attendees	
		The introduction of CEPCO and PET and Flow of Employee Education of Chugoku Electric Power Co.	
		The role of PET	
Lecturer's self evaluation		Human resource development training was a reference for participants by showing concrete examples of Japanese style education.	
Trainees' evaluation by lecturer		Participants worked diligently and showed high interest in training human resources in Japan.	
Evaluation by trainees	**Contents**	Evaluation Score (7 pers. average) 4.00	
	Amount	Evaluation Score (7 pers. average) 4.00	
	Time	Evaluation Score (7 pers. average) 3.86	
	Comprehension	Evaluation Score (7 people average) 4.00	
	Acquired knowledge and ability	Acquired knowledge ：Evaluation Score 4.00	
		Useful to make Action Plan Evaluation Score 4.00	
		Helpful to improve your knowledge and ability：Evaluation Score 4.00	
		Valuable lecture to become a trainer：Evaluation Score 4.00	
		Effective for considering equipment lists: evaluation point 3.57	
		Effective for reviewing Russian training materials. 3.43	
	Trainees' comments	I think that the knowledge of training in the Japanese energy company is very important. Training center "PET" is very well organized. I think that all teachers are kind and highly qualified. This lecture will help me become a good instructor. Despite a number of advantages of listening to the lecture and the lecturer, there are also some suggestions that may be useful for further application to study this course.	

Date		**15th Mar, 2018**	**9:00～16:00**
Lecturer Name/Affiliation		Mr. Shohei Hasebe / PET, Technical Training Dept. Planning & Administration Group Chief Manager Mr. Hiroaki Tsujino / PET, Technical Training Dept. Electrical control Mr. Shinji Fujimoto / PET, Deputy General Manager Mr. Kiyoshi Tamura / PET, Technical Training Dept. Operation Group Mr. Shinya Ando / PET, Technical Training Dept. Planning &	
Course (5-4)		Training introduction of power company (machine, electric control, power generation)	
Aim of Lecture		In order to work as a trainers at Navoi Training Center, learn and refer to the training course and facilities in Japanese power plant.	
Contents of Lecture		Introduction of training contents and equipment in electric control	
		Introduction of training contents and equipment in power generation	
		Introduction of training contents and equipment in mechanical	
Lecturer's self evaluation		Since we took sufficient time to visit the facilities, the participants were satisfied. Through equipment tours, they were able to imagine concretely the image of training in Japan.	
Trainees' evaluation by lecturer		They learned extremely aggressively.	
Evaluation by trainees	**Contents**	Evaluation Score (7 pers. average) 3.86	
	Amount	Evaluation Score (7 pers. average) 3.86	
	Time	Evaluation Score (7 pers. average) 3.86	
	Comprehension	Evaluation Score (7 people average) 3.86	
	Acquired knowledge and ability	Acquired knowledge ：Evaluation Score 4.00	
		Useful to make Action Plan Evaluation Score 3.86	
		Helpful to improve your knowledge and ability：Evaluation Score 4.00	
		Valuable lecture to become a trainer：Evaluation Score 4.00	
		Effective for considering equipment lists: evaluation point 4.00	
		Effective for reviewing Russian training materials. 3.71	
	Trainees' comments	The lesson was very fruitful, the teacher has a lot to learn. I especially liked the stands in all directions and the training equipment. I think that the ideal training center should be that way. Today's lesson was good in practice and we learned new equipment for studying.	

＊Through the introduction of each training course and tour of the facility, trainees had a good suggestion for the Navoi new training center.

Date		**16th,19th 20th Mar, 2018**	**9:00～16:00** **9:00～16:00** **9:00～16:00**
Lecturer Name/Affiliation		Mr. Shohei Hasebe / PET, Technical Training Dept. Planning & Administration Group Chief Manager	
Course (5-5)		Training of power company Vibration basic technology lecture and practical training	
Aim of Lecture		Learn the content of training transferred to technology in project	
Contents of Lecture		Lecture：Using the Video material (English) and text	
		Practical Training : Vibration measurement using model rotor, balancing and congirmation of vibration phenomenon.	
Lecturer's self evaluation		Taking time to discuss with prticipants led to the promotion of the understanding of all.	
Trainees' evaluation by lecturer		They were very enthusiastic and concentrated on all the time.	
Evaluation by trainees	**Contents**	Evaluation Score (7 pers. average) 4.00	
	Amount	Evaluation Score (7 pers. average) 4.00	
	Time	Evaluation Score (7 pers. average) 4.00	
	Comprehension	Evaluation Score (7 people average) 4.00	
	Acquired knowledge and ability	Acquired knowledge：Evaluation Score 4.00	
		Useful to make Action Plan Evaluation Score 3.86	
		Helpful to improve your knowledge and ability：Evaluation Score 4.00	
		Valuable lecture to become a trainer：Evaluation Score 3.86	
		Effective for considering equipment lists: evaluation point 3.71	
		Effective for reviewing Russian training materials. 3.71	
	Trainees' comments	I liked how the teacher teaches and answers the emerging questions of instructors. And he explained such a difficult lesson with such ease. The teacher knows his specialty very well. I will remember his lessons and use them in the future.	

＊It was the first time to implement the TOT of vibration analysis training using equipment, and trainees are seemed to cooperate each other.

＊The Russian translation of text was not fully completed, there were some difficulties to understand.

＊A lecture using video materials which is to be delivered to Uzbekistan was also conducted, it led and promoted the image of the TOT for trainees.

＊The experience of the practical training is expected to utilize the TOT in Uzbekistan near the future.

Date		**22th 23th Mar, 2018**	**9:00～16:00** **9:00～16:00**
Lecturer Name/Affiliation		Mr. Kouji Fukuyama / PET, Technical Training Dept. Mechanical Group Mr. Yohei Miyamoto / PET, Engineering Dept. Senior Manager	
Course (5-6)		Combined cycle power generation technology (Yanai Power Station)	
Aim of Lecture		On-site visit of CCPP and mock-training of GT power generation basic and hot parts	
Contents of Lecture		Introducution for Yanai Power Station facility	
		Mock-Trainiang of text No.4 & No.5	
		Feedback and additional explanation of mock-training (ex. Difference between GT and CCPPe)	
		Site tour ;Equipment during periodic inspection and combustor inspection, central control room, etc.	
		Discussion with Yanai Power Plant Engineeres	
Lecturer's self evaluation		We were able to confirm the decomposition of periodic inspection facility (No. 2 GE: 7 F) and combustor inspection facility (No. 1 No. 1 Hitachi: H 100) at the worksit.	
Trainees' evaluation by lecturer		I was able to answer many questions of the trainees.	
Evaluation by trainees	**Contents**	Evaluation Score (7 pers. average) 3.86	
	Amount	Evaluation Score (7 pers. average) 4.00	
	Time	Evaluation Score (7 pers. average) 3.71	
	Comprehension	Evaluation Score (7 people average) 3.86	
	Acquired knowledge and ability	Acquired knowledge ：Evaluation Score 3.86	
		Useful to make Action Plan Evaluation Score 3.57	
		Helpful to improve your knowledge and ability：Evaluation Score 3.86	
		Valuable lecture to become a trainer：Evaluation Score 3.86	
		Effective for considering equipment lists: evaluation point 3.57	
		Effective for reviewing Russian training materials. 3.71	
	Trainees' comments	We visited the plant not only by the principles of the CCGT operation of other modifications and manufacturers, but also acquired experience and skills in the design and technical characteristics of the operated equipment.	

＊Trainees seemed very interactively on the site tour of the periodic inspection.

＊They also actively participated in the simulated lecture.

＊JET would like to expect that trainer candidates make the new course of on-site training in Uzbekistan.

Date		**26th Mar, 2018**	**10:00～12:00**
Lecturer Name/Affiliation		Mr. Eiji Yamamoto / CEPCO,Director of Distribution and Distribution Company Central Power Supply Director Section Manager Mr. Takanori Shuto / CEPCO, Deputy Director of Central Power Supply Directive and Distribution Company	
		Mr. Masaharu Murata / CEPCO,Head of Thermal Power Division, Power Supply Division Mr. Haruhito Kubota / CEPCO Group Manager, Thermal Power Plant, Power Supply Division Mr. Masashi Murata / CEPCO, Power Business Division Thermal Power Plant Planning Group	
Course (5-7)		Visit to Central Supply Order Office and Thermal Division	
Aim of Lecture		Understanding the current state of system operation of Japanese electric company & Discussion with thermal division staff	
Contents of Lecture		The role of Central Supply Order Office	
		Situation of the thermal power division · On future direction	
Lecturer's self evaluation		It was meaningful in learning the actual power supply operation situation of Japanese power companies.	
		In Japan, it was urged to reduce CO2 emissions and increase the proportion of non-fossil fuels urgently.	
Trainees' evaluation by lecturer		They were very interested in the power generation cost by fuel type, including sunlight, nuclear power and positively asked questions.	
		They were always polite, expressing respectful relationships.	
Evaluation by trainees	**Contents**	Evaluation Score (7 pers. average) 3.86	
	Amount	Evaluation Score (7 pers. average) 3.71	
	Time	Evaluation Score (7 pers. average) 3.86	
	Comprehension	Evaluation Score (7 people average) 3.86	
	Acquired knowledge and ability	Acquired knowledge ：Evaluation Score 3.71	
		Useful to make Action Plan Evaluation Score 3.71	
		Helpful to improve your knowledge and ability：Evaluation Score 4.00	
		Valuable lecture to become a trainer：Evaluation Score 3.86	
		Effective for considering equipment lists: evaluation point 3.57	
		Effective for reviewing Russian training materials. 3.71	
	Trainees' comments	Meeting with the management of the power system and getting to know the functions of the dispatching service, the representative of the activity of the power system of the Tyugoku electric is exhausted.	

＊There were many questions about Japan's electricity charge service system and power generation other than thermal power generation.

＊They understood the difference of system between Japan and Uzbekistan by the response from Japanese side.

Date		**27th, 28th Mar, 2018**	**9:00～16:00** **9:00～15:30**
Lecturer Name/Affiliation		Mr. Yohei Miyamoto / PET, Engineering Dept. Senior Manager Mr. Shohei Hasebe / PET, Technical Training Dept. Planning & Administration Group Chief Manager Mr. Yohei Okamoto / PET, Technical Training Dept. Mechanical Group Mr. Kouji Fukuyama / PET, Technical Training Dept. Mechanical Group	
Course (5-8)		Combined cycle power generation technology (Mizusima Power Station)	
Aim of Lecture		On-site visit of CCPP and mock-training of Non-destructive inspection · remaining life diagnosis	
Contents of Lecture		Introduction of Mizushima Power Plant facility	
		Mock-Trainiang of text No.1 & No.3	
		Feedback and additional explanation of mock-training	
		Site tour ;Equipment of the M501F3 which is the same series as the Navoi power plant, central control room, spare parts warehouse etc.)	
		Discussion with Mizushima Power Plant Engineeres	
Lecturer's self evaluation		I was able to explain in response to the trainee's interests such as arrangement of fuel valves and control sensors.	
Trainees' evaluation by lecturer		They were struggling with technical terms but positively asked questions with the help of an interpreter.	
Evaluation by trainees	**Contents**	Evaluation Score (7 pers. average) 3.86	
	Amount	Evaluation Score (7 pers. average) 3.86	
	Time	Evaluation Score (7 pers. average) 3.86	
	Comprehension	Evaluation Score (7 people average) 3.86	
	Acquired knowledge and ability	Acquired knowledge ：Evaluation Score 3.71	
		Useful to make Action Plan Evaluation Score 3.71	
		Helpful to improve your knowledge and ability：Evaluation Score 3.71	
		Valuable lecture to become a trainer：Evaluation Score 3.86	
		Effective for considering equipment lists: evaluation point 3.86	
		Effective for reviewing Russian training materials. 3.86	
	Trainees' comments	Sharing experience with the plant staff is very important for us. We compared fuel: gas and coal, from view of poitn of comfortable and economically.	

＊Trainees highly interested in the spare parts management and air filters.

＊They were surprised that troubles were hardly happened in Japanese power plant, because a Japanese engineer answered that last trouble case was happened about twenty years ago.

Date		**29th Mar, 2018** **3rd Apr, 2018**	**9:00～12:00** **16:00-16:50**
Lecturer Name/Affiliation		Mr. Hiroya Watanabe / MHPS, Takasago Service Divison	
Course (5-9)		Manufacturer training ; MHPS opening ceremony and Factory tour	
Aim of Lectur		MHPS opening ceremony and Factory tour	
Contents of Lecture		Introduction of Takasagao Facility	
Lecturer's self evaluation		To explaine the flow of development, design, manufacture and verification of gas turbine and visited our factory/	
		To explaine about the remote monitoring center and training facility for human resource development and visit to there later due to time constraints.	
Trainees' evaluation by lecturer		There were various questions and we are glad to know that trainees were interested in with good understanding.	
		After visiting the factory, there was some request to see other factory. We explained them that it required authorization in advance and they understood.	
Evaluation by trainees	**Contents**	Evaluation Score (7 pers. average) 4.00	
	Amount	Evaluation Score (7 pers. average) 4.00	
	Time	Evaluation Score (7 pers. average) 3.71	
	Comprehension	Evaluation Score (7 people average) 4.00	
	Acquired knowledge and ability	Acquired knowledge ：Evaluation Score 4.00	
		Useful to make Action Plan Evaluation Score 4.00	
		Helpful to improve your knowledge and ability：Evaluation Score 4.00	
		Valuable lecture to become a trainer：Evaluation Score 4.00	
		Effective for considering equipment lists: evaluation point 4.00	
		Effective for reviewing Russian training materials. 3.86	
	Trainees' comments	・Excursion to one of the world's leading factories for the manufacture of gas turbines (MHPS) left a maximum of a passive impression. The organizational event was carried out at a high level.	
		・The teacher explained his lesson very clearly. Excursions we really liked, but the time was VERY SMALL for familiarization.	

＊Almost all trainees felt that the factory site tour time was too short. They seemed high interested in.

＊ The award of manager's certificate was done by JICA after factory tour.

Date		**30th Mar, 2018**	**9:00～12:00**
Lecturer Name/Affiliation）		Mr. Shintaro Nonaka / MHPS, Plant Engineering Department Plant Design Division	
Course (5-10)		P&I Diagram	
Aim of Lecture		To explain the fuel and air system on P&I Diagram	
Contents of Lecture		Fuel gas system	
		Bleed / cooling system	
		Anti-icing system	
Lecturer's self evaluation		I was able to answer all the questions in this lecture	
		All the trainees fully understood this training.	
Trainees' evaluation by lecturer		There were also specific questions from trainees who have plant operation experience .	
		The trainees taught the unknown part each other.	
Evaluation by trainees	**Contents**	Evaluation Score (7 pers. average) 3.86	
	Amount	Evaluation Score (7 pers. average) 4.00	
	Time	Evaluation Score (7 pers. average) 3.71	
	Comprehension	Evaluation Score (7 people average) 3.86	
	Acquired knowledge and ability	Acquired knowledge ：Evaluation Score 4.00	
		Useful to make Action Plan Evaluation Score 3.57	
		Helpful to improve your knowledge and ability：Evaluation Score 4.00	
		Valuable lecture to become a trainer：Evaluation Score 3.57	
		Effective for considering equipment lists: evaluation point 3.57	
		Effective for reviewing Russian training materials. 3.57	
	Trainees' comments	・We are well aware of fire safety and equipment malfunctions and signals. ・A lecture by Mr. Nonaka on the topic "PID diagramm, dangerous zone (premises and equipment of CCGT) and interlock" is learnt very well.	

Date		**2018/3/30**	**13:00～16:00**
Lecturer Name/Affiliation		Robert Murphy / MHPS, Plant Engineering Department Plant Design Division	
Course (5-10)		Hazardous Area, Operation Procedure, General Interlock	
Aim of Lecture		To explain plant operation, interlock and explosion proof policy	
Contents of Lecture		Plant operation: explanation of plant start and stop	
		Interlock	
		Explosion-proof:	
Lecturer's self evaluation		I could answer all the questions, I think they got a good and enough understanding.。	
		The training was exceeded about 10 minutes.	
Trainees' evaluation by lecturer		Since there were some traineese who had experience of plant operation, I felt that their understanding was fast	
		I felt trainees positively confirmed their questions and joined this training eagerly.	
Evaluation by trainees	**Contents**	Evaluation Score (7 pers. average) 3.86	
	Amount	Evaluation Score (7 pers. average) 4.00	
	Time	Evaluation Score (7 pers. average) 3.71	
	Comprehension	Evaluation Score (7 people average) 3.86	
	Acquired knowledge and ability	Acquired knowledge ：Evaluation Score 4.00	
		Useful to make Action Plan Evaluation Score 3.57	
		Helpful to improve your knowledge and ability：Evaluation Score 4.00	
		Valuable lecture to become a trainer：Evaluation Score 3.57	
		Effective for considering equipment lists: evaluation point 3.57	
		Effective for reviewing Russian training materials. 3.57	
	Trainees' comments	・Especially I learned about lessons about hazardous areas of GT. ・The teacher knows his specialty very well. I will remember his lessons and use them in the future.	

＊There were some comments that trainees could learned from lecturer's experience and ability, while others felt there was short time to understand.

Date		**29th Mar, 2018** **2nd Apr, 2018**	**13:00～16:00** **9:00～16:00**
Lecturer Name/Affiliation		Shikari Swapankumar / MHPS, Gas turbine equipment design division	
Course (5-11)		GT and Auxiliaries System	
Aim of Lecture		To explain GT Auxiliaries System, Equipment, function, instermtation and control.	
Contents of Lecture		Following System completed perfectly as per the Training Slides/manuals in the training database.. (1) GT Air Intake System. (2) CO2 Fire Fighting System (3) GT Enclosure and Ventilation System.	
		Following system needed additional training slides byeond the those available in training manual in the database. (1) LO system additional slides needed to explain the Pressure and Temperature control settings. (2) CO System, additional Slides needed to explain the Trip Valve unit and Pressure control setting of CO system.	
		GT Exhaust Bypass Damper and Bypass Silencer & Stack could not be discussed because of less times and it was additional item for other plant.	
Lecturer's self evaluation		I grade my performance as 9 out 10 (90%).	
		All question of the customer (trainees) coulde answered and explained upto the satisfaction of the trainees.	
Trainees' evaluation by lecturer		9 out of 10 (90%).	
		Trainees could grasp well. They interacted well by theirs question of really good quality.	
Evaluation by trainees	**Contents**	Evaluation Score (7 pers. average) 3.86	
	Amount	Evaluation Score (7 pers. average) 3.57	
	Time	Evaluation Score (7 pers. average) 3.71	
	Comprehension	Evaluation Score (7 people average) 3.71	
	Acquired knowledge and ability	Acquired knowledge ：Evaluation Score 3.71	
		Useful to make Action Plan Evaluation Score 3.29	
		Helpful to improve your knowledge and ability：Evaluation Score 3.71	
		Valuable lecture to become a trainer：Evaluation Score 3.71	
		Effective for considering equipment lists: evaluation point 3.43	
		Effective for reviewing Russian training materials. 3.00	
	Trainees' comments	・We have today learned the fire alarm system, how it works, what its property is and what actions it does in the event of a fire. ・The lecturer acquainted in detail with the details of these equipments. The lecturer showed great practical experience in operation and design work when designing new power plants.	

Date		**3rd Apr, 2018**	**9:00～10:30**
Lecturer Name/Affiliation		Mr. Kotaro Matsui / MHPS,Plant Engineering Department Plant Design Division	
Course (5-12)		Blade Washing Device, etc.	
Aim of Lecture		To explain othere system on P&I Diagram	
Contents of Lecture		Explained the outline of purpose and operation method etc. for the following three devices	
		・GT Casing Cooling Fan	
		・GT Compressor Blade Washing Device	
		・Fuel Gas Last Chance Net Skid	
Lecturer's self evaluation		I could answer all questions in the training.	
		The training was exceeded about 5 minutes.	
Trainees' evaluation by lecturer		Since there were some traineese who had experience of plant operation, I felt that their understanding of our explanation was fast	
		They positively confirmed questions and joined this training eagerly.	
Evaluation by trainees	**Contents**	Evaluation Score (7 pers. average) 4.00	
	Amount	Evaluation Score (7 pers. average) 4.00	
	Time	Evaluation Score (7 pers. average) 4.00	
	Comprehension	Evaluation Score (7 people average) 4.00	
	Acquired knowledge and ability	Acquired knowledge ：Evaluation Score 4.00	
		Useful to make Action Plan Evaluation Score : 4.00	
		Helpful to improve your knowledge and ability：Evaluation Score 4.00	
		Valuable lecture to become a trainer：Evaluation Score 4.00	
		Effective for considering equipment lists: evaluation point 3.86	
		Effective for reviewing Russian training materials. 3.71	
	Trainees' comments	・The lecture on the topic "Blade washing devices" covered sufficient information on this direction. Listeners received a full information on the methods of cleaning the compressor blades in both online and offline modes.	

＊There were many comments that they learned much from the lecturer's high expertise and experience.

Date		**3rd Apr, 2018**	**10:30～12:00**
Lecturer Name/Affiliation		Mr. Masahiko Ito / MHPS,Heat Exchanger Design Division	
Course (5-12)		Heat Exchanger	
Aim of Lecture		To explain the structure, operation, maintenance etc. of the heat exchanger.	
Contents of Lecture		Explained the air-cooled heat exchanger TCA Cooler with FGH(Fuel Gas Heater). We believe that we could give trainees a good understanding of structure, operation and maintenance on this training.	
		Explained Air cooling condenser for Navoi 2. and we had many questions and we could help them for their good understanding.	
Lecturer's self evaluation		We had a additional training/question time on another day and we think that they understood the basic well. (Additional trainig were held later)	
Trainees' evaluation by lecturer		Their Q & A was aggressive.	
Evaluation by trainees	**Contents**	Evaluation Score (7 pers. average) 4.00	
	Amount	Evaluation Score (7 pers. average) 4.00	
	Time	Evaluation Score (7 pers. average) 4.00	
	Comprehension	Evaluation Score (7 people average) 4.00	
	Acquired knowledge and ability	Acquired knowledge ：Evaluation Score 4.00	
		Useful to make Action Plan Evaluation Score : 4.00	
		Helpful to improve your knowledge and ability：Evaluation Score 4.00	
		Valuable lecture to become a trainer：Evaluation Score 4.00	
		Effective for considering equipment lists: evaluation point 3.86	
		Effective for reviewing Russian training materials. 3.71	
	Trainees' comments	・The lecture on the heat exchangers and the device for washing the blades of the GT compressor was carried out at a high level. I think it would be nice if you would give an emphasis on more relevant topics to date.	

Date		**3rd Apr, 2018**	**13:00～16:00**
Lecturer Name/Affiliation		Mr. Hirotaka Ishikawa / MHPS, Takasago Instrument Control and Design Division	
		Mr. Norihisa Kishi / MHPS Engineering, C&I Group	
Course (5-12)		Gneral Description of Instruction and Control System	
Aim of Lecture		Understanding of MHPS GT control system and GT control overview	
Contents of Lecture		Outline of the overall MHPS GT control system	
		Outline of the equipment that contains in the GT control system	
		Outline of fuel control system of GT	
		Demonstration of GT start and stop operation by using simulator	
Lecturer's self evaluation		I think that their understanding has deepened by actual graphic and calculatied value on the simulator.	
Trainees' evaluation by lecturer		Attitude to understand our control system was very good.	
		There were some trainers who had experience in actual operation asked many question that they have had so far and I felt their understanding were fast.	
Evaluation by trainees	**Contents**	Evaluation Score (7 pers. average) 4.00	
	Amount	Evaluation Score (7 pers. average) 4.00	
	Time	Evaluation Score (7 pers. average) 4.00	
	Comprehension	Evaluation Score (7 people average) 4.00	
	Acquired knowledge and ability	Acquired knowledge ：Evaluation Score 4.00	
		Useful to make Action Plan Evaluation Score : 4.00	
		Helpful to improve your knowledge and ability：Evaluation Score 4.00	
		Valuable lecture to become a trainer：Evaluation Score 4.00	
		Effective for considering equipment lists: evaluation point 3.86	
		Effective for reviewing Russian training materials. 3.71	
	Trainees' comments	・This instructor provided me very important information about Remote monitoring centre. ・The presented extensive information on the system of control and management of GT served as practical answers to many previously arisen in the course of operation issues.	

Date		**4th- 6th Apr, 2018**	**9:00～16:00**
Lecturer Name/Affiliation		Ms. Shoko Yamada / MHPS Control System, Chief of Netmation Technology	
Course (5-13)		GT Control System Operation and Maintenance	
Aim of Lecture		GT control system : System configuration of DIASYS Netmation, functional specification of major functions, operation method / How to change HW, signal definition or logic / Initial operation at trouble occurrence / Function of A-CPFM	
Contents of Lecture		Diasys Netmation (Overview, OPS, EMS, Maintenance, A-CPFM)	
Lecturer's self evaluation		By using training PC that were customized for this training , they could operate it by themselves. I think their understood is enough to achieve the target of this training.	
Trainees' evaluation by lecturer		Everyone was very happy for training. Trainees who are not I&C nor operator were also properly operating the PC. Also, they were taking a note and take pictures on whiteboard	
		Sometimes trainees taught and talked with each other, this kind of training circumstance makes their under understanding deeper.	
Evaluation by trainees	**Contents**	Evaluation Score (7 pers. average) 4.00	
	Amount	Evaluation Score (7 pers. average) 4.00	
	Time	Evaluation Score (7 pers. average) 4.00	
	Comprehension	Evaluation Score (7 people average) 4.00	
	Acquired knowledge and ability	Acquired knowledge ：Evaluation Score 4.00	
		Useful to make Action Plan Evaluation Score : 4.00	
		Helpful to improve your knowledge and ability：Evaluation Score 4.00	
		Valuable lecture to become a trainer：Evaluation Score 4.00	
		Effective for considering equipment lists: evaluation point 3.86	
		Effective for reviewing Russian training materials. 3.86	
	Trainees' comments	・I learned a lot of useful information from these lessons and I also liked the training simulator. I want to sincerely say thanks to the teacher! ・I learned that without logic we can not manage such equipment as a gas turbine. The lesson was wonderful.	

＊Throughout the course of this training, this lecture was the highest evaluation from the trainees was.

＊It seemed that they wished to learn more for the future.

Date		**9th Apr, 2018**	**10:00～16:00 9:00～12:00**
Lecturer Name/Affiliation		Ms. Yuka Takagi / MHPS, Large gas turbine engineering department plan Group	
Course (5-14)		Design construction and performance	
Aim of Lecture		Deepen understanding of the main structure of MHPS gas turbine	
Contents of Lecture		Basic structure of gas turbine, definition of performance and efficiency, and temperature characteristics	
		Details of the structure, function and characteristics of each part of the gas turbine	
Lecturer's self evaluation		I could explain the basic structure of the gas turbine and the definitions of performance and efficiency etc.	
		Some questions could not be answered right away, but it seemed that trainees were almost satisfied. (Later all questions were answered)	
Trainees' evaluation by lecturer		Trainees taught each other, and they were trying to their understanding deeper.	
		Based on their actual operation experience, they listened to the training and asked many questions.	
Evaluation by trainees	**Contents**	Evaluation Score (7 pers. average) 4.00	
	Amount	Evaluation Score (7 pers. average) 3.86	
	Time	Evaluation Score (7 pers. average) 3.71	
	Comprehension	Evaluation Score (7 people average) 3.86	
	Acquired knowledge and ability	Acquired knowledge ：Evaluation Score 3.86	
		Useful to make Action Plan Evaluation Score : 3.86	
		Helpful to improve your knowledge and ability：Evaluation Score 3.86	
		Valuable lecture to become a trainer：Evaluation Score 4.00	
		Effective for considering equipment lists: evaluation point 4.00	
		Effective for reviewing Russian training materials. 3.86	
	Trainees' comments	・The lesson was conducted by a highly qualified staff member clearly and interestingly. ・The lesson was very awesome, I learned what I wanted. ・I especially liked the level of understanding of the topic by testing.	

＊Every trainees evaluated that the explanation of the lecturer was very easy to understand.

＊It is effective for their training implementation.

Date		**10th Apr, 2018**	**9:00～10:40**
Lecturer Name/Affiliation		Mr. Naoki Yamada / MH PS, Takasago Service Division Overseas Project Promotion Group	
Course (5-15)		Perodical Maintenance	
Aim of Lecture		Understanding of maintenance guidelines of MHPS Gas Turbine	
Contents of Lecture		Maintenance guideline of gas turbine	
		Concept of operating hours.	
		Outline of periodic inspection	
		Damage and repairment of hot gas path parts	
Lecturer's self evaluation		Basically I answered the question immediately, but some times I explained too much detail.	
		The scheduled time was exceeded.	
Trainees' evaluation by lecturer		As they already attended some related lectures, I am sure they had a good understanding.	
		They were good attitude and wanted to know more and more.	
Evaluation by trainees	**Contents**	Evaluation Score (7 pers. average) 3.86	
	Amount	Evaluation Score (7 pers. average) 3.86	
	Time	Evaluation Score (7 pers. average) 3.57	
	Comprehension	Evaluation Score (7 people average) 3.86	
	Acquired knowledge and ability	Acquired knowledge ：Evaluation Score 3.86	
		Useful to make Action Plan Evaluation Score : 3.86	
		Helpful to improve your knowledge and ability：Evaluation Score 3.86	
		Valuable lecture to become a trainer：Evaluation Score 3.86	
		Effective for considering equipment lists: evaluation point 3.86	
		Effective for reviewing Russian training materials. 3.71	
	Trainees' comments	・It's a pity that there was not enough time for a more detailed explanation of the CPFM system. ・The lecture on the topic "Periodic maintenance" is prepared in accordance with the requirements.	

Date		**10th Apr, 2018**	**10:50～11:55**
Lecturer Name/Affiliation		Mr. Hayato Mishizaki / MHPS Gas turbine service, Overseas department	
Course (5-15)		Perodical Maintenance	
Aim of Lecture		Expllanation of outline of periodic inspection and notes	
Contents of Lecture		Outline of periodic inspection & parts arrangement	
		Flow of periodic inspection from planing to execution (engineering schedule)	
		Tool / Foreign material control management	
		How to set up and think of laydown plan	
Lecturer's self evaluation		The level of trainee's understanding was higher than expected, and it was possible to complete the lecture on time.	
		I explainted that it is important for periodic inspection that MHPS and customers cooperate closely and it is important	
Trainees' evaluation by lecturer		Trainees joined this training with high interested and motivation.	
Evaluation by trainees	**Contents**	Evaluation Score (7 pers. average) 3.86	
	Amount	Evaluation Score (7 pers. average) 3.86	
	Time	Evaluation Score (7 pers. average) 3.57	
	Comprehension	Evaluation Score (7 people average) 3.86	
	Acquired knowledge and ability	Acquired knowledge ：Evaluation Score 3.86	
		Useful to make Action Plan Evaluation Score : 3.86	
		Helpful to improve your knowledge and ability：Evaluation Score 3.86	
		Valuable lecture to become a trainer：Evaluation Score 3.86	
		Effective for considering equipment lists: evaluation point 3.86	
		Effective for reviewing Russian training materials. 3.71	
	Trainees' comments	・The lecturer competently and intelligibly explained the content of the material. ・I think that the allocated time for such topics is very small and at the end of the educational process is not correct.	

＊Instructor evaluated that the trainees' high knowledge and motivation.

＊JET expect that they will try to prepare their training contents with periodical maintenance.

Date		10th Apr, 2018	13:00～16:00
Lecturer Name/Affiliation		Mr. Ikuto Matsui / MHPS, Chief, Takasago Electric Design Division, Electrical Design Dept	
Course (5-15)		GT Electrical & Control Package	
Aim of Lecture		Understanding of GT control PKG and internal distribution equipment	
Contents of Lecture		PLANT CONFIGURATION	
		ELECTRICAL SYSTEM CONFIGURATION	
		SPECIFICATION OF ELECTRICAL EQUIPMENTS	
		GT CONTROL PACKAGE AUXILIARIES	
Lecturer's self evaluation		It seems that participants understood well the contents,	
		The drawings, that were used on the training, were too small and need to be improved.	
Trainees' evaluation by lecturer		Some trainees have good knowledge about electrical equipment, they understood quuite well.	
		They asked some questions and I felt that they actively joined this training.	
Evaluation by trainees	**Contents**	Evaluation Score (7 pers. average) 3.86	
	Amount	Evaluation Score (7 pers. average) 3.86	
	Time	Evaluation Score (7 pers. average) 3.57	
	Comprehension	Evaluation Score (7 people average) 3.86	
	Acquired knowledge and ability	Acquired knowledge ：Evaluation Score 3.86	
		Useful to make Action Plan Evaluation Score : 3.86	
		Helpful to improve your knowledge and ability：Evaluation Score 3.86	
		Valuable lecture to become a trainer：Evaluation Score 3.86	
		Effective for considering equipment lists: evaluation point 3.86	
		Effective for reviewing Russian training materials. 3.71	
	Trainees' comments	・The material is dedicated to the need for repair work.	

＊Some participants felt that the time was short and the content was complicated.

Date		**11th Apr, 2018**	**9:00～12:00**
Lecturer Name/Affiliation		Mr. Keishi Kobayashi / MHPS, Chief engineer, Takaguchi Construction Commissioning Technology Division	
Course (5-16)		GT Commissioning Procedure	
Aim of Lecture		GT commissioning at Combined Cycle Power Plant	
Contents of Lecture		Commissioning Flow	
		Test operation of auxiliary equipments and test items of main equipment.	
		Action at Emergency condition	
Lecturer's self evaluation		It took more time to explain than expected and I could not complete all the explanations of the text because of many questions.	
Trainees' evaluation by lecturer		Some trainees positively asked questions and I could confirm their understanding are correct.	
Evaluation by trainees	**Contents**	Evaluation Score (7 pers. average) 4.00	
	Amount	Evaluation Score (7 pers. average) 4.00	
	Time	Evaluation Score (7 pers. average) 3.71	
	Comprehension	Evaluation Score (7 people average) 3.86	
	Acquired knowledge and ability	Acquired knowledge ：Evaluation Score 4.00	
		Useful to make Action Plan Evaluation Score : 4.00	
		Helpful to improve your knowledge and ability：Evaluation Score 3.86	
		Valuable lecture to become a trainer：Evaluation Score 4.00	
		Effective for considering equipment lists: evaluation point 3.86	
		Effective for reviewing Russian training materials. 3.71	
	Trainees' comments	・The lecture on the topic "The procedure for commissioning GT" covered the full scope of the issues of the schedule and methods of repairing the gas turbine. The lecturer answered all the questions raised by the listeners. The rich experience of repair and adjustment works of the teacher served as an intelligible explanation of the material	

＊Evaluation of lecture contents was high, but some trainees felt that it was difficult.

(1) Closing Ceremony for 3rd TOT

The trainees made a presentation about the achievements of this TOT and future implementation of this project. We had Q&A session and comments from the Japanese side, awarded a certificate of completion, and closed the training in Japan.

Date & Venue

'Date; 12th Apr., 2018： AM 10～P.M.

Venue： JICA Tokyo Room No. SR409

Main participant: 7 Trainees/ Trainer Candidates of Navoi New Training Center

Agenda for Closing Ceremony for 3rd TOT in Japan

Date	DayWK	Time			Event	Venue	Facilitated by	
4/12	Thursday	10:00	～	10:10	Opening / Self -introduction	JICA Tokyo Room SR409	JET/AEC	Mr. Saito/ Facilitator
					Opening Remarks		JET/AEC	Mr. Murata/ JET Leader
		10:13	～	11:40	Presentation "Training result and future" by representative of trainee Mr. Eshev H. 30 minutes for presentation & 10-20 minutes for Q&A		Trainee/ Trainer Candidates	7 participants of 3rd training in Japan
							Training manager	Mr. Katori/ Translation
							AEC	Mr Umid/ Presentation Advisor
		11:40	～	11:53	Awarding Certificate		JICA	Mr. Yuzurio/ Director of Energy and Mining Group, Team 1
		11:53	～	11:55	Impression & Greeting		Representative of Trainee Mr. Istam Toshov	
		11:55	～	12:00	Closing remarks		JICA	Mr. Yuzurio/ Director of Energy and Mining Group, Team 1
		12:00	～	12:10	Photo session		All Attendance	
		12:10	～		After Celemony; Lunch, preparation for departure			

1) Participant's self-introduction

2) Opening Remarks from Mr. Murata / JET Leader

In the greetings, he emphasized the following points.

- Trainer candidates should aim at the highest level of comprehension of textbooks by question and discussion. If you have any questions, please actively ask to Japanese experts.
- Proposal for development of technical term glossary in Russian

3) Presentation “Training Result and Future”

They made presentations on the achievements of the training in Japan, the person in charge of 12 courses and the lesson plans. (Refer to the attachment-1.)

5. Comments and evaluation of 3rd TOT in Japan by trainees

From the questionnaire after the completion of the training, the comments from trainees are summarized below.

(1)Comments and Suggestions

"I was able to learn what I wanted to know."

"I was able to understand the essence of this project."

"Everything was very beneficial and I was able to achieve my goal."

(2) Training Course

1) Beneficial

(a) Gas turbine control system（7 persons）

(b) Vibration basic technology (6 persons)

(c) PCM Method (5 persons)

(d) Outline of C&I system (4 persons)

(e) Operating principle of air-cooled condenser (3 persons)

(f) Factory site-tour (3 persons)

(g) Composition of gas turbine auxiliaries (3 persons)

(h) All (2 persons)

2) Not necessary

Most of trainees stated that there was no courses that they felt not necessary. Regarding "Washing machine of gas turbine wing", there was an opinion that this type of machine is not used, so it is not necessary.

3) Required more

(a) Protection of gas turbine (2 persons)

(b) Details of gas turbine C&I

(c) Static frequency converter

(d) Overview of metal and steel

(e) Cleaning of metal with chemical substances

(f)Inception of CPFM

(g) Cleaning and repairing of heat exchanger

4) Recommendations to the training design

The results of questionnaire shows the high level of satisfaction in the quality of the training. And, there were many comments that this experience will be useful for their own work.

(a) Training Period：Short time for factory and site-tour

(b) Accommodation：To change the hotel in Yanai

5) Learnings from 3rd TOT in Japan

(a) Training classroom with equipment and teaching materials prepared

(b) Detailed planning of schedule and presentation materials

(c) Presence of a high level instructor

6) Impression of Japan and Japanese people

(a) Accurate in the time, keep discipline

(b) Politeness

(c) Kindness

(d) Wonderfulness of culture and history

(e) Natural riches

6. Summary

(1) Aggressiveness of trainees

Throughout the training in this program, many lecturers evaluated the aggressiveness of the trainees In addition, it was seen that the trainees tried to deepen mutual understanding.

(2) Continuance of the Project

From the comments of the questionnaire, there were several opinions that wished to continue this Project.

(3) On-Site Training utilizing periodical inspection

"On-site training by UE, utilizing periodic inspection of combined cycle" is hard to implement, caused by scheduling problem during this project. JICA Expert Team finally decided to cultivate trainer candidate with experiencing "Periodical Inspection", with the course contents of TOT in Japan, instead of in Uzbekistan.

(4) Summary on implementation results of the 1st - 3rd TOT in Japan

Regarding the implementation of this project as a whole, we will report the summary as attachment-2. It includes the results of 1st and 2nd TOT in Japan and implementation status of TOT in Uzbekistan of this project.

7. Acknowledgments

We, all the members of this project, gratefully thanks to Ms. Masuya from JICA HQ, Ms. Kimura and Ms. Nakasone from JICA Chugoku Center, JICA Coordinator Mr. Katori and Ms. Tanaka, lecturers from IC-NET, PET and MHPS.

REPORT

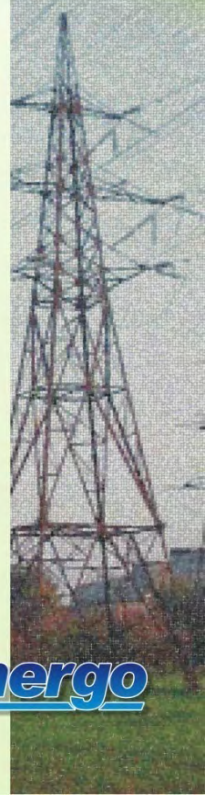
about the results of the work done on the training center of JSC “NAVOI TPP”

UzbekEnergo

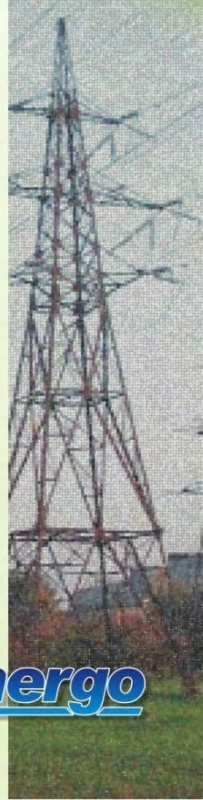
JSC «NAVOI TPP»

Briefly about the state of the Uzbek energy system

At present, 7 thermal power plants are in operation in the Uzbek power system. The installed capacity of the generating facilities excluding the newly introduced CCGTs is 12,400 MW

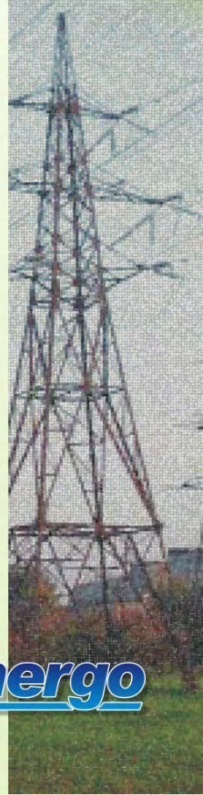


In order to use the economic feasibility of power generating facilities, the Government of the Republic approved projects for the implementation of combined-cycle power plants on the basis of existing stations and also in new regions of the Republic. Until 2023, it is planned to build 20 CCGT units with a total capacity of more than 6270 MW throughout the country.



Based on the experience of the 3rd training in Japan, together with the future plan of action, the following points were summarized.

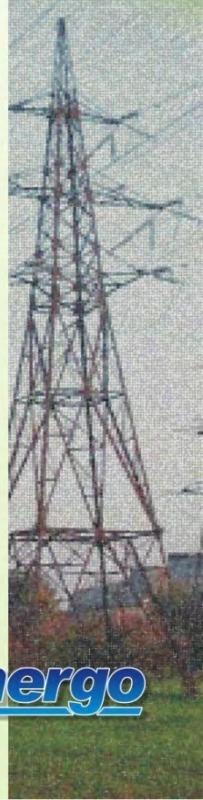
- The final decision of the persons responsible for 12 courses and future plans
- About the creation and review of the Lesson Plan
- Results of consideration of trainer-candidates and the head for training centre regarding the position of each course and preparation of the training plan



Approved instructors for the training center of JSC NTPP

№	Name	Position	Teaching filed
1	Musaev Alisher	Leading engineer on TME (thermal mechanical equipment)	Mechanical
2	Aslonov Aslon	Shift head	Mechanical
3	Djamalov Bakhodir	Repair master of TME	Mechanical
4	Bayliev Shukhrat	GT Operator	Mechanical
5	Islamov Ismail	Repair master of TME	Mechanical
6	Bazarov Fakhriddin	BOP Operator	Mechanical
7	Pirnazarov Nurali	Senior patrol operator of Unit	Mechanical
8	Khudoykulov Lutfullo	GT Operator	Mechanical
9	Khasanov Latif	Leading engineer programmer	Programming
10	Toshov Istam	Leading C&I Engineer	C&I
11	Narziev Akmal	C&I engineer	C&I
12	Toshov Sanjar	Electrical technical labo master	Electrical
13	Parmonov Azim	Leading electrical engineer	Electrical
14	Eshev Khamdam	Leading electrical engineer	Electrical
15	Makhmudov Aziz	Metal labo worker	Mechanical

- Our colleagues in the second TOT in Japan drafted an action plan for the textbooks of the training center.
- At the moment, textbooks No. 1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 have already been finalized. Corrected translation errors in terms of technical content.
- Lesson plans with milestones have been drawn up.



Формат План действий

Деятельность Activities	Исполняющий персонал Implementation personel		3				4				5				6				7				8				9				10				11				12				1				2				03			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Неразрушающий контроль	*Аслонов А. Джамалов Б. Исламов И. Махмудов А.	План																																																		
		Фактический																																																		
2. Анализ вибрации во врашающихся механизмах	*Тошов И. Мусаев А. Нарзиев А.	План																																																	
		Фактический																																																	
3. Оценка остаточного ресурса	*Махмудов А. Аслонов А. Джамалов Б. Байлиев Ш.	План																																																
		Фактический																																																	
4. Оборудование комбинированной генерации Газовой Турбины	*Мусаев А. Байлиев Ш. Аслонов А. Бозоров Ф. Пирназаров Н	План																																																
		Фактический																																																	
5. Техобслуживание горячих частей ГТ	*Джамалов Б. Исламов И. Мусаев А. Байлиев Ш. Худойкулов Л. Пирназаров Н.	План																																															
		Фактический																																																	
6. Детали электротехнического оборудования для газотурбинной электростанции комбинированного цикла	*Пармонов А. Тошов С. Эшов Х.	План																																															
		Фактический																																																	
7. Теория эксплуатации и управления газотурбинной электростанции комбинированного цикла	*Тошов И. Саидов К. Мусаев А. Пармонов А.	План																																															
		Фактический																																																	
8. Детали КИП приборов для газотурбинной электростанции комбинированного цикла	*Нарзиев А. Тошов И. Хасанов Л. Саидов К.	План																																															
		Фактический																																																	
9. Эксплуатация и техобслуживание ГТ	*Мусаев А. Байлиев Ш. Аслонов А. Джамалов Б. Нарзиев А.	План																																															
		Фактический																																																	
10. Система управления ГТ	*Байлиев Ш. Мусаев А. Аслонов А. Худойкулов Л.	План																																															
		Фактический																																																	
11. Система электрического управления ГТ	*Пармонов А. Тошов С. Эшов Х. Мусаев А. Пирназаров Н.	План																																															
		Фактический																																																	
12. Лекция по Э и ТО Газовой турбины	*Мусаев А. Байлиев Ш. Аслонов А. Джамалов Б. Худойкулов Л.	План																																															
		Фактический																																																	

Учебный план **Дата: «___»_____2018г**

Учебный центр по эксплуатации и техобслуживанию ПГУ

«УТВЕРЖДАЮ»
Директор учебного центра
_____ Достов Ш.О.

1. *Номер и название учебного курса*

4. Оборудование комбинированной генерации газовой турбины

Ответственный инструктор для данного курса

Главный:

Заместитель:

Другие:

2. *Стандартное количество слушателей*

10 слушателей.

Целевые слушатели

Работники АО «НТЭС»

3. *Продолжительность курса (часы)*

3 дня (21 час)

4. *Содержание курса и часы*

№	Главы	дни	часы
1	Обзор Навоийской ТЭС	первый	3
2	Основы комбинированного цикла выработки	первый	4
3	Основные знания о ГТ	второй	3
4	Периодическая инспекция и инспекция камеры сгорания	второй	4
5	Котел утилизатор	третий	2
6	Паровая турбина	третий	2
7	Примеры неисправностей	третий	2
8	Анкетирование	третий	1

5. *Необходимое оборудование для данного курса*

Не требуется

6. *Контрольные точки данного курса*

№	Контрольные точки в деталях
1	Контрольные вопросы после прохождения каждой главы
2	Тестирования после прохождения данного учебника
3	Короткометражные видеоролики с «You Tube»ба по оборудованию
4	Экскурсия по узлам основных оборудованиях
5	

7. *Вопросы и типичные ответы для заключительного экзамена курса*

8. *Критерии оценки слушателей*

№	Параметры	Результат
1	Уровень посещаемости тренинга (%)	
2	Количество заданных вопросов	
3	Понимание лекции	

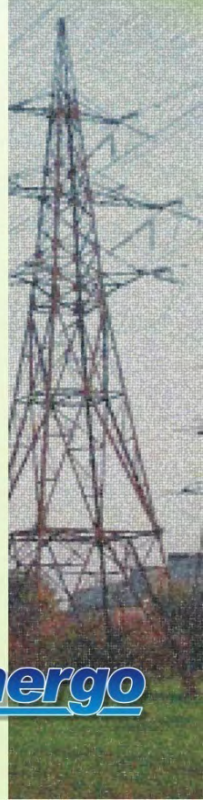
- The main instructor and his deputy will be included in the lesson plan in the following table

- During the training period, we plan to include video clips on the technological process from Youtube in order to make the lesson understandable and interesting.

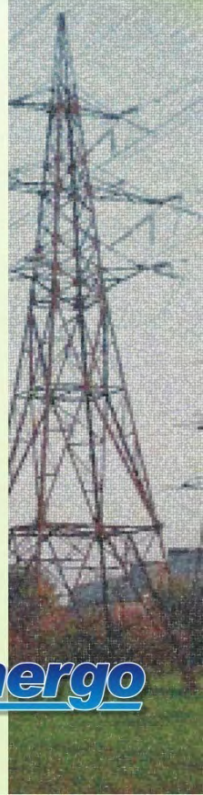
- ALL LESSON PLANS

№	Course name	Main instructor	Deputy
1	Nondestructive testing	Makhmudov A.	Djamalov B., Islamov I.
2	Vibration analysis for rotating machine	Islamov I.	Toshov I., Djamalov B.
3	Remaining life assessment	Aslonov A.	Djamalov B. Makhmudov A.
4	Gas Turbine (GT) Combined Power Generation Equipment	Musaev A.	Aslonov A., Khudoykulov L.
5	GT Hot Parts Maintenance	Djamalov B.	Islamov I., Bayliev Sh.
6	Details of Electrical Facilities for GT CCPP	Toshov S.	Eshev Kh., Parmonov A.
7	Operation & Control Theory of GT CCPP	Toshov I.	Parmonov A., Khasanov L., Khudoykulov L.
8	Details of Control & Instrument Devices for GT CCPP	Narziev A.	Toshov I., Khasanov L.
9	GT Operation & Maintenance	Bazarov F.	Khudoykulov L., Aslonov A
10	GT Control System	Pirnazarov N.	Bayliev Sh., Musaev A.
11	GT Electrical Control System	Parmonov A.	Eshev Kh., Bazarov F., Pirnazarov N.
12	GT O&M lecture	Musaev A.	Khudoykulov L., Islamov I.

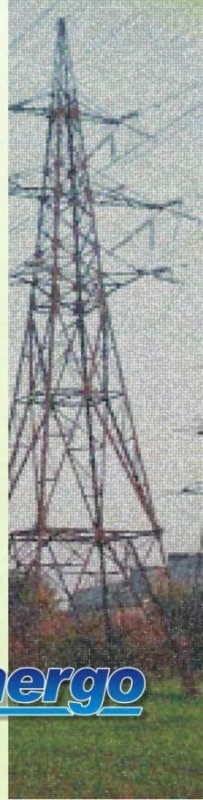
- In order to fully implement and effectively complete the project, we consider it expedient to include in the training material an additional thirteenth textbook with the content of the following topics:
- studying of SFC logic circuits and electric protection of generators (GT Gen, ST Gen).
- diagnostics of fluctuation sensors;
- maintenance of software of the "DIASYS Netmation" system



- We would like to note that all the project activities carried out by Japanese experts and instructor candidates are conducted in sufficient measure according to the schedule. In this regard, we want to sincerely thank our respected Sensei and JICA for their hard work.
- Due to certain reasons, there are minor delays in completing the repair of the building of our training center.
- During the project implementation, a partial supply of training equipment for classrooms was made. But unfortunately, the repair of the building of the training center has not been completed so far. Therefore, we can begin to train new employees for Navoi CCGT-2 unit and Turakurgan CCPP-1 and 2 only after the completion of the renovation of the building.
- And the completion of our project is planned in March 2019.
- Unfortunately, until the end of project, we will have very few opportunity to conduct actual training of staff in theory and practice using training equipment. Accordingly, we would like to ask the JICA management to extend the duration of our project by several years, since this training center is of paramount importance for the new energy infrastructure of Uzbekistan. We sincerely hope that JICA will positively satisfy our request and will provide long-term assistance in the development of our training center.
-



- And also we really liked the level of specialists of power plants Chugoku Electric and the plant MHPS achieved thanks to personnel rotation between sections and organizations.
- If JICA approved our proposal to extend our Project for another 3 years, then I have a good idea that would contribute to a general increase in the operation and maintenance potential of all Uzbekenergo power plants.
- In the future, at our training center with the help of Japanese experts, we would organize joint seminars and conferences to improve the capacity of the O & M of the CCPP by inviting specialists of all levels from all CCPP units of Uzbekenergo. These periodic meetings at different levels would help us learn about the specific problems of the CCPP, about frequent breakdowns, or about concrete achievements in O & M of individual units, or about new world achievements in the field of CCPP. This would help collectively analyze the specific problems of O & M CCP.
- Although all TPPs are located under Uzbekenergo, they all have separate business entities and employees.
- And my proposal would help the overall development of O & M potential and close communication between power plants.
- To implement this idea, we need the support of our experienced Japanese experts.



Our gratitudes

The Project for

Establishment of the Combined Cycle Gas Turbine (CCGT) Operation and Maintenance Training Center in Uzbekistan

Technical Transfer of The Project

JICA Expert Team of The Project

Asia Engineering Consultant Co., Ltd.

Nippon Koei Co., Ltd.

The Chugoku Electric Power Co., Inc.

Power Engineering and Training Services, Inc.

Overview

Contents

- Training course/ subject (12 courses) and Textbook
- Review and revision of textbook
- Training of Trainer (TOT)
- Training equipment and practical training
- PCM Training @ Training in Japan
- Lecture Plan/Lesson Plan by Trainer - Navoi Training Center
- On-Site Training @ Training in Japan
- Mock-UP training/ Simulation of "lecture & practical" training

Location of Cultivation of TOT @

Training in Japan 1st, 2nd and 3rd

TOT in Uzbekistan, in Mission to Uzbekistan

Training Course/Subject and Textbook

Proposal of subjects

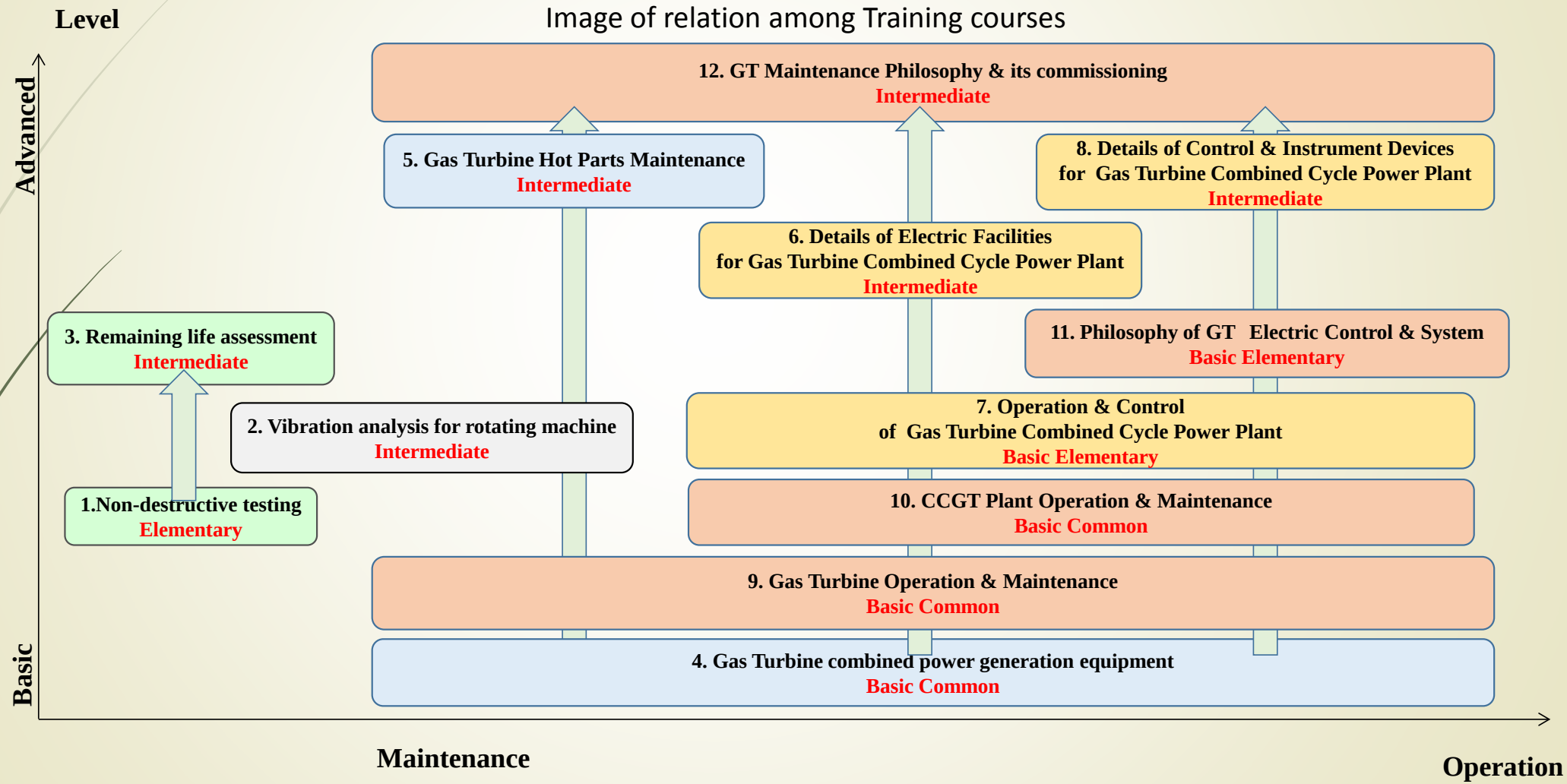
- 12 target subjects/ courses were discussed and agreed
- Proposed in 1st JCC in Uzbekistan and discussed

Training Course/ Subject, and preferable condition **by JET**

Text No. / Course Title		Training Level of course	Target field of trainee		Potential of on-site training for *upper class*	Standard Training Days	Standard Trainees Number	Purocured Training Equipment by JICA	Required Number of Trainer for the course/ subject		
									Chief Trainer	Deputy Trainer	Assistant Trainer
Mechanical Field											
1	Non-destructive testing	Elementary	Mechanist	Maintenance	–	2	10	○	1	1	1
2	Vibration analysis for rotating machine	Intermediate	Mechanist	Maintenance	–	3	10	○	1	1	1
3	Remaining life assessment	Intermediate	Mechanist	Maintenance	–	3	10	–	1	1	–
4	Gas Turbine; Combined power generation equipment	Basic Common	All Staff of CCPP	Maintenance & Operation	effective	3	10	–	1	1	–
5	Gas Turbine; Hot Parts Maintenance	Intermediate	Mechanist	Maintenance	effective	3	10	–	1	1	–
Electrical Field											
6	Details of Electrical Facilities for Gas Turbine Combined Cycle Power Plant	Intermediate	Electrician	Maintenance	–	4	8	○	1	1	1
7	Operation & Control Theory of Gas Turbine Combined Cycle Power Plant	Basic Elementary	Electrician & Mechanist	Maintenance & Operation	effective	3	10	–	1	1	–
8	Details of Control & Instrument Devices for Gas Turbine Combined Cycle Power Plant	Intermediate	Electrician C&I	Maintenance	effective	5	8	○	1	1	1
Equipment Field											
9	Basic Gast Turbine Gas Turbine Operation & Maintenance	Basic Common	All Staff of CCPP	Maintenance & Operation	effective	3	15	○	1	1	–
10	CCGT Plant Operation & Maintenance Gas Turbine Control System	Basic Common	Electrician & Mechanist	Maintenance & Operation	effective	3	15	–	1	1	–
11	Philosophy of GT electrical system and GT control Gas Turbine Electrical Control System	Basic Elementary	Electrician	Maintenance & Operation	effective	1	15	–	1	1	–
12	Gas Turbine Maintence Pholsophy and its commissioning Gas Turbine O&M Lecture	Intermediate	Electrician & Mechanist	Maintenance & Operation	–	1	15	–	1	1	–

- Chief Trainer should manage and implement the Training Course. Deputy Trainer should be alternative for Chief trainer.
- Assistant Trainer will be apprentice, and can participate the training including practical training as an assistant under guidance of other trainer.
- *upper class* including Manager, Engineer, Trainer Candidate and etc.
- All condition of the course should be arranged by Chief Trainer to be optimized for target trainees.

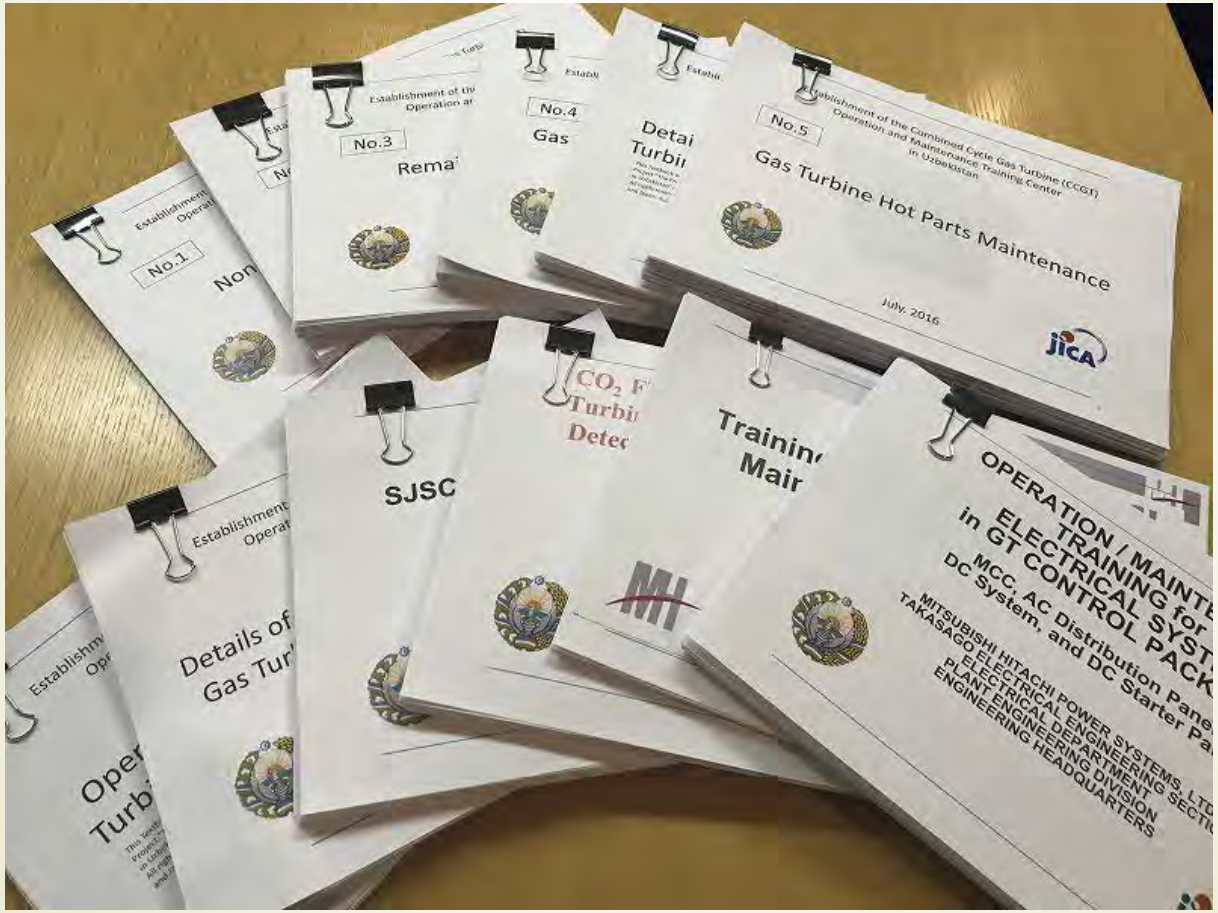
Relation among subjects



Review and revision of Textbook

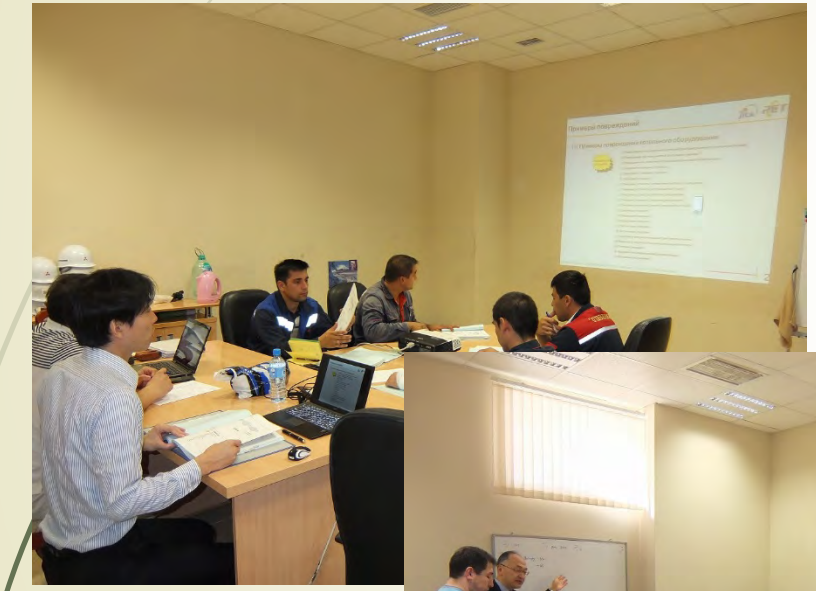
Proposed Textbook

- Original contents in English were proposed, and handover from JET.



Review of Textbook

- Original contents were translated to Russian, and reviewed in TOT UZ by Trainer Candidates.

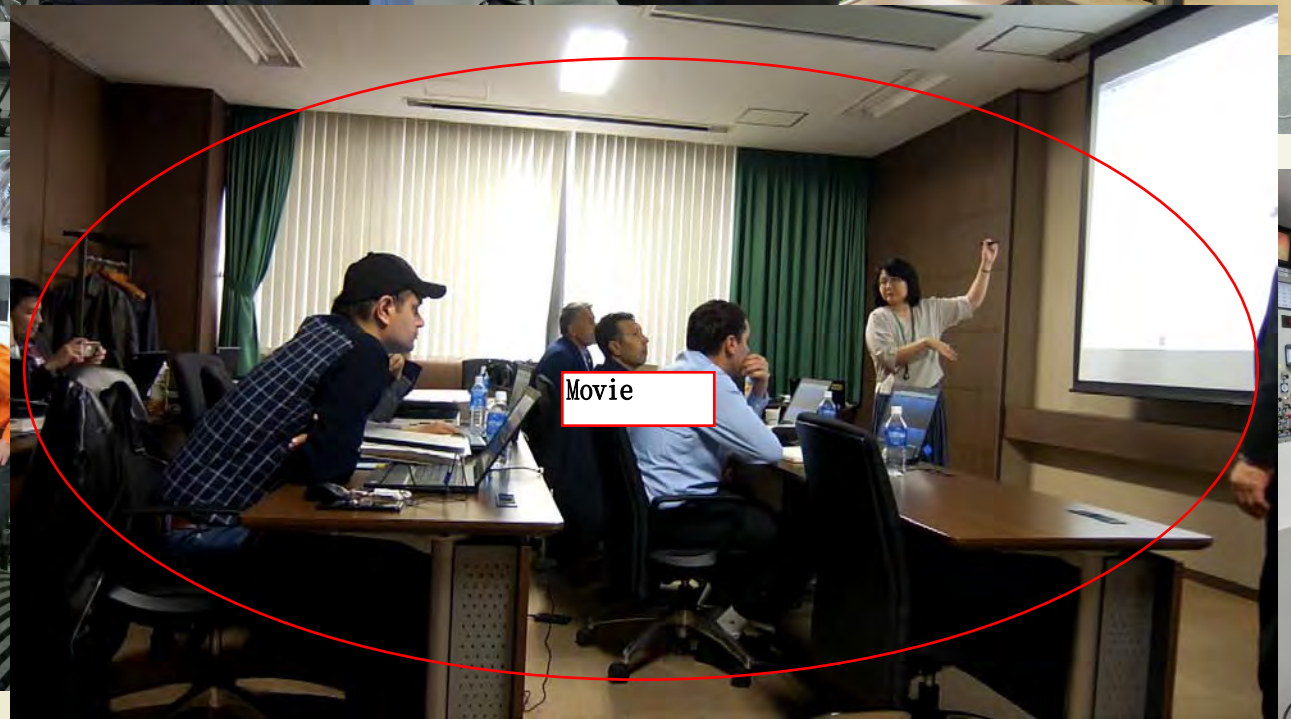


Revised Russian Textbook

- Textbooks were revised, and will finally be printing as a Textbook of NTC.

Training of Trainer

Training in Japan


Movie

TOT in Uzbekistan

Training Equipment and Practical Training

Training Equipment

- Training Equipment were procured by JICA for 5 courses/subjects.

Training Course/ Subject, and preferable condition **by JET**

Text No. / Course Title		Training Level of course	Target field of trainee		Potential of on-site training for *upper class*	Standard Training Days	Standard Trainees Number	Purocured Training Equipment by JICA	Required Number of Trainer for the course/ subject		
									Chief Trainer	Deputy Trainer	Assistant Trainer
Mechanical Field											
1	Non-destructive testing	Elementary	Mechanist	Maintenance	–	2	10	○	1	1	1
2	Vibration analysis for rotating machine	Intermediate	Mechanist	Maintenance	–	3	10	○	1	1	1
3	Remaining life assessment	Intermediate	Mechanist	Maintenance	–	3	10	–	1	1	–
4	Gas Turbine; Combined power generation equipment	Basic Common	All Staff of CCPP	Maintenance & Operation	effective	3	10	–	1	1	–
5	Gas Turbine; Hot Parts Maintenance	Intermediate	Mechanist	Maintenance	effective	3	10	–	1	1	–
Electrical Field											
6	Details of Electrical Facilities for Gas Turbine Combined Cycle Power Plant	Intermediate	Electrician	Maintenance	–	4	8	○	1	1	1
7	Operation & Control Theory of Gas Turbine Combined Cycle Power Plant	Basic Elementary	Electrician & Mechanist	Maintenance & Operation	effective	3	10	–	1	1	–
8	Details of Control & Instrument Devices for Gas Turbine Combined Cycle Power Plant	Intermediate	Electrician C&I	Maintenance	effective	5	8	○	1	1	1
Equipment Field											
9	Basic Gast Turbine Gas Turbine Operation & Maintenance	Basic Common	All Staff of CCPP	Maintenance & Operation	effective	3	15	○	1	1	–
10	CCGT Plant Operation & Maintenance Gas Turbine Control System	Basic Common	Electrician & Mechanist	Maintenance & Operation	effective	3	15	–	1	1	–
11	Philosophy of GT electrical system and GT control Gas Turbine Electrical Control System	Basic Elementary	Electrician	Maintenance & Operation	effective	1	15	–	1	1	–
12	Gas Turbine Maintence Pholsophy and its commissioning Gas Turbine O&M Lecture	Intermediate	Electrician & Mechanist	Maintenance & Operation	–	1	15	–	1	1	–

- The project team could not implement before delivery of equipment. So, JET implemented alternative practical course in **Training in Japan**.
- Implemented course were No.1 "Non-destructive testing" in 2nd Training in Japan, and course No2 "Vibration analysis for rotating machine" in 3rd Training in Japan.
- For the course No.6 and No.8, there were no occasion to implement practical training in Japan, Practical training will be implemented in Uzbekistan after equipment delivery.

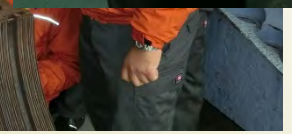
Practical Training No1

- Practical Training was implemented for course No. 1

"Non- destructive testing" ***@ Training in Japan***







Practical Training No2

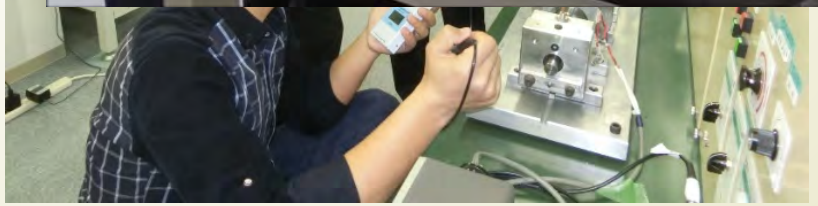
- Practical Training was implemented for course No. 2

"Vibration analysis for rotating machine" ***@ Training in Japan***

Practical Training No2

- Practical Training was implemented for course No. 2

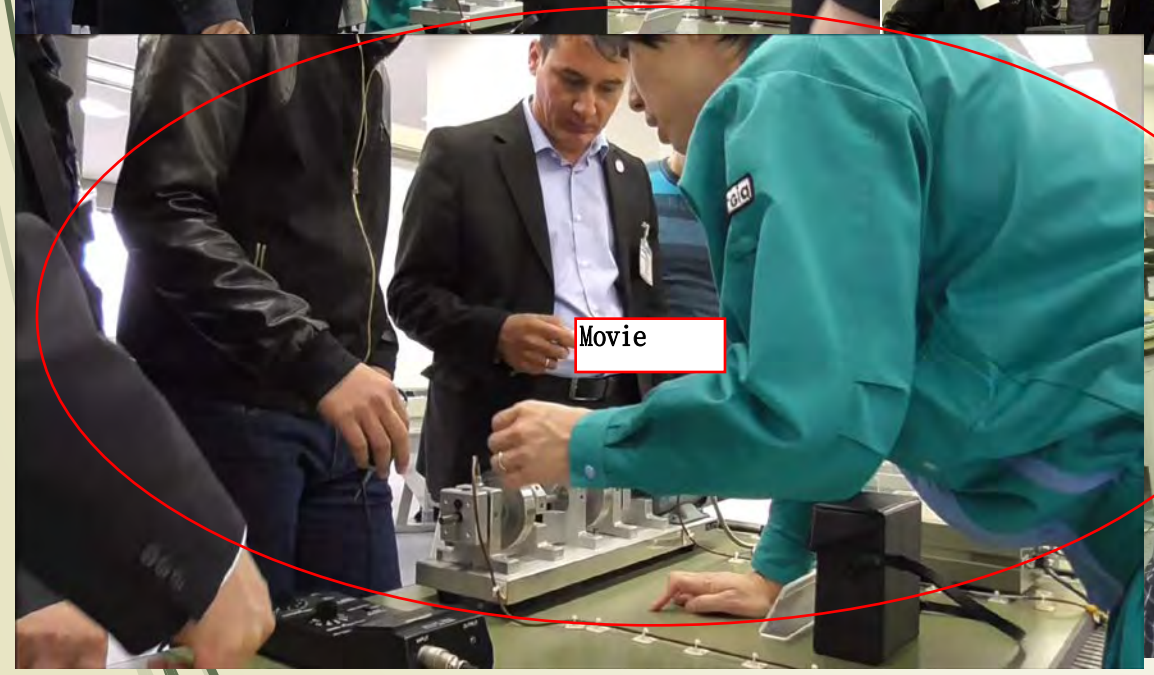
"Vibration analysis for rotating machine" ***@ Training in Japan***

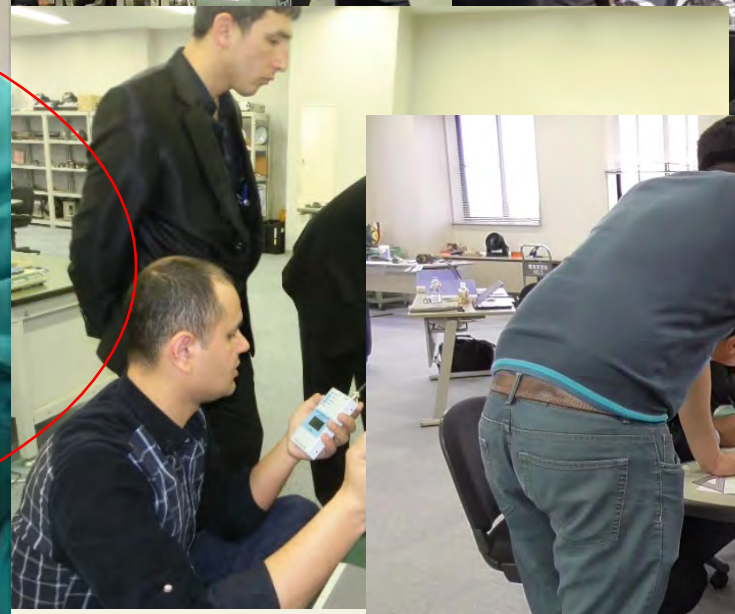


Practical Training No2

- Practical Training was implemented for course No. 2

"Vibration analysis for rotating machine" ***@ Training in Japan***





Practical Training coming up soon

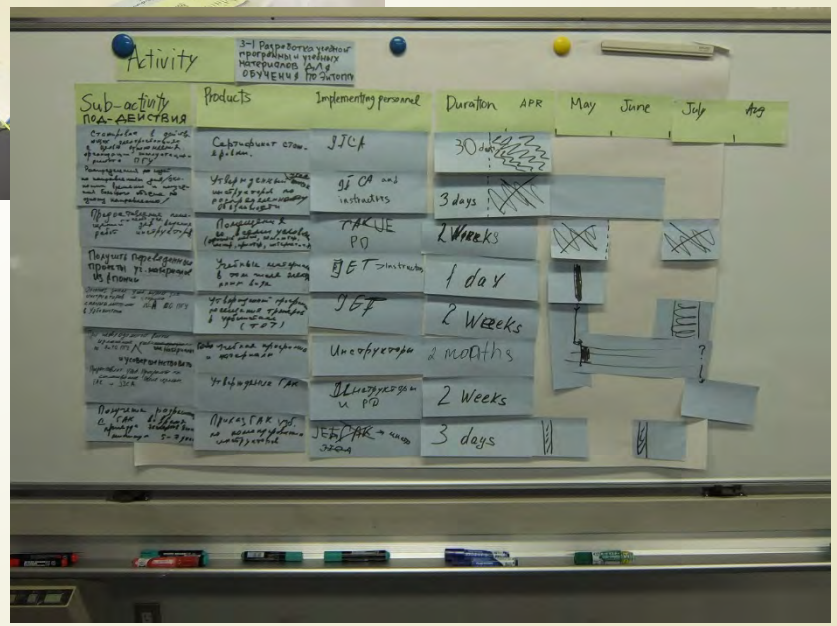
- *Remaining practical training* for following courses will be *coming up soon*.

- For course No. 2 “Vibration analysis for rotating machine” on TOT in UZ @13th mission (scheduled on Oct. 2018)
- For course No.8 “Detail of C&I devices/ C&I Control box” on TOT in UZ @12th Mission (scheduled on end of Jul. 2018)
- For course No.6 “Detail of Electrical Facilities/ SFC” on TOT in UZ @Xth Mission (schedule not decided)

PCM Training

@Training in Japan

PCM Training



PCM Training Process

- JET implemented PCM method training in “Training in Japan”.
- Participant from Uzbekenergo, i.e. trainer candidates, invited to “Training in Japan”, were learned ***PCM method and create Action Plan*** for their task of the Project.
- Action Plan, concluded in “1st Training in Japan”, was including ***trainer's allocation*** of training course, ***reviewing the equipment list***, ***reviewing the proposed textbook***, and etc.
- Trainer candidates implemented their task according to these Action Plan. Unfortunately, all of trainer candidate were decided to replace over, due to the influence from changing construction site for training center by UE.
- Created Action Plan were becoming property to ***take over to new Trainer candidates***.
- These action plan were implemented by new Trainer candidates, in an optimal way that can be achieved.

Created Action Plan

- New Action Plan, concluded in "***2nd Training in Japan***", one was "***to create Lecture Plan/ Lesson Plan***". And other one was "problem to solve", i.e. mainly a training program for external trainee.

To create Lecture Plan

活動	実施者		3				4				5				6				7				8				9				10				11				12			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. 非破壊検査	Aslonov A, Djamalov B, *Khamraev I	計画									■	■																														
		実施																																								
2. 回転体の振動分析	Musaev A. *Toshov I.	計画																					■	■																		
		実施																																								
3. 余寿命診断	Aslonov A, Djamalov B, *Khamraev I	計画																									■	■														
		実施																																								
4. ガスタービンコンバインドサイクル発電設備	*Musaev A. Bayliev Sh. Aslonov A. Djamalov B.	計画					■	■																																
		実施																																								
5. ガスタービン・ホットパーツ保守	*Djamalov B. Musaev A. Bayliev Sh.	計画													■	■																										
		実施																																								
6. ガスタービンコンバインドサイクル発電プラント電気設備	*Parmonov A. Toshov S. Eshov Kh.	計画																							■	■																
		実施																																								
7. ガスタービンコンバインドサイクル発電設備運転制御理論	Toshov I. *Musaev A. Saidov K. Aslonov A. Parmonov A.	計画											■	■																												
		実施																																								
8. ガスタービンコンバインドサイクル発電設備計測器	*Toshov I. Narziev A. Khasanov L. Saidov K.	計画																																			■	■				
		実施																																								
9. ガスタービン運転・保守	Baiyiev Sh. *Aslonov A, Musaev A . Djamalov B. Narziev A.	計画							■	■																																
		実施																																								
10. ガスタービン制御システム	*Khasanov L. Narziev A. Toshov I.	計画							■	■																																
		実施																																								
11. ガスタービン電気制御	*Parmonov A. Toshov S. Eshov Kh. *Toshov I. Musaev A. Saidov K.	計画									■	■																														
		実施																																								
12. 講義・ガスタービン運転・保守	Bayliev Sh. * Aslonov A. Musaev A. Djamalov B.	計画																																				■	■			
		実施																																								

Problem to solve

活動	実施者	成果		3				4				5				6				7				8				9			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
大学・専門学校への広報活動																															
発電所管理者から許可を得る	Eshov Kh. , *Musaev A	発電所の許可	計画			■																									
			実施																												
大学と専門学校の管理者の同意を得る	*Eshov Kh, Musaev A	大学・専門学校の許可	計画			■																									
			実施																												
プレゼンテーション資料の作成	*Aslonov A, Musaev A, *Parmonov A, Narziev A, Khasanov, Djamalov B	プレゼンテーション資料	計画				■	■	■																						
			実施																												
プレゼンテーションの実施	*Aslonov A, *Parmonov A.	参加者名簿	計画									■	■																		
			実施																												
学生を招待してGTCCについて知ってもらう（説明会）	*Musaev A., Khasanov L., *Parmonov A	希望者名簿	計画									■	■																		
			実施																												
学生向けGTCC説明会について参加者にアンケートをとる	*Aslonov A, Parmonov A	アンケート集計結果	計画									■	■																		
			実施																												
発電所への就職に興味を示す学生を対象に、発電所の研修センターでGTCCに関する短期研修を実施する。																															
研修プログラムの作成	Аслонов А, *Мусаев А, Парм онов А, Нарзиев А, Хасанов Л, Джамалов Б, Тошов С, Б айлиев Ш	研修プログラム	計画							■	■	■	■	■	■																
			実施																												
発電所管理者の許可を得る	Eshov Kh, *Musaev A	発電所の許可	計画											■	■																
			実施																												
大学・専門学校の管理者の同意を得る	*Eshov Kh , Musaev A	大学・専門学校の許可	計画											■	■																
			実施																												
研修教材の作成	*Aslonov A, Musaev A, *Parmonov A, Narziev A, Khasanov L, Djamalov B, Toshov S, Bayliev Sh	研修教材	計画							■	■	■	■	■	■																
			実施																												
研修の実施	*Aslonov A , *Parmonov A, Narziev A, Khasanov L, Djamalov B	参加者名簿	計画													■	■	■													
			実施																												
優秀な学生のリストアップ	*Musaev A, Aslonov A, Khasanov L, Djamalov ,Narziev A, *Toshov S	研修参加者名簿	計画														■													
			実施																												
研修教材に関するアンケートの実施	*Aslonov A, Parmonov A	アンケート集計結果	計画													■	■	■													
			実施																												
発電所での研修プログラム																															
学生向け研修プログラムの作成	Aslonov A, *Musaev A, Parmonov A, Narziev A,	承認済みプログラム	計画													■	■	■													
			実施																												
発電所の管理者の許可を得る	Eshov Kh, *Musaev A	発電所の許可	計画															■													
			実施																												
大学・専門学校の管理者の同意を得る	*Eshov Kh, Musaev A	大学・専門学校の許可	計画															■													
			実施																												
GTCC発電設備での研修の実施	Musaev A, Aslonov A. Parmonov A, Bayliev Sh, Khasanov L, Djamalov B, Narziev A, Toshov S	参加者名簿	計画																■	■	■	■	■	■							
			実施																												
アンケートの実施	*Aslonov A, Parmonov A	アンケート集計結果	計画																				■								
			実施																												

Implementation of Action Plan

- Action Plan for “problem to solve” is the issue under the control by manager. So that, it needs understanding of manager to implement this Action Plan directly by Trainer candidate. Trainer candidate entrusted this issue to manager in charge.
- For “***to create Lecture Plan***”, Trainer candidates, participated 2nd Training in Japan, continue to execute Action Plan with amendment.
- Trainer candidates, who participated 3rd Training in Japan, followed up these Action Plan. Then finally, they ***completed*** to create tentative ***Lecture Plan*** till May 2018, ***except course No2***.

Lecture Plan
Lesson Plan

Trainer in charge

- Trainers, in charge of each courses/subjects, were proposed by NTC, ***on 3rd Training in Japan***
- Chief Trainer is responsible to create Lecture Plan with Deputy Trainer.

№	Name	Position	Training Subject / Course Number											
			1	2	3	4	5	6	7	8	9	10	11	12
1	Musaev Alisher	Leading Engineer TME				◎						○		◎
2	Aslonov Aslon	Shift Head			◎	○					○			
3	Djamalov Bakhodir	Maintenance Master TME	○	○	○		◎							
4	Bayliev Shukhrat	Operator GT					○					○		
5	Islamov Ismail	Maintenance Master TME	○	◎			○							○
6	Bazarov Faxriddin	Operator BOP									◎		○	
7	Pirnazarov Nurali	Senior Engineer Power Unit										◎	○	
8	Khudoykulov Lutfillo	Operator GT				○			○		○			○
9	Khasanov Latif	Leading Engineer Programmer							○	○				
10	Toshov Istam	Leading Engineer C&I		○					◎	○				
11	Narziev Akmal	Engineer Electrical								◎				
12	Toshov Sanjar	Master Electro Technical Lab.						◎						
13	Parmonov Azim	Leading Engineer Electrical						○	○				◎	
14	Eshev Khamdam	Leading Engineer Electrical						○					○	
15	Makhumudov Aziz	Laboratory assistant Metal-Lab	◎		○									

◎ Chief Trainer,
○ Deputy Trainer

Prepared Lecture Plan

- Draft of Lecture Plan for the course No.4/ example is as follows.

red character, commented by T. SAITO on April 16, 2018

План урока

Дата: «___»_____2018г
Учебный центр по эксплуатации и техобслуживанию ПГУ
«УТВЕРЖДАЮ»
Директор учебного центра
_____Достов Ш.О.

1. *Номер и название учебного курса/ Title & Trainer*
   4. Оборудование комбинированной генерации газовой турбины
   (GT, combined power generation equipment)
   Ответственный инструктор для данного курса/Responsible Instructor for this course
   Главный: Худойкулов Лутфулло Chief: Khudoykulov Lutfullo
   Заместитель: Мусаев Алишер Deputy: Musayev Alisher
   Другие: Байгиев Шухрат Others:Bayliev Shukhrat
2. *Стандартное количество слушателей/* Number of trainee
   10 слушателей. 10 Trainee
   Целевые слушатели : Работники АО «НТЭС»
   Персонала эксплуатации и технического обслуживания, Новые сотрудники ПГУ
   /O&M Staff of Navoi TPP, New employee for CCPP
3. *Продолжительность курса (часы)/* Course duration
   Из дневного месяца, года; до дневного месяца, года
   3 дня (21 час)
4. *Содержание курса и часы/* Course contents and hours

№	Главы	дни	часы
1	Обзор Навоийской ТЭС	первый	3
2	Основы комбинированного цикла выработки	первый	4
3	Основные знания о ГТ	второй	3
4	Периодическая инспекция и инспекция камеры сгорания	второй	4
5	Котел утилизатор	третий	2
6	Паровая турбина	третий	2
7	Примеры неисправностей	третий	2
8	Анкетирование	третий	1

5. *Необходимое оборудование для данного курса/* Equipment
   Не требуется/ not required
6. *Контрольные точки данного курса/* Milstone

№	Контрольные точки в деталях
1	Контрольные вопросы после прохождения каждой главы Question after each chapter
2	Тестирования после прохождения данного учебника Test, after Classroom lecture
3	Короткометражные видеоролики с «YouTube»ба по оборудованию Short video clips from "You Tube" on equipment
4	Экскурсия по узлам основного оборудования On-site tour of the main equipment
5	

7. *Вопросы и типичные ответы для заключительного экзамена курса/Q&A for the final course exam*
   Подготовить, конкретные вопросы и типичные ответы для завершения экзамена курса, чтобы подтвердить понимание курса, более 10 вопросов. Отшите конкретные вопросы и ответы на другой странице.
   Preparing concretequestions and typical answers for completing the course exam to confirm understanding of the course, more than 10 questions. Please describe concreteQ&A in another page.

   Please clarify thespecific Q&A/ section 9 before 12th mission

8. *Критериоценкислушателей/* Criteria

№	Параметры	Результат
1	Уровеньпосещаемоститренинга (%)/ attendancerate	
2	Количество заданных вопросов/Количество вопросов, заданных каждым стажером по каждому, и его качество Number of questions asked from each trainee by each, and its quality	
3	Понимание лекции, Результатытестазавершения Understanding of the lecture, results of completion examination	

red character, commented by T. SAITO on April 16, 2018

9. Specific Q&A, for course № 4(GT, combined power generation equipment)
Конкретный список вопросов и ответов, курса № 4. Оборудование комбинированной генерации газовой турбины

Q&A should be more than 10 / Вопросы и ответы должны быть более 10

No	Chapter глава	Question/ Вопрос (drawings separated/чертежи разделены)	Typical answer/ Типичный ответ (drawings separated/чертежи разделены)
1		Части высокотемпературных элементов	Камбастр, направляющие лопатки, рабочие лопатки.
2		Части камбасторя	Топливные форсунки, камеры сгорания, переходные потрубки.
3		Температура горячего воздуха на входе и выходе турбины (на F4 марке)	1400°C на входе 600°C на выходе
4		Типы термостойких материалов	Легированный сплав, литейный сплав, сс лопатка сплав, полученный методом направленной кристализации ,IIS лопатки.
5		Типы охлаждения	Конвективное охлождение, (игольчатое охлаждение) Пленочное охлаждение, Инжекционное охлаждение
6		Типы инспекций	Неразрушающий контроль(НК) Разрушающий контроль(РК)
7		Типы тестирования по (НК)	Визуальный контроль, контроль проникающими веществом, люменесцентный проникающий метод, Магнитно порошковый метод, исследования под микроскопом, исследования бороскопом, вихретоковый метод, измерительный контроль, исследования микротрещин, Исследование структуры поверхности
8		Пример процесса ремонта при коррозии топливной форсунки.	Проверка-нанесение временного защитного покрытия –продувка (окись алюминия)-очистка-проверка с помощью дороскопа-антикаррозийной меры-заключительная проверка.
9		Промежуток рабочих часов между ремонтами турбины.	Каждые 12000 часов
10		Замена деталей горючей части.	Камера сгорания и переходной потрубок через 36,000 часов. 1,2,3 ступень рабочие и 1,2 ступень направляющие лопатки, 1,2 ступень сигменты через 50,000 часов 3ступень направляющие и 3ступен сигменты через 80.000 часов. 4 ступень направляющие, 4 ступень рабочие и 4 ступень сигменты через 100,000 часов.

- Trainer can use specific Q&A in training lecture, and for Examination of the course.

Current Lecture Plan

- Current progress to create Lecture Plan is as follows.

№	Course name	Chief Trainer in document		Progress of Lecture Plan
		3rd Training JP	in Lecture Plan	
1	Nondestructive testing	Makhmudov Aziz.		Prepared draft of Lecture Plan are including Specific Q&A.
2	Vibration analysis for rotating machine	Islamov Ismail	No document	Not prepared (before creating)
3	Remaining life assessment	Aslonov Aslon	Baylief Shukhrat	Prepared draft of Lecture Plan are including Specific Q&A. Chief Trainer described in draft of Lecture Plan, is different from proposed list of 3rd training in Japan, by NTC, for the course No3, No4, No7, No8.
4	Gas Turbine (GT) Combined Power Generation Equipment	Musaev Alisher	Khudoykulov L	
5	GT Hot Parts Maintenance	Djamalov B.		
6	Details of Electrical Facilities for GT CCPP	Toshov Sanjar	Eshev Khamdam	
7	Operation & Control Theory of GT CCPP	Toshov Istam	Narziev Akmal	
8	Details of Control & Instrument Devices for GT CCPP	Narziev Akmal;	Toshov Istam	
9	GT Operation & Maintenance	Bazarov Faxriddin		
10	GT Control System	Pirnazarov Nurali		
11	GT Electrical Control System	Parmonov Azim		
12	GT O&M lecture	Musaev Alisher		

- Lecture Plan will be revised according to feedback of training, annually.

On-Site Training

On-Site Training

- On-Site experiences, especially ***experiences of periodical inspection***, ***are required*** for trainer candidates to become trainer.
- Unfortunately in Uzbekistan, there are very few opportunity to experience the periodical inspection of CCPP.
- In this project, JET cultivated trainer candidates within Training in Japan, with experiences of "Periodical inspection" at Japanese power company.
- All the ***training in Japan***, 1st 2nd and 3rd, ***were including "Periodical inspection" of CCPP*** of CEPCO.
- After this Project, NTC should manage to implement On-Site Training to cultivate Trainer and/or manager.

On-Site Training in Japan

On-Site Training in Japan

On-Site Training

- *Potential of On-Site Training* for upper class is recommended as under.

Training Course/ Subject, and preferable condition **by JET**

Text No. / Course Title		Training Level of course	Target field of trainee		Potential of on-site training for *upper class*	Standard Training Days	Standard Trainees Number	Purocured Training Equipment by JICA	Required Number of Trainer for the course/ subject		
									Chief Trainer	Deputy Trainer	Assistant Trainer
Mechanical Field											
1	Non-destructive testing	Elementary	Mechanist	Maintenance	–	2	10	○	1	1	1
2	Vibration analysis for rotating machine	Intermediate	Mechanist	Maintenance	–	3	10	○	1	1	1
3	Remaining life assessment	Intermediate	Mechanist	Maintenance	–	3	10	–	1	1	–
4	Gas Turbine; Combined power generation equipment	Basic Common	All Staff of CCPP	Maintenance & Operation	effective	3	10	–	1	1	–
5	Gas Turbine; Hot Parts Maintenance	Intermediate	Mechanist	Maintenance	effective	3	10	–	1	1	–
Electrical Field											
6	Details of Electrical Facilities for Gas Turbine Combined Cycle Power Plant	Intermediate	Electrician	Maintenance	–	4	8	○	1	1	1
7	Operation & Control Theory of Gas Turbine Combined Cycle Power Plant	Basic Elementary	Electrician & Mechanist	Maintenance & Operation	effective	3	10	–	1	1	–
8	Details of Control & Instrument Devices for Gas Turbine Combined Cycle Power Plant	Intermediate	Electrician C&I	Maintenance	effective	5	8	○	1	1	1
Equipment Field											
9	Basic Gast Turbine Gas Turbine Operation & Maintenance	Basic Common	All Staff of CCPP	Maintenance & Operation	effective	3	15	○	1	1	–
10	CCGT Plant Operation & Maintenance Gas Turbine Control System	Basic Common	Electrician & Mechanist	Maintenance & Operation	effective	3	15	–	1	1	–
11	Philosophy of GT electrical system and GT control Gas Turbine Electrical Control System	Basic Elementary	Electrician	Maintenance & Operation	effective	1	15	–	1	1	–
12	Gas Turbine Maintence Pholsophy and its commissioning Gas Turbine O&M Lecture	Intermediate	Electrician & Mechanist	Maintenance & Operation	–	1	15	–	1	1	–

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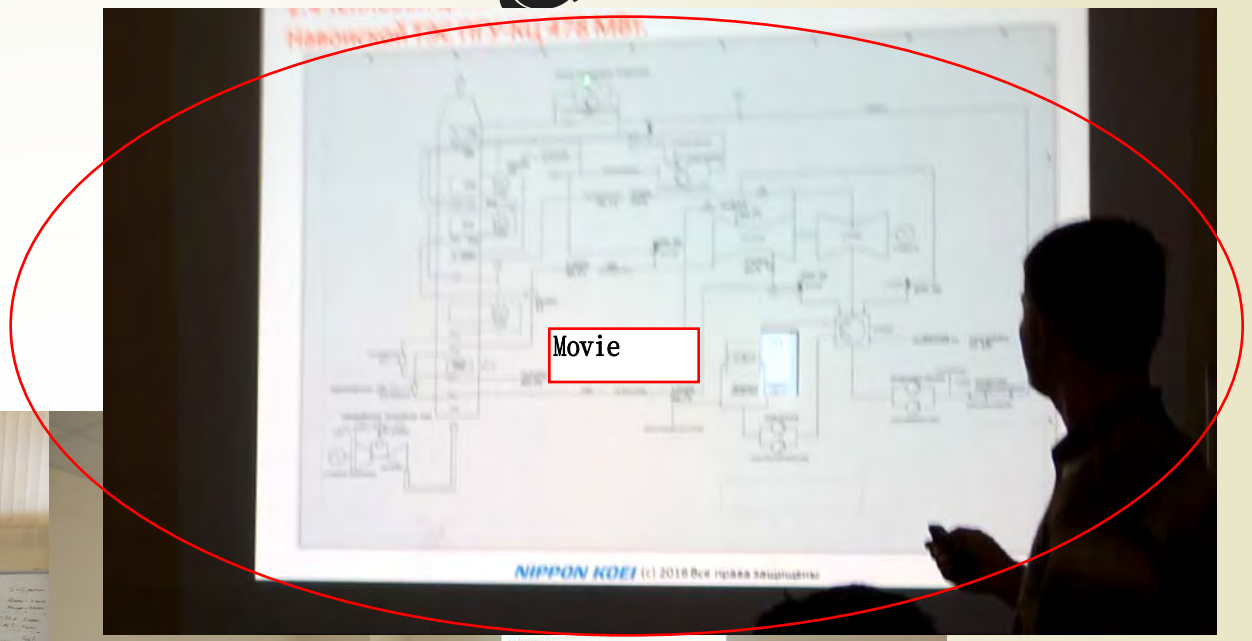
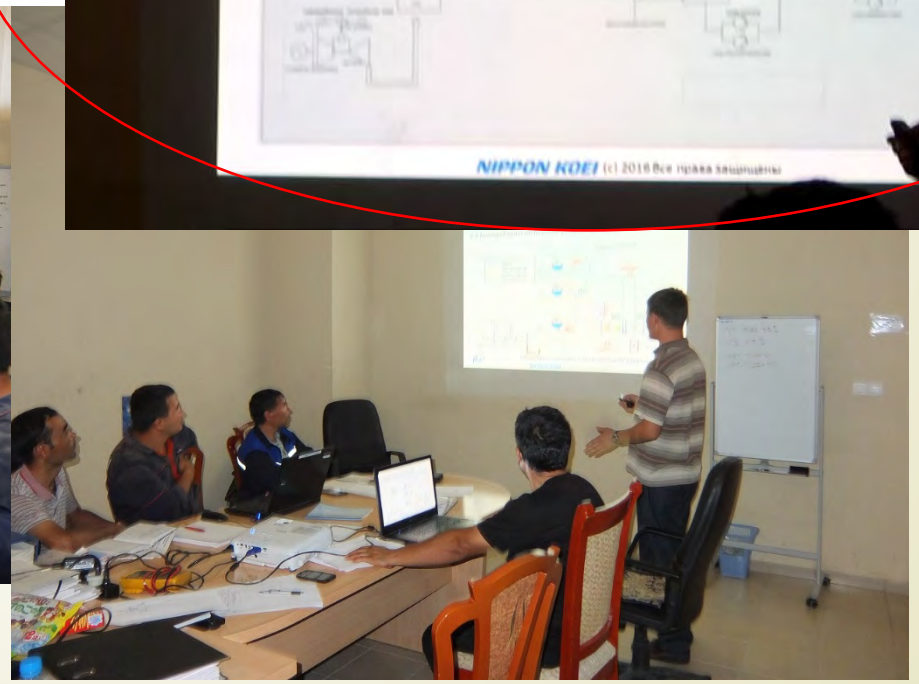
Mock-UP Training

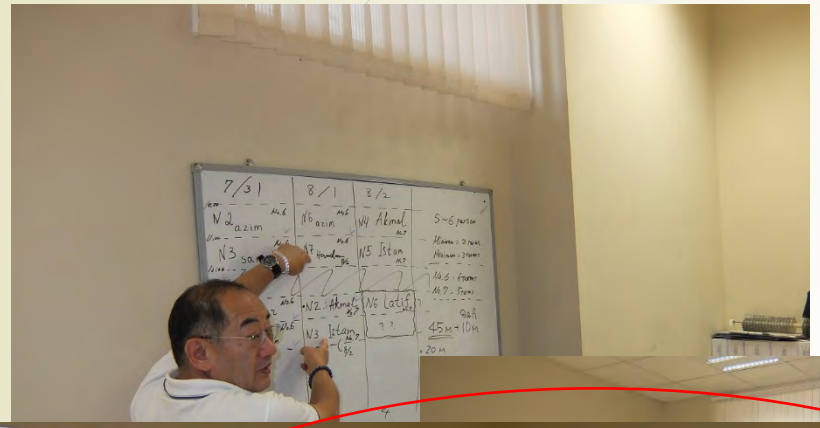
Mock-UP Training in UZ

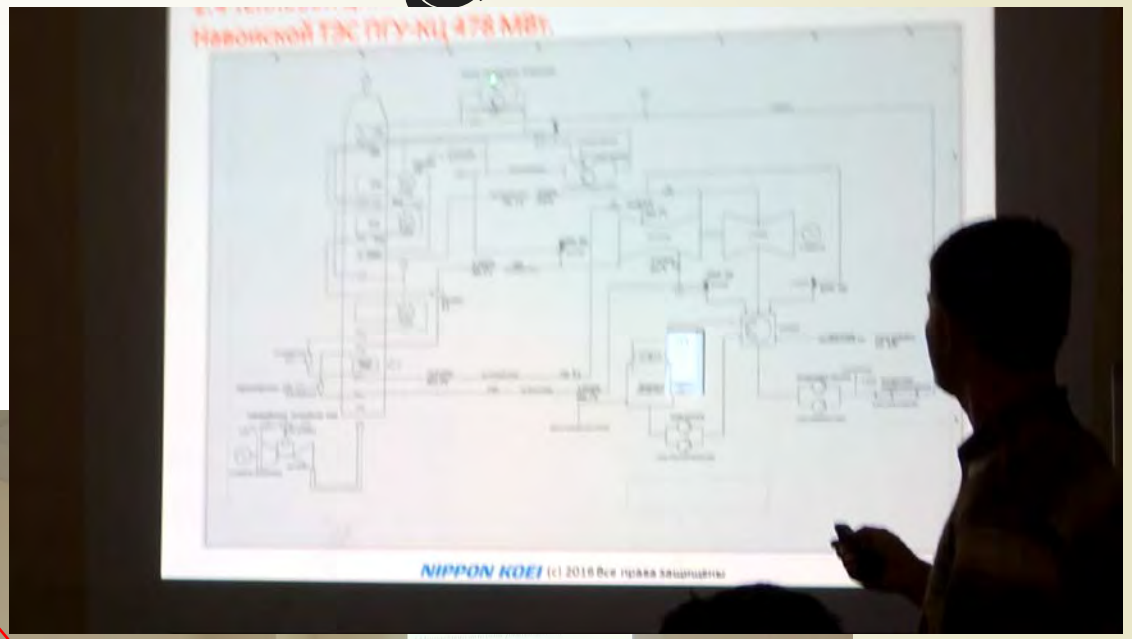
Mock-UP Training in UZ

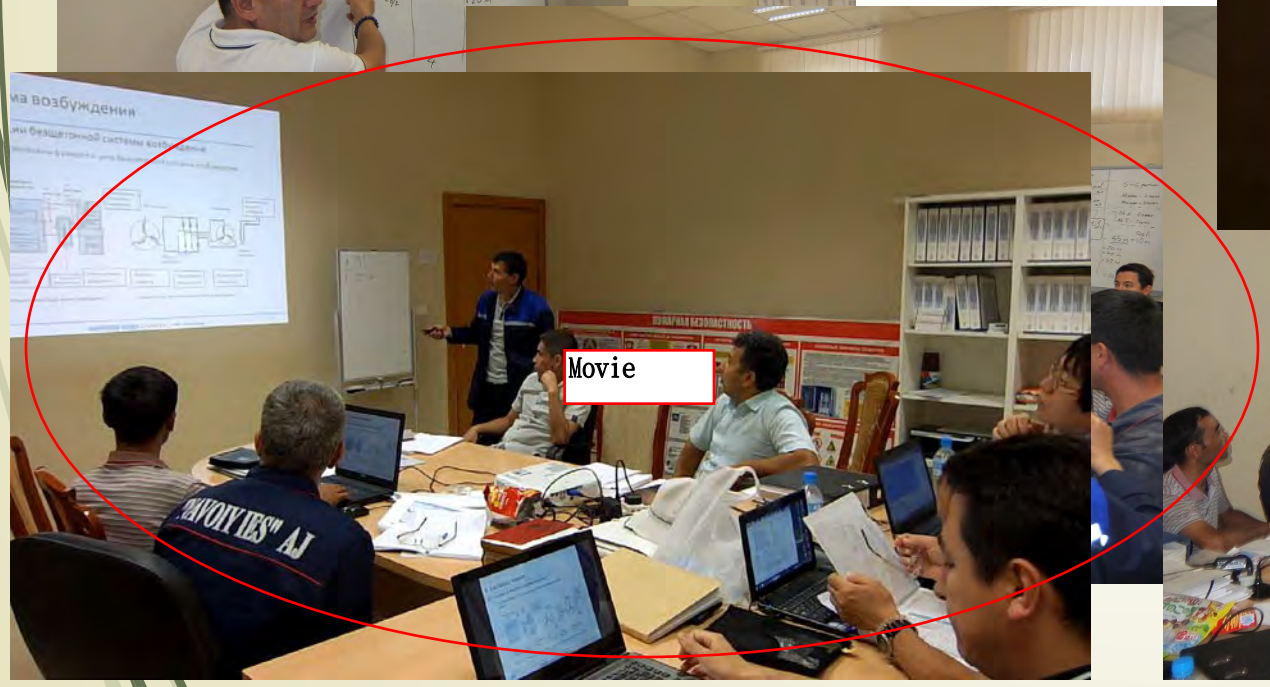




Mock-UP Training in UZ







Mock-Up Training

- Mock-UP Training is the milestone to terminate cultivation of Trainer candidates.
- Trainer candidate experiences simulation of lecture as a trainer, and grown up to suitable trainer.
- After Mock-Up training, JET will interview trainer candidates, and will check they have adequate ability as a trainer, in this project. In the case after this project, Director NTC and Chief Trainer in charge will decide appointment of trainer. (The rule for trainer's appointment will be reported separate from this report.)

Appreciate your cooperation