

Appendix-2
Minutes of Working Group Meetings
(No.1 to No.16)

Minutes of Working Group Meeting (Kick-off Meeting)

1. Date/Time : November 14, 2008 / 9:00am to 12:00pm
2. Place : Meeting Room of MIME
3. Participants
 - MIME : Dr. Bun Narith (Leader of Counterpart Team),
Mr. Nong Sareth, Mr. So Veasna, Mr. Phan Bunthoeun
 - EAC : Mr. Theng Marith, Mr. Teng Saroeun, Mr. Suon Ponnarith
 - EDC : Mr. Ros Chenda, Mr. Aun Hemrith, Mr. Heav Chanvisal
 - JICA : Mr. Takeshi Washizawa (Expert to MIME)
 - JICA Team : Mr. Shigeru Nakamura, Mr. Yutaro Mizuhashi, Mr. Hajime Butsuhara,
Mr. Tatsuya Kunishi, Mr. Msasafumi Iori, Mr. Eiji Tsuchiya,
Ms. Hitomi Sugimachi
4. Contents

The following matters were discussed and agreed among the parties;

- 1) The leader of Counterpart Team, Dr. Bun Narith of MIME, assigned the members and the leaders for each of Civil WG and Electromechanical WG as shown in the table below:

Member of Civil WG	Member of Electromechanical WG
Mr. Theng Marith (EAC), Leader of C.WG	Mr. Ros Chenda (EDC), Leader of E. WG
Mr. Much Chhun Horn (MIME)	Mr. Chiv Hour (MIME)
Mr. Nong Sareth (MIME)	Mr. So Veasna (MIME)
Mr. Chea Narin (MIME)	Mr. Aun Hemrith (EDC)
Mr. He Sam Ol (MIME)	Mr. Phan Bunthoeun (MIME)
Mr. Leang Khemarith (MIME)	Mr. Pan Narith (MIME)
Mr. Heavf Chan Visal (EDC)	Mr. Teng Saroeun (EAC)
Mr. Suon Ponnarith (EAC)	

- 2) Responding agencies and schedule for collection of data and information listed in the Questionnaire submitted by the JICA Study Team were confirmed as follows:
 - (a) Responding agencies were confirmed for each item in the Questionnaire as shown in the sheets attached hereto.
 - (b) The 1st delivery of the requested data and information will be on November 21, 2008 subject to availability.

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- 3) Separate meetings were held for each of Civil WG and Electromechanical WG to discuss the following issues:
- (a) Draft table of contents of SREPTS
 - (b) Draft Technical Glossary
 - (c) Activity schedule for WGs (Civil WG and Electromechanical WG)

Results of the separate WGs are summarized as stated in “Memorandum of Civil WG” and “Memorandum of Electromechanical WG” attached hereto.

4) Others

Each party agreed to take place the Supplemental Workshop as follows:

- Date/Time: November 20, 2008 / 9:00am
- Place: Meeting room at EAC
- Agenda: (1) Framework and Scope of SREPTS on Hydropower
(2) Schedule of First Seminar to be held in Jan. or Feb. 2009
(3) Others
- Participants: Member of Counterpart Team (member of WGs)
JICA Study Team



MIME
Leader of Counterpart Team
Dr. Bun Narith



EAC
Deputy Team Leader
(Civil WG)
Mr. Theng Marith



EDC
Deputy Team Leader.
(Electromechanical WG)
Mr. Ros Chenda



JICA Study Team
Team Leader
Mr. Shigeru Nakamura

Japan International Cooperation Agency
Ministry of Industry, Mines and Energy (MIME)
Electricity Authority of Cambodia (EAC)
Kingdom of Cambodia

**The Follow-up Study
on
the Establishment of the Specific
Requirements for Electric Power Technical
Standards on Hydropower
for
the Study for Establishment of Electric Power
Technical Standards and Guidelines
in
The Kingdom of Cambodia**

QUESTIONNAIRE

October 2008

*Demarcation of Responding Agencies
(confirmed in WG Meeting on November 14, 2008)*

**Electric Power Development Co., Ltd.
The Chugoku Electric Power Co., Inc.**

Questionnaire

1. Policies and future plans on power sector and hydropower development plans

(1) General information of power sector : collected and supplied by MIME (for all items)

- Outline of the current overall structure of power sector
- The latest policy review and strategy paper for energy sector and power sector
- The latest Power Development Plan in Cambodia including IPP projects
- The latest power demand forecast in Cambodia including the actual data of domestic power consumption growth in recent years
- Existing MOU of power import/export plans

(2) Hydropower Development Plan: collected and supplied by MIME (for all items)

- Schedule of hydropower development plan including IPP projects
- Information of each hydropower project including IPP projects
 - Outline of the Project
 - Project owner (EDC, PEC, IPP, etc.)
 - Study stage (pre-F/S, F/S, D/D),
 - Project status (MOU, development concession, PPA, construction, etc.)
 - Result of F/S or Pre-F/S (Summary Report or Report of F/S or Pre-F/S)

2. Existing Laws and Regulations related to Power Sector

(1) General information of power sector: collected and supplied by EAC

- List of existing laws and regulations related to the power sector
- Current electricity tariff system in Cambodia

(2) Existing Electricity Law and Electric Power Technical Standards: collected and supplied by EAC (for all items)

- Original copy of Electricity Law of the Kingdom of Cambodia (February 02, 2001)
- Original copy of Electric Power Technical Standards of the Kingdom of Cambodia (August 2007)
 - 1) General Requirements of Electric Power Technical Standards of the Kingdom of Cambodia
 - 2) Specific Requirements of Electric Power Technical Standards of the Kingdom of Cambodia
 - 3) Explanation Sheet for Electric Power Technical Standards
 - 4) Glossary for Electric Power Technical Standards

(3) Existing authorized industrial and electrical standards & codes: collected and supplied by MIME

- List of existing industrial standards & codes (supplied by Dept. of Industry of MIME)
- List of existing electrical standards and codes

(4) Other existing laws, ministerial decrees and regulations related to power business, if any: collected and supplied by EAC (for all items)

- Original or copy of major laws, ministerial decrees and regulations (in English)
- Abridged translation or brief of major laws, ministerial decrees and regulations in English in the case that no English version was published

3. Enforcement Status of Existing GREPTS and SREPTS on Thermal Power and Transmission and Distribution Facilities: collected and supplied by MIME, EAC and EDC as shown below

(1) Current enforcement status of the existing electric power technical standards including GREPTS, SREPTS on Thermal Power and SREPTS on Transmission and Distribution Facilities

- List of licensed projects or companies under the existing technical standards: by EAC
- Procedure of assessment and evaluation for licensing actually applied in the current approval and licensing system under the existing technical standards: by MIME
- Procedure of examination and inspections actually applied to the existing or ongoing projects before and/or after licensing at each stage of design, construction and putting into operation: Not available in Cambodia
- Sample documents for approval and licensing of projects under the existing technical standards including application form, inspection form, etc.: by EAC
- Problems and/or difficulties in the current approval and licensing system under the existing technical standards, if any: by EAC

(2) Current enforcement status of the existing decrees and/or regulations

- Current status of ministerial ordinances (decrees and/or regulations) related to power businesses and rules for enforcement of them: by MIME and EAC
- Record of application of ministerial ordinances (decrees and/or regulations) to existing and ongoing projects, if any: by EDC and EAC
- Problems and/or difficulties in the current approval and/or licensing procedure under the existing decrees and/or regulations, if any: by EAC

4. Current Status of Approval and Licensing System on Hydropower Business

(1) Current status of approval and licensing system for IPP project: collected and supplied by MIME and EDC as shown below

- Procedures applied to the existing and ongoing projects for MOU: by MIME
- Procedures applied to the existing and ongoing projects for approval of development concession: by MIME
- Procedures applied to the existing and ongoing projects for Pre-F/S and F/S: by MIME
- Procedures applied to the existing and ongoing projects for project design: by MIME
- Procedures applied to the existing and ongoing projects for project construction including inspection at completion and others, if any: by MIME
- Procedures applied to the existing and ongoing projects for putting into operation including inspections for periodical monitoring: by EDC

(2) Current status of approval and licensing system for hydropower project owned by public sector including EDC: collected and supplied by EDC (for all items)

- Procedures applied to the existing and ongoing projects for Pre-F/S and F/S
- Procedures applied to the existing and ongoing projects for project design
- Procedures applied to the existing and ongoing projects for project construction including inspection at completion and others, if any.
- Procedures applied to the existing and ongoing projects for putting into operation including inspections for periodical monitoring

5. Current Situation of Existing and Ongoing Hydropower Projects

Information of the following existing and ongoing hydropower projects for the items listed below: : ***collected and supplied by MIME (for all items)***

- Kirirom Hydropower Project (12MW)
 - O'Chum~~2~~ Hydropower Project (1MW)
 - 2 Small-scale Hydropower Plants (185kW x 2) in Mondul Kiri Rural Electrification Project
 - Kirirom III Hydropower Project (18MW)
 - Kamchay Hydropower Project (193MW)
 - Other hydropower projects, if any
- 1) Standards actually applied to the design of the civil structures and electromechanical equipment
 - 2) Design documents such as design report, technical specifications, drawings, etc.
 - 3) Standards and method actually applied to the inspections of the civil structures and electromechanical equipment at completion of construction/installation and during operation and maintenance stage
 - 4) Records of the inspections of the civil structures and electromechanical equipment at completion of construction/installation and during operation and maintenance stage
(In the case that the actual inspection records are not available, sample of the recording form is useful for the Study.)
 - 5) Record of operation and maintenance work
 - 6) Information of technical and other problems previously faced or currently facing at each existing and ongoing hydropower project, if any.
 - 7) Purpose of power plant such as local power supply, connection to national grid or power export to foreign countries

6. Current Status of Environmental Laws and Regulations for Electric Power Facilities : ***collected and supplied by MIME (for all items)***

- (1) List of the existing laws, ministerial decrees and regulations related to power facilities including thermal power plant, transmission and distribution systems
- (2) Current status of assessment and evaluation of environmental issues for power facilities including thermal power plant, transmission and distribution systems
 - Responsible authority
 - Flow of current approval system of environmental impact assessment (EIA)

- List of assessment items required in EIA under the under the existing laws, ministerial decrees and regulations
 - Sample documents for approval and licensing of environmental impact assessment (EIA) under the existing laws, ministerial decrees and regulations including application form, evaluation form, etc.
- (3) List of the existing laws, ministerial decrees and regulations related to hydropower development
- (4) Current status of assessment and evaluation of environmental issues for hydropower project
- Responsible authority
 - Flow of current approval system of environmental impact assessment (EIA)
 - List of assessment items required in EIA under the under the existing laws, ministerial decrees and regulations
 - Sample documents for approval and licensing of environmental impact assessment (EIA) under the existing laws, ministerial decrees and regulations including application form, evaluation form, etc.

7. Other Information: collected and supplied by MIME, EAC and EDC as shown below

- (1) Organization chart of MIME, EAC, EDC and other organizations in the power sector: by MIME, EAC and EDC
- (2) Organization chart of Ministry of Environment and other organizations related to environmental issues for power facilities and hydropower development: by MIME
- (3) List of familiar international standards for electrical and industrial fields: by EDC
- (4) Existing and planning schematic diagram of national power network: by MIME
- (5) Annual report of the major authorities in the power sector (latest issue): by MIME, EAC and EDC

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MEMORANDUM OF WG MEETING NO.1 (Kickoff) (CIVIL WORKING GROUP)

1. Date : November 14, 2008
2. Place : Meeting Room of MIME
3. Participants
 - EAC : Mr. Theng Marith (Leader of Civil WG)
 - MIME : Mr. Nong Sareth
 - EAC : Mr. Suon Ponnarith
 - EDC : Mr. Heav Chan Visal
 - JICA Team : Mr. Shigeru Nakamura
Mr. Hajime Butsuhara
Mr. Yutaro Mizuhashi
Mr. Tatsuya Kunishi

4. Contents

The following matters were discussed and agreed among the parties.

- a) JICA Study Team explained draft contents of the SREPTS and proposed that the parties should discuss and modify, if required, the contents so that those might be suited to circumstances in Cambodia.
- b) JICA Study Team explained the draft technical glossary of civil part and stated that he would present the final draft Technical Glossary to the Cambodian members of Civil WG on November 17.
- c) In the above connection, JICA Study Team requested the Cambodian Civil WG members to translate the Technical Glossary into Khmer by the middle of January 2009 and to list up such words that no equivalent words exist in Khmer.
- d) JICA Study Team explained an example of the SREPTS provision and stated that he would provide the Cambodian WG members with the final draft of SREPTS by the end of January 2009.
- e) JICA Study Team explained the overall working schedule of the translation work into Khmer to be completed by the beginning of July 2009.
- f) Each party agreed that a next meeting would be held on November 20, 2008.

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MEMORANDUM OF WG MEETING NO.1 (Kickoff) (ELECTROMECHANICAL WORKING GROUP)

1. Date : November 14, 2008
2. Place : Meeting Room of MIME
3. Participants
 - EDC : Mr. Ros Chenda (Leader of Electromechanical WG)
 - MIME : Mr. So Veasna
 - EAC : Mr. Teng Saroeun
 - EDC : Mr. Aun Hemrith
 - JICA Team : Mr. Masafumi Iori
Mr. Eiji Tsuchiya

4. Contents

The following matters were discussed and agreed among the parties;

- a) JICA Study Team presented the draft Technical Glossary of electromechanical part and requested that Cambodian members of Electromechanical WG should study the draft and provide comments with JICA Study Team on November 20, 2008 and, if possible, commence the translation work into Khmer. Cambodian members would try to do that.
- b) JICA Study Team explained the table of contents of electromechanical part of SREPTS on Hydropower and stated that he would present the draft of SREPTS on November 20, 2008.
- c) JICA Study Team proposed that “Article 128 Examination and Inspection” would be prepared only for the commissioning test of Hydropower plant and examination and inspection during implementation of project would be described in Explanation Sheet as an example. The Cambodian members will study it and provide the JICA Study Team with comments on November 20, 2008.
- d) The Cambodian WG members requested that the Explanation Sheet should be prepared in the same manner as SREPTS on Thermal Power and Transmission & Distribution Facilities. JICA Study Team agreed and will propose concept of Explanation Sheet on November 20, 2008.
- f) JICA Study Team explained the overall working schedule.
- e) Each party agreed to hold the next meeting on November 20, 2008 at EAC meeting room.

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MEMORANDUM OF WG MEETING NO.2 (ELECTROMECHANICAL WORKING GROUP)

1. Date : November 20, 2008
2. Place : Meeting Room of MIME
3. Participants
Cambodian members of Electromechanical WG
JICA Team

4. Contents

The following matters were discussed and agreed among the parties;

- a) JICA study team submitted additional technical glossary which is concerning testing.
- b) Cambodian members of Electromechanical WG had no comments on draft technical glossary submitted on November 14, 2008.
- c) JICA study team requested WG members to commence translation work and to complete it by the end of January 2009. WG members agreed.
- d) JICA study team explained revised policy of SREPTS that description of equipment in for hydropower station is added from Chapter 6 to Chapter 10 (Chapter 6 Electrical Equipment in Hydropower Stations, Substations and Switching Stations, Chapter 7 Mechanical Equipment in Hydropower Stations, Chapter 8 Measuring Devices in Hydropower Stations, Substations and Switching Stations, Chapter 9 Auxiliary Equipment in Hydropower Stations, Substations and Switching Stations, Chapter 10 Examination on Hydropower Station) additionally to general requirement of electrical equipment.
- e) Draft of SREPTS was handed over to WG members. JICA study team requested WG member to study it and to give comments in next WG meeting. WG members agreed.
- f) JICA study team explained that requirement for mechanical parts of SREPTS would be submitted to WG members by November 28, 2008. This will be Chapter 7 and Chapter number shall be revised accordingly.
- g) WG members requested to add color photos for clear explanation of technical glossary. JICA study team agreed to add those.
- h) Concerned parties confirmed article number is temporary one. At final stage, article number will be fixed.

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MEMORANDUM OF WG MEETING NO.2 (CIVIL WORKING GROUP)

1. Date : November 20, 2008
2. Place : Meeting Room of MIME
3. Participants
 - EAC : Mr. Theng Marith (Leader of Civil WG)
 - MIME : Mr. Much Chhun Horn
 - Mr. Chea Narin
 - Mr. He Sam Ol
 - Mr. Leang Khemarith
 - EAC : Mr. Suon Ponnarith
 - EDC : Mr. Heav Chan Visal
 - JICA Team : Mr. Shigeru Nakamura
 - Mr. Yutaro Mizuhashi
 - Mr. Takeshi Washizawa

4. Contents

The JICA study team explained the abstract of the SREPTS, and the following matters were discussed and agreed among the parties.

- a) As for Article 6 "Conformity to the Technical Standards," the Cambodian Civil WG members requested JICA Study Team to accept various technical standards according to a project owner.
- b) The Cambodian Civil WG members requested JICA Study Team to shift Article 127 "Nomination of Chief Engineers" and Article 129 "Order of Remedy for Conformance to Technical Standards" to Chapter 7 "Transitional Provisions" because the regulations described in the said articles will be necessary in the future although they do not exist at the present time and hasty enactment of these articles prevents the existing hydropower plants from operation.
- c) The Cambodian Civil WG members requested JICA Study Team to modify provisions of Article 131 "Transitional Provisions for Small Licensees" because the parties agreed on applying the SREPTS to hydropower facilities without distinction of their output, in accordance with their safety for the third parties.
- d) The Cambodian Civil WG members requested JICA Study Team to shift Article 134 "Environmental Protection," Article 135 "Requirements for Operation" and Article 136 "Safety and Technical Training" to Chapter 6 "Requirements for Project Implementation" because provisions of these articles already exist.
- e) As for Chapter 6 "Requirements for Project Implementation," the Cambodian Civil WG members requested JICA Study Team to provide independent chapter for

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Article 128 “Examination and Inspection.”

- f) The Cambodian Civil WG members requested JICA Study Team to attach pictures and/or illustrations to the Technical Glossary for convenience of better understanding about technical terms.

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Minutes of Working Group Meeting No.3 (Pre-meeting for Second Workshop)

Date and Time: January 20, 2009 (Tue) from 9:00AM to 11:00AM

Place: Meeting Room at MIME, General Department of Energy

Participants: Members of Working Group (Civil and Electromechanical) from MIME, EAC, EDC and JICA Study Team listed below:

MIME : Dr. Bun Narith (Leader of Counterpart Team),
Mr. Much Chhun Horn, Mr. Nong Sareth, Mr. So Veasna,
Mr. Chiv Huor, Mr. Pan Narith, Mr. Chea Norin,
EAC : Mr. Theng Marith, Mr. Teng Saroeun,
EDC : Mr. Ros Chenda, Mr. Aun Hemrith,
JICA Team: Mr. Shigeru Nakamura, Mr. Yutaro Mizuhashi,
Mr. Tatsuya Kunishi, Mr. Eiji Tsuchiya,

Contents:

1. Activities and Schedule of Working Group (Jan. ~ Feb. 2009)

It was agreed among the participants to hold Weekly Meetings on January 30, February 04, 11 and 18, 2009 from 15:00pm at the MIME's meeting room for each date mainly for the following activities;

- 1) To check and discuss provisions of the draft SREPTS for Hydropower Article by Article
- 2) To check and discuss results of translation work of the draft SREPTS for Hydropower Article by Article.
- 3) To check and discuss contents of presentation documents for the First Seminar to be prepared by Counterpart Team

2. Preparation for First Seminar to be held during the period from February 16 to 19, 2009

It was agreed in the meeting that the presentation in the First Seminar will be performed by Counterpart Team and JICA Study Team for the following subjects (tentative and to be confirmed in the Second Workshop):

- 1) Present status of GREPTS and SREPTS (by MIME)
- 2) Present status of Electricity Law, Licensing System for electric power businesses and other related laws and regulations (by EAC)
- 3) Purpose of SREPTS for Hydropower (by MIME)
- 4) Framework of Draft SREPTS for Hydropower (by MIME/EAC/EDC and JICA Study Team)

In the above regards, the material shall be prepared by each responsible party as follows (tentative):

- 1) Invitation to the Seminar to be delivered by the end of January 2009
- 2) Material to be attached to the Invitation (to be prepared by Jan. 29)
(abstract of the issues in Agenda of Seminar)
- 3) Material for presentation in the Seminar (draft to be prepared by Feb.04 by JICA Study Team)

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3. Translation Work

It was agreed in the meeting to proceed with the translation work during the stay of JICA Study Team in the following manner:

- 1) JICA Study Team will co-work with the working group members once or twice a week to discuss and/or answer to questions raised by the counterpart team in the translation work.
- 2) Results of the translation work will be discussed and confirmed in the weekly WG Meetings step by step.

4. Framework of SREPTS for Hydropower

The revisions proposed by JICA Study Team to be made on the previous draft Framework of SREPTS for Hydropower were agreed by the counterpart team as follows:

Previous Version	Revised Version <i>(Article Nos. are of tentative following those shown in Interim Report.)</i>
<p>Overall Framework <Inception Report> Part 1: Hydropower Facilities (including General Provisions, Provisions for Civil Structures, Hydromechanical Equipments and Turbine)</p> <p>Part 2: Electrical Facilities (including Provisions for Electrical Equipments in Hydropower Station (excluding Turbine))</p> <p>Part 3: Particular Provisions (including Requirements for Project Implementation and Transitional Provisions)</p>	<p>Overall Framework <Further revisions on Interim Report> <u>Part 1: General Provisions</u> (including General Provisions, Transitional Provisions and Requirements for Project Implementation)</p> <p><u>Part 2: Civil Engineering and Hydromechanical Facilities</u> (including Provisions for Civil Structures and Hydromechanical Equipments)</p> <p><u>Part 3: Electrical Facilities</u> (including Provisions for Electrical Equipments in Hydropower Station (including Turbine), Substation and Switching Station)</p> <p><u>Part 4: Examination and Inspection</u> (for Civil Engineering & Hydromechanical Facilities and Electrical Facilities)</p>
<p>Part 1: Hydropower Facilities Chapter 1: General Provisions Art-1: Definitions Art-2: Purpose of Technical Standards Art-3: Area of Application Art-4: Applicable Standards Art-5: Facilities regulated in this SREPTS Art-6: Conformity to Technical Standards</p>	<p>Part 1: General Provisions Chapter 1: General Provisions Art-1: Definitions Art-2: Purpose of Technical Standards Art-3: Scope (Area) of Application Art-4: Applicable Standards and Codes → <i>Tentatively cancelled (to be confirmed)</i> → <i>Provisions are included in Art-2 and Art-3.</i></p>

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<p>Part 3: Particular Provisions Chap.6 Requirements for Project Implement <i>Art-127: Nomination of Chief Engineers</i></p> <p><i>Art-129: Order of Remedy for Conformance to Technical Standards</i> <i>Art-130: Obligation for Reporting</i></p> <p>Chap. 7 Transitional Provisions <i>Art-131: Transitional Prov. for Small Licensees</i> <i>Art-132: Transitional Prov. for ongoing Project</i> <i>Art-133: Transitional Prov. for existing Project</i> <i>Art-137: <u>Environmental Protection</u></i> <i>Art-139: <u>Safety and Technical Training</u></i></p>	<p>Chapter 2: Particular Provisions Sec.1 Requirements for Project Implement Art-9: Nomination of Chief Engineers (transitional) Art-57: <u>Environmental Protection</u> Art-5: Order of Remedy for Conformance to Technical Standards Art-56: Obligation of Reporting Art-58: <u>Safety and Technical Training</u></p> <p>Sec.2 Exemptions Art-6: <u>Exemption</u> for Small Projects Art-7: <u>Exemption</u> for ongoing Projects Art-8: <u>Exemption</u> for existing Projects</p>
<p>Part 1: Hydropower Facilities Chapter 2: Hydropower Facilities</p> <p>Chap. 2.1 Fundamental Requirements Chap. 2.2 Dams Chap. 2.3 Waterways Chap. 2.4 <u>Turbine</u>, Powerhouse and Others Chap. 2.5 Reservoirs Chap. 2.6 Downstream</p>	<p>Part 2: Civil Engineering and Hydromechanical Facilities Chap.3 General Provisions (<i>Definitions, etc.</i>) Chap.4 Fundamental Requirements Chap.5 Dams Chap.6 Waterways Chap.7 Powerhouse and Others Chap.8 Reservoirs Chap.9 Downstream</p>
<p>Part 2: Electrical Facilities Chap.3 General Chap.4 Electric Facilities for Power Supply Chap.5 Electric Facilities at Consumer Side</p>	<p>Part 3: Electrical Facilities Chap.10 General Provisions Chap.11 Facilities for Electric Power Supply Chap.12 Electrical Facilities at Consumer Side Chap.13 Electrical Facilities in Hydropower Stations, Substations and Switching Stations Chap.14 Mechanical Equipment for Hydropower Stations Chap.15 Measuring and Protection Devices in Hydropower Stations, Substations and Switching Stations Chap.16 Auxiliary Equipment in Hydropower Stations, Substations and Switching Stations</p>

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<p>Part-3: Particular Provisions (tentative) Chap.6 Requirements for Project Implementation Art-128: Examination and Inspection</p>	<p>Part 4: Examination and Inspection Chap.17 General Provisions Chap.18 Examination and Tests on Hydropower Stations, Substations and Switching Stations Chap.19 Examination and Inspection of Civil Engineering and Hydromechanical Facilities</p>
<p>Part-3: Particular Provisions (tentative) Chap.6 Requirements for Project Implementation Art-127: Nomination of Chief Engineers Art-128: <u>Examination and Inspection</u> Art-129: Order of Remedy for Conformance to Technical Standards Art-130: Obligation for Reporting Chap.7 Transitional Provisions Art-131: Transitional Prov. for Small Licensees Art-132: Transitional Prov. for ongoing Project Art-133: Transitional Prov. for existing Project <u>Following are the transitional provisions for small and medium licensees applied in SREPTS for Thermal Power.</u> Art-134: Prevention of Electric Power Disasters Art-135: Safety of Third Persons Art-136: Safety Measures for Fuel and Chemical Materials Art-137: Environmental Protection Art-138: Requirements for Operation Art-139: Safety and Technical Training</p>	<p>→ Part 1/Chap.2/Art-9 → Part 4: Examination and Inspection → Part 1/Chap.1/Art-5 → Part 1/Chap.3/Sec./Art-56 → Part 1/Chap.2/Art-6 → Part 1/Chap.2/Art-7 → Part 1/Chap.2/Art-8 →Part 3/Chap.10/Sec.2, Chap.11/Sec.1, etc. →Part 3/Chap.10/Sec.2, etc. →Part 3/Chap.10/Sec.2, Chap.11/Sec.5, etc. →Part 1/Chap.2/Sec.1/Art-57 →Part 1/Chap.2/ Sec.1/Art-56, Part 2/Chap.5/Art-24 Part 3/Chap.15/Sec.1, etc. →Part 1/Chap.2/Sec.1/Art-58</p>

Note: Chap.1/ Art-5 "Order of Remedy for Conformance to Technical Standards" was once requested to be transitional provisions in WG Meeting on Nov. 20, 2008, but JICA Study Team again proposes to be a permanent provision because exception of ongoing and existing projects can be treated by the transitional provisions for these projects available in Chap.2/Art-7 and Art-8 respectively.

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4. Order of “Part” and “Chapter” in the draft SREPTS for Hydropower

It was agreed to use the sectional index titles of “Part / Chapter / Section / Article” with this order in the draft SREPTS for Hydropower to be prepared by JICA Study Team following the manner of common usage, although the present statuses of sectional index titles are as follows for each document;

Present applications of Part, Chapter, Section, Clause and Article in each Document


- 1) *GREPTS*
Chapter → Part (not continuous) → Clause (continuous)
- 2) *SREPTS for Thermal Power*
Chapter → Part (Chap.3 only) → Article (continuous)
- 3) *SREPTS for Transmission and Distribution System*
Chapter → Part (Chap.2 only) → Article (continuous)
- 4) ***Draft SREPTS for Hydropower***
Part → Chapter (continuous) → Section (not continuous) → Article (continuous)
- 5) *Common usage*
Part → Chapter → Section (not continuous) → Article (continuous)




MIME
Leader of Counterpart Team
Dr. Bun Narith



EAC
Deputy Team Leader
(Civil WG)
Mr. Theng Marith



EDC
Deputy Team Leader.
(Electromechanical WG)
Mr. Ros Chenda



JICA Study Team
Team Leader
Mr. Shigeru Nakamura

Minutes of Working Group Meeting No.4

Date and Time: January 30, 2009 (Fri) from 15:00PM to 17:30PM

Place: Meeting Room at Ministry of Industry, Mines and Energy (MIME)

Participants: Members of Working Groups (Civil and Electrical) from MIME, EAC, EDC and JICA Study Team

MIME : Dr. Bun Narith (Leader of Counterpart Team),
Mr. So Veasna, Mr. He Sam Ol, Mr. Pan Narith
EAC : Mr. Suon Ponnarith
EDC : Mr. Ros Chenda
JICA Team: Mr. Shigeru Nakamura, Mr. Yutaro Mizuhashi,
Mr. Hajime Butsuhara, Mr. Hideaki Morishita, Mr. Eiji Tsuchiya,

Contents:

1. General Issues

- 1) The draft of Minutes of the 2nd Workshop on January 22, 2009 was agreed by MIME, EAC, and EDC with some minor corrections.
- 2) The draft of Minutes of Working Group Meeting No.3 on January 20, 2009 was agreed by MIME, EAC, and EDC with some minor corrections.
- 3) Preparation for the 1st Seminar on February 17, 2009 (Tue)
The following are confirmed in the meeting;
 - Place: Phnom Penh Hotel
 - Time: 8:30 - 12:00 and Lunch (Reception start at 8:00AM)
 - Expected Participants: Participants list to be prepared by MIME by Feb.02 (Mon).
 - Invitation letter to be prepared and delivered by MIME by Feb.02 (Mon).
 - Presentation documents: the draft to be delivered to WG members on Feb. 04 (Wed.)
- 4) Check and discussion on the result of translation work of the Technical Glossary with JICA Staff (Mr. Salpiseth)
 - Civil WG: First Meeting was held on Jan. 29 at 9:00AM at EAC.
 - Electrical WG: First Meeting will be held on Feb. 04 at 9:00AM at EAC
- 5) Translation work of the draft SREPTS for Hydropower will be started as follows subject to confirmation of contents of draft SREPTS in the WG Meeting:
 - Civil WG: from Feb. 04
 - Electrical WG: from Feb. 02

2. Check and discuss the provisions of the first draft SREPTS for Hydropower

Contents of "Part 1 General Provisions (Chapters 1 and 2)" of SREPTS for Hydropower were discussed in the meeting and agreed with some corrections except some pending issues. These pending issues will be discussed in the next WG Meeting.


The pending items are, but not limited to, the following:

Follow-up Study on Establishment of SREPTS for Hydropower


- 1) Definition of “Owner” in study stages before obtaining license or development concession.
- 2) The words of “power facility” shall be corrected to be “hydropower facility”.
- 3) The word of “operation” shall be used in combination with “maintenance” in principle.
- 4) The word of “administration” shall be deleted in principle.
- 5) The word of “installation” shall be used instead of “construction” for the issues concerning electrical facilities.
- 6) Responsible authority shall be always in combination of MIME, EAC and EDC in principle subject to confirmation of the high ranking executives.
- 7) “Environmental Protection” shall be reinforced by adding “and Conservation” in Article 6.
- 8) Article 8 “Obligation of Reporting” is pending for discussion.
- 9) “Within the limits of possibility” shall be replaced with “as much as possible”.
- 10) In Article 12, the second paragraph shall be deleted and the first paragraph is pending for discussion.




MIME
Leader of Counterpart Team
Dr. Bun Narith



EAC
Deputy Team Leader
(Civil WG)
Mr. Theng Marith



EDC
Deputy Team Leader.
(Electromechanical WG)
Mr. Ros Chenda



JICA Study Team
Team Leader
Mr. Shigeru Nakamura

Minutes of Working Group Meeting No.5

Date and Time: February 04, 2009 (Wed) at 15:00PM

Place: Meeting Room at Ministry of Industry, Mines and Energy

Participants: Members of Working Groups (Civil and Electrical) from MIME, EAC, EDC and JICA Study Team

MIME : Dr. Bun Narith (Leader of Counterpart Team),
Mr. Nong Sareth, Mr. Chea Norin, Mr. Pan Narith
EAC : Mr. Theng Marith, Mr. Teng Saroeun, Mr. Suon Ponnarith
EDC : Mr. Ros Chenda
JICA Team: Mr. Shigeru Nakamura, Mr. Yutaro Mizuhashi,
Mr. Hajime Butsuhara, Mr. Hideaki Morishita, Mr. Eiji Tsuchiya,
Ms. Hitomi Ohashi

Contents:

1. General Issues

- 1) Draft of the Minutes of Working Group Meeting No.4 held on January 30, 2009 was delivered to MIME, EAC and EDC for confirmation. Each agency will provide the JICA Study Team with comments, if any, in the next WG meeting.
- 2) JICA Study Team prepared and delivered in the Meeting the English version of draft presentation documents for the First Seminar. The Counterpart Team will prepare the Khmer version of presentation documents based on the English version prepared by the JICA Study Team, and, at the same time, will review and make corrections, if necessary, the contents of draft presentation documents. The presentation documents will be finalized by the next WG Meeting in principle.
- 3) The JICA Study Team delivered the draft text of SREPTS for Hydropower for the following portions:
 - Part 1: General Provisions
Chapter 1: General Provisions and Chapter 2: Particular Provisions
(corrected based on discussion in WG Meeting No.4)
 - Part 2: Civil Engineering and Hydromechanical Facilities
Chapter 3 ~ Chapter 9
 - Part 4: Examination and Inspection
Chapter 17: General Provisions and
Chapter 18: Examination and Inspection on Civil Engineering and Hydromechanical Facilities
- 4) JICA Study Team was once delivered the draft of SREPTS for the electrical part to the members of Electrical WG in the end of Nov. 2008 for review by the members, and informs that the Study Team will deliver the latest revised version of the same on February 11, 2009 or before.

Follow-up Study on Establishment of SREPTS for Hydropower

- 5) JICA Study Team requested the Counterpart Team to complete the translation work for the main text of draft SREPTS for Hydropower by the end of March 2009, and provide the JICA Study Team with questionnaire for the translation work in early April 2009.

The Counterpart Team agreed to complete the translation work of the main text of SREPTS by the end of March 2009, and requested JICA Study Team to dispatch the team members for discussions and supporting work of the translation work in May and/or June 2009.

- 6) The Counterpart Team requested the JICA Study Team to deliver the draft of Explanation Sheets as early as possible to use to as a reference documents for the translation of the main text of SREPTS.

The JICA Study Team agreed to deliver the draft Explanation Sheet on Feb. 20 or before.

- 7) Counterpart Team provide JICA Study Team with the list of invitation letters which are being sent to concerned parties and proposal of new time table of the First Seminar.

- 8) The 7th WG Meeting is postponed from Feb. 18 to Feb. 19. (No change for the 6th Meeting)


2. Separate WGs (Civil and Electrical)

Civil WG:


- The JICA Study Team explained the draft contents of Article 8 (Obligation for Reporting) and Part 4 Examination and Inspection.
- EAC explained that MIME shall be responsible to organize an inspection committee, in which EAC will be a member, for the inspections to be performed before commissioning, and that only EAC shall be responsible for inspections after commissioning as the rule in Cambodia under the Electricity Law.

Electrical WG:


- Counterpart Team requested and JICA Study Team agreed to deliver the electric file of Glossary (electrical part) in CD on February 05 and that of the draft main text of SREPTS for Hydropower (electrical part) on February 06 in order to commence translation work of the main text of SREPTS for Hydropower as soon as possible.




MIME
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Dr. Bun Narith



EAC
Deputy Team Leader
(Civil WG)
Mr. Theng Marith



EDC
Deputy Team Leader.
(Electromechanical WG)
Mr. Ros Chenda



JICA Study Team
Team Leader
Mr. Shigeru Nakamura

Minutes of Working Group Meeting No.6

Date and Time: February 11, 2009 (Wed) at 15:00PM

Place: Meeting Room at Ministry of Industry, Mines and Energy

Participants: Members of Working Groups (Civil and Electrical) from MIME, EAC, EDC and JICA Study Team

MIME : Dr. Bun Narith (Leader of Counterpart Team),
Mr. Leang Khemarith, Mr. He Sam Ol, Mr. Pan Narith
EAC : Mr. Theng Marith, Mr. Teng Saroeun, Mr. Suon Ponnarith
EDC : Mr. Ros Chenda, Mr. Aun Hemarith
JICA Team: Mr. Shigeru Nakamura, Mr. Yutaro Mizuhashi,
Mr. Hajime Butsuhara, Mr. Hideaki Morishita, Mr. Eiji Tsuchiya,
Ms. Hitomi Ohashi

Contents:

1. General Issues

- 1) Confirmation of Minutes of Working Group Meeting No.4 on January 30, 2009
Counterpart Team provided with comments that the statement in Item 2.6) of the draft minutes concerning the combined responsible authorities of MIME, EAC and EDC shall be subject to confirmation of high ranking executives of each agency. This matter will be confirmed in the next meeting.
- 2) Draft of the Minutes of Working Group Meeting No.5 held on February 04, 2009 was delivered to MIME, EAC and EDC for confirmation. Each agency will provide the JICA Study Team with comments, if any, in the next WG meeting.
- 3) The following are confirmed among the parties concerning the presentation documents for the First Seminar.
 - Contents of Slide No.33, 34, 38, 43 and 44 of English Version shall be corrected in accordance with the comments of Counterpart Team.
 - Preparation of presentation documents into Khmer is underway by the Counterpart Team and the final confirmation of the content will be done at 9:00AM on Feb.16, 2009 at MIME.
 - Presenters of each part will be as follows:
 - (1) Introduction: Dr. Bun Narith (MIME)
 - (2) Present Status of GERPTS/SEPTS: Mr. So Veasna (MIME)
 - (3) Present Status of Electricity Law and Licensing System: Mr. Theng Marith (EAC)
 - (4) Purpose of SREPTS for Hydropower: Mr. Much Chhun Horn (MIME)
 - (4) Framework of SREPTS for Hydropower: Mr. Chea Narin / Mr. Pan Narith (MIME)
 - JICA Study Team is making arrangement facilities for Seminar though Phnom Penh Hotel and final check will be done on February 16 together with Counterpart Team.
 - MIME has already delivered the invitation to Seminar to about 90 agencies and groups so that number of participants will be 60 to 90 persons.

Follow-up Study on Establishment of SREPTS for Hydropower

- 4) Confirmation of contents of draft text of SREPTS for Hydropower
 - Part 1: General Provisions / Chapter 1: General Provisions and Chapter 2: Particular Provisions (revised version corrected based on discussion in WG Meeting No.4)
Concerning Article-8 “Obligation of Reporting”, the Counterpart Team requested to provide the sample contents of Reports to be submitted in the Explanation Sheet.
The Counterpart Team requested to revise Article-11 “Exemption for Project under Implementation” by replacing “MIME or EAC exempt ---“ with “MIME may exempt ---“.
JICA Study Team will consider the above revision.

2. **Separate WGs (Civil and Electrical)**

The following are discussed in the separate WG Meeting for Civil WG and Electrical WG respectively:

Civil WG:

- 1) Confirmation of contents of draft text of SREPTS for Hydropower as follows:
 - Part 2: Civil Engineering and Hydromechanical Facilities / Chapter 3 ~ Chapter 9
 - Part 4: Examination and Inspection / Chapter 18: Examination and Inspection on
Civil Engineering and Hydromechanical Facilities
- 2) Confirmation of progress of the translation work of SREPTS (main text)

Electrical WG:

- 1) Confirmation of comments on the revised draft of SREPTS for Electrical Part delivered on Feb. 06, 2009
- 2) Confirmation of progress of the translation work of SREPTS (main text)



MIME
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Dr. Bun Narith



EAC
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(Civil WG)
Mr. Theng Marith



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Deputy Team Leader.
(Electromechanical WG)
Mr. Ros Chenda



JICA Study Team
Team Leader
Mr. Shigeru Nakamura

Minutes of Working Group Meeting No.7

Date and Time: February 19, 2009 (Thu) at 15:00PM

Place: Meeting Room at Ministry of Industry, Mines and Energy

Participants: Members of Working Groups (Civil and Electrical) from MIME, EAC, EDC and JICA Study Team

MIME : Dr. Bun Narith (Leader of Counterpart Team),
Mr. Much Chhun Horn, Mr. Cha Narith, Mr. So Veasna,
Mr. Non Sareth, Mr. Leang Khemarith, Mr. Heav Chanvisal
EAC : Mr. Theng Marith, Mr. Teng Saroeun, Mr. Suon Ponnarith
EDC : Mr. Ros Chenda, Mr. Aun Hemarith
JICA Team: Mr. Shigeru Nakamura, Mr. Yutaro Mizuhashi,
Mr. Hajime Butsuhara, Mr. Hideaki Morishita, Mr. Eiji Tsuchiya,
Ms. Hitomi Ohashi

Contents:

1. General Issues

- 1) Confirmation of Minutes of Working Group Meeting No.5 on February 04, 2009
Counterpart Team provided with no comments about the contents of draft minutes of meeting delivered in the WG Meeting No.6 on Feb. 11, 2009.
- 2) Draft of the Minutes of Working Group Meeting No.6 held on February 11, 2009 was delivered to MIME, EAC and EDC for confirmation. Each agency will provide the JICA Study Team with comments, if any, on February 20, 2009.

2. Confirmation of the Schedule of WG Activities

The schedule of WG activities until the end of June 2009 was confirmed as follows:

- 1) Submission of the draft of SREPTS for Hydropower (20 copies and 3 CDs)
 - General and Civil part (Part 1, Part 2 and Chapters 17&18 of Part 4): Feb.20, '09
 - Electrical part (Part 3 and Chapter 19 in Part 4): Feb.19, '09
- 2) Submission of the first draft of Explanation Sheet of SREPTS for Hydropower (20 copies and 3 CDs)
 - General and Civil part (Part 1, Part 2 and Chapters 17&18 of Part 4): Feb.20, '09
 - Electrical part (Part 3 and Chapter 19 in Part 4): Feb.19, '09
- 3) Translation of the draft SREPTS for Hydropower into Khmer
 - By the end of April 2009
- 4) Translation of the draft Explanation Sheet into Khmer
 - By the end of June 2009

3. Other Issues


- 1) Comments on the contents of Draft SREPTS for Hydropower from Counterpart Team, if any
 - The Counterpart Team requested JICA Study Team to reconsider deletion of the definition of "Small Scale Generating Equipment" from Article 1 (tentative number) in Part 3.

Follow-up Study on Establishment of SREPTS for Hydropower


JICA Study Team will reconsider the above.

- The Counterpart Team will provide JICA Study Team with the comments by e-mail after reviewing the draft of SREPTS and Explanation Sheets to be submitted on February 19 and 20, 2009.


- 2) Others
NA




MIME
Leader of Counterpart Team
Dr. Bun Narith



EAC
Deputy Team Leader
(Civil WG)
Mr. Theng Marith



EDC
Deputy Team Leader.
(Electromechanical WG)
Mr. Ros Chenda



JICA Study Team
Team Leader
Mr. Shigeru Nakamura

Minutes of Working Group Meeting No.8

Date and Time: June 16, 2009 (Thu) at 15:00PM

Place: Meeting Room at Ministry of Industry, Mines and Energy

Participants: Members of Working Groups (Civil and Electrical) from MIME, EAC, EDC and JICA Study Team

MIME : Mr. Much Chhun Horn, Mr. Cha Narith, Mr. So Veasna,
Mr. Non Sareth, Mr. Leang Khemarith, Mr. Heav Chanvisal
EAC : Mr. Teng Saroeun, Mr. Suon Ponnarith
EDC : Mr. Ros Chenda, Mr. Aun Hemarith
JICA Team: Mr. Hajime Butsuhara, Mr. Eiji Tsuchiya,

Contents:

1. Confirmation of the Schedule of JICA Team Activities

The schedule of JICA Study Team for the follow-up Study for establishment of SREPTS on Hydropower (from June 15 to July 11) was explained to Counterpart and agreed basically.

2. Confirmation of Progress for translation work of SREPTS and Explanation sheets

- 1) Translation work of Glossary has been finished already.
- 2) Translation work of SREPTS has been finished already.
- 3) Translation work of Explanation sheets (electrical) has been in progress of 10%.
- 4) Translation work of Explanation sheets (Civil) has been in progress of 0%.
- 5) The counterpart team has not been translating the Explanation sheets as scheduled because they have been busy and they requested us to compensate for the translation work.


3. Other issue

As for the seminar held on last February, MIME has received some comments from Ministry of Environment, Water Resources and Meteorology.

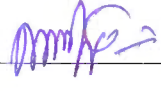
MIME promised to provide the copy of comments to JICA Study Team.



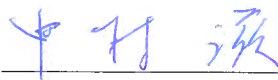
MIME
Leader of Counterpart Team
Dr. Bun Narith



EAC
Deputy Team Leader
(Civil WG)
For Mr. Theng Marith



EDC
Deputy Team Leader.
(Electromechanical WG)
Mr. Ros Chenda



JICA Study Team
Team Leader
Mr. Shigeru Nakamura

Minutes of Working Group Meeting No.9

Date and Time: June 24, 2009 (Wed) at 15:00PM
Place: Meeting Room at Ministry of Industry, Mines and Energy
Participants: Members of Working Groups (Civil and Electrical) from
MIME, EAC, EDC, JICA Cambodia office and JICA Study Team

MIME : Dr. Bun Narith (Leader of Counterpart Team),
Mr. So Veasna, Mr. Chiv Huor, Mr. Phan Bunthoeun,
Mr. Leang Khemarith, Mr. Pan Narith
EAC : Mr. Teng Saroeun, Mr. Suon Ponnarith,
EDC : Mr. Ros Chenda, Mr. Aun Hemarith, Mr. Heav Chamvisal
JICA Cambodia Mr. Shigeki Miyake, Mr. Takanobu Shinoda, Mr. Heng Salpiseth
JICA Team: Mr. Yutaro Mizuhashi, Mr. Hajime Butsuhara,
Mr. Eiji Tsuchiya, Mr. Akira Irie

Contents:

1. General Issues

Draft of the Minutes of Working Group Meeting No.8 held on June 16, 2009 will be delivered to MIME, EAC and EDC by JICA Study Team on June 25, 2009 for confirmation.


2. Confirmation of the schedule of Translation Work of Explanation Sheet


- 1) The Counterpart Team shall complete the translation work of Explanation Sheet by the end of July 2009 and it is prospected to play a role of technical transfer to the Cambodian engineers, subject to the JICA Study Team's supports (compensation for the work).
- 2) The Counterpart Team requests the JICA Study Team to dispatch an electrical member earlier than his next scheduled arrival date (July 22, 2009), in order to complete the translation work of Explanation Sheet by the deadline. JICA Study Team shall discuss this request among team members including its Leader.


3. Other Issues

- 1) In response to the inquiring from JICA Cambodia Office: how to ensure the quality of translation, the Counterpart Team replies that the Explanation Sheet is scheduled to be checked and corrected by the Team Leader and this step guarantees its quality.
- 2) The progress of translation work of the Explanation Sheet shall be checked and shared among WG members in Weekly WG Meeting.
- 3) Others
The Counterpart Team requests that there is no discrepancy between the SREPTS and other countries' technical standards.


MIME
Leader of Counterpart Team
Dr. Bun Narith


EAC
Deputy Team Leader
(Civil WG)
Mr. Theng Marith


EDC
Deputy Team Leader.
(Electromechanical WG)
Mr. Ros Chenda


JICA Study Team
Team Leader
Mr. Shigeru Nakamura

Minutes of Working Group Meeting No.10

Date and Time: June 29, 2009 (Mon) at 15:00PM
Place: Meeting Room at Ministry of Industry, Mines and Energy
Participants: Members of Working Groups (Civil and Electrical) from
MIME, EDC, JICA Cambodia office and JICA Study Team

MIME : Dr. Bun Narith (Leader of Counterpart Team), Mr. Nong Sareth
Mr. Chea Norin, Mr. Pan Narith
EDC : Mr. Heav Chamvisal
JICA Cambodia : Mr. Takanobu Shinoda, Mr. Heng Salpiseth
JICA Team: Mr. Shigeru Nakamura, Mr. Hajime Butsuhara,
Mr. Yutaro Mizuhashi, Mr. Akira Irie

Contents:

1. General Issues

- 1) Confirmation of Minutes of Working Group Meeting No.8 on June 16, 2009
(Draft was delivered on June 25 to the Leader and Deputy Leaders of the Counterpart Team respectively.) The original Minutes of Meeting was delivered for signature of the Leader and Deputy Leaders
- 2) Delivery of Minutes of Working Group Meeting No.9 on June 24, 2009

2. Progress of translation work of the Explanation Sheet

- a) Electric Parts has been in Progress of 10 % as of June 16, 2009.
- b) Civil Parts has been in Progress of 30 % as of June 26, 2009.


3. Confirmation of the schedule by the end of August 2009

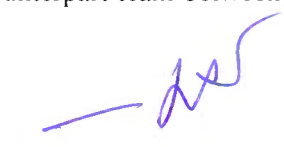
- 1) Scheduled date of a seminar etc. were temporarily agreed as follows;
3rd Workshop: **Jul. 29, 2009** (if Dr. Ith Praing and Dr. Ty Norin are possible to attend), 2nd Seminar: **Aug. 14, 2009** (if Dr. Ith Praing and Dr. Ty Norin are possible to attend), Follow up meeting: **Aug 18, 2009**.
- 2) Draft Final Report (including SREPTS, Explanation Sheet and Glossary in annex) x 20, CD of PDF file x 1 and CD of Word file x 3 were submitted to MIME with submission letter.
- 3) Scheduled date of WG activities until the end of July 2009 was confirmed as follows:
 - a) Check of the draft SREPTS in Khmer by the Team Leader of Counterpart Team - By Jul. 20, 2009
 - b) Translation of the draft Explanation Sheet into Khmer - By the end of July 2009
 - c) Check of the draft Explanation Sheet in Khmer by the Team Leader of Counterpart Team - By Aug. 14, 2009


4. Other Issues

- 1) New schedule in Phnom Penh of JICA Study Team members will be fixed after the discussion based on the fixed date of 2nd seminar.
- 2) Invitation letter to the possible participants in the seminar shall be delivered 10 days before the date of the seminar by the Counterpart Team.
- 3) JICA Study Team will prepare the 50 additional copies of the Annex (SREPTS, Explanation Sheet and Glossary) of draft final report before the invitation letter is send.
- 4) The Counterpart Team agreed that the opinions of participants of the 2nd Seminar requiring drastic or unreasonable change in the SREPTS shall not be necessary to be reflected in the final draft of SREPTS.
- 5) Presentation in the 2nd Seminar shall be made in both Khmer and English simultaneously. Presentation documents in Khmer shall be prepared by the Counterpart team between the 3rd Workshop and the 2nd Seminar.


MIME
Leader of Counterpart Team
Dr. Bun Narith


EAC
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(Civil WG)
Mr. Theng Marith


EDC
Deputy Team Leader.
(Electromechanical WG)
Mr. Ros Chenda


JICA Study Team
Team Leader
Mr. Shigeru Nakamura

Minutes of Working Group Meeting No.11

Date and Time: July 6, 2009 (Mon) at 15:00PM
Place: Meeting Room at Ministry of Industry, Mines and Energy
Participants: Members of Working Groups (Civil and Electrical) from
MIME, EDC, JICA Cambodia office and JICA Study Team

MIME : Dr. Bun Narith (Leader of Counterpart Team), Mr. Nong Sareth
Mr. Chea Norin, Mr. Pan Narith, Mr. So Veasna, Mr. Chiv Huor
EAC : Mr. Theng Marith
EDC : Mr. Aun Herith, Mr. Heav Chamvisal
JICA Team: Mr. Hajime Butsuhara,

Contents:

1. General Issues

- 1) Confirmation of Minutes of Working Group Meeting No.9 on June 24, 2009
(Draft was delivered on June 25 to the Leader and Deputy Leaders of the Counterpart Team respectively.)
And signing of this Minutes by Dr. Bun Narith, Mr. Theng Marith and Mr. Aun Herith
- 2) Delivery of Minutes of Working Group Meeting No.10 on June 29, 2009
And signing of this Minutes by Dr. Bun Narith, Mr. Theng Marith and Mr. Aun Herith

2. Explanation of the schedule by the end of August 2009

Notes: Due to Dr. Ith Praing's convenience, the schedule was changed after WG meeting as follows July 7.

- 1) **3rd Workshop:** Jul. 29, 2009 (→ **July 23, 2009**)
2nd Seminar: Aug. 14, 2009 (→ **August 6, 2009**)
Follow up meeting: Aug 18, 2009 (→ **August 11, 2009**)
- 2) Translation work of the Explanation Sheet will be finished by July 31 by WG member.
Checking translation work of SREPTS will be finished by WG leader by July 20.
Checking translation work of Explanation Sheet will be finished by WG leader by August 14.
- 3) WG meeting will be held on every Tuesday.
- 4) JICA members' the latest dispatch schedule

Notes: Changed after WG meeting as follows


Mr. Tsuchiya	: from July 13	(→ same)
Mr. Irie	: from July 20	(→ from July 13)
Mr. Nakamura, Mr. Mizuhashi and Mr. Morishita	: from July 27	(→ from July 20)
Mr. Shinoda	: from August 9	(→ from August 2)
Mr. Butsuhara	: from August 10	(→ from August 2)

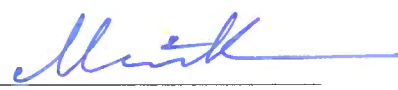
3. Progress of translation work of the Explanation Sheet


- a) Electric Parts has been in Progress of 42 % as of July 6, 2009.
- b) Civil Parts has been in Progress of 60 % as of July 6, 2009.


4. Other Issues

- 1) As the confirmation : JICA study team prepared the 50+5 additional copies of the Annex (SREPTS, Explanation Sheet and Glossary) of Draft Final Report, and hand over them to Dr. Bun Narith at the MIME on July 2, 2009.
- 2) JICA study team will provide WG member the presentation materials for the work shop and the seminar written in English on July 20, and WG members will prepare the presentation materials written in Khmer for the 2nd Semenan.


MIME
Leader of Counterpart Team
Dr. Bun Narith


EAC
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(Civil WG)
Mr. Theng Marith


EDC
Deputy Team Leader.
(Electromechanical WG)
Mr. Ros Chenda


JICA Study Team
Team Leader
Mr. Shigeru Nakamura

Minutes of Working Group Meeting No.12

Date and Time: July 14, 2009 (Tue) at 15:00PM
Place: Meeting Room at Ministry of Industry, Mines and Energy
Participants: Members of Working Groups (Civil and Electrical) from MIME, EAC, EDC, JICA Cambodia Office and JICA Study Team

MIME : Dr. Bun Narith (Leader of Counterpart Team), Mr. Nong Sareth
Mr. Chea Norin, Mr. Pan Narith, Mr. He Sam Ol,
EAC : Mr. Teng Saroeun, Mr. Suon Ponnarith,
EDC : Mr. Aun Hemarith, Mr. Heav Chamvisal,
JICA Cambodia: Mr. Takano Shinoda, Mr. Heng Salpiseth,
JICA Team: Mr. Eiji Tsuchiya, Mr. Akira Irie.

Contents:

1. General Issues

Delivery of Minutes of Working Group Meeting No.11 on Jul. 6, 2009

2. Reconfirmation of the schedule by the end of August 2009 (ref. Appendix I)

- 1) **3rd Workshop:** Jul. 22, 2009 (Changed from Jul. 23 due to Dr. Ith Praing's participation in National Assembly")
2nd Seminar: Aug. 6, 2009
Follow up meeting: Aug. 11, 2009
- 2) Translation work of the Explanation Sheet will be finished by Jul. 31 by WG member.
Checking translation work of SREPTS will be finished by WG leader by Jul. 20.
Checking translation work of Explanation Sheet will be finished by WG leader by Aug. 14.
- 3) WG meeting will be held on every Tuesday.
- 4) JICA members' the latest dispatch schedule
Mr. Tsuchiya (Electric B): Jul. 13 ~ 31
Mr. Irie (Civil C): Jul. 13 ~ 24
Mr. Nakamura (Team Leader), Mr. Mizuhashi (Civil A) and Mr. Morishita (Electric A):
Jul. 20 ~ Aug. 13
Mr. Butsuhara (Civil A): Aug. 2 ~ 13
Mr. Shinoda (Coordinator): Aug. 2 ~ 13

3. Explanation of the proposed schedule of the 3rd Workshop (ref. Appendix II)

- 1) MIME recommendation:
 - a) "Opening Address" should be changed to "Welcome Address" by Dr. Ith Praing
 - b) The ending time should be changed from "12:00" to "11:30"
 - c) "Part 2 Civil Engineering and Hydro mechanical Facilities" should be changed to "Part 2 Civil Engineering Structures and Hydro mechanical Equipment"
- 3) JICA Cambodia Office recommendation: "Opening Remarks" by JICA Cambodia Office (5 minutes) should be inserted between "Introduction" by JICA Team and "Explanation of Draft Final Report"


4. Progress of translation work of the Explanation Sheet


- a) Electric Parts has been in Progress of 50 % as of Jul. 14 (42 % as of Jul. 6).
- b) Civil Parts has been in Progress of 60 % as of Jul. 14 (60 % as of Jul. 6).


4. Other Issues

- 1) JICA Study Team will provide WG members the presentation materials for the Workshop and the Seminar written in English on Jul. 20, and WG members will prepare the presentation materials written in Khmer for the 2nd Seminar.


MIME
Leader of Counterpart Team
Dr. Bun Narith


EAC
Deputy Team Leader
(Civil WG)
Mr. Theng Marith


EDC
Deputy Team Leader.
(Electromechanical WG)
Mr. Ros Chenda


JICA Study Team
Team Leader
Mr. Shigeru Nakamura

Minutes of Working Group Meeting No.13

Date and Time: July 21, 2009 (Tue) at 15:00PM
Place: Meeting Room at Ministry of Industry, Mines and Energy
Participants: Members of Working Groups (Civil and Electrical) from
MIME, EAC, EDC, JICA Cambodia Office and JICA Study Team

MIME : Dr. Bun Narith (Leader of Counterpart Team), Mr. Nong Sareth,
Mr. Pan Narith, Mr. He Sam Ol, Mr. Chea Narin, Mr. Pan Narith
EAC : Mr. Theng Marith, Mr. Teng Saroeun, Mr. Suon Ponnarith
EDC : Mr. Ros Chenda, Mr. Aun Hemarith, Mr. Heav Chamvisal
JICA Cambodia: Mr. Takanobu Shinoda, Mr. Heng Salpiseth
JICA Team: Mr. Shigeru Nakamura, Mr. Yutaro Mizuhashi,
Mr. Hideaki Morishita, Mr. Eiji Tsuchiya, Mr. Akira Irie.

Contents:

1. General Issues

- 1) Delivery of Signed Minutes of Working Group Meeting No.10 on Jun. 29, 2009.
- 2) Confirmation of Minutes of Working Group Meeting No.11 on Jul. 6, 2009.
The original Minutes of Meeting was delivered for signature of the Leader and Deputy Leaders
- 3) Delivery of Minutes of Working Group Meeting No.12 on Jul. 14, 2009.

2. Reconfirmation of the schedule by the end of August 2009

- 1) **3rd Workshop: Jul. 22, 2009 8:00~11:30**
2nd Seminar: Aug. 6, 2009
Follow up meeting: Aug. 11, 2009
- 2) Translation work of the Explanation Sheet will be finished by **Jul. 31** by WG member.
Checking translation work of SREPTS will be finished by WG leader by **Jul. 20**.
Checking translation work of Explanation Sheet will be finished by WG leader by **Aug. 14**.

3. Progress of translation work of the Explanation Sheet

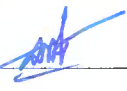
- 1) Electric Parts has been in Progress of **85 %** as of **Jul. 21** (50 % as of Jul. 14).
- 2) Civil Parts has been in Progress of **100 %** as of **July 21** (60 % as of Jul. 14).

4. Preparation for the 2nd Seminar


- 1) Delivery of invitation letter: Already sent by MIME last week.
Cambodian side: Invitation letter was sent to **approx. 80 persons** including 9 groups of IPP.
- 2) Delivery of copy of SREPTS: Already sent by MIME with invitation letter
- 3) Proposed program of the 2nd Seminar and responsible person for each part: Based on the recommendation from Counterpart Team, it was revised and agreed as Appendix-1
- 4) Schedule of preparation of presentation document: Presentation document shall be made by Counterpart Team with the supported of JICA Study Team.
- 5) Presentation document was delivered to the Team Leader of Counterpart Team from JICA Study Team.
- 6) Rehearsal and discussion for the 2nd Seminar shall be held on **Jul. 28th 2009**.
- 7) MIME will provide JICA Study Team with the English list of invited participants to the 2nd Seminar.

5. Other Issues


- 1) Counterpart team advised JICA Study Team to deliver souvenirs (carry bag etc.) to the participants in the 2nd Seminar. JICA Study Team shall discuss the possibility of the preparation.
- 2) Counterpart Team informed that the translation into Khmer would not be completed in time in case that further revisions are made by JICA Study Team without notice and agreement.



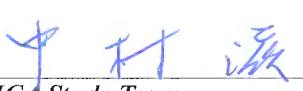
MIME
Leader of Counterpart Team
Dr. Bun Narith



EAC
Deputy Team Leader
(Civil WG)
Mr. Theng Marith



EDC
Deputy Team Leader.
(Electromechanical WG)
Mr. Ros Chenda



JICA Study Team
Team Leader
Mr. Shigeru Nakamura

Program of the 2nd Seminar (Draft)

Date: 06 August 2009 (Thu)

Place: Conference Room at Phnom Penh Hotel

Program:

8:00~8:30	Registration
8:30~8:35	Welcome Address (MIME)
8:35~8:40	Key Note Address (JICA)
8:40~8:50	Opening Address (MIME)
8:50~9:00	Introduction and Purpose of SREPTS (MIME) <i>(Responsible person: Dr. Bun Narith, MIME)</i>
9:00~9:10	Outline of the final draft SREPTS for Hydropower (MIME) <i>(Responsible person: Mr. Much Chhun Horn, MIME)</i>
9:10~9:40	Explanation of the final draft SREPTS (Part-1) (MIME) <i>(Responsible person: Mr. Chea Narin, MIME)</i>
9:40~10:00	Discussion Session
10:00~10:30	Coffee Break
10:30~11:30	Explanation of the final draft SREPTS (Part-2) (EAC) <i>(Responsible person: Mr. Theng Marith, EAC)</i>
11:30~11:50	Discussion Session
11:50~13:15	Lunch Service
13:15~13:45	Explanation of the final draft SREPTS (Part-3) (MIME) <i>(Responsible person: Mr. So Veasna, MIME)</i>
13:45~14:00	Discussion Session
14:00~14:20	Explanation of the final draft SREPTS (Part-4) (EAC) <i>(Responsible person: Mr. Suon Ponnarith and Mr. Teng Saroeun, EAC)</i>
14:20~14:40	Discussion Session
14:40~15:00	Coffee Break
15:00~15:10	Comment of JICA Study Team
15:10~15:20	Summary and Conclusion (MIME/EAC)
15:20~15:30	Closing Remark (MIME)

Minutes of Working Group Meeting No.14

Date and Time: July 28, 2009 (Tue) at 15:00PM
Place: Meeting Room at Ministry of Industry, Mines and Energy
Participants: Members of Working Groups (Civil and Electrical) from MIME, EAC, EDC, JICA Cambodia Office and JICA Study Team

MIME : Dr. Bun Narith (Leader of Counterpart Team), Mr. Nong Sareth, Mr. Pan Narith, Mr. He Sam Ol, Mr. Chea Narin, Mr. Pan Narith, Mr. Phan Bun Hoeum, Mr. Leang Khemarith, Mr. So Veasna
EAC : Mr. Theng Marith, Mr. Teng Saroeun, Mr. Suon Ponnarith
EDC : Mr. Ros Chenda, Mr. Aun Hemarith, Mr. Heav Chamvisal
JICA Cambodia: Mr. Heng Salpiseth
JICA Team: Mr. Shigeru Nakamura, Mr. Yutaro Mizuhashi, Mr. Hideaki Morishita, Mr. Eiji Tsuchiya.

Contents:

1. General Issues

- 1) Signed Minutes of Working Group Meeting No.11 (Jul. 06) was delivered to each party.
- 2) Minutes of Working Group Meeting No.12 (Jul. 14) was confirmed and signed by each party.
- 3) The draft Minutes of Working Group Meeting No.13 (Jul. 21) was delivered to each party for confirmation.

2. Confirmation of draft Minutes of the 3rd Workshop

The contents of draft minutes of the 3rd Workshop were discussed and agreed with some minor revisions in the meeting. The revised minutes will be confirmed at the next WG meeting.

3. Confirmation of the schedule by the end of August 2009

The schedule of the Follow-up Meeting of the 3rd Workshop was confirmed as follows:
Follow up meeting: Aug. 07, 2009 at 10:00AM at MIME

4. Progress of translation work of the Explanation Sheet

- 1) Translation of Explanation Sheet by the WG members has been already completed for both of the Electric Parts and Civil Parts.
- 2) The final check by the Leader of Counterpart Team will be completed by 14 August 2009.

5. Preparation for the 2nd Seminar


- 1) Presentation material for the 2nd Seminar in Khmer are under preparation and will be delivered to JICA Study Team on 04 Aug. and the contents of them will be confirmed at the next WG Meeting held on Aug. 04.
- 2) MIME will inform of the final contents of Back-drop to JICA Study Team within this week for preparation.
- 3) MIME informed the name of the 6 main guests for preparation of name plates. The name of the Japanese main guests will be confirmed by JICA Study Team.
- 4) MIME will deliver the script of Welcome Address and Opening Address by 04 Aug. and JICA Study Team will prepare the script of Key Note Address by JICA.
- 5) MIME will invite 5 News Papers and 5 TV stations for coverage of the Seminar.
- 6) Final arrangement at the conference room will be confirmed on 05 Aug. by both parties.


6. The proposed revisions on the contents of draft SEPTS for Hydropower

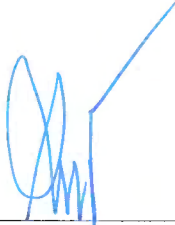
JICA Study Team presented the proposal of revisions on the content of the draft SREPTS for Hydropower as shown in Attachment-1 and the revisions were agreed after discussion as shown in Attachment-2 of this Minutes of Meeting.

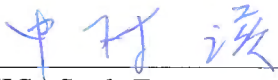
7. Other Issues

Next WG Meeting will be held on Aug. 04, 2009.


MIME
Leader of Counterpart Team
Dr. Bun Narith


EAC
Deputy Team Leader
(Civil WG)
Mr. Theng Marith


EDC
Deputy Team Leader.
(Electromechanical WG)
Mr. Ros Chenda


JICA Study Team
Leader
Mr. Shigeru Nakamura

Attachment-1

Article 20

According to the comment, we suggest adding following sentences to the Explanation Sheet for Article 20.

3. Explanations

Meteorological and hydrological measurement shall be conducted to clarify characteristics of river discharge in an ordinary state and during flood.

Quantity of river maintenance flow shall refer to the average minimum annual river flow rate.

Measures shall be taken against the affected zone downstream of a dam or an intake according to advice of the EIA report.

Article 21

We suggest the revised classification of dams for design flood as follows.

Table 21-2 Dam Classification

Dam classification	Dam height (m)	Gross reservoir capacity (Million m³)	Affected downstream population	Expected loss of life	Impact on economy, society and environment
Large	Higher than 30	More than 50	City or several towns	Large increase in loss	Excessive increase in economic social and/or environmental impact
Medium	15 to 30	1 to 50	Villages	Some increase in loss	Substantial increase in economic social and/or environmental impact
Small	Less than 15	Less than 1	No households	No increase in loss	Low increase in economic social and/or environmental impact

Note : In selecting dam classification, the table shall not be read in a row but the most severe factor shall be selected.

The above table can also be used for Article 171.

Article 171 General Provisions

In-progress inspection determined in this SREPTS consists of 3 kinds of inspection, "Examination for commencement of construction", "Inspection on dam foundation", and "Inspection prior to initial reservoir impounding".

“Examination for commencement of construction” shall be conducted to confirm that civil engineering and hydromechanical planning conform to this SREPTS before the commencement of construction.

“Inspection on dam foundation” shall be conducted in the case that the dam ~~height is more than 15 meters~~ classified as “Large” or “Medium,” or which has difficult foundation problems and/or of unusual design although the dam is classified as “Small” as shown in Table 21-2 to check whether the foundation conditions are appropriate for construction of dam body. It shall be conducted after the completion of excavation for the dam foundation and before the commencement of construction of the dam body.

“Inspection prior to initial reservoir impounding” shall be conducted in the case that the dam ~~height is more than 15 meters~~ classified as “Large” or “Medium,” or which has difficult foundation problems and/or of unusual design although the dam is classified as “Small” as shown in Table 21-2 to check whether constructed and installed facilities are ready for impounding. It shall be conducted prior to the commencement of reservoir impounding.

Article 54

We suggest modifying the provision as follows.

2. If the deterioration of water quality in a reservoir or downstream such as cold water discharge or turbid water is expected due to the establishing of the reservoir, appropriate measures, such as cutting down trees from the inundated area etc., shall be taken ~~as much as possible~~ according to advice of the EIA report.

Article 58

We suggest adding to Table 58-1 “Voltage Classification” as the same note applied to the table of voltage classification in GREPTS.

If in the interest of development of the power sector in the Kingdom of Cambodia it becomes necessary to use a nominal voltage other than that given in the table above, the Ministry of Industry, mines and energy may allow the use of such nominal voltage as a standard voltage through issuing Prokas.

Attachment-2

Proposed Revisions on the Draft SREPTS for Hydropower and Explanation Sheet

The revisions on the draft SREPTS for Hydropower and Explanation Sheet submitted as Annex of the Draft Final Report to be made in reply to the comments from various agencies are agreed as follows.

General Matters

In reply to the comment from MIME, the wording of the SREPTS for Hydropower is to be revised as follows.

The term “*civil engineering and hydromechanical facilities*” is to be changed to “*civil structures and hydromechanical equipment.*”

The term “*this SREPTS*” is to be changed to “*SREPTSHP*” to avoid misunderstanding.

Article 6 Environmental Protection

1. In reply to the comment from the Ministry of Environment concerning the law and regulation related to environmental protection, the following guidance is to be added to as the 1st paragraph of **Explanation Sheet for Article 6.**

In view of the environmental conservation, an owner intending to design, construct/rehabilitate, operate and maintain hydropower facilities shall comply with the environmental laws and regulations in the Kingdom of Cambodia, specifically Law on Environmental Protection and Natural Resources Management, Law on Protected Area, Sub-decree on Environmental Impact Assessment (EIA) Process, etc.

2. In reply to the comment from the Ministry of Environment on **Article 8 “Obligation of Reporting”** concerning Environmental and Social Impact Assessment (ESIA), the following guidance is to be added to as the 3rd paragraph of **Explanation Sheet for Article 6.**

According to the requirements under the environmental laws and regulation in the Kingdom of Cambodia, an owner shall conduct Environmental and Social Impact Assessment (ESIA) and submit a report to MoE for reviewing expected impacts before construction phase

Article 20 Prevention of Damage to Upstream and Downstream Areas

1. In reply to the comment from the Ministry of Water Resource and Meteorology, the following clarification is to be added to **Explanation Sheet for Article 20**.

3. Explanations

Meteorological and hydrological measurement shall be conducted to clarify characteristics of river discharge in an ordinary state and during flood.

The owner shall establish meteorological and hydrological measurement stations and conduct the measurement if there are not any stations located near the project site.

2. In reply to the comment from the Ministry of Environment on Article 20 as well as to the comment from the Ministry of Water Resources and Meteorology on Article 41 “Other Discharge Facilities”, the following guidance is to be added to **Explanation Sheet for Article 20**.

Measures shall be taken against the affected zone downstream of a dam or an intake according to advice suggested by the approved EIA report.

Article 21 Design Flood

1. In reply to the comment from the Ministry of Water Resource and Meteorology, the first sentence of **Article 21** is to be revised by adding the word “meteorological and” as follows.

1. *Design flood shall be established appropriately to prevent dam failure based on sufficient meteorological and hydrological research and review.*

2. Taking account of the comment from MIME that suggest to consider more about the condition of the Kingdom of Cambodia, **Table 21-2** of **Article 21** is to be revised as follows.

Table 21-2 Dam Classification

		Gross reservoir capacity (Million m ³)		
		Less than 10	10 to 100	More than 100
Dam height (m)	Less than 15	Small	Medium	Large
	15 to 30	Small	Medium	Large
	Higher than 30	Medium	Large	Large

Article 23 Freeboard

In reply to the comment from MIME, explanations are added to the provisions as follows.

ha : the margin for a rise in a reservoir water level due to malfunction of spillway gate(s)

0.5 meter for a dam with a spillway gate and 0 meter for a dam without a spillway

hi : the margin to be applied to a fill dam to prevent a dam body from overtopping

1 meter for a fill dam and 0 meter for a concrete dam

Article 54 Sedimentation and Water Quality

In reply to the comment from the Ministry of Environment, the 2nd sentence of **Article 54** is to be revised as follows.

“2. If the deterioration of water quality in a reservoir or downstream such as cold water discharge or turbid water is expected due to the establishing of the reservoir, appropriate measures, such as cleaning of the reservoir area etc., shall be taken ~~as much as possible~~ according to advice suggested by the approved EIA report.”

Article 58 Classification of Voltage

If in the interest of development of the power sector in the Kingdom of Cambodia it becomes necessary to use a nominal voltage other than that given in the table above, the Ministry of Industry, Mines and Energy may allow the use of such nominal voltage as a standard voltage through issuing Prokas.

Article 171 General Provisions

In reply to the comment from MIME, the 3rd and 4th sentences of **Article 171** are to be revised as follows.

“Inspection on dam foundation” shall be conducted in the case that the dam ~~height is more than 15 meters~~ is classified as “Large” or “Medium,” or has difficult foundation problems and/or is of unusual design although the dam is classified as “Small” as shown in Table 21-2 of Article 21 to check whether the foundation conditions are appropriate for construction of dam body. It shall be conducted after the completion of excavation for the dam foundation and before the commencement of construction of the dam body.

“Inspection prior to initial reservoir impounding” shall be conducted in the case that the dam ~~height is more than 15 meters~~ is classified as “Large” or “Medium,” or has difficult foundation

problems and/or is of unusual design although the dam is classified as "Small" as shown in Table 21-2 of Article 21 to check whether constructed and installed facilities are ready for impounding. It shall be conducted prior to the commencement of reservoir impounding.

And in relation to the revision of Article 171, provisions of Explanation Sheet for Article 172 and for Article 175 are to be revised as follows.

Explanation Sheet for Article 172 Scope of Examination for Commencement of Construction

2. Information of Dam and Spillway

Item	Required Information
4. Foundation of Dam	In the case of that the dam which height is over 15 m which is classified as "Large" or "Medium," or has difficult foundation problems and/or is of unusual design although the dam is classified as "Small" as shown in Table 21-2 of Article 21

Explanation Sheet for Article 175 General Provisions

1. Civil structure	(1) Dam (over 15 m) which is classified as "Large" or "Medium," or has difficult foundation problems and/or is of unusual design although the dam is classified as "Small" as shown in Table 21-2 of Article 21
--------------------	--

Article 177 General Provisions

In reply to the comment from MIME, a sentence is to be added after the 1st sentence of Article 177 as follows.

As for dams, this Inspection shall be conducted in the case that the dam is classified as "Large" or "Medium" or the dam has difficult foundation problems and/or is of unusual design although the dam is classified as "Small" as shown in Table 21-2 of Article 21.

Minutes of Working Group Meeting No.15

Date and Time: Aug., 04, 2009 (Tue) at 15:00PM
Place: Meeting Room at Ministry of Industry, Mines and Energy
Participants: Members of Working Groups (Civil and Electrical) from MIME, EAC, EDC, JICA Cambodia Office and JICA Study Team

MIME : Dr. Bun Narith (Leader of Counterpart Team), Mr. Much Chhun Hom, Mr. Nong Sareth, Mr. Chea Narin, Mr. Pan Narith, Mr. He Sam Ol, Mr. Phan Bun Hoeum, Mr. Leang Khemarith
EAC : Mr. Theng Marith
EDC : Mr. Ros Chenda, Mr. Aun Hemarith, Mr. Heav Chamvisal
JICA Cambodia: Mr. Takanobu Shinoda, Mr. Heng Salpiseth
JICA Team: Mr. Shigeru Nakamura, Mr. Yutaro Mizuhashi, Mr. Hajime Butsuhara, Mr. Hideaki Morishita, Mr. Ryuichi Shinoda.

Contents:

1. General Issues

- 1) Agreed Minutes of 3rd Workshop (Jul. 22) was delivered to each party for signature.
- 2) Minutes of Working Group Meeting No.13 (Jul. 21) was confirmed and signed by each party.
- 3) The draft Minutes of Working Group Meeting No.14 (Jul. 28) was delivered for confirmation.

2. Confirmation of the post revisions on the draft SREPTSHP and Explanation Sheet

- 1) The modified provisions for the agreed post revisions on draft SREPTSHP and Explanation Sheet were presented by JICA Study Team and confirmed by the Counterpart Team.
- 2) In relation to the agreed revisions on Article-8 "Obligation for Reporting", the flow of related process was confirmed as shown in Attachment-1.
- 3) Additional minor revisions and corrections in Part 3 of draft SREPTSHP and Explanation Sheet were proposed by JICA Study Team and agreed by the Counterpart Team as shown in Attachment-2.
- 4) The both parties agreed not to additionally provide new numbers and titles for the non-titled tables and figures existing in the draft Explanation Sheet.

3. Progress of translation work of the Explanation Sheet


- 1) Translation of Explanation Sheet by the WG members has been already completed for both of the Electric Parts and Civil Parts.
- 2) The final check by the Leader of Counterpart Team will be completed by August 13, 2009.

4. Preparation for the 2nd Seminar

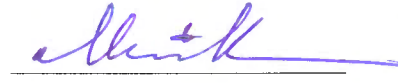
- 1) Presentation material in Khmer was completed and delivered to JICA Study Team.
- 2) Arrangements of the 2nd Seminar were confirmed and agreed in the meeting.
- 3) Final arrangement at the conference room will be confirmed at 17:00 of Aug. 05.

5. Other Issues

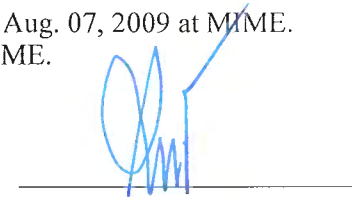
- 1) Follow-up Meeting for the 2nd Seminar will be held at 10:00 of Aug. 07, 2009 at MIME.
- 2) Next WG Meeting will be held at 15:00 of Aug. 11, 2009 at MIME.



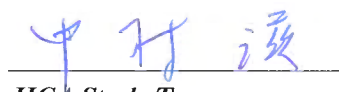
MIME
Leader of Counterpart Team
Dr. Bun Narith



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Deputy Team Leader
(Civil WG)
Mr. Theng Marith



EDC
Deputy Team Leader.
(Electromechanical WG)
Mr. Ros Chenda



JICA Study Team
Leader
Mr. Shigeru Nakamura

Attachment-1

Flow of Project Implementation Process

Project Implementation Process	Required Reporting and Inspections under SREPTSHP
1. Project proposal by Owner (IPP Group)	
2. Letter of Permission (LoP)	
3. Memorandum of Understanding (MOU)	
4. Feasibility Study / IEIA / EIA	
5. <u>Implementation Agreement (IA)</u> between MIME and Owner (IPP Group)	
6. <u>Power Purchase Agreement (PPA)</u> between EDC and Owner (IPP Group)	
7. Application of License to EAC by Owner	1. <u>Construction Commencement Report</u> to MIME/EDC with copy to EAC
8. Issuance of <u>License</u> to Owner by EAC	2. <u>Examination for Commencement of Construction</u>
	3. Commencement of construction by Owner
	4. <u>Inspection on Dam Foundation</u>
	5. <u>Operation Commencement Report</u> to EAC/EDC with copy to MIME describing <u>Flood Management Rules</u>
	6. <u>Inspection Prior to Initial Reservoir Impounding</u>
	7. Commencement of the initial reservoir impounding
	Project under regal control of EAC	8. Completion Inspection before Operation
9. <u>Completion Inspection under Operation Condition</u>	
10. Commencement of operation by Owner	

Note-1: Project is under regal control of **MIME** before starting project operation.

Note-2: Project Owner must be EAC Licensee before conducting "Completion Inspection before Operation".

Attachment-2

1. List of Corrections on Explanation Sheet

We suggest correcting some words in Explanation Sheet as following table:

No.	Before Correction	After Correction
65	1m <u>fro</u> steel pole in Fig. 65-1	1m <u>from</u> steel pole in Fig. 65-1
67	..... medium voltage circuits and <u>lies</u> shall .....	..... medium voltage circuits and <u>lines</u> shall
	..... it shall be grounded within <u>400m</u> in distance .....	..... it shall be grounded within <u>200m</u> in distance
95, 1, (1)	(1) Article <u>39</u> , 1, (1) of SREPTS	(1) Article <u>95</u> , 1, (1) of SREPTS
95, 1, (2)	(2) Article <u>39</u> , 1, (2) a) of SREPTS	(2) Article <u>95</u> , 1, (2) a) of SREPTS
95, 1, (3)	(3) Article <u>39</u> , 1, (2) b) of SREPTS	(3) Article <u>95</u> , 1, (2) b) of SREPTS
95, 3, (1)	According to V-t characteristics of Figure <u>39</u> -1,	According to V-t characteristics of Figure <u>95</u> -1,
	(1) <u>Air Ground of Circuit Breaker</u> in Fig 95-1	(1) <u>Air Insulation to Ground of Each Circuit Breaker</u> in Fig 95-1
95, 3, (3)	(3) Bushing type <u>current</u> transformer	(3) Bushing type <u>of</u> current transformer
	Inside of bushing type <u>current</u> transformer	Inside of bushing type <u>of</u> current transformer
102, 1	..... to grounding work of Article <u>45</u>, .....	..... to grounding work of Article <u>101</u> ,
103, 3	Dia. 1.6mm (<u>12.57</u> mm ²) in Fig 103-1	Dia. 1.6mm (<u>2.01</u> mm ²) in Fig 103-1
105, 1, (1)	..... operating duty according to Table <u>49</u> -1 from .....	..... operating duty according to Table <u>105</u> -1 from
105, 2, (1)	..... operating duty according to Table <u>49</u> -3 from ....	..... operating duty according to Table <u>105</u> -3 from
111, 1	Article <u>55</u> states provisions	Article <u>111</u> states provisions
112, 1	Article <u>56</u> is to prevent	Article <u>112</u> is to prevent
115	1) is used for <u>lightning</u> sign device	1) is used for <u>lighting</u> sign device
	3) <u>Chord</u> or cab-tire cable with	3) <u>Cord</u> or cab-tire cable with
147	..... and relay coil, Article <u>91</u> is not .....	..... and relay coil, Article <u>147</u> is not
	..... optical fiber cable, Article <u>91</u> is not .....	..... optical fiber cable, Article <u>147</u> is not
181, 2, (2)	According to Table <u>114</u> -1,	According to Table <u>181</u> -1,
181, 3, (2)	According to Figure <u>114</u> -2,	According to Figure <u>181</u> -2,
	..... at first according to figure <u>114</u> -3 of .....	..... at first according to figure <u>181</u> -3 of
181, 3, (3)	..... (refer to figure <u>8</u> -4) .....	..... (refer to figure <u>181</u> -4)
185	Article <u>118</u> states about	Article <u>185</u> states about

2. Revisions on Explanation Sheet

For Article 64

We suggest adding following some sentences

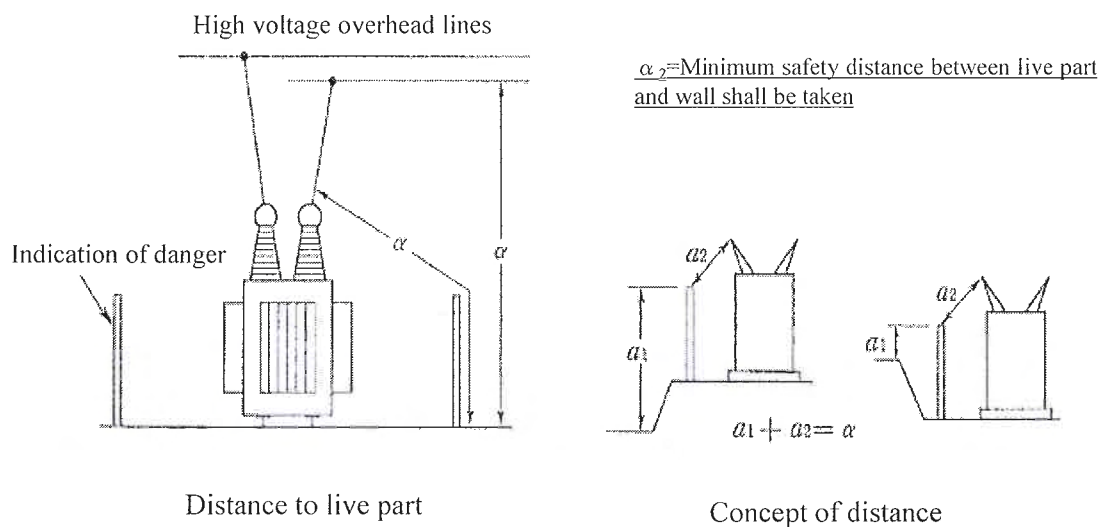


Fig. 64-2 Installation of High Voltage

Table 64-1 Total Distance of Height of Fence, Wall and Live Part

Voltage Classification	Total Distance of Height of Fence, Wall and Live Part
35kV or less	$\alpha = 5\text{m}$
Over 35kV and 160kV or less	$\alpha = 6\text{m}$
Over 160kV	$\alpha = 6\text{m} + 12\text{cm}/10\text{kV}$

Note: In case of 180kV: $\alpha = 6\text{m} + 0.12 \times 2 = 6.24\text{m}$
 In case of 220kV: $\alpha = 6\text{m} + 0.12 \times 6 = 6.72\text{m}$

For Article 67

We suggest adding following figure numbers:

Neutral point of low voltage side of transformer which is to be connected to high and medium voltage circuits and lines shall be grounded. However, single phase transformer with 300V or less or transformer with delta connection cannot ground, so that following terminal grounding is permissible (Fig.67-1).

***** Fig 67-1 is omitted. *****

In this case of earth resistance, the product of one line grounding current by earth resistance shall be 150V or less (Fig.67-2). This grounding work shall be done at transformer's place in general. However, if required resistance value cannot be obtained due to soil condition, the grounding work can be done within 200m in distance from transformer as shown follow. But hard drawn copper wire with tensile strength of 5.26kN or diameter of 4mm shall be used for overhead grounding wire (Fig.67-3).

***** Fig 67-2 and 67-3 are omitted. *****

In the case that required earth resistance cannot be obtained by single grounding due to soil condition, collaborative overhead grounding wire can be permissible. As for installation of collaborative overhead grounding wire, hard drawn copper wire with tensile strength of 5.26kN or diameter of 4mm shall be used and every transformer shall be grounded (Fig.67-4). If grounding work shall be done at transformer's place, it shall be grounded within 200m in distance from the transformer.

***** Fig 67-4 is omitted. *****

Even though area of collaborative overhead grounding wire is not stipulated, required combined resistance shall be obtained every 0.5km radius area (Fig.67-5). The 0.5km radius area can be selected voluntarily, and overlapping shall not be allowed. In case of collaborative overhead grounding, value of earth resistance shall be 300Ω or less.

***** Fig 67-5 is omitted. *****

For Article 75

We suggest adding following some sentences.

Dielectric strength of transformer shall withstand the condition in the following table for 1 minute.(Except nominal voltage from 187kV to 500kV)

Table 75-1 Power Frequency Test Voltage for Transformer Winding

(kV)			
Nominal Voltage	Test Voltage	Nominal Voltage	Test Voltage
3.3	16	110	230
6.6	22	154	325
11	28	187	225*
22	50	220	265*
33	70	275	330*
66	140	500	635*
77	160		

Note*: Testing time of Nominal voltage from 187kV to 500kV shall be as follow;

$$\frac{120 \times \text{Rated Frequency}}{\text{Tested Frequency}} \text{ (Second)}$$

For Article 95

We suggest adding following some sentences.

2. Installation of Protective Air Gap

Traditional idea of insulation coordination is that main transformer is regarded as the most important equipment and to be protected properly and then surge arrester is located to protect whole area of bus-bar such place as bus-bar or transformer terminal. However, due to emerging of large scale hydropower recently, area of bus-bar spreads also and equipments to be located far away from surge arrester cannot be protected and incoming (or outgoing) point is the weakest point of the area.

3. Type of incoming equipment and lightning protection

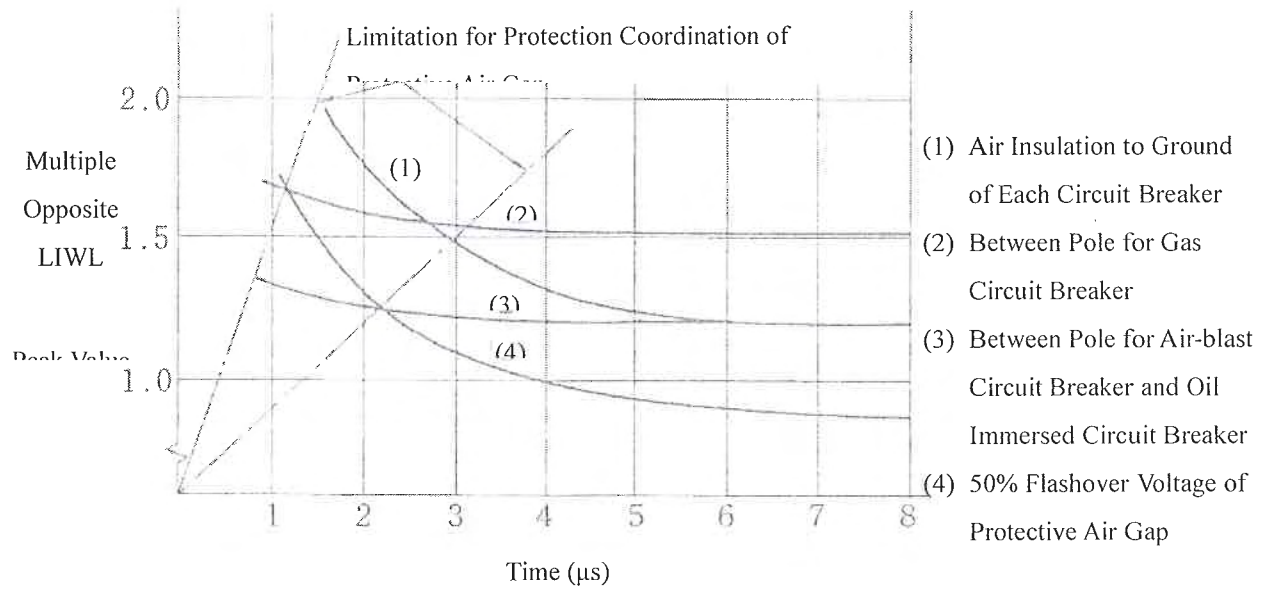


Fig. 95-1 Comparison of V-t Characteristics for Circuit Breaker

Table 95-1 Lightning Protection of Circuit Breaker

Breaker Type	Insulation to the earth	Insulation between phases	Protection
Air-blast circuit breaker	Insulated by air, therefore, V-t characteristic is the same as protective air gap. Protection can be done by protective air gap. Characteristics curve (1)	V-t characteristic is flat comparison with insulation to the earth. Protection cannot be done by protective air gap all cases. Characteristics curve (3)	In case of anticipation of steep lightning voltage, surge arrester at incoming point is necessary for protection of phase insulation.
Gas circuit breaker	Air insulated portion is as the same as air blast circuit breaker. In the gas, V-t characteristic is flat but it has capability more than 150% of LIWL in many cases. Therefore, protection can be done by protective air gap Characteristics curve (1)	In the gas, it has capability more than 150% of LIWL in many cases. Therefore, it is necessary to consider insulation between air insulated portion and the earth. Characteristics curve (2)	Taking account air insulated portion, protection can be done by protective air gap.
Oil circuit breaker	Air insulated portion is as the same as air-blast circuit breaker. Therefore, protection can be done by protective air gap. Characteristics curve (1)	V-t characteristic is more flat in comparison with air insulated portion but insulation strength of phase is relatively high. Possibility of phase flash over is low. Characteristics curve (3)	Oil circuit breaker has high insulation strength between phases. Therefore, protection can be done by protective air gap.

For Article 99

We suggest changing following words:

2. Installation for Rapid Shut Off Device of Water Inflow and Outflow

(2) Rapid shut off device of water inflow and outflow

- 1) Guide vane or needle ~~vane~~ valve which has emergency function
- 2) Inlet valve which has capability to shut off the running water
- 3) Water intake with emergency closing device, penstock guard valve, head tank with sluice gate or valve

(3) Emergency closing function of guide vane or needle ~~vane~~ valve

For the guide vane or needle ~~vane~~ valve which has emergency closing function by means of load adjusting device with protective closing function for turbine-generator to stop the turbine reliably, reliable stopping device for turbine is as follows:

- 1) Pressure tank which has enough capacity to stop the turbine-generator without replenishment of oil.
- 2) Water pressure self-closing type of guide vane, needle ~~vane~~ valve
- 3) Counter weight and spring closing type method
- 4) Emergency oil pressure tank closing method
- 5) Emergency servomotor closing method

6) Combination of self-closing and other closing method

(4) Inlet valve for shut of running water

Inlet valve which has capability of shut off running water means inlet valve to be installed for shut off the water inflow or outflow rapidly.

Inlet valve combination with guide vane or needle ~~vane~~ valve normally to be installed is not categorized to be to the above mentioned type of inlet valve.

Traditionally, inlet valve has capability to shut off running water for security reason and back up function.

Minutes of Working Group Meeting No.16

Date and Time: Aug., 11, 2009 (Tue) at 15:00PM
Place: Meeting Room at Ministry of Industry, Mines and Energy
Participants: Members of Working Groups (Civil and Electrical) from
MIME, EAC, EDC, JICA Cambodia Office and JICA Study Team

MIME : Dr. Bun Narith, Mr. Much Chhun Horn, Mr. Nong Sareth,
Mr. Chea Narin, Mr. Phan Bunthoeun, Mr. He Sam Ol, Mr. Pan Narith,
EAC : Mr. Theng Marith, Mr. Teng Saroeun, Mr. Soun Ponnarith
EDC : Mr. Ros Chenda, Mr. Aun Hemarith
JICA Cambodia: Mr. Takanobu Shinoda, Mr. Heng Salpiseth
JICA Team: Mr. Shigeru Nakamura, Mr. Yutaro Mizuhashi, Mr. Hajime Butsuhara,
Mr. Hideaki Morishita, Mr. Ryuichi Shinoda.

Contents:

1. General Issues

- 1) Minutes of Working Group Meeting No.14 (Jul. 28) was confirmed and signed by each party.
- 2) Minutes of Working Group Meeting No.15 (Aug. 04) was confirmed and signed by each party.
- 3) Minutes of Follow-up Meeting for the 3rd Workshop on Aug.07, 2009 was confirmed and signed by each party.

2. Confirmation of the agreed post revisions on the draft SREPTSHP and Explanation Sheet

- 1) Final revisions on SREPTSHP was presented by JICA Study Team and confirmed by the Counterpart Team.
- 2) Final revisions on Explanation Sheet was presented by JICA Study Team and confirmed by the Counterpart Team.


3. Recommendations proposed in Draft Final Report (Chapter 12)

The Counterpart Team agreed that following recommendations should be implemented for proper execution of hydropower and expressed an intention to take actions for requesting JICA's support.


- 1) Development of a guideline for the procedures for development and operation of hydropower projects including execution, reporting, examination and approval for, but not limited to, the following processes:
 - F/S, IEIA, EIA,
 - Action plans of environmental conservation, compensation for affected people, resettlement
 - Detailed design for construction of hydropower facilities
 - Examination and inspection during construction/installation and operation/maintenance stages
 - Reservoir operation plan for power generation and flood control
 - Operation rules for spillway gates and other discharge gates/valves
- 2) Establishment of certification and registration system of qualified engineers and technicians
- 3) Capacity building for hydropower engineers of MIME, EAC and EDC
- 4) Development of a manual for examination and inspection
- 5) Development of safety and security guideline for workers of operation and maintenance at hydropower stations

4. Request of Follow-up Activities for execution of GREPTS and SREPTS, if any


The Counterpart Team expressed its intention to request study tours to inspect hydropower project in Japan. JICA Cambodia Office, observer of the meeting, can provide some information for application.



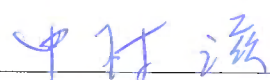
MIME
Leader of Counterpart Team
Dr. Bun Narith




EAC
Deputy Team Leader
(Civil WG)
For: Mr. Theng Marith



EDC
Deputy Team Leader.
(Electromechanical WG)
Mr. Ros Chenda



JICA Study Team
Leader
Mr. Shigeru Nakamura


Mr. Teng Saroeun

Appendix-3

List of Participants of Seminars

- 1. First Seminar (February 17, 2009)**
- 2. Second Seminar (August 06, 2009)**

List of Participants of the First Seminar

The 1st Seminar on the SREPTS for Hydropower
in Phnom Penh Hotel, date 17 February 2009

No	Name	Title-Position	Company/Organization
1	H.E. Suy Sem	Minister	MIME
2	H.E. Dr. Ith Praing	Secretary of State	MIME
3	H.E. Khlaut Randy	Secretary of State	MIME
4	H.E. Dr. Ty Norin	Chairman	EAC
5	H.E. Say Pirum	Under Secretary of State	MIME
6	H.E. Tun Lean	General Director	MIME
7	Dr. Bun Narith	Deputy General Director	MIME
8	Mr. Hul Kunvuth	Executive Director	EAC
9	Mr. Much Chhun Horn	Director	MIME
10	Mr. Touch Sovanna	Director	MIME
11	Mr. Heng Kunleang	Director	MIME
12	Mr. Tan Sokchea	Director	MIME
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25	Mr. Teng Saroeun	Chief Section	EAC
26	Mr. Suon Ponnarith	Staff	EAC
27	Mr. Kim Nhan Chan Amrin	Deputy Chief	MIME
28	Ms. Horn Naren	Staff	MIME
29	Mr. Chi Chanraksmei	Staff	MIME
30	Mr. Son Davin	Staff	MIME
31	Mr. Touch Vuthy	Staff	EAC
32	Mr. Chheng Bunthy	Staff	EAC
33	Mr. Pich Siyun	Director	DIME, Koh Kong
34	Mr. Seng Bunthol (On behalf of Mr. Mao)	Chief of Energy of office (On behalf of Director)	DIME, Pursat
35	Mr. Ros Visith (On behalf of Mr. Chui Chheang)	Chief of Energy of office (On behalf of Director)	DIME, Battambang
36	Mr. Hun Buntham (On behalf of Mr. Hem Vanthan)	Deputy Director (On behalf of Director)	DIME, Rattanak Kiri
37	Mr. Kong Pisith	Director	DIME, Mondul Kiri
38	Mr. Ny Chhon (On behalf of Mr. Iv)	Deputy Director (On behalf of Director)	DIME, Kratie
39	Mr. Chhun Hin	Director	DIME, Kampot
40	Mr. Pheng Chea	Director	DIME, Stung Treng

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42	Mr. Nam Thang	Deputy General Director	EVN International
43	Mr. Van Tuan	Director of Envi	EVN International
44	Mr. Zhu Yu Fang	Director	Gui Guan Power(GGEP)
45	Dr. Tian Ming Tun	Engineer	GGEP
46	Ms. Srun Im	Chief-Officer	MOE (Ministry of Environment)
47	Mr. Rajasekoren	Representative	Boving Farerb
48	Dr. Lois Pinit	Deputy Chief of psen	MEF (Ministry of Economy and Finance)
49	Mr. Lor Sathya	Chief Secretary	MIME
50	Mr. Lieng Sopha	Deputy Director	MAFF (Ministry of Agriculture, Forestry and Fisheries)
51	Do Van Duc	Deputy Project Manager	IECCL
52	Mr. Leang Monirith	Chief Officer	MLMUPC (Ministry of Land Management, Urban Planning and Construction)
53	Mr. Nuon Pichnimik	Deputy Director	MRD (Ministry of Rural Development)
54	Mr. Heng Salpiseth	Program Officer	JICA Cambodia Office
55	Mr. Zheng Hansong	Assistant President	CHMC(China Heavy Macinary Cooperation)
56	Mr. Hang Choeun	Chief Officer	MPWT (Ministry of Public Wort and Transport)
57	So Sopheas	Director	CNMC (Cambodia National Mekhong Committee)
58	Mr. Liu Wen Tian	Director	CSG/GXZD
59	Mr. Fu Zhiping	Vice Director	CSG (China Southern Grid
60	Mr. Huang Yu Qian	Vice President	CSG
61	Yi Yingzhang	Director	C.H.D.
62	Wuning Chang	Engineer	C.H.D.
63	Hong Jong Chul	Managing Director	KTC Cable (Korea)
64	Hak Sok Chamreun	Manager	KTC Cable
65	Mr. Sim Desmond	Director	Camdara (Singapore)
66	Mr. Nhem Sovann	Aftermarket Manager	DKSH (Combodia) Ltd
67	Chhim Chankroesna	Staff	NETi
68	Mr. Kobayashi Yukiharu	Deputy Resident	JICA Cambodia Office
69	Mr. Miyake Shigeki	Assistant Resident Representative	JICA Cambodia Office
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72	Mr. Mizuhashi Yutaro	Member	JICA Study Team
73	Mr. Butsuhara Hajime	Member	JICA Study Team
74	Mr. Morishita Hideaki	Member	JICA Study Team
75	Mr. Tsuchiya Eiji	Member	JICA Study Team
76	Ms. Ohashi Hitomi	Member	JICA Study Team

KINGDOM OF CAMBODIA

Nation Religion King

List of Attendants
The Second Seminar
on the Specific Requirement
for Electric Power Technical Standards for Hydropower
on 06 August 2009
at Phnom Penh Hotel
Phnom Penh, Cambodia

N ^o	Name	Title – Position	Organization / Company	Remarks
I- Ministry of Industry, Mines and Energy				
1	H.E Dr. Ith Praing	Secretary of State	MIME	
2	H.E. Khlaut Randy	Secretary of State	MIME	
3	H.E. Say Pirum	Under Secretary of State	MIME	
4	Dr. Bun Narith	Deputy General Director	MIME	
5	Mr. Victor Jona	Deputy General Director	MIME	
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24	Mr. Seng Kimrithy	Staff	MIME	
25	Mr. Hean Veasna	Staff	MIME	
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27	Mr. Sun Davin	Staff	MIME	
28	Mr. Bun Vichet	Staff	MIME	
29	Mr. Chea Piseth	Staff	MIME	
30	Mr. Ngeth Bora	Staff	MIME	
31	Mr. Thay Piseth	Staff	MIME	

N ^o	Name	Title – Position	Organization / Company	Remarks
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32	Mr. Pich Siyun	Director	DIME, KK	
33	Mr. Mao San	Director	DIME, Pusat	
34	Mr. Chui Chheng	Director	DIME, BB	
35	Mr. Hem Vanthan	Director	DIME, RK	
36	Mr. Kong Pisith	Director	DIME, MK	
37	Mr. Iv Samith	Director	DIME, Kratie	
38	Mr. Chhun Hin	Director	DIME, Kampot	
39	Mr. Pheng Chea	Director	DIME, ST	
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40	H.E. Chan Sodavath	Deputy Managing Director	EDC	
41	Mr. Ros Chanda	Director	EDC	
42	Mr. Nou Sokhon Rady	Director	EDC	
43	Dr. Praing Chulsa	Director	EDC	
44	Mr. Oun Hemrith	Deputy Director	EDC	
45	Mr. Om Piseth	Deputy Director	EDC	
46	Mr. Heav Chanvisal	Chief Section	EDC	
47	Mr. Pen Pha	Chief Office	EDC	
IV- EAC				
48	H.E. Dr. Ty Norin	Chairman	EAC	
49	Mr. Hul Kunvuth	Executive Director	EAC	
50	Mr. Teng Marith	Director	EAC	
51	Mr. Teng Saroeun	Chief Office	EAC	
52	Mr. Chheng Bunthy	Chief Section	EAC	
53	Mr. Suon Ponnarith	Staff	EAC	
V- Concern Ministries				
54	Mr. Oum Borith	Deputy Director General	MLMUPC	
55	Mr. Duong Samkeat	Deputy Director	MOE	
56	Mr. Nhan Hong	(Representative)	MRD	
57	H.E. Long Seravath	General Director	MOWRAM	
58	Mr. Hang Choeun	Chief Director	MPWAT	
VI- Private Company				
59	Mr. Ngoyun Nam Thang	Deputy Director General	EVNE	Vietnam
60	Mr. Nguyen Phu Xuan	International Dept	EVNE	Vietnam
61	Mr. Duong Nhac Hen	Technical Dept	EVNI	Vietnam
62	Mr. Yi Ying Zhong	(Representative)	C.H.D	China
63	Ms. Yuan Yuem	(Representative)	CHMC	China
64	Mr. Xu Li Lin	(Representative)	CHMC	China
65	Mr. Desmond Sim	Director	Camdara	Singapore
66	Mr. Phan Bin Miar	(Representative)	Camdara	Singapore
67	Mr. Nam Sovarn	(Representative)	Camdara	Singapore
68	Mr. Whring Chang	(Representative)	(blank)	
69	Mr. Hon Guang Zoco	(Representative)	(blank)	
70	Mr. Na Huu Chunh	(Representative)	PECC1(EVN)	Vietnam

N°	Name	Title – Position	Organization / Company	Remarks
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73	Mr. Vn Van Duang	(Representative)	PECC1(EVN)	Vietnam
74	Mr. Dau Duc Nham	(Representative)	PECC2(EVN)	Vietnam
75	Mr. Bui Viet Cugug	(Representative)	PECC2(EVN)	Vietnam
76	Mr. Liu Wenjian	(Representative)	CSG	Chin
77	Mr. So Nam	(Representative)	IFRe	
78	Mr. Chaeng Rhon	(Representative)	IFRudi	
79	Mr. Chim Sokhum	(Representative)	NDKE	
VII- Embassy of Japan, JICA and Consultant Team				
80	Mr. MURAKAMI Yusuke	Senior Representative	JICA Cambodia Office	
81	Mr. SHINODA Takanobu	Representative	JICA Cambodia Office	
82	Mr. HENG Saphiseth	Representative	JICA Cambodia Office	
83	Ms. MIYATA Chiyoko	Associate Expert	JICA Headquarters	
84	Mr. NAKAMURA Shigeru	Team Leader	JICA Team	
85	Mr. MIZUHASHI Yutaro	Member	JICA Team	
86	Mr. BUTSUHARA Hajime	Member	JICA Team	
87	Mr. MORISHITA Hideaki	Member	JICA Team	
88	Mr. SHINODA Ryuichi	Member	JICA Team	

Appendix-4

Abstract of Draft SREPTS for Hydropower

**Electric Power Technical Standards
Specific Requirements for Hydropower Facilities
(draft)
(Draft SREPTS for Hydropower)**

ABSTRACT

Part-1 General Provisions

Chapter 1 General Provisions

Article 1. Definitions

Definitions of words that are particularly used and important in SREPTSHP are described.

Article 2. Purpose of Technical Standards

Purpose of establishment of SREPTSHP is described.

Article 3. Scope of Application

Related facilities, technical studies and parties that SREPTSHP are applied are described.

Article 4. Applicable Standards and Codes

What kinds of other standards or codes should be applied in case that a matter is not stipulated in SREPTSHP are described.

Chapter 2 Particular Provisions

Section 1 Requirements for Project Implementation

Article 5. Assignment of Chief Engineers

Specific requirements for nomination of chief engineers such as registered hydropower civil engineer and registered electrical engineer are described.

Article 6. **Environmental Protection**

Transitional provisions for requirements related to the existing laws and regulations for environmental protection are described.

Article 7. **Order of Remedy for Conformance to Technical Standards**

Specific requirements for order of remedy for conformance to technical standards are described.

Article 8. **Obligation for Reporting**

Specific requirements for obligation for reporting are described.

Article 9. **Safety and Technical Training**

Transitional provisions for requirements related to safety and technical training for related persons and parties are described.

Section 2 **Exemptions**

Article 10. **Exemptions for Small Projects**

Provisions for exception in conformity to SREPTSHP for small scale hydropower projects are described in view of preservation of safety and promotion of rural electrification.

Article 11. **Exemptions for Project under Implementation**

Provisions for exception in conformity to SREPTSHP for projects under implementation are described.

Article 12. **Exemptions for Projects under Operation**

Provisions for exception in conformity to SREPTSHP for the existing projects are described.

Article 13. **Exception of Exemptions**

Obligations of reporting, monitoring and inspection that remain not exempted even if hydropower facilities are exempted from application of SREPTSHP are described.

Part-2 Civil Structures and Hydromechanical Equipment

Chapter 3 General Provisions

Article 14. Definitions

Definitions of words that are particularly used and important in Part 2 are described.

Chapter 4 Fundamental Requirements

Article 15. Prevention of Overtopping from Non-overflow Sections of Dams

Fundamental requirements for preventing overtopping from non-overflow sections of dam such as estimation of design flood, design of spillway capacity and setting of freeboard of dam are described.

Article 16. Dam Stability

Fundamental requirements for preserving dam stability such as stability against sliding, overturning and material failure are described.

Article 17. Prevention of Failure of Waterways

Fundamental requirements for preventing failure of waterways and other facilities such as design and selection of its location are described.

Article 18. Prevention of Failure of Other Structures

Fundamental requirements for preventing failure of powerhouses such as design and selection of its location are described.

Article 19. Prevention of Damage to Ground around a Reservoir

Fundamental requirements for preventing seepage failure of ground around a reservoir are described.

Article 20. Prevention of Damage to Upstream and Downstream Areas

Fundamental requirements for preventing damages or negative impacts to upstream and downstream areas such as appropriate setting of spilling water from dam in operation and flooding, management of sedimentation in the reservoir, and preservation of environment are described.

Chapter 5 Dams

Section 1 Common Rules

Article 21. **Design Flood**

Common rules for setting design flood are described.

Article 22. **Basic Water Levels**

Common rules for setting basic water levels such as normal water level, flood water level and low water level are described.

Article 23. **Freeboard**

Common rules for setting freeboard of dam for each dam type are described.

Article 24. **Loads**

Common rules for setting loads, forces and pressures for dam design for each type are described.

Article 25. **Dam Foundations**

Common requirements for dam foundations such as surveys, tests and countermeasures in construction are described.

Article 26. **Monitoring and Inspections**

Common requirements for monitoring and inspections of dams such as arrangement and monitoring of various instrumentation equipment and inspection in case of emergency are described.

Section 2 Concrete Dams

Article 27. **Concrete Materials**

Specific technical requirements related to quality of concrete materials such as cement, aggregate, water and admixture are described.

Article 28. **Foundations for Concrete Dams**

Specific technical requirements for foundations for concrete dams are described.

Article 29. **Stress Conditions**

Specific technical requirements for setting stress conditions for concrete dam design are described.

Article 30. **Stability of Concrete Gravity Dams**

Specific technical requirements for stability of concrete gravity dams such as sliding, overturning are described.

Article 31. **Stability of Arch Dams**

Specific technical requirements for stability of arch dams such as sliding and stress distribution are described.

Article 32. **Structural Details of Concrete Dam Body**

Specific technical requirements for structural details of concrete dam body are described.

Article 33. **Temperature Regulation for Concrete Dam Body**

Specific technical requirements of temperature regulation for concrete dam body in construction works are described.

Section 3 **Fill Dams**

Article 34. **Embankment Materials**

Specific technical requirements for selection and quality control of embankment materials of fill dams are described.

Article 35. **Foundations for Fill Dams**

Specific technical requirements for foundations of fill dams are described.

Article 36. **Stability of Fill Dams**

Specific technical requirements for stability of fill dams such as sliding are described.

Article 37. **Restrictions on Facilities such as Discharge Facilities**

Specific technical requirements for restrictions on facilities of fill dams such as discharge facilities are described.

Article 38. **Particular Applications for Fill Dams**

Specific technical requirements of particular applications for various types of fill dams such as homogeneous type, zoned type and surface diaphragm type are described.

Section 4 Spillways and Other Discharge Facilities

Article 39. Spillways

Specific technical requirements for design of spillways such as discharge capability, location arrangement and its function are described.

Article 40. Spillway Gates and Auxiliaries

Specific technical requirements for design of spillway gates and auxiliaries such as durability, stress condition and materials are described.

Article 41. Other Discharge Facilities

Specific technical requirements for design of other discharge facilities are described.

Chapter 6 Waterways

Article 42. Common Rules

Common rules for design of waterways related to functions and materials are described.

Article 43. Intakes

Specific technical requirements for design of intakes such as setting of stress conditions, its functions and structures are described.

Article 44. Settling Basins

Specific technical requirements for design of settling basins such as stress conditions, its functions and structures are described.

Article 45. Headraces

Specific technical requirements for design of headraces such as stress conditions, its functions and structures are described.

Article 46. Head Tanks

Specific technical requirements for design of head tanks such as stress conditions, its functions and structures are described.

Article 47. Surge Tanks

Specific technical requirements for design of surge tanks such as stress conditions, its functions and structures are described.

Article 48. **Penstocks**

Specific technical requirements for design of each type of penstocks such as stress conditions, its functions and structures are described.

Article 49. **Tailraces**

Specific technical requirements for design of tailraces such as stress conditions, its functions and structures are described.

Article 50. **Gates, Valves, and Auxiliaries**

Specific technical requirements for design of gates, valves and auxiliaries such as stress conditions, its functions and structures are described.

Chapter 7 Powerhouses and Other Facilities

Article 51. **Powerhouse Structure**

Specific technical requirements for design of powerhouse structure such as stress conditions and its structures are described.

Article 52. **Other Facilities**

Specific technical requirements for design of other facilities related to a powerhouse are described.

Chapter 8 Reservoirs

Article 53. **Prevention of Landslide**

Specific technical requirements for prevention of landslide in reservoirs and countermeasures are described.

Article 54. **Sedimentation and Water Quality**

Specific technical requirements for management of sedimentation and water quality in reservoirs are described.

Chapter 9 Downstream Area

Article 55. **Regulation of Discharge to Downstream Areas**

Specific technical requirements for regulation of discharge to downstream areas of dams and reservoirs are described.

Article 56. **Facilities to Discharge to Downstream Areas**

Specific technical requirements for facilities to discharge to downstream areas of dams and reservoirs are described

Part-3 Electrical Facilities

Chapter 10 General Provisions

Section 1 Definitions

Article 57. Definition

Definitions of words that are particularly used and important in the SREPTSHP are described.

Article 58. Classification of Voltage

Classification of AC voltage is described.

Section 2 Safety Policies

Article 59. Prevention of Electrical Shock and Fire Caused by Electrical Equipment

Prevention of electrical shock, fire or other threats caused by electrical equipment is described.

Article 60. Insulation for Electrical Circuits and Lines

The electrical circuits and lines insulated from ground are described.

Article 61. Prevention of Disconnection of Electrical Wires and Cables

Having enough strength to the electrical wires, cables, guy wires etc. for electrical equipment in normal operating condition are described.

Article 62. Connection for Electrical Wires and Cables

Connecting the electrical wires and cables so as not to increase electrical resistance and not to decrease insulation level are described.

Article 63. Thermal Strength for Electrical Equipment

Having enough heat resistance against produced heat from the equipment to the electrical equipment in normal operation is described.

Article 64. Prevention of Hazard for Medium and High Voltage Electrical Equipment

Having protection to medium voltage and high voltage electrical equipment against unauthorized person not to touch the equipment easily are described.

Article 65. Grounding of Electrical Equipment

Providing grounding of electrical equipment so as to prevent electrical shock, fire or other accident caused by happening or invasion of abnormal high voltage are described.

Article 66. Method of Ground for Electrical Equipment

Method of grounding for electrical equipment is described.

Article 67. Prevention of Fire Caused by Transformers Connected to High and Medium Voltage Circuits and Lines

Providing the grounding at transformer to prevent electrical shock, fire or other accidents caused by transformer connected high voltage and medium voltage circuits are described.

Article 68. Restriction of High and Medium Voltage Transformer convert Directly into Low Voltage

Restriction of high voltage and medium voltage transformer convert directly into low voltage are described.

Article 69. Protection for Electrical Wires, Cables and Electrical Equipment against Over-current

Installing over-current protection devices so as to protect electrical wires, cables and electrical equipment from overheating burnout are described.

Article 70. Protection against Ground Fault

Providing an earth fault circuit breaker to prevent damage of electrical equipment, electrical shock or fire from grounding fault are described.

Article 71. Prevention of Electrical or Magnetic Interference to Electrical Facilities

Installing the electrical facilities in such a manner so as not to cause electrical or magnetic interference to the function of other electrical facilities is described.

Article 72. Prevention of Interference for Facilities which Use High Frequency Wave

Installing facilities which use high frequency wave in such a manner so as not to cause serious interference to the function of other facilities which use high frequency wave are described.

Article 73. Prevention of Electric Power Outage Caused by Electrical Facilities

Installing high and medium voltage electrical facilities in such a manner so as not to cause obstacle to power supply from public power supply industry due to damage or destruction are described.

Section 3 Prevention of Pollutions

Article 74. Prevention of Pollutions

Complying with the environmental laws and regulations of the Kingdom of Cambodia to the hydropower station and associated facilities are described.

Chapter 11 Electrical Equipment for Hydropower Station

Section 4 Insulation Level

Article 75. Insulation level of Transformers

Having enough insulation level so as to withstand testing voltage for 10 minutes is described.

Article 76. Insulation Level of AC Electrical Equipment except Transformers

Insulation level of the electrical circuits and lines of AC electrical equipment except transformer are described.

Article 77. Insulation Level of Electrical Equipment to be Connected DC Circuit

Insulation level of the electrical equipment to be connected to DC circuit is described.

Article 78. Insulation Level of Rotary Converter and Rectifier

Insulation level of the rotary converter and rectifier is described.

Section 5 Thermal Strength

Article 79. Thermal Strength of Turbine Bearing

Maximum allowable temperature of turbine bearing is described.

Article 80. **Thermal Strength of Rotating Machines**

Maximum allowable temperature of directly air cooled machines at rated load condition is described.

Article 81. **Thermal Strength of Transformer**

Maximum allowable temperature of oil immersed transformer at rated load condition is described.

Article 82. **Thermal Strength of AC Circuit Breaker**

Maximum allowable temperature of AC circuit breaker at rated load condition is described.

Article 83. **Thermal Strength of Disconnecting Switch**

Maximum allowable temperature of disconnecting switch at rated load condition is described.

Article 84. **Thermal Strength of Gas Insulated Switchgear**

Maximum allowable temperature of gas insulated switchgear at rated load condition is described.

Article 85. **Thermal Strength of Load Breaker Switch**

Maximum allowable temperature of load breaker switch at rated load condition is described.

Article 86. **Thermal Strength of Power Fuse**

Maximum allowable temperature of power fuse at rated load condition is described.

Article 87. **Thermal Strength of Capacitor Voltage Transformer**

Maximum allowable temperature of capacitor voltage transformer at rated load condition is described.

Article 88. **Thermal Strength of Instrument Transformer**

Maximum allowable temperature of instrument transformer at rated load condition is described.

Article 89. **Thermal Strength of Bushing**

Maximum allowable temperature of bushing at rated load condition is described.

Article 90. Thermal Strength of Metal Enclosed Switchgear and Control Gear

Maximum allowable temperature of metal enclosed switchgear and control gear is described.

Article 91. Thermal Strength of Bus-bar and Conductor

Maximum allowable temperature of bus-bar and conductor is described.

Article 92. Thermal Strength of Power Cable

Maximum allowable temperature of power cable is described.

Section 6 Structure, Performance and Installation

Article 93. Structure, Performance and Installation of Load Breaker Switch and Disconnecting Switch

Structure, performance and installation of load breaker switch and disconnecting switch is described.

Article 94. Structure, Performance and Installation of Neutral Point Device

Structure, performance and installation of neutral point device is described.

Article 95. Structure, Performance and Installation of Surge Arrester

Structure, performance and installation of surge arrester is described.

Article 96. Structure, Performance and Installation of Control Gear and Metal Enclosed Switchgear

Structure, performance and installation of control gear and metal enclosed switchgear is described.

Article 97. Structure, Performance and Installation of Gas Insulated Switchgear

Structure, performance and installation of gas insulated switchgear is described.

Article 98. Structure, Performance and Installation of Bus-bar and Conductor

Structure, performance and installation of bus-bar and conductor is described.

Article 99. Structure, Performance and Installation of Turbine

Structure, performance and installation of turbine is described.

Article 100. Structure and Performance of Inlet Valve

Structure and performance of inlet valve is described.

Chapter 12 Auxiliary Equipment

Section 7 Grounding Work

Article 101. Classification of Grounding Work

Value of grounding resistance and type of grounding work is described.

Article 102. Grounding of Electrical Equipment

Grounding of electrical equipment is described.

Article 103. Types of Grounding Wire

Type of grounding wire is described.

Article 104. Installation of Grounding Electrode and Grounding Wire

Prevention of danger around grounding electrode and thermal strength of grounding wire is described.

Section 8 Pressure Oil and Compressed Air Supply System

Article 105. Volume of Pressure Oil Container

Volume of pressure oil container to be used turbine and generator is described.

Article 106. Volume of Compressed Air Container

Volume of compressed air container to be used switchgear or circuit breaker is described.

Article 107. Pressure Tightness of Pressure Oil and Compressed Air Supply System

Pressure tightness of pressurized parts of pressure oil and compressed air supply system is described.

Article 108. Safety Valve and Pressure Gauge of Pressure Oil and Compressed Air Supply System

Installation of safety vale and pressure gauge of pressure oil and compressed air supply system is described.

Article 109. Pressure Recovery Device for Pressure Oil and Compressed Air Supply System

Provision of automatic pressure recovery device to oil pressure container and main air pressure container is described.

Section 9 Others

Article 110. Protective Fences for Inspection Route

Providing protective fences at inspection routes to prevent to touch live part easily by inspector is described.

Article 111. Phase and Status Indication Device for Medium and High Voltage Bus-bar

Providing phase and status indication device at a conspicuous place for medium and high voltage bus-bar is described.

Article 112. Installation of Prevention Facility for Invasion of Small Animals

Installing prevention facilities for invasion of small animals so as not to cause any accident is described.

Article 113. Installation of Emergency Power Supply System

Installation of emergency power facilities to be used in case of outage of ordinary power supply is described.

Chapter 13 Electrical Facilities for Station Service

Section 10 Prevention of Electrical Shock and Fire

Article 114. Prevention for Electrical Shock and Fire of Electrical Wiring

Installing the electrical wiring in such a manner so as not to cause any electrical shock or fire taking its circumstance and working voltage into consideration is described.

Article 115. Application for Electrical Wiring

Having the electrical wirings proper strength and insulation level so as not to cause electrical shock or fire is described.

Article 116. Insulation Level for Low Voltage Electrical Circuits and Lines

The insulation resistance value for each section into which the electrical circuits and lines can be divided by switching devices or over-current circuit breakers is described.

Article 117. Prevention for Electrical Shock and Fire of Electrical Equipment for Station Service

Installing the electrical equipment for station service so as not to expose any live parts and no risk of fire by overheating and to prevent any danger to the human body is described.

Section 11 Prevention of Risk to Other Electrical Wiring and Other Structures by Electrical Facilities

Article 118. Prevention of Risk to Other Electrical Wiring and Other Structures by Electrical Wiring

Installing electrical wiring which is installed closely or crossing other electrical wiring or telecommunication lines so as to prevent electrical shock or fire caused by accidental contact is described.

Section 12 Protective Measures against Abnormal Conditions

Article 119. Protection for Low Voltage Electrical Trunk Line against Over-current

Having switching devices and the current breaker at appropriate to low voltage trunk line so as to protect the concerned electrical circuit against over-current is described.

Article 120. Protection for Overload of Motor

Installing over-current circuit breaker to the electrical motor in indoor so as to preventing fire caused by overheating of the motor is described.

Article 121. Cutting Off for Medium Voltage Mobile Cables and Trolley Cables in case of Abnormal Conditions

Installing over-current circuit breaker to middle voltage mobile cables and trolley cables for protecting them against over-current is described.

Section 13 Prevention of Electrical and Magnetic Interferences

Article 122. Prevention of Interferences of Telecommunication Facilities Caused by Electrical Equipment or Trolley Cables

Installing electrical equipment or trolley cables in such a manner so as not to cause interference with the telecommunication facilities caused by radio wave or high frequency current is described.

Section 14 Restriction of Installation at Special Locations

Article 123. Electrical Equipment Installed in the Place Where May Decrease Insulation Level by Dust

Installing electrical equipment in duty place in such a manner so as to prevent electrical shock or fire caused by decreasing of insulation level or conductivity is described.

Article 124. Prohibition of Installation for Electrical Equipment at Volatile Places Caused by Flammable Gas

Installing electrical equipment at volatile places in such a manner so as not to ignite any explosion or fire in normal operating condition is described.

Article 125. Prohibition of Installation for Electrical Equipment at Corrosive Places

Installing the electrical equipment at corrosive place to take preventive measure against electrical shock or fire caused by decreasing of insulation level or conductivity is described.

Article 126. Prohibition of Installation for Electrical Equipment at Explosive Magazine

Prohibition of installation of electrical equipment in explosive magazine except lighting purpose is described.

Chapter 14 Electrical Facilities for Outgoing Line

Section 15 Prevention of Electrical Shock and Fire

Article 127. Prevention of Electrical Shock and Fire for Electrical Lines

Installing electrical lines in such a manner so as not to cause electrical shocks or fire taking its circumstance into consideration is described.

Article 128. Prevention of Electrical Shock for Overhead Lines and Underground Electrical Lines

Using for insulated cable to low and medium voltage overhead lines and underground electrical lines so as not to cause electrical shocks to human body taking working voltage into consideration is described.

Article 129. Insulation Level for Low Voltage Electrical Lines

Not exceeding 1/2,000 maximum current of the lines to insulation resistance for low voltage electrical lines in accordance with working voltage on insulation level for low voltage electrical lines is described.

Article 130. Prevention of Entry by Unauthorized Persons into Hydropower Station

Prevention of entry by unauthorized person and provision into hydropower station of a notice of high voltage is described.

Article 131. Prevention of Climbing Supporting Structure of Overhead Electrical Lines

Installing in such a manner so as not to be climbed the support structure easily to supporting structure for overhead electrical lines.

Article 132. Height for Overhead Lines

Installing overhead line and overhead telecommunication equipment for electric power system in high position so as not to cause electrical shock by contacting or electromagnetic induction and not to interfere with traffic are described.

Article 133. Prevention of Electrical Shock against Workers on Other Electrical Lines

Not installing passing through the other overhead lines to the supporting structure of overhead lines are described

Article 134. Prevention of Electrical Shock Caused by Electrostatic or Electromagnetic from Overhead Lines

Installing high voltage overhead electrical lines in such a manner so as not to be sensed electrostatic induction or cause any danger to the human body by electromagnetic is described.

Section 16 Prevention of Hazard to Other Electrical Wires, Cables and Structures

Article 135. Prevention of Contact between Electrical Wires and Cables

Installing electrical lines and telecommunication equipment for electric power system near other line or on same supporting structures of other lines so as not to cause electrical shock or fire by contacting or disconnection of line is described.

Article 136. Prevention of Hazard to Other Structures by Electrical Wires and Cables

Installing wires and cables of electrical lines coming close or cross over other supporting structure so as not to cause electrical shock or fire due to contacting or disconnection of lines is described.

Article 137. Prevention of Hazard to Other Electrical Wires, Cables and Structures by Underground Electrical Cables

Installing underground wires and cables coming close or cross over the other electric wires and cables so as not to cause damages on wire and cables by electrical arc at failure.

Article 138. Prevention of Obstruction to Overhead Electrical Lines by Abnormal Voltage

Making appropriate measures taken in order not to cause damage to low voltage side of facilities by invasion of abnormal voltage from high voltage side in case of installation of high and low voltage overhead electrical lines same supporting structures together is described.

Section 17 Prevention of Hazard by Collapse of Supporting Structure

Article 139. Prevention of Collapse of Supporting Structures

Making safe material and structure of supporting structure of overhead electrical line so as not to collapse is described.

Section 18 Prevention of Hazard by High Pressure Gas

Article 140. Prevention of Hazard for Gas Insulated Equipment

Installation manners such as the material and structures of pressurized portion withstand the maximum operation pressure sufficiently and safely of gas insulated equipment are described.

Article 141. Installation for Pressurized Facilities

Installation manners such as the pressurized portion withstands the maximum operation pressure sufficiently and safely to pressurized facilities are described.

Section 19 Prohibition of Installation for Dangerous Facilities

Article 142. Restriction for Installation for Oil-filled Switchgear

Not installing insulated oil-filled switchgear on supporting structure of overhead electrical lines is described.

Article 143. Prohibition for Installation for House Wiring

Not passing electrical line through interior of building and not installing electrical line interior side, roof or ground of premises of other manager of the electrical facilities are described.

Article 144. Prohibition of Connected Branch Electrical Lines

Not installing connected branch electrical lines to high voltage and medium voltage electrical lines are described.

Article 145. Prohibition of Installation for Electrical Lines at Cliff

Prohibition of installation for electrical lines at cliff is described.

Article 146. Prohibition of High Voltage Overhead Electrical Lines at Urban Area

Not installing high voltage overhead electrical lines at urban area except that electrical line are cables are described.

Article 147. Prohibition of Connection for Telecommunication Equipment for Power Supply System to Other Telecommunication Equipment for Power Supply System of High Voltage Electrical Lines at Urban Area

Not connecting the telecommunication equipment for power supply system with other telecommunication equipment for power supply system of high voltage electrical lines at urban area is described.

Section 20 Prevention of Electrical and Magnetic Interference

Article 148. Prevention of Telecommunication Interference

Installing electric lines so as not to generate electromagnetic wave which cause obstacle to the radio transmission equipment are described.

Section 21 Prevention of Electric Power Outage

Article 149. Prevention of Electric Power Outage Caused by Electrical Facilities Damage

Installing a function to disconnect the electrical circuits and lines automatically to generators in case that there may be destruction to other electric power facilities or obstacle to the concerned electrical facilities is described.

Article 150. Mechanical Strength for Generators and Other Electrical Facilities

Withstanding the mechanical shock caused by short-circuit current to generators are described.

Article 151. Protection for Underground Lines

Installing underground lines so as to withstand the vehicle's weight or heavy load objects on those are described.

Article 152. Prevention for Electric Power Outage Caused by High Voltage Overhead Line

Not installing high voltage overhead lines at urban area or crowded area are described.

Article 153. Installation of Surge Arrester for Medium and High Voltage Electrical Circuits and Lines

Installing surge arresters to prevent damage by lightning surge voltage are described.

Article 154. Installation for Telecommunication Equipment for Electrical Power System

Installing the telecommunication equipment for electrical power system at hydropower station so as to secure the security and to prevent the electrical power outage is described.

Article 155. Maintaining for Telecommunication Equipments in case of Disasters

Installing antenna of the radio communication or the reflective plate so as not to cause destruction of telecommunication functions is described.

Chapter 15 Measuring and Protection Device

Section 22 Measuring Device

Article 156. Purpose of Installation of Measuring Devices

Purpose of installation for measuring devices such as voltmeter, ammeter is described.

Article 157. Measuring Devices of Hydropower Station

Measuring devices such as pressure gauge, bearing thermometer at hydropower station is described.

Section 23 Protective Device

Article 158. Protective Device for Turbine and Generator

Providing protective device for turbine and generator is described.

Article 159. Protective Device for High Voltage Transformer

Providing protective device for high voltage transformer is described.

Article 160. **Protective Device for Gas Insulated Switchgear**

Providing alarm device for remarkable decrease of insulated gas for the gas insulated switchgear is described.

Article 161. **Earth Fault Protective Device for Electrical Circuits and Lines**

Providing automatic cut-off device to medium and high voltage electrical circuits and lines to prevent accident, disaster and influence to the human body are described.

Article 162. **Protective Device for High Voltage Overhead Lines**

Providing protective device for earth fault and short circuit fault to high voltage overhead lines is described.

Article 163. **Protective Device for Bus-bar**

Providing protective device against earth and short circuit fault to bus-bar is described.

Article 164. **Safety Alarm for Hydropower Station**

Installing alarm devices to hydropower station which is controlled remotely from control center so as to transmit alarm to administrative office or control center in case of accident is described.

Article 165. **Supervisory Device for Operation of Turbine and Generator**

Providing supervisory device at hydropower station for supervision of condition of turbine and generator is described.

Article 166. **Load Regulation Device**

Providing load regulation device at hydropower station is described.

Article 167. **Fire Extinguisher System for Transformer**

Operating automatically fire extinguisher system of transformer with over 170 kV which to be connected earthed neutral system is described.

Part-4 Examination and Inspection

Chapter 16 General Provisions

Article 168. Definitions

Definitions of words that are particularly used and important in this Part are described.

Article 169. Purpose

Purpose of Examination and Inspection that is the confirmation of quality and safety in construction, operation and maintenance of hydropower facilities are described.

Article 170. General Provisions

Character of Examination and Inspection including responsibility of Owner and Authority are described.

Chapter 17 Examination and Inspection on Civil Structures and Hydromechanical Equipment

Section 1 In-progress Inspection

Article 171. General Provision

Character of In-progress Inspection consisting of “Examination for Commencement of construction”, "Inspection on Dam Foundation" and "Inspection prior to Initial Reservoir Impounding” are described.

Article 172. Scope of Examination for Commencement of Construction

Purpose of Examination for Commencement of Construction and points to notice in case of Examination is described.

Article 173. Scope of Inspection on Dam Foundation

Purpose of Inspection on Dam Foundation and points to notice in case of Inspection is described.

Article 174. Scope of Inspection prior to Initial Reservoir Impounding

Purpose and subjects of Inspection prior to Initial Reservoir Impounding and points to notice in case of Inspection are described.

Section 2 Completion Inspection

Article 175. General Provision

Purpose, types and general matters of Completion Inspection are described.

Article 176. Scope of Completion Inspection

Subjects of 2 types of Completion inspection, before operation and under operation condition, are described.

Section 3 Periodical Inspection

Article 177. General Provision

Purpose, types and general matters of Periodical Inspection are described.

Article 178. Scope of Periodical Inspection

Subjects and methods of Periodical Inspection are described.

Chapter 18 Examination and Testing on Electrical Facilities

Section 1 General

Article 179. Examination and Testing

Examination and testing items for electrical equipment to be installed at hydropower station are described.

Section 2 Visual Inspection

Article 180. Visual Inspection

Purpose of visual inspection and visual inspection items are described.

Section 3 Measurement of Grounding Resistance

Article 181. Measuring Method of Grounding Resistance

Measurement method of grounding resistance is described.

Section 4 Measurement of Insulation Resistance

Article 182. Measuring Method of Insulation Resistance

Measurement method of insulation resistance is described.

Article 183. Insulation Resistance Value

Insulation resistance value of low, medium and high voltage electrical circuits and lines is described.

Section 5 Dielectric Strength Test

Article 184. Dielectric Strength Test Method for Transformer

Dielectric strength test method for transformer is described.

Article 185. Dielectric Strength Test Method for Electrical Equipment

Dielectric strength test method for electrical equipment is described.

Section 6 Operation Test

Article 186. Operation Test for Hydropower Station

Test items, verification method of test and operation for operation test of electrical equipment, control equipment and protective equipment at hydropower station are described.

Section 7 Load Test

Article 187. Method of Load Test

Method of load test at hydropower station is described.