

## **Appendix-2**

ワーキンググループ会議議事録

(第1回～第16回)

## 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 1<sup>st</sup> 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:

<b>Previous Version</b>	<b>Revised Version</b> <i>(Article Nos. are of tentative following those shown in Interim Report.)</i>
<p><b>Overall Framework</b> &lt;Inception Report&gt;</p> <p><b>Part 1: Hydropower Facilities</b> (including General Provisions, Provisions for Civil Structures, Hydromechanical Equipments and Turbine )</p> <p><b>Part 2: Electrical Facilities</b> (including Provisions for Electrical Equipments in Hydropower Station (excluding Turbine))</p> <p><b>Part 3: Particular Provisions</b> (including Requirements for Project Implementation and Transitional Provisions)</p>	<p><b>Overall Framework</b> &lt;Further revisions on Interim Report&gt;</p> <p><b><u>Part 1: General Provisions</u></b> (including General Provisions, Transitional Provisions and Requirements for Project Implementation)</p> <p><b><u>Part 2: Civil Engineering and Hydromechanical Facilities</u></b> (including Provisions for Civil Structures and Hydromechanical Equipments)</p> <p><b><u>Part 3: Electrical Facilities</u></b> (including Provisions for Electrical Equipments in Hydropower Station (including Turbine), Substation and Switching Station)</p> <p><b><u>Part 4: Examination and Inspection</u></b> (for Civil Engineering &amp; Hydromechanical Facilities and Electrical Facilities)</p>
<p><b>Part 1: Hydropower Facilities</b> <b>Chapter 1: General Provisions</b> 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><b>Part 1: General Provisions</b> <b>Chapter 1: General Provisions</b> 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><b>Part 3: Particular Provisions</b>  <b>Chap.6 Requirements for Project Implement</b>  <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><b>Chap. 7 Transitional Provisions</b>  <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><b>Chapter 2: Particular Provisions</b>  <b>Sec.1 Requirements for Project Implement</b>  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><b>Sec.2 Exemptions</b>  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><b>Part 1: Hydropower Facilities</b>  <b>Chapter 2: Hydropower Facilities</b></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><b>Part 2: Civil Engineering and Hydromechanical Facilities</b>  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><b>Part 2: Electrical Facilities</b>  Chap.3 General  Chap.4 Electric Facilities for Power Supply  Chap.5 Electric Facilities at Consumer Side</p>	<p><b>Part 3: Electrical Facilities</b>  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><b>Part-3: Particular Provisions (tentative)</b>  <b>Chap.6 Requirements for Project Implementation</b>  Art-128: Examination and Inspection</p>	<p><b>Part 4: Examination and Inspection</b>  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><b>Part-3: Particular Provisions (tentative)</b>  <b>Chap.6 Requirements for Project Implementation</b>  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  <b>Chap.7 Transitional Provisions</b>  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)




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**MIME**  
Leader of Counterpart Team  
Dr. Bun Narith




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



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



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**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 2<sup>nd</sup> 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 1<sup>st</sup> 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.




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**MIME**  
Leader of Counterpart Team  
Dr. Bun Narith




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



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



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**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 7<sup>th</sup> WG Meeting is postponed from Feb. 18 to Feb. 19. (No change for the 6<sup>th</sup> 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.

  
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**MIME**  
**Leader of Counterpart Team**  
**Dr. Bun Narith**

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

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

  
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**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**  
**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.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




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**MIME**  
*Leader of Counterpart Team*  
*Dr. Bun Narith*




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



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



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**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.

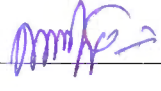
#### 3. Other issue

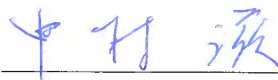
As for the seminar held on last February, MIME has received some comments from Ministry of Environment, Water Resources and Meteorology.

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

  
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MIME  
Leader of Counterpart Team  
Dr. Bun Narith

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

  
\_\_\_\_\_  
EDC  
Deputy Team Leader.  
(Electromechanical WG)  
for 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

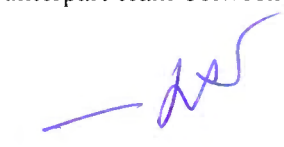
- 1) Scheduled date of a seminar etc. were temporarily agreed as follows;  
3<sup>rd</sup> Workshop: **Jul. 29, 2009** (if Dr. Ith Praing and Dr. Ty Norin are possible to attend), 2<sup>nd</sup> Seminar: **Aug. 14, 2009** (if Dr. Ith Praing and Dr. Ty Norin are possible to attend), Follow up meeting: **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 2<sup>nd</sup> 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 2<sup>nd</sup> 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 2<sup>nd</sup> Seminar shall be made in both Khmer and English simultaneously. Presentation documents in Khmer shall be prepared by the Counterpart team between the 3<sup>rd</sup> Workshop and the 2<sup>nd</sup> 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.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) **3<sup>rd</sup> Workshop:** Jul. 29, 2009 (→ **July 23, 2009**)  
**2<sup>nd</sup> 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	(→ <b>same</b> )
Mr. Irie	: from July 20	(→ <b>from July 13</b> )
Mr. Nakamura, Mr. Mizuhashi and Mr. Morishita	: from July 27	(→ <b>from July 20</b> )
Mr. Shinoda	: from August 9	(→ <b>from August 2</b> )
Mr. Butsuhara	: from August 10	(→ <b>from August 2</b> )

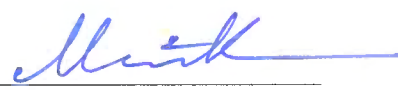
#### 3. Progress of translation work of the Explanation Sheet


- 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.

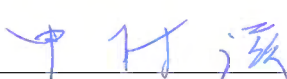
#### 4. Other Issues

- 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 2<sup>nd</sup> Semenan.

  
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.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) **3<sup>rd</sup> Workshop:** Jul. 22, 2009 (Changed from Jul. 23 due to Dr. Ith Praing's participation in National Assembly")  
**2<sup>nd</sup> 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 3<sup>rd</sup> 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 2<sup>nd</sup> 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) **3<sup>rd</sup> Workshop: Jul. 22, 2009 8:00~11:30**  
**2<sup>nd</sup> 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

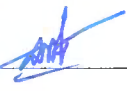
- 1) Electric Parts has been in Progress of **85 %** as of Jul. **21** (50 % as of Jul. 14).
- 2) Civil Parts has been in Progress of **100 %** as of July **21** (60 % as of Jul. 14).


#### 4. Preparation for the 2<sup>nd</sup> 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 2<sup>nd</sup> 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 2<sup>nd</sup> Seminar shall be held on **Jul. 28<sup>th</sup> 2009**.
- 7) MIME will provide JICA Study Team with the English list of invited participants to the 2<sup>nd</sup> Seminar.

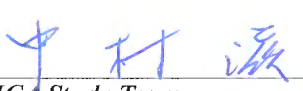
#### 5. Other Issues

- 1) Counterpart team advised JICA Study Team to deliver souvenirs (carry bag etc.) to the participants in the 2<sup>nd</sup> 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 2<sup>nd</sup> 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 3<sup>rd</sup> Workshop

The contents of draft minutes of the 3<sup>rd</sup> 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 3<sup>rd</sup> 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 2<sup>nd</sup> Seminar


- 1) Presentation material for the 2<sup>nd</sup> 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

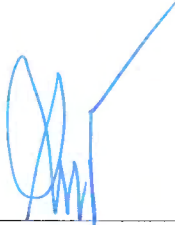
JICA Study Team presented the proposal of revisions on the content of the draft SREPTS for Hydropower as shown in Attachment-1 and the revisions were agreed after discussion as shown in Attachment-2 of this Minutes of Meeting.

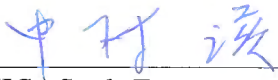
#### 7. Other Issues

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 m <sup>3</sup> )	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 <sup>3</sup> )		
		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 <del>that</del> the dam <del>which height is over 15 m which</del> 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 <del>(over 15 m)</del> 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
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**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 3<sup>rd</sup> 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.

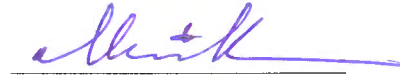
#### **4. Preparation for the 2<sup>nd</sup> Seminar**

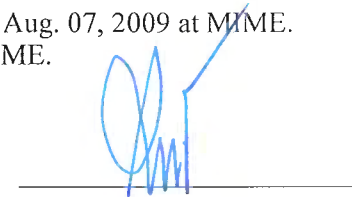
- 1) Presentation material in Khmer was completed and delivered to JICA Study Team.
- 2) Arrangements of the 2<sup>nd</sup> Seminar were confirmed and agreed in the meeting.
- 3) Final arrangement at the conference room will be confirmed at 17:00 of Aug. 05.

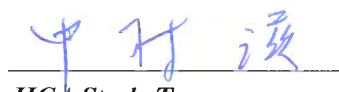
#### **5. Other Issues**

- 1) Follow-up Meeting for the 2<sup>nd</sup> 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*

  
\_\_\_\_\_  
*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

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 <b>MIME</b> and Owner (IPP Group)	
6. <u>Power Purchase Agreement (PPA)</u> between <b>EDC</b> and Owner (IPP Group)	
7. Application of License to EAC by Owner	1. <u>Construction Commencement Report</u> to <b>MIME/EDC</b> 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 <b>EAC/EDC</b> with copy to <b>MIME</b> 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 <b>EAC</b>
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

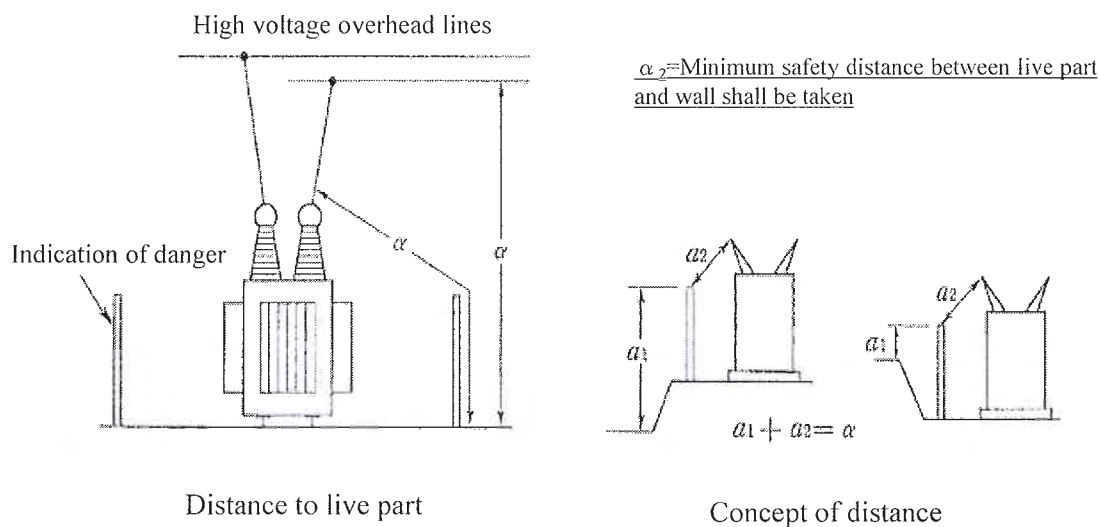
We suggest correcting some words in Explanation Sheet as following table:

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>12.57mm<sup>2</sup></u> ) in Fig 103-1	Dia. 1.6mm ( <u>2.01mm<sup>2</sup></u> ) 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;

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

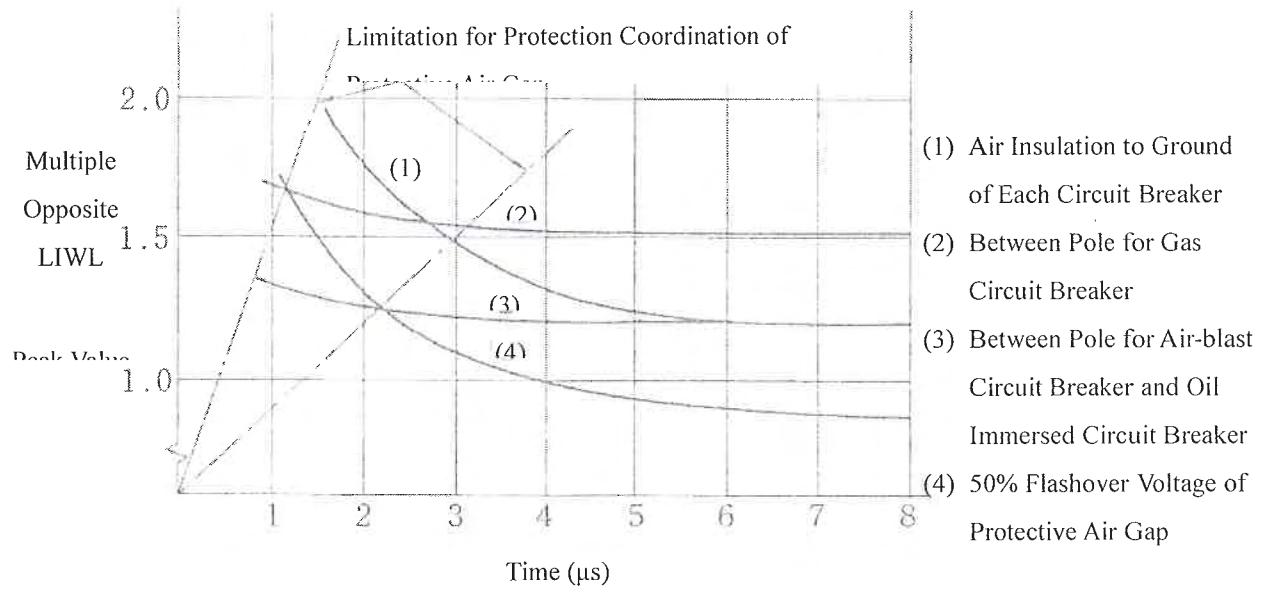
**For Article 95**

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**

<b>Breaker Type</b>	<b>Insulation to the earth</b>	<b>Insulation between phases</b>	<b>Protection</b>
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. <b>Characteristics curve (1)</b>	V-t characteristic is flat comparison with insulation to the earth. Protection cannot be done by protective air gap all cases. <b>Characteristics curve (3)</b>	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 <b>Characteristics curve (1)</b>	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. <b>Characteristics curve (2)</b>	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. <b>Characteristics curve (1)</b>	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. <b>Characteristics curve (3)</b>	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 3<sup>rd</sup> 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

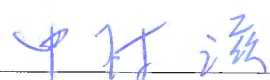
#### 4. Request of Follow-up Activities for execution of GREPTS and SREPTS, if any

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**

### **セミナー参加者リスト**

- 1. 第1回セミナー (2009年2月17日)**
- 2. 第2回セミナー (2009年8月6日)**

## 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
13	Mr. Theng Marith	Director	EAC
14	Mr. Ros Chenda	Director	EDC
15	Mr. Nong Sareth	Deputy Director	MIME
16	Mr. So Veasna	Deputy Director	MIME
17	Mr. Aun Hemrith	Deputy Director	EDC
18	Mr. Chea Narin	Chief Office	MIME
19	Mr. Phan Bunthoeun	Chief Office	MIME
20	Ms. San Vibol	Chief Office	MIME
21	Mr. Pan Narith	Deputy Chief Office	MIME
22	Mr. He Sam Ol	Deputy Chief Office	MIME
23	Mr. Leang Khemrith	Deputy Chief Office	MIME
24	Mr. Heav Chanvisal	Chief Section	EDC
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

<b>No</b>	<b>Name</b>	<b>Title-Position</b>	<b>Company/Organization</b>
41	Ms. Bun Voaddhana		KENERTEC (Korea)
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
70	Mr. Washizawa Takeshi	Expert to MIME	JICA
71	Mr. Nakamura Shigeru	Team Leader	JICA Study Team
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

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**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 <sup>o</sup>	Name	Title – Position	Organization / Company	Remarks
<b>I- Ministry of Industry, Mines and Energy</b>				
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	
6	Ms. Pouv Voroleak	Deputy General Director	MIME	
7	Mr. Much Chhun Horn	Director	MIME	
8	Mr. Touch Sovanna	Director	MIME	
9	Mr. Heng Kunleng	Director	MIME	
10	Mr. Nong Sareth	Deputy Director	MIME	
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13	Mr. On Vuthy	Deputy Director	MIME	
14	Mr. Chea Narin	Chief Office	MIME	
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16	Ms. San Vibol	Chief Office	MIME	
17	Mr. Pan Narith	Deputy Chief Office	MIME	
18	Mr. He Sam Ol	Deputy Chief Office	MIME	
19	Mr. Leang Khemrith	Deputy Chief Office	MIME	
20	Mr. Kim Nhan Chan Amrin	Deputy Chief Office	MIME	
21	Mr. Pen Sameth	Staff	MIME	
22	Mr. Sem Nisseth	Staff	MIME	
23	Ms. Horn Naren	Staff	MIME	
24	Mr. Seng Kimrithy	Staff	MIME	
25	Mr. Hean Veasna	Staff	MIME	
26	Mr. Chy Chan Raksmy	Staff	MIME	
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 <sup>o</sup>	Name	Title – Position	Organization / Company	Remarks
<b>II- Provincial Department of Industry, Mines and Energy</b>				
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	
<b>III- EDC</b>				
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	
<b>IV- EAC</b>				
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	
<b>V- Concern Ministries</b>				
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	
<b>VI- Private Company</b>				
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

<b>N°</b>	<b>Name</b>	<b>Title – Position</b>	<b>Organization / Company</b>	<b>Remarks</b>
71	Mr. Cao Thi Thu yen	(Representative)	PECC1(EVN)	Vietnam
72	Mr. Dang Thanh Long	(Representative)	PECC1(EVN)	Vietnam
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	
<b>VII- Embassy of Japan, JICA and Consultant Team</b>				
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**

**水力 SREPTS (案) 概要版**



# 電力技術基準細則(水力)(案)

## (Draft SREPTS for Hydropower)

### 概要版

## Part-1 一般規定

### Chapter 1 一般規定

**Article 1.** 定義

水力 SREPTS において特別な意味で使用されている重要な用語を定義している。

**Article 2.** 技術基準の目的

水力 SREPTS 制定の目的を記述している。

**Article 3.** 適用範囲

水力 SREPTS が適用される設備、調査、組織について記述している。

**Article 4.** 適用可能な他の基準

水力 SREPTS で規定されない事項に適用される他の技術基準について記述している。

### Chapter 2 特記規定

#### Section 1 事業実施のための要求事項

**Article 5.** 主任技術者の任命

主任土木技術者や主任電気技術者の任命に関する要求事項について記述している。

**Article 6.** 環境保全

環境保全に関する既存の法令について記述している。

**Article 7.**      **技術基準に適合させるための改善措置**  
SREPTS に適合させるための改善措置について記述している。

**Article 8.**      **報告義務**  
報告義務に関する要求事項について記述している。

**Article 9.**      **安全および技能研修**  
関連する人員や組織の安全および技能研修について記述している。

## **Section 2    適用除外**

**Article 10.**    **小規模水力の除外**  
安全および地方電化の推進の観点から小水力に対して SREPTS の適用を除外する場合の規定について記述している。

**Article 11.**    **実施中の水力計画の除外**  
実施中の水力計画に対して SREPTS の適用を除外する場合の規定について記述している。

**Article 12.**    **既設の水力設備の除外**  
既設の水力発電設備に対して SREPTS の適用を除外する場合の規定について記述している。

**Article 13.**    **除外の例外**  
除外規定が適用される場合でも、報告や点検の義務は除外の対象とならないことについて記述している。

## Part-2 土木設備および水門鉄管設備

### Chapter 3 一般条項

#### Article 14. 定義

Part2 において特別な意味で使用されている重要な用語を定義している。

### Chapter 4 基本的要求事項

#### Article 15. ダムの非越流部からの越流の防止

ダム堤体の非越流部からの越流を防止するために、洪水吐を設置することおよび十分な余裕高を取ることについて記述している。

#### Article 16. ダムの安定

ダム堤体の安定を維持するために必要な事項について記述している。

#### Article 17. 水路等の構造物の安定

電力の安定供給や公共の安全のために水路等の構造物に求められる性能について規定している。

#### Article 18. 発電所等の構造物の安定

電力の安定供給や公共の安全のために発電所等の構造物に求められる性能について規定している。

#### Article 19. 貯水池周辺斜面への損害の防止

電力の安定供給や公共の安全のために貯水池周辺斜面に求められる性能について規定している。

#### Article 20. 上下流域への被害の防止

上下流域への被害を防止するためにダムおよび貯水池に求められる性能について規定している。

### Chapter 5 ダム

#### Section 1 共通事項

#### Article 21. 設計洪水

設計洪水の設定方法について記述している。

**Article 22.**     **基本水位**

ダム設計等に用いられる貯水池の基本水位について記述している。

**Article 23.**     **余裕高**

ダムの非越流部の余裕高について記述している。

**Article 24.**     **荷重**

ダム設計において考慮すべき荷重について記述している。

**Article 25.**     **ダム基礎**

ダムの安定のために基礎に求められる事項について記述している。

**Article 26.**     **監視および点検**

常時および非常時のダムの監視および点検項目について記述している。

**Section 2**     **コンクリートダム**

**Article 27.**     **コンクリート材料**

ダムの安定のためにコンクリート材料に求められる事項について記述している。

**Article 28.**     **コンクリートダムの基礎**

ダムの安定のために基礎に求められる事項について記述している。

**Article 29.**     **応力**

ダムの安定のために必要な堤体の許容応力について記述している。

**Article 30.**     **コンクリート重力ダムの安定**

コンクリート重力ダムの安定条件について記述している。

**Article 31.**     **アーチダムの安定**

アーチダムの安定条件について記述している。

**Article 32.**     **コンクリートダム堤体の詳細**

コンクリートダム堤体の詳細構造に関する要求事項について記述している。

**Article 33.**     **コンクリートダム堤体の温度規制**

堤体コンクリート打設時の温度規制について記述している。

## Section 3 フィルダム

### Article 34. 堤体材料

ダムの安定のために堤体材料に求められる事項について記述している。

### Article 35. フィルダムの基礎

ダムの安定のために基礎に求められる事項について記述している。

### Article 36. フィルダムの安定

フィルダムの安定条件について記述している。

### Article 37. 堤体への放流設備等の設置の制限

フィルダム堤体内を貫通する設備の設置の制限について記述している。

### Article 38. フィルダムの特別規定

フィルダムの各型式に対する要求事項について記述している。

## Section 4 洪水吐およびその他の放流設備

### Article 39. 洪水吐

放流能力、設置位置、機能等の洪水吐の設計に関する要求事項について記述している。

### Article 40. 洪水吐ゲートおよび付帯設備

耐久性、応力条件、材料等の洪水吐ゲートおよび付帯設備の設計に関する要求事項について記述している。

### Article 41. その他の放流設備

その他の放流設備の設計に関する要求事項について記述している。

## Chapter 6 水路

### Article 42. 共通事項

水路の設計において、その強度、機能や材料に関して要求される共通規定について記述している。

### Article 43. 取水口

取水口の設計における、その強度、機能や構造に関する技術的要求事項について記述している。

**Article 44.**    **沈砂池**

沈砂池の設計における、その強度、機能や構造に関する技術的要求事項について記述している。

**Article 45.**    **導水路**

導水路の設計における、その強度、機能や構造に関する技術的要求事項をについて記述している。

**Article 46.**    **ヘッドタンク**

ヘッドタンクの設計における、その強度、機能や構造に関する技術的要求事項について記述している。

**Article 47.**    **サージタンク**

サージタンクの設計における、その強度、機能や構造に関する技術的要求事項について記述している。

**Article 48.**    **鉄管路**

各種鉄管路の設計における、その強度、機能や構造に関する技術的要求事項について記述している。

**Article 49.**    **放水口**

放水路の設計における、その強度、機能や構造に関する技術的要求事項について記述している。

**Article 50.**    **ゲート、バルブおよび付属設備**

ゲート、バルブおよび付属設備の設計における、その強度、機能や構造に関する技術的要求事項について記述している。

## **Chapter 7 発電所およびその他の設備**

**Article 51.**    **発電所構造物**

発電所構造物の設計における、その強度や構造に関する技術的要求事項について記述している。

**Article 52.**    **その他構造物**

発電所のその他設備の設計に関する技術的要求事項について記述している。

## Chapter 8 貯水池

### **Article 53.** 地すべりの防止

貯水池周辺斜面の地すべりを防止するために必要な技術的事項について記述している。

### **Article 54.** 堆砂および水質

貯水池の堆砂や水質悪化の防止のために必要な技術的事項について記述している。

## Chapter 9 下流域

### **Article 55.** 下流への放流の制限

下流域への被害を防止するために放流に課せられる制限について記述している。

### **Article 56.** 放流設備

放流設備に要求される技術的事項について記述している。

## Part-3 電気設備

### Chapter 10 一般条項

#### Section 1 用語の定義

##### Article 57. 用語の定義

SREPTS において特別な意味で使用されている重要な用語を定義している。

##### Article 58. 電圧の種別

電圧の種別を記述している。

#### Section 2 保安原則

##### Article 59. 電気設備における感電・火災等の防止

電気設備による感電・火災等の防止について記述している。

##### Article 60. 電路の絶縁

電路の絶縁について記述している。

##### Article 61. 電線等の断線の防止

電線・ケーブル等、通常の使用状態において断線しないよう施設することを記述している。

##### Article 62. 電線の接続

電線等を接続するにあたって、接続部分の電気抵抗の増加および絶縁性能の低下等をしないように接続することを記述している。

##### Article 63. 電気機械器具の機械的強度

電気機械器具は、通常の使用状態において、電気機械器具に発生する熱に耐えることを記述している。

##### Article 64. 高圧・中圧電気機械器具の危険の防止

高圧・中圧の電気機械器具に取扱者以外の者が容易に触れるおそれがないように施設することを記述している。



**Article 65.** **電気設備の接地**

異常時の電圧上昇および高電圧の侵入による感電・火災・その他人体等へ危害をおよぼさないよう適切な場所に接地することを記述している。

**Article 66.** **電気設備の接地の方法**

電気設備の接地方法について記述している。

**Article 67.** **高圧・中圧電路等と結合する変圧器の火災等の防止**

高圧・中圧電路等に結合する変圧器について、電気設備への損傷・感電および火災等のおそれがないよう当該変圧器へ接地することを記述している。

**Article 68.** **高圧・中圧を直接低圧に変成する変圧器の施設制限**

高圧・中圧を直接低圧に変成する変圧器の施設制限について記述している。

**Article 69.** **過電流からの電線および電気機械器具の保護対策**

過電流による過熱損傷からの電線および電気機械機器の保護として、過電流遮断器を施設することを記述している。

**Article 70.** **地絡に対する保護対策**

地絡による電線および電気機械機器の損傷・感電・火災等を防ぐために、地絡遮断器を施設することを記述している。

**Article 71.** **電気設備の電氣的・磁氣的障害の防止**

電気設備が他の電気設備等に電氣的および磁氣的な障害を与えないように施設することを記述している。

**Article 72.** **高周波利用設備への障害の防止**

高周波利用設備は、他の高周波利用設備に障害をおよぼさないように設置しなければならないことを記述している。

**Article 73.** **電気設備による供給支障の防止**

高圧・中圧電気設備は、その損壊により一般電気事業者の電氣の供給に支障をおよぼさないように施設することを記述している。

## Section 3 公害等の防止

### Article 74. 公害等の防止

水力発電所等は、「カ」国の環境法規に適合することを記述している。

## Chapter 11 水力発電所の電気機械器具

### Section 4 絶縁性能

#### Article 75. 一般電力用変圧器の絶縁性能

一般電力用変圧器の電路の絶縁性能について記述している。

#### Article 76. 交流電路の接続する電気機械器具の絶縁性能

交流電路に接続する電気機械器具の絶縁性能について記述している。

#### Article 77. 直流電路に接続する電気機械器具の絶縁性能

直流電路に接続する電気機械器具の絶縁性能について記述している。

#### Article 78. 回転変流機および整流器の絶縁性能

回転変流機および整流器の絶縁性能について記述している。

### Section 5 熱的強度

#### Article 79. 水車軸受の熱的強度

水車軸受の最高許容温度について記述している。

#### Article 80. 回転機の熱的強度

空気を冷却媒体とする回転機の定格負荷状態における最高許容温度について記述している。

#### Article 81. 一般電力用変圧器の熱的強度

油入変圧器の定格負荷状態における最高許容温度について記述している。

**Article 82.** 交流遮断器の熱的強度

交流遮断器の定格負荷状態における最高許容温度について記述している。

**Article 83.** 断路器の熱的強度

断路器の定格負荷状態における最高許容温度について記述している。

**Article 84.** ガス絶縁開閉装置の熱的強度

ガス絶縁開閉装置の定格負荷状態における最高許容温度について記述している。

**Article 85.** 負荷開閉器の熱的強度

負荷開閉器の定格負荷状態における最高許容温度について記述している。

**Article 86.** 電力ヒューズの熱的強度

電力ヒューズの定格負荷状態における最高許容温度について記述している。

**Article 87.** コンデンサ形計器用変圧器の熱的強度

コンデンサ形計器用変圧器の定格負荷状態における最高許容温度について記述している。

**Article 88.** 計器用変成器の熱的強度

計器用変成器の定格負荷状態における最高許容温度について記述している。

**Article 89.** ブッシングの熱的強度

ブッシングの定格負荷状態における最高許容温度について記述している。

**Article 90.** 金属閉鎖型スイッチギヤおよびコントロールギヤの熱的強度

金属閉鎖型スイッチギヤおよびコントロールギヤの最高許容温度について記述している。

**Article 91.** 母線および接続導体の熱的強度

母線および接続導体の最高許容温度について記述している。

**Article 92.** 電力ケーブルの熱的強度

電力ケーブルの最高許容温度について記述している。

**Section 6** 構造・性能・施設条件等

**Article 93.** 負荷開閉器および断路器の構造・性能・施設条件等

負荷開閉器および断路器の構造・性能・施設条件等について記述している。

**Article 94.** 中性点設備の構造・性能・施設条件等

中性点設備の構造・性能・施設条件等について記述している。

**Article 95.** 避雷器の構造・性能・施設条件等

避雷器の構造・性能・施設条件等について記述している。

**Article 96.** 配電盤および閉鎖配電盤の構造・性能・施設条件等

配電盤および閉鎖配電盤の構造・性能・施設条件等について記述している。

**Article 97.** ガス絶縁機器の構造・性能・施設条件等

ガス絶縁機器の構造・性能・施設条件等について記述している。

**Article 98.** 母線および接続導体の構造・性能・施設条件等

母線および接続導体の構造・性能・施設条件等について記述している。

**Article 99.** 水車の構造・性能・施設条件等

水車の構造・性能・施設条件等について記述している。

**Article 100.** 入口弁の構造・性能等

入口弁の構造・性能等について記述している。

## Chapter 12 諸装置

### Section 7 接地工事

**Article 101.** 接地工事の種類

接地工事の種類および接地抵抗値について記述している。

**Article 102.** 電気機械器具等の接地

電気機械器具等の接地について記述している。

**Article 103.** 接地線の種類

接地線の種類について記述している。

**Article 104.** 接地極および接地線の布設等

接地極の近傍における危険防止・接地線の熱的強度等について記述している。

### Section 8 圧油装置および空気圧縮装置

**Article 105.** 圧油タンクの容量

水車発電機に使用する圧油タンクの容量について記述している。

**Article 106.** 空気タンクの容量

開閉器または遮断器に使用する空気タンクの容量について記述している。

**Article 107.** 圧油装置および空気圧縮装置の耐圧性能

圧油装置および空気圧縮装置の圧力をうける部分の耐圧性能について記述している。

**Article 108.** 圧油装置および空気圧縮装置の安全弁および圧力計

圧油装置および空気圧縮装置に取り付ける安全弁および圧力計について記述している。

**Article 109.** 圧油装置および空気圧縮装置の圧力回復装置

圧油装置および空気圧縮装置に圧力回復装置を設けることについて記述している。

**Section 9** その他

**Article 110.** 巡視通路における保護さく等

取扱者が容易に露出充電部分に触れないよう巡視通路に保護さく等を施設することを記述している。

**Article 111.** 高圧・中圧母線の相表示および接続状態表示装置

高圧・中圧母線の相および接続状態表示を見やすいところに表示することを記述している。

**Article 112.** 小動物侵入防止装置の施設

小動物による事故発生を防ぐために小動物進入防止装置を施設することを記述している。

**Article 113.** 非常用予備電源の施設

停電時に使用する非常用予備電源の施設について記述している。

**Chapter 13** 所内電気設備

**Section 10** 感電・火災等の防止

**Article 114.** 配線の感電または火災の防止

配線について、施設場所の状況および電圧に応じ、感電または火災のおそれがないように施設することを記述している。

**Article 115.** 配線の使用電線

配線に使用する電線は、使用上十分な強度および絶縁性能を有することを記述している。

**Article 116.** 低圧電路の絶縁性能

低圧電路において開閉器または過電流遮断器で区切られる電路の絶縁抵抗値について記述している。

**Article 117.** 所内に施設する電気機械器具の感電・火災等の防止

所内に施設する電気機械器具について、充電部の露出や熱の発生による火災の危険がなく、また、人体への危害を及ぼさないよう施設することを記述している。

**Section 11** 電気設備による他の配線、他の工作物への危険の防止

**Article 118.** 配線による他の配線または工作物への危険の防止

他の配線・工作物に接近または交差して布設される配線は、混触による感電や火災のおそれがないように施設することを記述している。

**Section 12** 異常時の保護対策

**Article 119.** 過電流からの低圧幹線等の保護措置

低圧の幹線には、適切な箇所に開閉器を施設するとともに、過電流を保護するために過電流遮断器を施設することを記述している。

**Article 120.** 電動機の過負荷保護

屋内に施設する電動機には、当該電動機の過電流により火災が発生しないように過電流遮断器等を施設することを記述している。

**Article 121.** 異常時における中圧移動電線および接触電線における電路の遮断

中圧の移動電線および接触電線には、過電流が発生した場合に保護する過電流遮断器を施設することを記述している。

**Section 13** 電氣的・磁氣的障害の防止

**Article 122.** 電気機械器具または接触電線による無線設備への障害の防止

電気機械器具および接触電線は、電波・高周波電流等が発生することによる無線設備への障害をおよぼさないよう施設することを記述している。

## Section 14 特殊場所における施設制限

### Article 123. 粉じんにより絶縁性能等が劣化する場所に施設する電気設備

粉じんの多い場所に施設する電気設備は、絶縁性能等が劣化することによる感電等のおそれがないように施設することを記述している。

### Article 124. 可燃性のガス等により爆発する危険のある場所への電気設備の施設の禁止

可燃性のガス等により爆発の危険のある場所に施設する電気設備は、通常の使用状態において、爆発または火災のおそれがないように施設することを記述している。

### Article 125. 腐食性のある場所への電気設備の施設の禁止

腐食性のある場所への電気設備の施設は、腐食性のガスまたは溶液による絶縁性能等の劣化に伴う感電または火災のおそれがないよう予防措置を講じることを記述している。

### Article 126. 火薬庫内における電気設備の施設の禁止

照明以外の電気設備は、火薬庫内に施設してはいけないことを記述している。

## Chapter 14 電気の供給のための電気設備

### Section 15 感電・火災等の防止

#### Article 127. 電線路の感電または火災の防止

電線路には、施設場所の状況等に応じ、感電または火災のおそれがないように施設することを記述している。

#### Article 128. 架空電線および地中電線の感電の防止

低圧または中圧の架空電線および地中電線は、感電のおそれがないよう使用電圧に応じた絶縁性能を有するケーブルを使用することを記述している。

#### Article 129. 低圧電路の絶縁性能

低圧電路の絶縁抵抗は、使用電圧に対する漏えい電流が最大供給電流の 1/2,000 を超えてはならないことを記述している。



**Article 130.** 発電所等への取扱者以外の者の立入の防止

水力発電所における取扱者以外の者への危険表示および立ち入りの禁止を記述している。

**Article 131.** 架空電線路の支持物の昇塔防止

架空電線路の支持物には、取扱者以外が容易に昇降できないようにすることを記述している。

**Article 132.** 架空電線等の高さ

架空電線等は、接触または誘導作用による感電のおそれがなく、かつ交通に支障を及ぼさない高さに施設することを記述している。

**Article 133.** 他人の電線等の作業者への感電の防止

架空電線路の支持物は、他人の設置した電線路等を貫通して施設してはいけないことを記述している。

**Article 134.** 架空電線路からの静電誘導または電磁誘導による感電の防止

高圧架空電線路は、静電誘導作用により人による感知の、または電磁誘導作用により人体に危害を及ぼすおそれがないよう施設することを記述している。

## **Section 16** 他の電線、他の工作物への危険の防止

**Article 135.** 電線の混触の防止

電線路の電線または電力保安通信線は、他の電路と接近もしくは同一の支持物に施設する場合は、接触・断線等によって生じる混触による感電または火災のおそれがないように施設することを記述している。

**Article 136.** 電線による他の工作物等への危険の防止

電路が他の工作物と接近または交差する場合には、接触・断線等によって生じる感電または火災のおそれがないように施設することを記述している。

**Article 137.** 地中電線等による他の電線および工作物への危険の防止

地中電線は、他の電線等と接近、または交差する場合には、アーク放電等により他の電線を損傷するおそれがないように施設することを記述している。

**Article 138.** 異常電圧による架空電線等への障害の防止

高圧および低圧架空電線を同一支持物に施設する場合は、異常時の高圧の侵入により低圧側の電気設備に障害を与えないよう適切な処置を講じることを記述している。

**Section 17** 支持物の倒壊による危険の防止

**Article 139.** 支持物の倒壊の防止

架空電線路等の支持物の材料および構造は、倒壊のおそれがないように安全なものであることが記述されている。

**Section 18** 高圧ガス等による危険の防止

**Article 140.** ガス絶縁機器等の危険の防止

圧力を受ける部分の材料および構造は最高圧力に対して十分に耐え、安全であること等、ガス絶縁機器等の施設方法を記述している。

**Article 141.** 加圧装置の施設

圧力を受ける部分は最高圧力に対して十分に耐え、安全であること等、圧縮ガスを使用してケーブルに加圧する装置の施設方法について記述している。

**Section 19** 危険な施設の禁止

**Article 142.** 油入開閉器等の施設の制限

絶縁油を使用する開閉器等は、架空電線路の支持物に施設してはならないことを記述している。

**Article 143.** 屋内電路等の施設の禁止

屋内を貫通する電線路、屋側・屋上および地上に施設する電線路は、電気供給を受ける者以外の者の構内に施設してはいけないことを記述している。

**Article 144.** 接続引込線の禁止

高圧および中圧の接続引込線は施設してはいけないことを記述している。

**Article 145.** 電線路のがけへの施設の禁止

電線路はがけに施設してはいけないことを記述している。

**Article 146.** 高圧架空電線路の市街地における施設の禁止

高圧架空電線路は、ケーブルの場合を除き、市街地へは施設してはいけないことを記述している。

**Article 147.** 市街地における高圧電線に添架する電力保安通信線と他の電力保安通信線との接続の禁止

市街地に施設する電力保安通信線は、高圧電線路の支持物に添架された電力保安通信線と接続してはいけないことを記述している。

## Section 20 電氣的・磁氣的障害の防止

**Article 148.** 通信障害の防止

電線路は、無線設備の機能に障害をおよぼす電波を発生するおそれがないように施設することを記述している。

## Section 21 供給支障の防止

**Article 149.** 電気設備等の損傷による供給支障の防止

発電機等は、当該電気機械器具を著しく損壊するおそれがあり、電気の供給に著しい支障を及ぼすおそれがある異常を生じた場合に、自動的にこれらを電路から遮断する装置を施設することを記述している。

**Article 150.** 発電機等の機械的強度

発電機等は、短絡電流により生ずる機械的衝撃に耐えることを記述している。

**Article 151.** 地中電線路の保護

地中電線路は、車両その他の重量物による圧力に耐えるように施設することを記述している。

**Article 152.** 高圧架空電線路の供給支障の防止

高圧架空電線路は、市街地その他人家の密集する地域に施設してはいけないことを記述している。

**Article 153.** **高圧および中圧電線路の避雷器等の施設**

雷電圧による電気設備の損壊を防止するよう避雷器等を施設することを記述している。

**Article 154.** **電力保安通信設備の施設**

発電所等には、電気の供給の支障を防ぎ、保安を確保するために電力保安通信用電話設備を施設することを記述している。

**Article 155.** **災害時における通信の確保**

電力保安通信設備に使用する無線通信用アンテナまたは反射板は、倒壊により通信機能を損なうおそれがないように施設することを記述している。

## **Chapter 15 計測装置および保護装置**

### **Section 22 計測装置**

**Article 156.** **計測装置の施設目的**

電圧計・電流計等の計測装置の施設目的を記述している。

**Article 157.** **水力発電所の計測装置**

圧力計・温度計等、水力発電所に施設する計測装置を記述している。

### **Section 23 保護装置**

**Article 158.** **水車および発電機の保護装置**

水車および発電機の保護装置を施設することを記述している。

**Article 159.** **一般電力用高圧変圧器の保護装置**

一般電力用高圧変圧器に保護装置を施設することを記述している。

**Article 160.** **ガス絶縁開閉装置の保護装置**

ガス絶縁機器において、絶縁ガスの圧力が著しく低下した場合に警報する警報装置を施設することを記述している。

**Article 161.** **電路の地絡保護装置**

高圧および中圧電路には、地絡による事故・災害および波及の防止ために、電路を自動的に遮断する装置を施設することを記述している。

**Article 162.** **高圧架空電線路の保護装置**

高圧架空電路には、地絡および短絡保護装置を施設することを記述している。

**Article 163.** **母線の保護装置**

母線には、地絡および短絡事故に対する保護装置を施設することを記述している。

**Article 164.** **水力発電所の保安警報装置**

遠方制御されている水力発電所には、故障が生じた場合に技術員駐在所または制御所に警報する装置を施設することを記述している。

**Article 165.** **主機運転停止の監視操作装置**

水力発電所には、水車および発電機の状態を監視するための監視操作装置を施設することを記述している。

**Article 166.** **負荷調整装置**

水力発電所には、負荷調整装置を施設することを記述している。

**Article 167.** **変圧器消火設備**

170 kV を超える中性点直接接地電路に接続する変圧器の消火装置は、自動起動とすることを記述している。

## Part-4 審査および検査

### Chapter 16 一般事項

#### **Article 168.** 定義

審査および検査に関する用語のうち特別に使用されたものあるいは重要なものについての定義を記述している。

#### **Article 169.** 目的

審査および検査が水力発電所の建設から運転維持にわたる品質と安全性の確保を目的とすることについて記述している。

#### **Article 170.** 一般事項

発電事業者および許認可権者の責任や審査および検査の特徴について記述している。

### Chapter 17 土木設備や水門鉄管設備に関する審査 および検査

#### Section 1 建設中検査

#### **Article 171.** 一般事項

建設中検査を構成する工事着手時検査、ダム基礎検査および貯水池初期湛水前検査に関する特徴について記述している。

#### **Article 172.** 工事着手時検査の範囲

工事着手時検査の目的および実施に際しての留意点等について記述している。

#### **Article 173.** ダム基礎検査の範囲

ダム基礎検査の目的および実施に際しての留意点等について記述している。

#### **Article 174.** 貯水池初期湛水前検査の範囲

貯水池初期湛水前検査の目的、検査対象および実施に際しての留意点等について記述している。

## Section 2 完成時検査

### Article 175. 一般事項

完成時検査の目的、種類等、一般事項について記述している。

### Article 176. 完成時検査の範囲

完成時検査を構成する「運転前検査」および「運転時検査」の検査対象等について記述している。

## Section 3 定期検査

### Article 177. 一般事項

定期検査の目的、種類等、一般事項について記述している。

### Article 178. 定期検査の範囲

定期検査の方法、検査対象等について記述している。

## Chapter 18 電気設備の試験および検査

### Section 1 一般事項

#### Article 179. 試験および検査

水力発電所の電気設備の試験・検査項目について記述している。

### Section 2 外観検査

#### Article 180. 外観検査

外観検査の目的および検査項目について記述している。

### Section 3 接地抵抗測定

#### Article 181. 接地抵抗の測定方法

接地抵抗の測定方法について記述している。

## Section 4 絶縁抵抗測定

### Article 182. 絶縁抵抗の測定方法

絶縁抵抗の測定方法について記述している。

### Article 183. 絶縁抵抗値

低圧電路・中圧および高圧電路における絶縁抵抗値について記述している。

## Section 5 絶縁耐力試験

### Article 184. 一般電力用変圧器の電路の絶縁耐力試験方法

一般電力用変圧器の絶縁耐力試験方法について記述している。

### Article 185. 電気機械器具の電路の絶縁耐力試験方法

電気機械器具の絶縁耐力試験方法について記述している。

## Section 6 機器動作試験

### Article 186. 水力発電所の機器動作試験

水力発電所の電気機械器具・制御装置および保護装置の動作試験について、試験項目・試験方法および確認方法を記述している。

## Section 7 負荷試験

### Article 187. 負荷試験方法

水力発電所の負荷試験方法について記述している。