

**1<sup>ST</sup> DRAFT OF TERM OF REFERENCE,  
ANNOUNCEMENT AND DETAILS OF MEDIUM COST  
FOR INVITATION TO BID NO. TS12-FRS-03(R)  
SUPPLY OF FAULT RECORDING SYSTEM  
TRANSMISSION SYSTEM EXPANSION PROJECT NO. 12  
EGAT's Fund**

---

The Electricity Generating Authority of Thailand (EGAT) plans to call for proposals for the subject Bid. Any person who has the authorization from the company, firm, joint venture or consortium who supplies or manufactures the equipment required under the subject Bid is allowed to submit a comment against the first draft of the Term of Reference (TOR), the Announcement and the details of medium cost attached herewith.

**How to Comment**

Those who would like to comment shall submit an official letter signed by the authorized person together with the letter of authorization or the power of attorney, and addressed to "Chief, International Procurement Department – Transmission Segment, Procurement and Inventory Management Division".

Comments shall be submitted via EGAT Procurement website or via email address: sunisa.y@egat.co.th with all related documents attached (e.g. the letter of authorization and the power of attorney).

Comments shall be received by EGAT on or before **April 11, 2019**, otherwise the comments will not be taken into consideration:

**EGAT reserves the right to change or not to change the terms and conditions contained in the Term of Reference, the Announcement and the details of medium cost subject to its consideration and such decision shall be final.**

*Sunisa Yaemyoo*

Mrs. Sunisa Yaemyoo

Head, International Buy Section – Transmission System Segment

April 5, 2019



## INVITATION TO BID NO. TS12-FRS-03(R)

### SUPPLY OF FAULT RECORDING SYSTEM TRANSMISSION SYSTEM EXPANSION PROJECT NO. 12

The Electricity Generating Authority of Thailand (EGAT) is calling for the subject Invitation to Bid to be financed by EGAT's fund.

**Place of Delivery** : EGAT's Store at Khlong Mai

**Medium Cost (including Value Added Tax)** : THB 23,500,000.-

#### **Eligibility of Bidders**

1. The Bidder shall be a juristic person who manufactures or provides such materials or services and shall not be named in the List of Work Abandoners published by the Office of Prime Minister and/or in the Debarment List and/or in the List of Work Abandoners declared by EGAT.
2. The Bidder shall not be a Jointly Interested Bidder with other Bidders as from the date of EGAT's issuance of the Invitation, or shall not be a person who undertakes any action as an "Obstruction of Fair Price Competition" for this Invitation.
3. The Bidder shall not either be EGAT's consultant or involve in EGAT's consultancy company under this Invitation to Bid, or shall not have EGAT's personnel involved in his business as shareholder having voting right that can control his business, director, manager, officer, employee, agent, or consultant except those who are officially ordered by EGAT to act or participate therein.
4. The Bidder shall not be the person who is privileged or protected not to be taken any legal proceedings under Thai Court; Provided that such Bidder's government declares that such special privilege is waived.
5. The Bidder who is a joint venture or consortium shall carry out all the work under such formation from the time of bidding until the fulfillment of the Contract.

#### **Availability of Bidding Documents**

Bidding Documents in CD-ROM will be available for examination of Bidder's Qualifications and purchase during 8:00 hrs. to 15:00 hrs., Bangkok Standard Time, as from \_\_\_\_\_ to \_\_\_\_\_ at \_\_\_\_\_ or per copy, non-refundable, at the following address :

International Procurement Department – Transmission Segment  
(Room No. 1202/2, 12<sup>th</sup> Floor, Building Tor. 101)

Procurement and Inventory Management Division

Electricity Generating Authority of Thailand

Bangkruai, Nonthaburi 11130, Thailand

Telephone no. 66 2436 0241

E-mail : procurement.tse@egat.co.th

For more details and downloading Registration Form for purchasing Bidding Documents on website :

<http://www4.egat.co.th/fprocurement/biddingeng/>

Payment can be made by a certified cheque or money order payable to EGAT or by a telegraphic transfer to EGAT's current account no. 109-6-01958-2 (swift code : KRTHTHBK), Krung Thai Bank Public Company Limited, Bangkruai Branch, Nonthaburi. All bank charges and fees incurred by the payment of bidding documents shall be under the buyer's responsibility.

Bidding Documents in CD-ROM will be either airmailed or airfreighted to the buyer at EGAT's expense upon receipt of the relevant remittance. In case the buyer requires the Bidding Documents to be sent by Express Mail Service (EMS), the charge will be at the buyer's expense.

**Delivery of Bids**

Bids shall be submitted at Room No. 1202/1, 12<sup>th</sup> Floor, Building Tor. 101 during 9:30 hrs. to 10:00 hrs., Bangkok Standard Time, \_\_\_\_\_ and will be opened publicly at 10:00 hrs.

ELECTRICITY GENERATING AUTHORITY OF THAILAND

(Date of Announcement)

(Mrs. Nilanate Osotpavapusit)

Chief, International Procurement Department –  
Transmission Segment

DRAFT



ประกาศการไฟฟ้าฝ่ายผลิตแห่งประเทศไทย  
เรื่อง ประกวดราคาซื้อ เลขที่ TS12-FRS-03(R)

การไฟฟ้าฝ่ายผลิตแห่งประเทศไทย (กฟผ.) มีความประสงค์จะซื้อ Fault Recording System ภายใต้โครงการขยายระบบส่งไฟฟ้าระยะที่ 12 โดยใช้งบประมาณ กฟผ.

**สถานที่ส่งมอบ** : คลังพัสดุ กฟผ. คลองใหม่

**ราคากลาง(รวมภาษีมูลค่าเพิ่ม)** : 23,500,000.- บาท

**คุณสมบัติของผู้เสนอราคา**

1. ต้องเป็นนิติบุคคลผู้ผลิตหรือเป็นผู้มีอาชีพขายพัสดุตามประกาศ และต้องไม่เป็นผู้ที่งานซึ่งสำนักนายกรัฐมนตรีได้แจ้งเวียนชื่อไว้ หรือต้องไม่เป็นผู้ที่ กฟผ. ห้ามติดต่อหรือห้ามเข้าเสนอราคา หรือต้องไม่เป็นผู้ที่ได้รับผลของการสั่งให้นิติบุคคลหรือบุคคลอื่นเป็นผู้ทำงานตามคำสั่ง กฟผ.
2. ต้องไม่เป็นผู้มีผลประโยชน์ร่วมกันกับผู้เสนอราคารายอื่น ณ วันประกาศประกวดราคาครั้งนี้เป็นต้นไป หรือต้องไม่เป็นผู้กระทำการอันเป็นการขัดขวางการแข่งขันราคาอย่างเป็นธรรมในการดำเนินการประกวดราคาครั้งนี้
3. ต้องไม่เป็นที่ปรึกษาของ กฟผ. หรือมีส่วนร่วมในบริษัทที่ปรึกษาของ กฟผ. ในงานนี้ หรือต้องไม่มีผู้ปฏิบัติงาน กฟผ. เข้าไปมีส่วนร่วมในกิจการของผู้เสนอราคา ไม่ว่าจะในฐานะผู้ถือหุ้นที่มีสิทธิควบคุมการจัดการ กรรมการ ผู้อำนวยการ ผู้จัดการ พนักงาน ลูกจ้าง ตัวแทนหรือที่ปรึกษา ยกเว้น ในกรณีที่ผู้ปฏิบัติงานได้รับคำสั่งอย่างเป็นทางการจาก กฟผ. ให้ไปปฏิบัติงานหรือเข้าร่วมในกิจการของผู้เสนอราคา
4. ต้องไม่เป็นผู้ได้รับเอกสิทธิ์หรือความคุ้มกัน ซึ่งอาจปฏิเสธไม่ยอมขึ้นศาลไทย เว้นแต่รัฐบาลของผู้เสนอราคาได้มีคำสั่งให้สละสิทธิ์และความคุ้มกันเช่นนั้น
5. ผู้ประสงค์เข้าประกวดราคาในนามของกิจการร่วมค้าหรือกิจการร่วม (Joint Venture or Consortium) จะต้องดำเนินการทุกขั้นตอนของการประกวดราคาในนามของกิจการร่วมค้าหรือกิจการร่วม ตั้งแต่การเสนอราคาจนถึงสุดท้ายผูกพันกับ กฟผ.

**การขายเอกสารประกวดราคา**

ผู้สนใจติดต่อขอทราบรายละเอียด เพื่อตรวจสอบคุณสมบัติของผู้เสนอราคา และขอซื้อเอกสารประกวดราคา ในราคาชุดละ ได้ที่ แผนกจัดซื้อต่างประเทศสายงานระบบส่ง (ห้อง 1202/2 ชั้น 12 อาคาร ท.101) กองจัดซื้อจัดจ้างต่างประเทศสายงานระบบส่ง ฝ่ายจัดซื้อจัดจ้างและบริหารพัสดุ การไฟฟ้าฝ่ายผลิตแห่งประเทศไทย เชียงสะพานพระราม 7 จังหวัดนนทบุรี ในวันทำการระหว่างเวลา 08:00 น. ถึง 15:00 น. ตั้งแต่วันที่ \_\_\_\_\_ ถึงวันที่ \_\_\_\_\_ หรือสอบถามทางโทรศัพท์ หมายเลข 0 2436 0241 หรืออีเมล procurement.tse@egat.co.th ทั้งนี้ สามารถ download แบบฟอร์มลงทะเบียนผู้ซื้อเอกสารประกวดราคาได้ที่เว็บไซต์ <http://www4.egat.co.th/fprocurement/biddingeng/>

**การยื่นซองประกวดราคา**

กำหนดยื่นซองประกวดราคา ในวันที่ \_\_\_\_\_ เวลา 9:30 น. ถึง 10:00 น. และเปิดซองประกวดราคาเวลา 10:00 น. ณ ห้อง 1202/1 ชั้น 12 อาคาร ท.101 การไฟฟ้าฝ่ายผลิตแห่งประเทศไทย เชียงสะพานพระราม 7 จังหวัดนนทบุรี

ประกาศ ณ วันที่ \_\_\_\_\_

(นางนิลเนตร โอสถกาวุชิต)

หัวหน้ากองจัดซื้อจัดจ้างต่างประเทศสายงานระบบส่ง

**ตารางแสดงวงเงินงบประมาณที่ได้รับจัดสรรและราคากลาง(ราคาอ้างอิง)  
ในการจัดซื้อจัดจ้างที่มีใ้ใช้งานก่อสร้าง**

1. **ชื่อโครงการ** ประกวราคาเลขที่ TS12-FRS-03(R)  
งานจัดซื้อ Fault Recording System  
โครงการขยายระบบส่งไฟฟ้าระยะที่ 12  
/หน่วยงานเจ้าของโครงการ ฝ่ายแผนงานและโครงการระบบส่ง การไฟฟ้าฝ่ายผลิตแห่งประเทศไทย
2. **วงเงินงบประมาณที่ได้รับจัดสรร**  
โครงการขยายระบบส่งไฟฟ้าระยะที่ 12 งบประมาณ 60,000 ล้านบาท
3. **วันที่กำหนดราคากลาง** 29 มีนาคม 2562 (วันที่ อวส. อนุมัติ )  
ราคารวมภาษีมูลค่าเพิ่มเป็นเงิน 23,500,000.00 บาท **ราคา/หน่วย** ตามเอกสารแนบ
4. **แหล่งที่มาของราคากลาง** หลักเกณฑ์การกำหนดราคากลางงานจัดซื้อจัดจ้างสายงานพัฒนาระบบส่ง
5. **รายชื่อเจ้าหน้าที่ผู้กำหนดราคากลาง**  
นางสาวจิราภา ทรงธนศักดิ์ หคป-ส. กวป-ส.

**MEDIUM COST FOR BID NO. TS12-FRS-03(R)**  
**SUMMARY OF BID PRICE**  
**SUPPLY OF FAULT RECORDING SYSTEM**  
**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12**

No.	Description	Supply of Equipment
		DDP EGAT 's Store ( excluding VAT ) Baht Amount
1	Schedule 1 : Fault Recording System	22,000,853.00
<b>BID PRICE</b>		<b>Baht</b> <b>22,000,853.00</b>
<b>IMPORT DUTY</b>		<b>Baht</b> <b>XXXXXX</b>
<b>VAT 7%</b>		<b>Baht</b> <b>1,540,059.71</b>
<b>SUMMARY OF BID PRICE</b>		<b>Baht</b> <b>23,540,912.71</b>
<b>SUMMARY OF BID PRICE (ROUNDED)</b>		<b>Baht</b> <b>23,500,000.00</b>

In case Bidder proposes price discount without specifying whether or not it includes Value Added Tax (VAT), EGAT will consider it as the price discount excluding VAT.

(นางสาวกานต์ อรรณพ)

๑๖  
๑๖ มิถุนายน ๒๕๖๒

**MEDIUM COST FOR BID NO. TS12-FRS-03(R)**  
**Schedule 1 : Fault Recording System**  
**SUPPLY OF FAULT RECORDING SYSTEM**  
**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12**

Item No.	Description	Drawing No. / Reference No.	Qty.	Unit	Supply of Equipment	
					DDP EGAT 's Store ( excluding VAT ) Baht	
					Unit Price	Amount
1-1	FAULT RECORDING SYSTEM, 48 ANALOG INPUT, 240 DIGITAL INPUT.	For 500 kV Substation Specification No. 1003 Dwg. Nos. WN-E-1.1 The quantity of analog channels shall be as noted below.	1	SET	2,139,525.00	2,139,525.00
1-2	FAULT RECORDING SYSTEM, 48 ANALOG INPUT, 144 DIGITAL INPUT.	Specification No. 1003 Dwg. Nos. MM4-E-1 The quantity of analog channels shall be as noted below.	1	SET	1,793,336.00	1,793,336.00
1-3	FAULT RECORDING SYSTEM, 48 ANALOG INPUT, 144 DIGITAL INPUT.	Specification No. 1003 Dwg. Nos. PY-E-1.1 & PY-E-1.2 The quantity of analog channels shall be as noted below.	1	SET	1,793,336.00	1,793,336.00
1-4	FAULT RECORDING SYSTEM, 32 ANALOG INPUT, 64 DIGITAL INPUT.	Specification No. 1003 Dwg. Nos. MM3-E-1.3 The quantity of analog channels shall be as noted below.	1	SET	1,372,198.00	1,372,198.00
1-5	FAULT RECORDING SYSTEM, 32 ANALOG INPUT, 64 DIGITAL INPUT.	Specification No. 1003 Dwg. Nos. UD3-E-1.2 The quantity of analog channels shall be as noted below.	1	SET	1,372,198.00	1,372,198.00

**Contract No.**

**Invitation to Bid No. TS12-FRS-03(R)**

---

**ELECTRICITY GENERATING AUTHORITY OF THAILAND**



**BIDDING DOCUMENTS**

**SUPPLY OF FAULT RECORDING SYSTEM**

**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12**

**EGAT'S FUND**

---

**BIDDER :** \_\_\_\_\_

---

(2019)

TC-SUPPLY-02 (Rev.1)  
(Jul.18)



**INVITATION TO BID NO. TS12-FRS-03(R)**  
**SUPPLY OF FAULT RECORDING SYSTEM**  
**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12**  
**EGAT'S FUND**

---

**CONTENTS**

DATA SHEET

SECTION A. INVITATION TO BID

SECTION B. INSTRUCTIONS TO BIDDERS

SECTION C. PROPOSAL

SECTION D. CONTRACT

SECTION E. GENERAL CONDITIONS

SECTION F. SPECIAL CONDITIONS

SECTION G. RATINGS AND FEATURES (None)

SECTION H. BILL OF MATERIALS (None)

SECTION I. SPECIFICATIONS

SECTION J. DRAWINGS

TC-SUPPLY-02 (Rev.1)  
(Jul.18)

## CONTENTS

<u>Article No.</u>	<u>Description</u>	<u>Page</u>
	Confirmation Form	-
	Discount Form	-
	Additional Regulation	1-11
	Data Sheet	i
<b>SECTION A : <u>INVITATION TO BID</u></b>		
A-1	Invitation	A1
A-2	Eligibility of Bidders: General Requirements	A1
A-3	Eligibility of Bidders: Technical Requirements	A2
A-4	Joint Venture or Consortium	A4
A-5	Preparation and Delivery of Bids	A4
A-6	Availability of Bidding Documents	A5
	EGAT Accepted Manufacturer List for Fault Recording System	1
	EGAT Accepted Fault Recording System List	1
<b>SECTION B : <u>INSTRUCTIONS TO BIDDERS</u></b>		
	Overview of the Procurement Process	B1
B-1	Preparation of Bids	B2
B-2	Bid Prices	B3
B-3	Bid Security	B4
B-4	Validity of Bids	B5
B-5	Delivery of Bids	B5

<u>Article No.</u>	<u>Description</u>	<u>Page</u>
B-6	Withdrawal of Bids	B5
B-7	Interpretation of Bidding Documents before Bid Opening	B5
B-8	Information to be Submitted with Bid	B6
B-9	Deviations from Specifications	B7
B-10	Rejection of Bids	B8
B-11	Delivery Time	B8
B-12	Evaluation and Comparison of Bids	B8
B-13	Acceptance of Bids	B9
B-14	Appeal	B9
B-15	Award of Contract	B9
B-16	Bidder's Responsibility	B10
B-17	Supplemental Notices	B10
B-18	Cost of Bidding	B11
B-19	Cancellation of Bid	B11
	Specimen of Bid Security	B12

**SECTION C : PROPOSAL**

C-1	Price Schedule	C1
C-2	Guaranteed Delivery Time	C2
C-3	Drawing and Document Submission Schedule	C2
C-4	Bid Security	C2
C-5	Supplemental Notices	C2

Part 1 : Price Proposal

Project 1-C1

<u>Article No.</u>	<u>Description</u>	<u>Page</u>
	Part 2 : Proposal Data	Part 2-C1
	Part 3 : Delivery Schedule and Distribution List	Part 3-C1

**SECTION D : CONTRACT**

D-1	Contract Documents	D1
D-2	Acceptance of Proposal	D2
D-3	Agreement	D2
D-4	Obligation of Contractor	D2
D-5	Obligation of EGAT	D2
D-6	Mutual Obligations	D3
D-7	Deposit of Performance Security	D3
D-8	Assignment	D3
D-9	Notices	D3
D-10	Integration	D4
D-11	Counterpart	D4

**SECTION E : GENERAL CONDITIONS**

E-1	Definitions	E1
E-2	Intent of Contract Documents	E2
E-3	Applicable Law and Legal Jurisdiction	E3
E-4	Statutory Requirements	E3
E-5	Patents and Copyrights	E3
E-6	Subcontracts	E3
E-7	Export Charges	E4

<u>Article No.</u>	<u>Description</u>	<u>Page</u>
E-8	Customs Clearance, Import Duty and Taxes	E4
E-9	Value Added Tax	E4
E-10	Income and Other Taxes	E5
E-11	Fees and Duties	E5
E-12	Performance Security	E6
E-13	Inspection and Tests	E8
E-14	Preparation for Delivery	E8
E-15	Shipment	E10
E-16	Force Majeure	E10
E-17	Transportation Insurance	E11
E-18	Transfer of Title	E11
E-19	Changes and Extra or Omitted Work	E11
E-20	Termination and Suspension of Contract	E12
E-21	Default and Termination	E12
E-22	Indemnification by the Contractor	E13
E-23	Limitation of Liability	E14
E-24	Consequential Damages	E14
E-25	Vesting of Contract in Receiver	E14
E-26	Extension of Time	E15
E-27	Failure to Meet Requirements	E15
E-28	Operation or Use of Unsatisfactory Equipment	E17
E-29	Dispute Resolution	E17

<u>Article No.</u>	<u>Description</u>	<u>Page</u>
E-30	Language and Numbers	E17
	Specimen of Guarantee	E18
	Instructions for Packaging	E19

**SECTION F : SPECIAL CONDITIONS**

F-1	Scope of Work	F1
F-2	Responsibility of Contractor	F1
F-3	Cooperation with Other Contractors	F1
F-4	Supervision of Installation	F1
F-5	Acceptance Tests	F2
F-6	Failure to Meet Performance Guarantees	F3
F-7	Acceptance Certificate	F3
F-8	Payment	F4
F-9	Liquidated Damages for Late Delivery of Equipment	F5
F-10	Maintenance Guarantee	F6
F-11	Drawings and Documents to be Furnished by Contractor	F8
F-12	Maintenance Security	F10
	Specimen of Maintenance Guarantee	F13
	(For Equipment with Two-Year Guarantee Period)	
	Specimen of Maintenance Guarantee	F14
	(For Equipment with One-Year Guarantee Period)	
	Drawings and Documents to be Furnished by the Contractor	F15
	(For Control and Protection Equipment)	

<u>Article No.</u>	<u>Description</u>	<u>Page</u>
	Drawings and Documents to be Furnished by the Contractor (For Fault Recording System)	F16
	Drawings and Documents to be Furnished by the Contractor (For All Equipment except Control and Protection Equipment and Fault Recording System)	F17
	SECTION G : <u>RATINGS AND FEATURES</u> (None)	
-	-	-
	SECTION H : <u>BILL OF MATERIALS</u> (None)	
-	-	-
	SECTION I : <u>SPECIFICATIONS</u>	
I-1	Specifications	I1
	SECTION J : <u>DRAWINGS</u>	
J-1	Drawings	J1

**CONFIRMATION FORM**

**(INDIVIDUAL COMPANY / JOINT VENTURE)**

**INVITATION TO BID NO. TS12-FRS-03(R)**

**SUPPLY OF FAULT RECORDING SYSTEM**

**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12**

---

By signing in the space provided below, we confirm that:-

- According to “Eligibility of Bidders” and in addition to the Documentary List attached to the bidding documents, we are not a Jointly Interested Bidder with the other bidders as from the date of EGAT’s issuance of the subject Invitation and are not a person who undertakes any actions as an “Obstruction of Fair Price Competition”.
- According to Article B-8 Information to be Submitted with Bid, we confirm
  - Registration with the Revenue Department as a value added tax registrant in Thailand as per certificate of value added tax registration (NW.20) attached.
  - Non-Registration as a value added tax registrant in Thailand, but will register later.
  - Non-Registration as a value added tax registrant in Thailand and will not register.

Confirmed :

.....

By : .....

Title : .....

Date : .....



**CONFIRMATION FORM**

**(CONSORTIUM)**

**INVITATION TO BID NO. TS12-FRS-03(R)**

**SUPPLY OF FAULT RECORDING SYSTEM**

**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12**

---

**Member No. ... of the consortium:**

By signing in the space provided below, we confirm that:-

- According to “Eligibility of Bidders” and in addition to the Documentary List attached to the bidding documents, we are not a Jointly Interested Bidder with the other bidders as from the date of EGAT’s issuance of the subject Invitation and are not a person who undertakes any actions as an “Obstruction of Fair Price Competition”.
- According to Article B-8 Information to be Submitted with Bid, we confirm
  - Registration with the Revenue Department as a value added tax registrant in Thailand as per certificate of value added tax registration (ณว.20) attached.
  - Non-Registration as a value added tax registrant in Thailand, but will register later.
  - Non-Registration as a value added tax registrant in Thailand and will not register.

Confirmed :

.....

By : .....

Title : .....

Date : .....

**DISCOUNT FORM**

**INVITATION TO BID NO. TS12-FRS-03(R)**

**SUPPLY OF FAULT RECORDING SYSTEM**

**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12**

**Bidder :** \_\_\_\_\_

By signing in the space provided below, we confirm that:-

- we offer no discount.
- we offer discount(s) as follows:

Details of discount	Currency	Amount	VAT
			<input type="checkbox"/> included <input type="checkbox"/> excluded
			<input type="checkbox"/> included <input type="checkbox"/> excluded
			<input type="checkbox"/> included <input type="checkbox"/> excluded
			<input type="checkbox"/> included <input type="checkbox"/> excluded

**Remarks :**

- The above discount(s) shall not be subject to any conditions. Discount with conditions shall not be considered.
- This Discount Form, together with Bidder's Summary of Bid Price, will be publicly presented on a screen to all Bidders in the bid opening room at the time of bid opening.

Confirmed by authorized person(s):

.....

By : .....

Title : .....

Date : .....

## Additional Regulation

This Regulation shall apply to the Enquiry, Bid for Supply, Lease, Hire of Work, or Hire of Consultant by Way of Selection.

1. Attachments
  - 1.1 Definitions
    - 1.1.1 Jointly Interested Bidder
    - 1.1.2 Obstruction of Fair Price Competition
  - 1.2 Documentary List
2. Bidder's Qualifications
  - 2.1 The Bidder shall professionally be in the business of providing materials or services or leasing or consultancy services, as the case may be, and shall not be named in the list of work abandoners published by the Office of the Prime Minister, and/or in the debarment list and/or the list of work abandoners declared by EGAT according to Article 5 of this Regulation.
  - 2.2 The Bidder shall not be a Jointly Interested Bidder with other bidders as from the date of EGAT's issuance of the Invitation for Bid/Enquiry or the Invitation Letter/ Terms of Reference for the consultancy services, as the case may be, or shall not be a person who undertakes any action as an "Obstruction of Fair Price Competition" described in Article 1.1 - Definitions.
  - 2.3 The Bidder shall not have EGAT's personnel involve in his business *as shareholder having voting right that can control his business, director, manager, officer, employee, agent or consultant* except for the ones who are officially ordered by EGAT to act or participate therein.
3. Information to be Submitted with Bid

The Bidder shall submit with his bid the documents according to Article 1.2 - Documentary List, including but not limited to, the following documents :-

- 3.1 Where the Bidder is a juristic person :
  - (a) ordinary partnership or limited partnership  
a certified copy of affidavit of incorporation, name list of managing partners, list of persons entrusted with controlling power (if any), as well as a certified copy of registration for value added tax (if any).
  - (b) limited company or public limited company  
a certified copy of affidavit of incorporation, memorandum of association, name list of managing directors, list of persons entrusted with controlling power (if any) and name list of major shareholders, as well as a certified copy of registration for value added tax (if any).



Such certified copy of affidavit of incorporation with the validity of not more than six (6) months from the date of certification to the opening date of Bid/Enquiry or the date of Invitation Letter/Terms of Reference in case of consultancy services, as the case may be, shall certify at least the following information :

- (i) Type of a juristic person : an ordinary partnership, a limited partnership, a limited company, a public limited company,
- (ii) Name according to (i),
- (iii) Number and names of managing partners or managing directors,
- (iv) Number and names of managing partners or managing directors authorized to act on behalf of the company,
- (v) Amount of shareholders' equity or registered capital,
- (vi) Authority of managing partner in case of partnership,
- (vii) Location of head office,
- (viii) Registration purposes,
- (ix) Scope of work indicated in business permit license of a foreign juristic person who registers in Thailand,
- (x) Other documents e.g. changes or additions to the above documents, branches (if any).

3.2 Where the Bidder is a natural person or a group of persons other than a juristic person :

a certified copy of :

- identity card
- partnership agreement or contract (if any)
- partners' identity cards
- registration required by Ministry of Commerce of Thailand
- registration for value added tax (if any)

3.3 Where the Bidder is a joint venture / consortium :

a certified copy of :

- association agreement
- identity card or passport (if non Thai national)  
(The participant in the joint venture or consortium is not a juristic person.)
- all documents specified in *Item 3.1* of Additional Regulation  
(The participant in the joint venture or consortium is a juristic person.)

3.4 Other documentary evidence as required per *Item 3, 6 or 8* of Documentary List (if any).

4. Preliminary Examination

4.1 EGAT shall examine the qualification of all bidders to determine whether any bidder is a Jointly Interested Bidder as from the date of EGAT's issuance of the Invitation for Bid/Enquiry or the Invitation Letter/Terms of Reference for the consultancy services, as the case may be, and/or undertakes any action as an "Obstruction of Fair Price Competition" before or during the bid opening. If there is evidence showing that any bidder is a Jointly Interested Bidder or undertakes any action as an "Obstruction of Fair Price Competition", EGAT shall delete his name from the list of bidders and inform such bidder by written notice hereof.

4.2 The Bidder whose name is deleted according to Article 4.1, may, within *fifteen (15)* calendar days from the date of receipt of EGAT's written notice, appeal to EGAT, explaining reasons together with relevant documents for EGAT's reconsideration.

In case EGAT agrees with the objection of the appellant but considers that the cancellation of enquiry/bidding will be beneficial to EGAT, EGAT may, at its sole discretion, cancel such bid. In the event that the Bidder who undertakes any action as an "Obstruction of Fair Price Competition" does not appeal or, after his appeal, EGAT does not agree with his objection, such Bidder shall be regarded as a work abandoner.

EGAT's decision shall be notified to the appellant in writing and such decision shall be final and conclusive.

5. Reservation of the Right for Proposal and Others

In case any juristic person is regarded as a work abandoner by EGAT and such abandonment is caused by the manager, the managing partner, the managing director, the executive or the person authorized to manage the business of that juristic person, EGAT shall also include his name as a work abandoner.

In case any juristic person is regarded as a work abandoner by EGAT, such decision shall also be applied to other juristic persons of the same business where its manager, managing partner, managing director, executive, or person authorized to manage the business is the same person who is the manager, managing partner, managing director, executive, or person authorized to manage the business of the juristic person who is regarded as a work abandoner by EGAT as aforesaid.

In case any natural person is regarded as a work abandoner by EGAT, such decision shall also be applied to other juristic persons who submit the proposal and have such natural person as the manager, managing partner, managing director, executive or person authorized to manage the business of such juristic persons

## 1.1 Definitions

These definitions shall apply to the Enquiry, Bid for Supply, Lease, Hire or Work, or Hire of Consultant by Way of Selection.

1.1.1 **“Jointly Interested Bidder”** means a natural person or juristic person who submits bid to EGAT for the supply of goods, lease, hire of work, or hire of consultant by way of selection, as the case may be, and who has an interest, either directly or indirectly, in the business of another natural person or juristic person whose bid is also submitted to EGAT in this bidding.

The interest, either direct or indirect, in another natural person or juristic person as aforesaid includes the relationship in the following manners :

- (1) Management relationship, whereby the manager, the managing partner, the managing director, the executive or the person authorized to manage the business of a natural person or a juristic person has the power, or is able to exercise the power, in managing the business of the other one or more natural persons or juristic persons whose bids are also submitted to EGAT in this bidding.
- (2) Capital relationship, whereby a partner in an ordinary partnership or a partner with unlimited liability in a limited partnership or a major shareholder in a limited company or a public limited company is a partner in the other one or more ordinary partnerships or limited partnerships, or is a major shareholder in the other one or more limited companies or public limited companies whose bids are also submitted to EGAT in this bidding.
- (3) Cross relationship between (1) and (2), whereby the manager, managing partner, managing director, executive or person authorized to manage the business of a natural person or juristic person is a partner in the other one or more ordinary partnerships or limited partnerships, or is major shareholder in the other one or more limited companies or public limited companies whose bids are also submitted to EGAT in this bidding, or *vice versa*.

**“Major shareholder”** means a shareholder who holds more than twenty five (25) percent of stake in such an enterprise or at another percentage determined by the Governor as he deems expedient for some types or sizes of enterprises.

Holding of position, being a partner or shareholding as aforesaid by the spouse or minor of the person in (1), (2) or (3) shall be deemed the holding of position, being a partner or shareholding by such person.

If any bidder uses the name of another person as the manager, managing partner, managing director, executive, partner or shareholder, but in which case he himself in fact exercises the power in management or he himself is the real partner or shareholder of the partnership or limited company or public limited company, as the case may be, and the related partnership or limited company or public limited company whose bid is also submitted to EGAT in this bidding, that bidder shall be deemed to have a relationship under (1), (2) or (3), as the case may be.

1.1.2 ***“Obstruction of Fair Price Competition”*** means any act committed by a bidder or bidders causing hindrance or obstruction or impeding the opportunity for fair price competition in the tendering of bid to EGAT, whether done by collusion, or by granting, requesting, or agreeing to grant, demand, accept or agreeing to accept money or property or other benefit or by committing an act of violence or by threatening to commit an act of violence or presenting a false document or doing any act in bad faith, with the objective of acquiring benefit among the other bidders or in order to give benefit to any specific bidder so that such person will be entitled to enter into a contract with EGAT or in order to avoid fair price competition, or in order to take advantage of EGAT which not being usual business practices.

DRAFT

1.2 Documentary List

This documentary list shall apply to the Enquiry, Bid for Supply, Lease, Hire of Work, or Hire of Consultant by Way of Selection.

		No. of page(s)	For EGAT only	
<b><u>Thai National Bidder</u></b>				
[ ]	1. Where the Bidder is a natural person or a group of persons other than a juristic person			
( )	(a) Natural Person		Yes	No
	- Certified copy of identity card .....		<input type="checkbox"/>	<input type="checkbox"/>
( )	(b) Group of persons			
	- Certified copy of partnership agreement or contract (if any) .....		<input type="checkbox"/>	<input type="checkbox"/>
	- Certified copy of identity card(s) of partners or related documents according to <i>Item 2 (a) and (b)</i> of each participant of the group .....		<input type="checkbox"/>	<input type="checkbox"/>
[ ]	2. Where the Bidder is a juristic person			
( )	(a) Ordinary partnership or limited partnership			
	- Certified copy of affidavit of incorporation .....		<input type="checkbox"/>	<input type="checkbox"/>
	- Name list of managing partners and list of persons entrusted with controlling power (if any) (Please fill in the form on page 10.) .....		<input type="checkbox"/>	<input type="checkbox"/>
( )	(b) Limited company or public limited company			
	- Certified copy of affidavit of incorporation .....		<input type="checkbox"/>	<input type="checkbox"/>
	- Memorandum of Association .....		<input type="checkbox"/>	<input type="checkbox"/>
	- Name list of managing directors and list of persons entrusted with controlling power (if any) (Please fill in the form on page 10.) .....		<input type="checkbox"/>	<input type="checkbox"/>
	- Name list of major shareholders (Please fill in the form on page 11.) .....		<input type="checkbox"/>	<input type="checkbox"/>
[ ]	3. Other documents (if any)			
( )	Certified copy of any other registration required by Ministry of Commerce of Thailand .....		<input type="checkbox"/>	<input type="checkbox"/>
( )	Certified copy of registration for value added tax .....		<input type="checkbox"/>	<input type="checkbox"/>
( )	.....		<input type="checkbox"/>	<input type="checkbox"/>
( )	.....		<input type="checkbox"/>	<input type="checkbox"/>
( )	.....		<input type="checkbox"/>	<input type="checkbox"/>



**Non-Thai National Bidder**

		No. of page(s)	For EGAT only	
			Yes	No
[ ]	4. Where the Bidder is a natural person or a group of persons other than a juristic person			
( )	(a) Natural Person			
	- Certified copy of passport	.....	<input type="checkbox"/>	<input type="checkbox"/>
( )	(b) Group of persons			
	- Certified copy of partnership agreement or contract (if any)	.....	<input type="checkbox"/>	<input type="checkbox"/>
	- Certified copy of passport of partners or related documents according to <i>Item 5</i> of each participant of the group	.....	<input type="checkbox"/>	<input type="checkbox"/>
[ ]	5. Where the Bidder is a juristic person			
	- Certified copy of affidavit of incorporation	.....	<input type="checkbox"/>	<input type="checkbox"/>
	- Name list of managing partners, directors, etc., as the case may be, and list of persons entrusted with controlling power (if any)	.....	<input type="checkbox"/>	<input type="checkbox"/>
	- Memorandum of Association (if any) (Please fill in the form on page 10.)	.....	<input type="checkbox"/>	<input type="checkbox"/>
	- Name list of major shareholders (if any) (Please fill in the form on page 11.)	.....	<input type="checkbox"/>	<input type="checkbox"/>
[ ]	6. Other documents (if any)			
( )	.....	.....	<input type="checkbox"/>	<input type="checkbox"/>
( )	.....	.....	<input type="checkbox"/>	<input type="checkbox"/>
( )	.....	.....	<input type="checkbox"/>	<input type="checkbox"/>
( )	.....	.....		
( )	.....	.....		

~

**Thai and Non-Thai National Bidder**

	No. of page(s)	For EGAT only	
		Yes	No
[ ] 7. Where the Bidder is a joint venture / consortium			
- Certified copy of association agreement	.....	<input type="checkbox"/>	<input type="checkbox"/>
( ) (a) If participant of a joint venture / consortium is not a juristic person			
(i) Thai national			
- Certified copy of identity card	.....	<input type="checkbox"/>	<input type="checkbox"/>
(ii) Non-Thai national			
- Certified copy of passport	.....	<input type="checkbox"/>	<input type="checkbox"/>
( ) (b) If participant of a joint venture / consortium is a Thai-national juristic person			
( ) (i) Ordinary partnership or limited partnership			
- Certified copy of affidavit of incorporation	.....	<input type="checkbox"/>	<input type="checkbox"/>
- Name list of managing partners, and list of persons entrusted with controlling power (if any) (Please fill in the form on page 10.)	.....	<input type="checkbox"/>	<input type="checkbox"/>
( ) (ii) Limited company or public limited company			
- Certified copy of affidavit of incorporation	.....	<input type="checkbox"/>	<input type="checkbox"/>
- Memorandum of Association	.....	<input type="checkbox"/>	<input type="checkbox"/>
- Name list of managing directors, and list of persons entrusted with controlling power (if any) (Please fill in the form on page 10.)	.....	<input type="checkbox"/>	<input type="checkbox"/>
- Name list of major shareholders (Please fill in the form on page 11.)	.....	<input type="checkbox"/>	<input type="checkbox"/>

	No. of page(s)	For EGAT only	
		Yes	No
( ) (c) If participant of a joint venture / consortium is a Non-Thai national juristic person			
- Certified copy of affidavit of incorporation	.....	<input type="checkbox"/>	<input type="checkbox"/>
- Name list of managing partners, directors, etc., as the case may be, and list of persons entrusted with controlling power (if any) (Please fill in the form on page 10.)	.....	<input type="checkbox"/>	<input type="checkbox"/>
- Memorandum of Association (if any)	.....	<input type="checkbox"/>	<input type="checkbox"/>
- Name list of major shareholders (if any) (Please fill in the form on page 11.)	.....	<input type="checkbox"/>	<input type="checkbox"/>
[ ] 8. Other documents (if any)			
( ) Certified copy of any other registration required by Ministry of Commerce of Thailand	.....	<input type="checkbox"/>	<input type="checkbox"/>
( ) Certified copy of registration for value added tax in Thailand	.....	<input type="checkbox"/>	<input type="checkbox"/>
( ) .....	.....	<input type="checkbox"/>	<input type="checkbox"/>
( ) .....	.....	<input type="checkbox"/>	<input type="checkbox"/>
( ) .....	.....	<input type="checkbox"/>	<input type="checkbox"/>

We hereby confirm that all documents detailed above are true and correct.

Signed \_\_\_\_\_  
(Name of Bidder)

stamp company seal (if any)

**List of Names of Manager / Managing Partner / Managing Director / Executive /  
Person Who Is Authorized to Manage the Business  
(Relationship in Management)  
Bidder shall fill in and submit this form with his bid**

Enquiry / Bid No : ..... Enquiry / Bid Opening Date : .....  
Name of Company / Partnership / Juristic Person : .....

No.	Name – Surname	Position	Name – Surname of Spouse	Name – Surname of Minor

We hereby confirm that all documents submitted are true and correct.

Signed \_\_\_\_\_  
(Name of Bidder)

Stamp company seal (if any)

**Remarks**

1. The unused wordings shall be struck out.
2. Duplicate this page as necessary.

List of Partner in Ordinary Partnership / Partner with Unlimited Liability in Limited Partnership /  
Major Shareholder in Limited Company or Public Limited Company  
(Relationship in Capital)

Bidder shall fill in and submit this form with his bid

Enquiry / Bid No. : ..... Enquiry / Bid Opening Date : .....

Name of Company / Partnership / Juristic Person : .....

Registered Capital : (currency) ..... Number of Share : ..... Price per Share : (currency) .....

No.	Name - Surname	Position	Number of Share (%) or Amount of Shareholder's Equity	Name – Surname of Spouse	Number of Share (%) or Amount of Shareholder's Equity	Name – Surname of Minor	Number of Share (%) or Amount of Shareholder's Equity

We hereby confirm that all documents submitted are true and correct.

Signed \_\_\_\_\_

(Name of Bidder)

Stamp company seal (if any)

**Remarks**

1. The unused wordings shall be struck out.
2. "Major Shareholder" means a shareholder who holds more than twenty-five (25) per cent of stake in an enterprise. The shareholding of spouse or minor of a person shall be regarded as being the shareholding of such person. In case of no major shareholder, please specify "No major shareholder" in the tabulation above.
3. Duplicate this page as necessary.
4. The Bidder shall submit List of Names of Manager/ Managing Partner/ Managing Director/ Executive/ Person Who Is Authorized to Manage the Business (Relationship in Management)/ and List of Partner in Ordinary Partnership/ Partner with Unlimited Liability in Limited Partnership/ Major Shareholder in Limited Company or Public Limited Company (Relationship in Capital) of the Bidder as per page 10-11 of this Additional Regulation.

In case that any Major Shareholder(s) of the Bidder is (are) juristic person(s), and such juristic person(s) has (have) Major Shareholder(s) who is (are) juristic person(s), the Bidder shall submit the list of the Major Shareholder(s)/ the Names of Manager/ Managing Partner/ Managing Director/ Executive/ Person Who Is Authorized to Manage the Business/ Partner/ Partner with Unlimited Liability/ of such juristic person(s) as per page 10-11 of this Additional Regulation. The requirement of submission of list of the Major Shareholder(s)/ the Names of Manager/ Managing Partner/ Managing Director/ Executive/ Person Who Is Authorized to Manage the Business/ Partner/ Partner with Unlimited Liability/ of such juristic person(s) shall apply to 2 tiers of Major Shareholder(s) who is(are) juristic person(s).

**DRAFT**

**DATA SHEET**

TC-SUPPLY-02 (Rev.1)  
(Jul.18)

# DATA SHEET

for

## Invitation to Bid No. TS12-FRS-03(R)

---

This section consists of provisions that are specific to each procurement and supplement the information or requirements included in bidding documents.

### **Article B-3. Bid Security**

The amount of bid security shall be THB 1,175,000.-.

### **Article B-4. Validity of Bids**

The validity of the bid shall be for one hundred and twenty (120) Days from the date specified for opening of bid.

### **Article B-12. Evaluation and Comparison of Bids:**

The evaluation of bid prices shall be on schedule basis.

### **Article F-9. Liquidated Damages for Late Delivery of Equipment**

The Liquidated Damages shall be at the rate of one-tenth of one (0.10) per cent of the price of each complete item of Equipment not timely delivered for each Day of delay. This sum is payable regardless of the actual loss and/or damages incurred, provided that the total claim of liquidated damages shall not exceed ten (10) per cent of the Contract Price of such delayed Item.

**DRAFT**

**SECTION A  
INVITATION TO BID**



**INVITATION TO BID NO. TS12-FRS-03(R)**  
**SUPPLY OF FAULT RECORDING SYSTEM**  
**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12**

---

**A-1. Invitation**

The Electricity Generating Authority of Thailand (EGAT) hereby invites sealed bids for furnishing and delivering of Fault Recording System under Transmission System Expansion Project No.12 hereinafter called Equipment in accordance with the terms, conditions and Specifications described in these Bidding Documents.

**A-2. Eligibility of Bidders: General Requirements**

All Bidders shall meet the following requirements; failure to so comply shall constitute sufficient ground for rejection.

- a. The Bidder shall be a partnership, firm or company, either alone or in joint venture or in consortium.
- b. The Bidder shall be a purchaser of the bidding documents from EGAT. For a joint venture or consortium, only one (1) member of the joint venture or consortium is required to purchase the bidding documents.

In the case where the Bidder is not the purchaser of the bidding documents, the purchaser shall notify EGAT of the name of the Bidder in writing prior to the bid opening.

- c. The Bidder shall be well-established and maintain a permanent place of business. For a joint venture or consortium, all members of the joint venture or consortium are required to meet this qualification.
- d. The Bidder shall not be named in the List of Work Abandoners published by the Office of the Prime Minister and/or in the Debarment List and/or in the List of Work Abandoners declared by EGAT.
- e. For the Bidder who changes name before submitting the bid, his experience records in previous name shall be considered as the experience records of the Bidder.

- f. The Bidder shall not be a Jointly Interested Bidder with other Bidders as from the date of EGAT's issuance of this invitation to bid, or shall not be a person who undertakes any action as an "Obstruction of Fair Price Competition" as defined in Additional Regulation for this invitation.
- g. The Bidder shall not either be EGAT's consultant or involve in EGAT's consultancy company under this invitation, or have EGAT's personnel involved in his business as shareholder having voting right that can control his business, director, manager, officer, employee, agent or consultant except the ones who are officially ordered by EGAT to act or participate therein.
- h. The Bidder shall not be the person who is privileged or protected not to be taken any legal proceeding under Thai court; provided that such Bidder's government declares that such special privilege is waived.
- i. In case of a joint venture or consortium, the Bidder shall carry out all the provision of the Equipment and all Work under such formation from the time of bidding until the fulfillment of the Contract and the parties to the joint venture or the consortium shall accept joint and several liability for performing all obligations under the bid and the Contract.
- j. The Bidder shall not propose to supply the Equipment from the country under the state of war whether declared or not.
- k. The Bidder shall have adequate fund to meet financial obligations incidental to this Contract.
- l. The Bidder shall submit documentary evidence established in accordance with Article B-8. Information to be Submitted with Bid to demonstrate the Bidder's sufficient eligibility to bid and qualification to perform the Contract.

**A-3. Eligibility of Bidders: Technical Requirements**

**All Bidders shall meet the following requirements; failure to so comply shall constitute sufficient ground for rejection.**

- a. The Bidder shall manufacture or supply the Equipment or Work as required under this invitation to bid.
- b. If the Bidder is a new company formed by acquisition of or merger with other companies or business units before submitting the Bid, the experience records of any of such previous companies or business units that meet the requirements set forth herein are acceptable as the experience records of the Bidder.

Reference records of either the parent or affiliated companies shall not be considered as the record of such Bidder.

- c. The Bidder shall have no just or proper claims pending against him with respect to breach in the performance of Contract on other similar works awarded by EGAT.

If the Bidder is a new company formed by acquisition of or merger with other companies or business units, the pending claim of any of such previous companies or business units shall be considered as pending claim of the Bidder.

- d. The Bidder shall have sufficient capacity to carry out the Work.
- e. The Bidder shall propose the Fault Recording System (FRS) cabinet manufactured by the qualified manufacturers who shall fulfill the following requirements:

- 1. Being well-established and maintaining a permanent place of business.

- 2. Having one of the following qualifications:

- 2.1 The cabinet and all Equipment are completely wired by the FRS manufacturer before shipping to Thailand.

OR

- 2.2 The cabinet and the Equipment are wired in Thailand by the local cabinet manufacturer who has one of the following qualifications:

- 2.2.1 Having supply records of successful manufacturing/operation/use of at least three (3) units of the FRS cabinet in EGAT's Transmission System for at least three (3) consecutive years. The characteristics of the said FRS cabinets shall be as specified in "Specification No. 1003: Fault Recording System".

OR

- 2.2.2 Having a letter of acceptance for manufacturing of Control and Protection Boards and/or fabrication of the specific Equipment issued by EGAT within the scope specified therein.

The design and engineering shall be performed by the FRS manufacturer. The assembly, factory test and commissioning shall be in accordance with the FRS manufacturer's standard and shall be performed under the FRS manufacturer's supervisor.

- 3. If the manufacturer is a new company formed by acquisition of or merger with other companies or business units, and any of such previous companies or business units has the experience records that meet the requirements set forth herein, such experience records are acceptable as the experience records of the new company.
- 4. Having no just or proper claims pending against Equipment on other similar works.

In case the manufacturer is a new company formed by acquisition of or merger with other companies or business units, the pending claim of any of such previous companies or business units shall be considered as pending claim of the manufacturer.

- f. The proposed FRS shall be the product from the manufacturers as listed in EGAT ACCEPTED MANUFACTURER LIST FOR FAULT RECORDING SYSTEM which is attached at the end of Section A. Invitation to Bid and shall be in compliance with the details specified in EGAT's Specifications.
- g. Type/model of the proposed FRS shall be as specified in EGAT ACCEPTED FAULT RECORDING SYSTEM LIST which is attached at the end of Section A. Invitation to Bid.

**A-4. Joint Venture or Consortium**

In the event that the successful Bidder is a joint venture or a consortium formed of two or more companies, EGAT requires that the parties to the joint venture or the consortium accept joint and several liability for all obligations under the Contract.

**A-5. Preparation and Delivery of Bids**

Bids shall be prepared in accordance with the Instructions to Bidders contained in the Bidding Documents in one (1) original and three (3) hard copies in English, on the bid forms included for this purpose and shall be accompanied with a bid security as required under the Article pertaining to Bid Security in Section B. Instructions to Bidders. The bid security will be placed in a separate sealed envelope.

The envelope of the bids will be marked in capital letters in the lower left-hand corner as follows :

**INVITATION TO BID NO. TS12-FRS-03(R)  
SUPPLY OF FAULT RECORDING SYSTEM  
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12**

and shall be addressed and delivered to :

***International Procurement Department - Transmission Segment  
Procurement and Inventory Management Division  
Electricity Generating Authority of Thailand  
Bangkrui, Nonthaburi 11130  
Thailand***

on or before 10:00 a.m., Bangkok Standard Time, see Tentative Schedule

If the envelope(s) is not sealed, marked and addressed as required above, EGAT will assume no responsibility for the bid misplacement or premature opening.

Bids will be opened publicly at Room No. 1202/1, 12<sup>th</sup> floor, Building TOR 101 and at the time specified above.

Bids received after the time stipulated herein shall be rejected and returned unopened.

**A-6. Availability of Bidding Documents**

The Bidding Documents in CD-ROM are available for examination and can be obtained from EGAT at the hereunder address upon payment to EGAT, non-refundable, in the amount of USD 16.- or Baht 500.-. These prices include the value added tax.

*International Procurement Department - Transmission Segment*  
*Procurement and Inventory Management Division*  
Electricity Generating Authority of Thailand  
Bangkruai, Nonthaburi 11130  
Thailand

**EGAT ACCEPTED MANUFACTURER LIST FOR FAULT RECORDING SYSTEM**

<b>Description</b>	<b>Manufacturer / Country</b>
Fault Recording System	Qualitrol / UK
	Siemens / Germany
	Rochester / USA
	GE / USA
	ERL Phase / Canada

DRAFT

tse  
เอกสารควบคุม

1.1

**EGAT ACCEPTED FAULT RECORDING SYSTEM LIST**

<b>Accepted Type/Model</b>	<b>Manufacturer</b>
IDM+	QUALITROL
M871	GE
7KE85	SIEMENS
TESLA 4000	ERL Phase
TR2100	Rochester (RIS)

**Note**

- The procedures for being listed in EGAT ACCEPTED FAULT RECORDING SYSTEM LIST can be obtained from Transmission System Engineering Division.
- If any type of FRS in the list is planned not to be manufactured, the manufacturer or the representative is responsible for informing EGAT at least 1 year before it is obsolete.

DRAFT

*M.U.*

1se  
เอกสารควบคุม

DRAFT

**SECTION B**  
**INSTRUCTIONS TO BIDDERS**



## INSTRUCTIONS TO BIDDERS

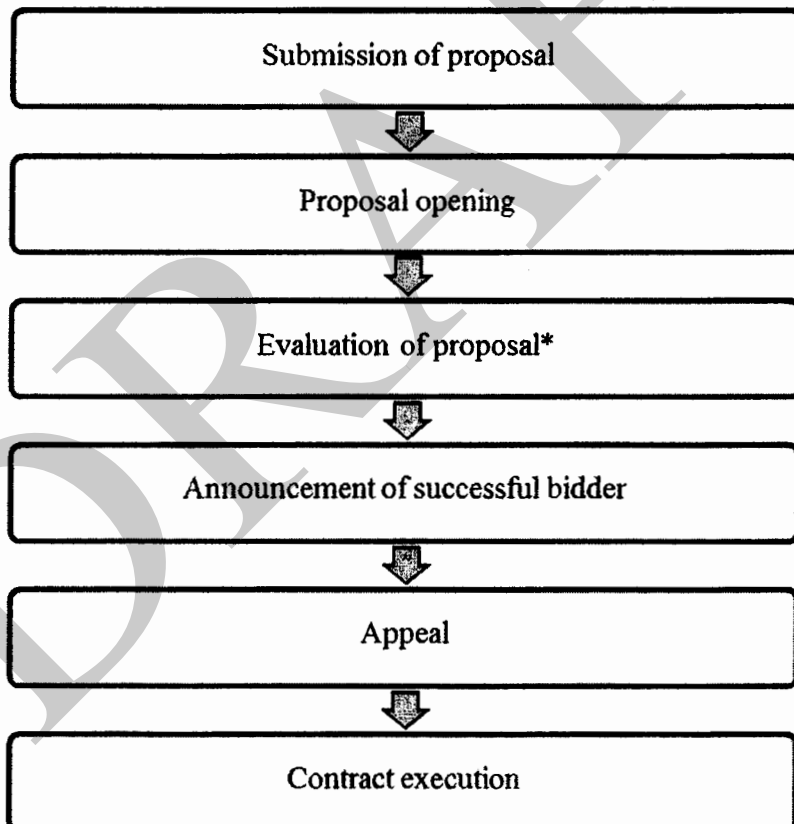
### Overview of the Procurement Process

In compliance with the Office of the Prime Minister's Regulations of e-Government Procurement B.E.2549, bid prices and the Contract Price shall include value added tax (VAT) imposed under the law of Thailand. The medium cost announced by EGAT is inclusive of VAT and other relevant expenses.

The amounts of performance security, maintenance security, and liquidated damages shall also be based on the Contract Price which is inclusive of VAT (if any).

For evaluation and comparison of Bids, the bid price shall be evaluated according to the conditions specified in the bidding document.

The procurement process is summarized in the following diagram.



#### \*Remarks

1. The Bidder shall be deemed to have carefully examined all of the terms, conditions and Specifications of the Bidding Documents.
2. EGAT will take into consideration the conformity of the bid to the requirements of the Bidding Documents as well as the suitability for the purpose intended.
3. EGAT will not be bound to accept the bid with the lowest indicated cost. EGAT reserves the right to accept the bid which in its judgement is the lowest evaluated bid.

**B-1. Preparation of Bids**

- a. Bids shall be prepared in English, in one (1) original and three (3) hard copies, clearly marked each "Original" and "Copy", and submitted at the place and time specified for receipt of bids.

In the event of any discrepancy between the Original and the Copy, the Original shall govern.

For price quotation, Bidder must fill bid prices in an excel file of Price Schedules contained in the Bidding Documents and submit one (1) original and three (3) hard copies together with the excel file to EGAT at the same time of bid submission.

Pursuant to the Office of the Prime Minister's Regulations of e-Government Procurement B.E.2549, VAT at the prevailing rate shall be filled automatically in the Summary of Bid Price of the price schedule in the Excel file subject to Article B-2. Bid Prices.

However, in case Bidder is a consortium formed of two or more companies, Bidder must also submit one (1) original hard copy including an excel file of price schedules of the Work performed by each member of the consortium in addition to hard copies and excel file of the total bid price as specified above.

If any discrepancy between the bid prices of the Work performed by each member of the consortium and the bid prices of the Bidder occurs, the bid prices of the Bidder shall govern and the bid prices of the Work performed by each member of the consortium shall be adjusted accordingly.

*In the event of discrepancy between the original hard copy and the Excel file submitted, the original hard copy shall govern.*

- b. Bidder shall not submit more than two (2) proposals and the proposal(s) to be submitted shall conform to the specifications. In case of any deviation from the specifications, Bidder shall follow the provisions under Article B-9. Deviations from Specifications.
- c. The "Original" and "Copy" shall be prepared on the bid forms included and made a part of the Bidding Documents, which shall be submitted with all applicable blanks in the bid forms properly filled in, and shall be manually signed in ink by a person or persons duly authorized. The letter of authorization shall be indicated by written power-of-attorney accompanying the bid.

All pages of the bid, except for unamended printed literature, shall be initialled by the person or persons signing the bid.

- d. The bid shall contain no interlineations, erasures or overwriting except as necessary to correct errors made by the Bidder, in which case such corrections shall be initialled by the person or persons signing the bid.
- e. Modification by letter or facsimile of bids already submitted will be considered if received prior to the time fixed for the receipt of bids. Confirmation by letter of any modification by facsimile should be sent to EGAT evidencing by post mark not later than the deadline for submission of Bids.
- f. No Bidder will be permitted to alter his bid after the bids have been opened, but clarifications not changing the substance of the bid therein may be accepted.
- g. Bidder may quote for any schedule or all schedules as called for, but shall quote for all items of the schedule (s) proposed. Consideration will be made as stipulated in Article B-12. Evaluation and Comparison of Bids.
- h. Any price discount to be offered shall be clearly stated in the Discount Form accompanied with the Bid to be submitted on the bid opening date specified herein.

## **B-2. Bid Prices**

### Currency

Bid prices for filled-in Price Schedules shall be firm and expressed and payable in Thai baht.

### Source of Supply and Service

- a. Prices for Equipment manufactured in Thailand or manufactured outside Thailand (imported Equipment) shall be firm and stated in Thai baht on DDP EGAT's store at the place of destination as specified. Any import duty and taxes (value added tax included) to be assessed by the Government of Thailand at the port of entry on importation of raw material or components for Equipment manufactured in Thailand or on importation of foreign Equipment shall be included in these prices.
- b. Prices for services including cost of installation supervisor (if any) shall be firm.

### Price Schedule

The Bidder shall enter a unit price, an amount, or a lump sum price, as required, for every item listed in the price schedule. If the unit price as entered does not conform to the amount entered for the same item, the unit price shall govern. If the sum of the amount entered for individual items does not conform to the total amount entered for these amounts under total bid prices, then the sum of the amount entered for the individual items shall govern.

Where quantity and total price only are required, the unit price shall be taken as the stated total price divided by the quantity specified.

VAT at the prevailing rate shall be filled automatically in the Summary of Bid Price of the price schedule in the Excel file. However, the Contract Price shall include VAT only for the portion of Work which is subject to VAT.

**B-3. Bid Security**

The original of the bid submitted shall be accompanied with a bid security in the form of a cash deposit or a certified cheque issued by a local bank, *or a cashier cheque issued by a local bank*, or a bank guarantee or a letter of guarantee issued only by a local bank or an acceptable financial institution in Thailand, or by a foreign bank counter-guaranteed by a local bank as primary obligor.

The bid security shall be in a form as per specimen attached or in any other form with essential content in accordance with the specimen, and made payable to EGAT in the amount as specified in Data Sheet. Any bid not being accompanied with bid security shall be rejected. The bid security shall remain in force up to and including ninety (90) Days after the expiry date of the bid validity.

The bid security shall be forfeited in favor of EGAT if :

- a. The Bidder withdraws his bid after the bid is opened; or
- b. The successful Bidder fails for any reason to execute the Contract or to furnish a performance security.

The Bidder may, upon EGAT's request to extend the bid security when it has expired, refuse to do so without forfeiting the bid security. A Bidder granting the request will be neither required nor permitted to modify his bids.

The bid security of unsuccessful Bidder(s) will be returned as decided by EGAT or within thirty (30) Days following EGAT's acceptance of the successful Bidder.

The bid security of the successful Bidder will be returned upon execution of the Contract and after the performance security furnished has been accepted by EGAT.

**B-4. Validity of Bids**

The validity of the bid shall be as specified in Data Sheet.

In the event EGAT requires the validity period to be extended, EGAT may in writing or by facsimile so notify the Bidders at least fourteen (14) Days prior to the expiry date of the validity period, in which event any Bidder not agreeing to such request for extension may withdraw his bid by so advising EGAT in writing or by facsimile prior to the expiry date of the original validity period. If the advice of withdrawal shall not have been received by EGAT prior to the said date, the extension shall be deemed to have been accepted by the Bidder, and the Bidder shall be required to extend the effective period of the bid security accordingly.

**B-5. Delivery of Bids**

Where bids are submitted by mail, the hour and date of receipt of the bid will be taken as that certified by EGAT. For all bids delivered directly, a receipt will be furnished to the Bidder indicating the place, hour, and date of delivery. Late bids will be returned unopened.

**B-6. Withdrawal of Bids**

Bids may be withdrawn only on written requests which are received by EGAT prior to the time fixed for the receipt of the bids. Negligence on the part of the Bidder in preparing his bid confers no right for the withdrawal of the bid after it has been opened. Whenever a bid has been withdrawn, it will be returned unopened to the Bidder.

**B-7. Interpretation of Bidding Documents before Bid Opening**

If a prospective Bidder is in doubt about the true meaning of any part of the Bidding Documents, the Bidder may submit to EGAT a written request for a reply or an interpretation; provided that sufficient time is allowed for a reply to reach the prospective Bidder prior to the date specified for bid opening. An interpretation will be given in the form of a Supplemental Notice furnished to all prospective Bidders. Receipt of all Supplemental Notices shall be acknowledged by each prospective Bidder on the Proposal. Oral interpretation of the Bidding Documents will not be binding.

**B-8. Information to be Submitted with Bid**

Each Bidder shall submit with his bid the following documents, data and information in English language in addition to any other information called for elsewhere in the Bidding Documents in order to enable EGAT to fully evaluate the Proposal of the Bidder :

- a. Name of manufacturer and country of origin and type or model of Equipment he proposes to furnish.
- b. Data, drawings, catalogue and descriptive materials which will show equipment arrangement, general dimensions, principles of operation, extent of factory assembly, and the materials from which parts are made.
- c. Sufficient references describing the technical experience of the manufacturers, including lists of the Equipment supplied and installed overseas. If possible, certificates issued by the user and/or consulting engineers supporting the said work and record of commercial operation in good condition should also be submitted.
- d. Copies of Auditor's certified balance sheet of the Bidder for the past three (3) consecutive years.
- e. In case the local manufactured Equipment is proposed, the sufficient documentary evidence, if any, showing that the manufacturers have been acknowledged for producing standard product by the Thai Industrial Standard Institute (TISI), Ministry of Industry, or registered with TISI, or ISO 9000 certified by the National Accreditation Council of Thailand (NAC) or obtained the privilege from the Board of Investment or accepted by EGAT for manufacture of such Equipment, is required to be submitted with the Bid.
- f. Sufficient evidence documents clearly demonstrating that a firm/company who changes its name, merges with, or acquires other company/companies, or forms a new company by merging its business unit with those of other companies, and the experience records of the new company clearly demonstrating that it has sufficient evidence of running the business as before.
- g. A statement of proposed minor deviations from the Specifications along with complete specifications and all necessary descriptive literature for any proposed alternative Equipment or procedure, as required under Article B-9. Deviations from Specifications.
- h. Where Proposal Data Forms are provided, the Bidder shall enter all information as directed.
- i. Where the Specifications provide for submission of a sample or samples, the Bidder shall submit same together with his bid.

- j. Joint Venture/Consortium Agreement with a statement that each member of a joint venture/consortium will be jointly and severally responsible and liable for the complete execution of the work (in case the Bidder is a joint venture or consortium).
- k. Confirmation Form of not being a Jointly Interested Bidder with other Bidders and not being a person who undertakes any actions as an Obstruction of Fair Price Competition, and Registration/Non-registration with the Revenue Department as a VAT registrant.

If the Bidder has registered as a VAT registrant, he shall submit EGAT an evidence of VAT registration. On the contrary, if the Bidder is not registered as a VAT registrant, he shall inform EGAT whether he will register as a VAT registrant or not.

In case the Bidder is a consortium, each member of the consortium shall fill in the Confirmation Form provided for consortium Bidders.

- l. Filled-in Documentary List and documents required according to Additional Regulation.

Should the Bidder fail to submit any of the document described above and neglect to submit the same to EGAT within the time as specified by EGAT, such failure shall be sufficient reason for rejection of his bid.

Verbal statements made by the Bidder at any time regarding quality, quantity, or arrangement of Equipment will not be considered.

If alternative Equipment is indicated in the bid, it shall be understood that EGAT will have the option of selecting any one of the alternates so indicated and such selection shall not be a cause for extra compensation or extension of time.

In case the Bidder proposes alternative Equipment, with the condition to supply any one of the alternates so indicated at his option, such bid will be considered conditional and may be considered sufficient reasons for rejection.

#### **B-9. Deviations from Specifications**

Unless otherwise provided in the Specifications, the quality of Equipment and workmanship shall comply in all respects with the Standards required under the bidding documents.

If the Bidder proposes any minor deviations from the specifications, he shall submit a statement of each proposed deviation referenced to the particular Article of these specifications, details on the design drawings or article, paragraph and section of referenced standards or specifications. Full details of all minor deviations together with

confirmation shall be submitted with the bid in a form provided in Section C. The Bidder shall submit, with his bid, copies of the standards or specifications proposed for his deviations. In case there is no statement in the form provided in Section C in the Bidder's proposal on the proposed deviations, the bid shall be regarded by EGAT as conforming in all respects to the terms and conditions and Specifications as stated in the bidding documents at no additional cost to the bid price.

Notwithstanding the foregoing, it is at EGAT's sole discretion in determining whether any of such proposed deviations is acceptable and in determining whether it is minor or major deviation.

**B-10. Rejection of Bids**

EGAT reserves the right not to accept the lowest evaluated bid.

Bids shall be strictly based on the Specifications and terms and conditions in the Bidding Documents. Should any bid fail to comply with the terms and conditions stipulated in these Bidding Documents, especially those under Article pertaining to payment or be incomplete, conditional or obscure, or contain additions not called for, or irregularities of any kind, it will be liable to rejection.

EGAT also reserves the right to reject any or all bids submitted without giving reason or to reject the bid from any Bidder who fails to satisfy EGAT that the bid complies with the terms and conditions stipulated in these bidding documents without any non-compliance which is deemed substantial and advantageous over other Bidders.

**B-11. Delivery Time**

Delivery time required is indicated for each respective Price Schedule in the Proposal section of the Bidding Documents, and shall be carefully observed. However, no preference will be given in the bid evaluation for earlier delivery than the stipulated delivery period.

All bids specifying delivery time later than those indicated may be rejected.

**B-12. Evaluation and Comparison of Bids**

Bid prices pursuant to Article B-2. Bid Prices will be evaluated as follows :

1. The evaluation of bid prices shall be specified in Data Sheet.



2. The prices to be used for evaluation and comparison purpose shall be DDP EGAT's store including VAT for the final sale direct to EGAT.

Price for optional items, if any, will not be taken into consideration; however, Bidders shall also quote the prices thereof as required.

**B-13. Acceptance of Bids**

EGAT will not be bound to accept the bid with the lowest indicated cost. EGAT reserves the right to accept the bid which in its judgement is the lowest evaluated bid. In making its selection, EGAT will take into consideration the conformity of the bid to the requirements of the Bidding Documents and Specifications, guaranteed delivery time, the suitability for the purpose intended and whenever applicable, compensating factors will be applied to deviation or departures from Specifications. EGAT will also take into consideration whether the Bidder's experience, organization, facilities and financial resources will assure the successful carrying out of the Work under the Contract within the time specified.

**B-14. Appeal**

*Disqualified or unsuccessful Bidders who see that their disqualification or failure are due to EGAT's non-compliance with EGAT's procurement regulations may appeal to EGAT within fifteen (15) Days from the date of receipt or announcement, whichever comes first, of EGAT's final evaluation result. An appeal shall be made in writing and clearly state the cause of appeal and argument with referred facts or regulations and related documents. Appealing does not constitute a ground for suspending the ongoing procurement process unless EGAT's Governor agrees otherwise.*

*The Contract or Purchase Order shall not be executed until the period of appeal has ended and there is no appeal. In the event there is an appeal during such period, the Contract or Purchase Order shall not be executed unless EGAT's Governor concurs.*

*Decision of EGAT's Governor is final and conclusive.*

**B-15. Award of Contract**

The Contract will be awarded as soon as practicable after opening of the bids, to the Bidder with the lowest evaluated bid. EGAT reserves the right to award the Contract on the basis of standards and specifications as proposed by the Bidder, if in the opinion of EGAT, they are considered acceptable.

At the time of execution of the Contract, the successful Bidder shall furnish the performance security in accordance with the conditions of Contract in the specimen of performance security provided in the bidding documents.

Failure to comply with the condition as expressed in the specimen of performance security will lead to withdrawal of award and cancellation of Contract, and in this respect EGAT reserves the right to award the Contract to the Bidder with the next lowest evaluated substantially responsive bid and the Bidder who defaults shall have his bid security forfeited in favor of EGAT.

After EGAT notifies the successful Bidder that his bid has been accepted, EGAT will send the Bidder the Contract Documents incorporating all agreements between the parties not later than ninety (90) Days after receipt of notice of award of Contract.

Promptly but not later than fifteen (15) Days after receipt of the Contract, the successful Bidder shall sign and date the Contract and return it to EGAT.

**B-16. Bidder's Responsibility**

The Bidder shall be deemed to have carefully examined all of the terms, conditions and Specifications of this Invitation to Bid, and also to have fully informed himself as to all conditions, local or otherwise, affecting the carrying out of the Work of the Contract, and to have formulated an estimate of the facilities available and needed.

The Bidder shall also be liable to any rules and regulations as well as Acts enforced in the Kingdom of Thailand. Failure to do so will be at the Bidder's risk.

**B-17. Supplemental Notices**

Supplemental Notices to the Bidding Documents may be issued prior to the date of opening of bids to clarify the Bidding Documents or to reflect modifications in the design or Contract terms. Each supplemental notice issued will be distributed to each person or organization to whom the Bidding Documents have been issued. The recipient shall acknowledge receipt of each supplemental notice by signing and returning in a reasonable time the receipt form distributed with the supplemental notice. All supplemental notices issued shall become a part of the Contract Documents.

**B-18. Cost of Bidding**

Bidders will not be reimbursed for any expenses they may incur in preparing and submitting their bids.

**B-19. Cancellation of Bid**

EGAT reserves the right not to accept any quantity or item or schedule or package, or to cancel the bid without purchasing any item. Bidders shall not be entitled to claim EGAT for any losses and/or damages in this connection. EGAT also reserves the right to cancel the bid should there be any reasonable grounds that bidder is not in good faith in submitting bid such as submitting false documents.

In case of bid cancellation, EGAT will not be responsible for any losses and/or damages and will not refund payment of Bidding Documents.

DRAFT

***SPECIMEN OF BID SECURITY***

Whereas.....(hereinafter called "the Bidder") has submitted his bid dated.....for.....(hereinafter called "the Bid") under Invitation to Bid No.....KNOW ALL MEN by these presents that WE.....of.....having our registered office at.....(hereinafter called "the Guarantor") are bound unto Electricity Generating Authority of Thailand (hereinafter called "EGAT") in the sum of..... (in words : ..... ) for which payment well and truly to be made to EGAT, the Guarantor binds itself, its successors and assigns by these presents. Sealed with the Common Seal of the said Bank this.....(date).....day of.....(month)....., .....(year).....

THE CONDITIONS of this obligation are :

1. If the Bidder withdraws his bid during the period of bid validity specified in the Bidding Documents; or
2. If the Bidder, having been notified of the acceptance of his bid by EGAT during the period of bid validity;
  - (a) fails or refuses to execute the Contract, if required; or
  - (b) fails or refuses to furnish the Performance Security, in accordance with the Instructions to Bidders;

We, the Guarantor, unconditionally undertake to pay to EGAT as the primary obligor, up to the above amount upon receipt of its first written demand, without EGAT having to substantiate its demand.

This guarantee will remain in force up to and including ninety (90) Days after the expiry date of the bid validity.

\_\_\_\_\_  
(Signature of the Bank)

**DRAFT**

**SECTION C  
PROPOSAL**

**INVITATION TO BID NO. TS12-FRS-03(R)**  
**PROPOSAL**  
**FOR**  
**SUPPLY OF FAULT RECORDING SYSTEM**  
**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12**

---

**C-1. Price Schedule**

The undersigned Bidder, having carefully examined the Bidding Documents, hereby offers and proposes to perform the services and to furnish the Equipment on the basis of DDP EGAT's store at Khlong Mai in accordance with all provisions and conditions as described herein, all for the prices stated in the Schedule(s) attached :

**Note : 1. Article E-12. Performance Security**

The performance security required under Article E-12. Performance Security shall be ten (10) per cent of the Contract Price. Cost for furnishing the performance security shall be spread over the items proposed.

**C-2. Guaranteed Delivery Time**

Delivery Time of Equipment is required as indicated in the Delivery Schedule and Distribution List attached. The undersigned Bidder guarantees to make and to complete the delivery of Equipment proposed as required by EGAT.

Whenever the Equipment in any item are sub-itemized, the Contractor shall endeavor not to make partial shipment/delivery by sub-items.

In case of failure on the part of the Contractor to comply with the provision of the above paragraph, it is hereby understood that the Equipment in such particular items shall be deemed undelivered unless and until each all sub-items have been shipped/delivered.

**C-3. Drawing and Document Submission Schedule**

Drawing and Document Submission Schedule is required as indicated in Article F-11. Drawings and Documents to be Furnished by Contractor. The undersigned Bidder guarantees to submit all drawings and documents as required by EGAT.

**C-4. Bid Security**

Bid security in the amount of \_\_\_\_\_,  
(in words)  
\_\_\_\_\_ has been deposited with EGAT.  
(number)

**C-5. Supplemental Notices**

The undersigned Bidder certifies that the following Supplemental Notices have been received for the Contract Documents :

---

---

---

---

---

---

Proposal Submission Date \_\_\_\_\_ Day of \_\_\_\_\_ A.D. \_\_\_\_\_

Firm's Name \_\_\_\_\_

By: \_\_\_\_\_

Title \_\_\_\_\_

Firm's Address \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Witness  
\_\_\_\_\_

DRAFT



DRAFT

**PART 1: PRICE PROPOSAL**

**PART 1 : PRICE PROPOSAL**  
**PRICE QUOTATION INSTRUCTIONS**

This part of the Bidding Document comprises :

1. Summary of Bid Prices
2. Price Schedules

Bidder is allowed to quote price in only baht (THB).

Bidder shall fill in the price schedules in the soft file recorded and given in the CD, item by item. Then, the total prices for each schedule and Summary of Bid Prices will be automatically calculated.

Filling-in the data shall be in accordance with the following instructions :

1. Bidder shall fill in all data required in blue cells of the price schedules - Unit Price.
2. The default currency is THB.

Remarks: Price Schedules are created in Microsoft Office Excel 2007.

**INVITATION TO BID NO. TS12-FRS-03(R)**  
**SUMMARY OF BID PRICE**  
**SUPPLY OF FAULT RECORDING SYSTEM**  
**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12**

No.	Description	Currency	Supply of Equipment
			DDP EGAT 's Store ( excluding VAT ) Baht
			Amount
1	Schedule 1 : Fault Recording System		
	<b>BID PRICE</b>		<b>Baht</b>
	<b>VAT</b>		<b>Baht</b>
	<b>SUMMARY OF BID PRICE</b>		<b>Baht</b>

**INVITATION TO BID NO. TS12-FRS-03(R)**  
**Schedule 1 : Fault Recording System**  
**SUPPLY OF FAULT RECORDING SYSTEM**  
**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12**

Item No.	Description	Drawing No. / Reference No.	Qty.	Unit	Supply of Equipment	
					DDP EGAT 's Store ( excluding VAT ) Baht	
					Unit Price	Amount
1-1	FAULT RECORDING SYSTEM, 48 ANALOG INPUT, 240 DIGITAL INPUT.	For 500 kV Substation Specification No. 1003 Dwg. Nos. WN-E-1.1 The quantity of analog channels shall be as noted below.	1	SET		
1-2	FAULT RECORDING SYSTEM, 48 ANALOG INPUT, 144 DIGITAL INPUT.	Specification No. 1003 Dwg. Nos. MM4-E-1 The quantity of analog channels shall be as noted below.	1	SET		
1-3	FAULT RECORDING SYSTEM, 48 ANALOG INPUT, 144 DIGITAL INPUT.	Specification No. 1003 Dwg. Nos. PY-E-1.1 & PY-E-1.2 The quantity of analog channels shall be as noted below.	1	SET		
1-4	FAULT RECORDING SYSTEM, 32 ANALOG INPUT, 64 DIGITAL INPUT.	Specification No. 1003 Dwg. Nos. MM3-E-1.3 The quantity of analog channels shall be as noted below.	1	SET		
1-5	FAULT RECORDING SYSTEM, 32 ANALOG INPUT, 64 DIGITAL INPUT.	Specification No. 1003 Dwg. Nos. UD3-E-1.2 The quantity of analog channels shall be as noted below.	1	SET		

**INVITATION TO BID NO. TS12-FRS-03(R)**  
**Schedule 1 : Fault Recording System**  
**SUPPLY OF FAULT RECORDING SYSTEM**  
**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12**

Item No.	Description	Drawing No. / Reference No.	Qty.	Unit	Supply of Equipment	
					DDP EGAT 's Store ( excluding VAT ) Baht	
					Unit Price	Amount
1-6	FAULT RECORDING SYSTEM, 32 ANALOG INPUT, 64 DIGITAL INPUT.	Specification No. 1003 Dwg. Nos. SO2-E-1.1 The quantity of analog channels shall be as noted below.	1	SET		
1-7	FAULT RECORDING SYSTEM, 32 ANALOG INPUT, 64 DIGITAL INPUT.	Specification No. 1003 Dwg. Nos. RE-E-1.2 sh.2 The quantity of analog channels shall be as noted below.	1	SET		
1-8	FAULT RECORDING SYSTEM, 48 ANALOG INPUT, 96 DIGITAL INPUT.	Specification No. 1003 Dwg. Nos. TTK-E-1.2 The quantity of analog channels shall be as noted below.	1	SET		
1-9	FAULT RECORDING SYSTEM, 32 ANALOG INPUT, 64 DIGITAL INPUT.	Specification No. 1003 Dwg. Nos. TA2-E-1.1 The quantity of analog channels shall be as noted below.	1	SET		
1-10	FAULT RECORDING SYSTEM, 80 ANALOG INPUT, 240 DIGITAL INPUT.	Specification No. 1003 Dwg. Nos. SLB-E-1.1 The quantity of analog channels shall be as noted below.	1	SET		

**INVITATION TO BID NO. TS12-FRS-03(R)**  
**Schedule 1 : Fault Recording System**  
**SUPPLY OF FAULT RECORDING SYSTEM**  
**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12**

Item No.	Description	Drawing No. / Reference No.	Qty.	Unit	Supply of Equipment	
					DDP EGAT 's Store ( excluding VAT ) Baht	
					Unit Price	Amount
1-11	FAULT RECORDING SYSTEM, 64 ANALOG INPUT, 128 DIGITAL INPUT.	Specification No. 1003 Dwg. Nos. SLB-E-1.2 The quantity of analog channels shall be as noted below.	1	SET		
1-12	FAULT RECORDING SYSTEM, 80 ANALOG INPUT, 240 DIGITAL INPUT.	Specification No. 1003 Dwg. Nos. HY2-E-1.1 SH.2/2 The quantity of analog channels shall be as noted below.	1	SET		
1-13	ANALOG ISOLATOR CARD	Supply as loose part	1	EA		
1-14	POWER SUPPLY	Supply as loose part	1	EA		
1-15	ACQUISITION UNIT	Supply as loose part	1	EA		
1-16	CPU & MEMORY MODULE 1	Supply as loose part	1	EA		
1-17	ANALOG ISOLATOR FOR VOLTAGE	Supply as loose part	1	EA		
1-18	ANALOG ISOLATOR FOR CURRENT	Supply as loose part	1	EA		
1-19	DIGITAL ISOLATOR MODULE	Supply as loose part	1	EA		
1-20	HARD DISK & HARD DISK CONTROLLER	Supply as loose part	1	EA		

**INVITATION TO BID NO. TS12-FRS-03(R)**  
**Schedule 1 : Fault Recording System**  
**SUPPLY OF FAULT RECORDING SYSTEM**  
**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12**

Item No.	Description	Drawing No. / Reference No.	Qty.	Unit	Supply of Equipment	
					DDP EGAT 's Store ( excluding VAT ) Baht	
					Unit Price	Amount
1-21	TELE- COMMUNICATION BOARD	Supply as loose part	1	EA		
	<p>Note:</p> <p>1.The following are channel requirements of Fault Recording System.</p> <p>-3 analog voltage channels for each bus.</p> <p>- For 230 kV: 3 analog voltage channel for each line bay</p> <p>-For 115 kV: 3 analog voltage channel for tie line, lient to plant and direct customer line.</p> <p>-3 analog current channels for each line bay and transformers.</p> <p>-3 analog current channels for each capacitor bank.</p> <p>-4 analog current channels for each tie transformer.</p> <p>The remaining analog input channels shall be current channels.</p> <p>The Fault Recording System shall include the following additional functions for every line:.</p> <p>-Calculation of Fault Locator and Power Flow.</p>					
<b>Total Price for Schedule 1</b>					<b>Baht</b>	

**Breakdown Price  
for Schedule 1 : Fault Recording System**

No.	Legend	Type	DDP EGAT 's Store ( excluding VAT ) Baht
1	Analog Card (.... Current Channels)		
2	Analog Card (.... Voltage Channels)		
3	Analog Card (.... Current Channels, .... Voltage Channels)		
4	Analog Card (.... Current Channels, .... Voltage Channels)		
5	Digital Card (.... Channels)		
6	Power Supply		
7	Acquisition Unit		
8	CPU & Memomry Module 1		
9	Hard Disk & Hard Disk Controller		
10	Tele-Communication Board		
11	Dual Blank Panel		
12	Test Switch		
13	Test Plug		
14	GPS Receiver		
15	GPS Atenna		
16	GPS Splitter		
17	Ethernet Switch		
18	Interfacing ..... Cable , Price Per Meter		
19	Patch Cords Cable , Price Per Meter		
20	Coaxial Cable , Price Per Meter		



**Breakdown Price  
for Schedule 1 : Fault Recording System**

No.	Legend	Type	DDP EGAT 's Store ( excluding VAT ) Baht
21	LAN Cable , Price Per Meter		
22	Industrial PC (Excluded Monitor)		
23	Monitor		
24	Workstation Notebook		
25	Man Machine Interface		
26	Operating System		
27	Auxiliary Relay		
28	Ventilation Fan		
29	MCB (Rating 0.5 A, 3 Pole )		
30	MCB (Rating 6 A, 2 Pole, 125 VDC )		
31	MCB (Rating 6 A, 2 Pole, 230 VAC )		
32	Terminal Block For CT Circuit		
33	Terminal Block For PT Circuit		
34	Terminal Block For Event		
35	Terminal Block For Power Supply Circuit		
36	Terminal Block For RTU		
37	End Section For Terminal Block		
38	End Stop For Terminal Block		
39	Terminal Marker		
40	Marker Holder For End Stop		

๑๖๘.-๑๗๑.

**Breakdown Price  
for Schedule 1 : Fault Recording System**

No.	Legend	Type	DDP EGAT 's Store ( excluding VAT ) Baht
41	Switchboard Wire, 1.5 Sq.mm, Gray Color, Price Per Meter		
42	Switchboard Wire, 2.5 Sq.mm, Gray Color, Price Per Meter		
43	Terminal Lug		
44	Spiral Wrap		
45	Wiremark		

DRAFT

**PART 2: PROPOSAL DATA**

**PROPOSAL DATA  
PANEL ASSEMBLY**

**BIDDER NAME** \_\_\_\_\_ **BID NO.** \_\_\_\_\_

**MANUFACTURER** \_\_\_\_\_

a. Make and Country of Origin \_\_\_\_\_

b. Engineering Work \_\_\_\_\_

c. Blank Panel Maker \_\_\_\_\_

d. Applied Standards \_\_\_\_\_

    Dielectric withstand \_\_\_\_\_

    Insulation Resistance \_\_\_\_\_

    Temperature Range \_\_\_\_\_

e. Type \_\_\_\_\_

f. The thickness of leveled sheet steel and  Yes  No

formed steel members is not less than 2.5 mm.

If no, specify the supporting structure method. \_\_\_\_\_

g. Degree of protection \_\_\_\_\_

h. Ambient temperature \_\_\_\_\_ °C

i. Ambient humidity \_\_\_\_\_ %

j. Terminal Block \_\_\_\_\_

    - Manufacturer \_\_\_\_\_

    - Type \_\_\_\_\_

k. Miniature Circuit Breaker \_\_\_\_\_

    - Manufacturer \_\_\_\_\_

    - Type \_\_\_\_\_

l. Switchboard wire \_\_\_\_\_

    - Manufacturer \_\_\_\_\_

    - Type \_\_\_\_\_

m. Test Equipment \_\_\_\_\_

    - Manufacturer \_\_\_\_\_

    - Type \_\_\_\_\_

n. The normal size of drawings. \_\_\_\_\_

    If not A1, give reason. \_\_\_\_\_

o. Specify type and manufacturer of special tool, \_\_\_\_\_

    if needed. \_\_\_\_\_

**PROPOSAL DATA  
FAULT RECORDING SYSTEM**

**BIDDER NAME** \_\_\_\_\_ **BID NO.** \_\_\_\_\_

**MANUFACTURER** \_\_\_\_\_

- a. Make and country of origin \_\_\_\_\_
- b. Type \_\_\_\_\_
- c. Hardware
  - c1. Type and capacity of hard disk \_\_\_\_\_
  - c2. Easy change every channels between voltage and current channels  Yes  No  
If No, give detail \_\_\_\_\_
  - c3. Automatically short CT when remove an analog isolator module  Yes  No  
If No, give detail \_\_\_\_\_
  - c4. Number of bits for A/D converters \_\_\_\_\_
  - c5. Have history log or SER log for maintenance  Yes  No
  - c6. Every digital channel shall be start FRS independently  Yes  No
  - c7. High scan frequency range \_\_\_\_\_ Hz
  - c8. Slow scan frequency range \_\_\_\_\_ Hz
  - c9. Dual scan frequency  Yes  No
  - c10. Prefault time \_\_\_\_\_ ms
  - c11. Postfault time \_\_\_\_\_ ms
  - c12. Event time resolution at least 1 ms.  Yes  No
  - c13 Total memory  $\geq$  32 MB for high scan rate  Yes  No
  - c14. Maximum duration per record at 30 Hz scan rate \_\_\_\_\_ Min.
  - c15. Duration of working (initialization and reset time) inclusion hardware and software \_\_\_\_\_ Sec.
  - c16. User calculate channel shall be save in configuration file  Yes  No

**PROPOSAL DATA  
FAULT RECORDING SYSTEM**

**BIDDER NAME** \_\_\_\_\_ **BID NO.** \_\_\_\_\_

**MANUFACTURER** \_\_\_\_\_

c17. Continuous self diagnostics (watch dog)  Yes  No

If No, give detail \_\_\_\_\_  
\_\_\_\_\_

**d. Software**

d1. Number of levels to security access (For User)

Detail \_\_\_\_\_  
\_\_\_\_\_

d2. Open many records simultaneously  Yes  No

d3. Each channel are displayed on separate axis  Yes  No

d4. All waveforms shall be moved to any position  Yes  No

d5. Harmonics order \_\_\_\_\_

d6. Backup & restore the record with OS command  Yes  No

(copy & paste)

If No, give detail \_\_\_\_\_  
\_\_\_\_\_

d7. Standard & version of comtrade file \_\_\_\_\_

d8. Every line shall be calculate power flow  Yes  No

d9. Have roll back configuration file when is communicating (remote failure)  Yes  No

d10. Have symbolic windows to indicate a status of communication that is success or not  Yes  No

d11. Polling period From \_\_\_\_\_ to \_\_\_\_\_

d12. Formula for the channel calculate function \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

d13. Combining any record in a new file  Yes  No

d14. Print chart same on the monitor  Yes  No

**f. Sensor**

f1. Have the starting sensor

**PROPOSAL DATA**  
**FAULT RECORDING SYSTEM**

**BIDDER NAME** \_\_\_\_\_ **BID NO.** \_\_\_\_\_

**MANUFACTURER** \_\_\_\_\_

- Overcurrent starting sensor [ ] Yes [ ] No
- Undervoltage starting sensor [ ] Yes [ ] No
- Frequency starting sensor [ ] Yes [ ] No
- Negative sequence voltage starting sensor [ ] Yes [ ] No
- Zero sequence voltage starting sensor [ ] Yes [ ] No
- Power swing starting sensor [ ] Yes [ ] No
- External start [ ] Yes [ ] No

f2. Sensor limit operating time \_\_\_\_\_ ms.

**g. Front panel**

Have a keyboard on front panel to set the FRS [ ] Yes [ ] No

If No, give detail \_\_\_\_\_

**h. Panel Assembly**

Manufacturer and country \_\_\_\_\_

**i. Spare parts**

List of all recommended spare parts :

- |          |          |
|----------|----------|
| 1. _____ | 2. _____ |
| 3. _____ | 4. _____ |
| 5. _____ | 6. _____ |

**j. Service**

j1. Startup with manufacturer's supervisor [ ] Yes [ ] No

**j2. Service maintenance**

- Response time of the after sale service \_\_\_\_\_ Days

- Service representative in Thailand [ ] Yes [ ] No

j3. 2 years warranty period [ ] Yes [ ] No





DRAFT

**PART 3: DELIVERY SCHEDULE AND DISTRIBUTION LIST**

**Invitation to Bid No.TS12-FRS-03(R)**  
**Delivery Schedule and Distribution List**  
**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12**  
**Schedule 1 : Fault Recording System**

Item No.	Description	Qty	Job no.	Substation	Delivery Required by EGAT (within months after receipt of Award of Contract)
					DDP EGAT's Store
1-1	FAULT RECORDING SYSTEM, 48 ANALOG INPUT, 240 DIGITAL INPUT.	1	TS12-14-S03	WANG NOI	8
1-2	FAULT RECORDING SYSTEM, 48 ANALOG INPUT, 144 DIGITAL INPUT.	1	TS12-08-S01	MAE MOH 4	10
1-3	FAULT RECORDING SYSTEM, 48 ANALOG INPUT, 144 DIGITAL INPUT.	1	TS12-08-S02	PHAYAO	10
1-4	FAULT RECORDING SYSTEM, 32 ANALOG INPUT, 64 DIGITAL INPUT.	1	TS12-14-S35	MAE MOH3	8
1-5	FAULT RECORDING SYSTEM, 32 ANALOG INPUT, 64 DIGITAL INPUT.	1	TS12-12-S16	UDON THANI 3	10
1-6	FAULT RECORDING SYSTEM, 32 ANALOG INPUT, 64 DIGITAL INPUT.	1	TS12-05-S04	SAKON NAKHON 2	8
1-7	FAULT RECORDING SYSTEM, 32 ANALOG INPUT, 64 DIGITAL INPUT.	1	TS12-13-S03	ROI ET 1	10
1-8	FAULT RECORDING SYSTEM, 48 ANALOG INPUT, 96 DIGITAL INPUT.	1	TS12-13-S19	THA TAKO	10
1-9	FAULT RECORDING SYSTEM, 32 ANALOG INPUT, 64 DIGITAL INPUT.	1	TS12-16-S29	TAK 2	10

**Invitation to Bid No.TS12-FRS-03(R)**  
**Delivery Schedule and Distribution List**  
**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12**  
**Schedule 1 : Fault Recording System**

Item No.	Description	Qty	Job no.	Substation	Delivery Required by EGAT (within months after receipt of Award of Contract)
					DDP EGAT's Store
1-10	FAULT RECORDING SYSTEM, 80 ANALOG INPUT, 240 DIGITAL INPUT.	1	TS12-07-S01	SALOKBAT	10
1-11	FAULT RECORDING SYSTEM, 64 ANALOG INPUT, 128 DIGITAL INPUT.	1	TS12-07-S01	SALOKBAT	10
1-12	FAULT RECORDING SYSTEM, 80 ANALOG INPUT, 240 DIGITAL INPUT.	1	TS12-16-S08	HAT YAI 2	10
1-13	ANALOG ISOLATOR CARD	1	TS12-16-RSV	SPARE	10
1-14	POWER SUPPLY	1	TS12-16-RSV	SPARE	10
1-15	ACQUISITION UNIT	1	TS12-16-RSV	SPARE	10
1-16	CPU & MEMORY MODULE 1	1	TS12-16-RSV	SPARE	10
1-17	ANALOG ISOLATOR FOR VOLTAGE	1	TS12-16-RSV	SPARE	10
1-18	ANALOG ISOLATOR FOR CURRENT	1	TS12-16-RSV	SPARE	10

**Invitation to Bid No.TS12-FRS-03(R)**  
**Delivery Schedule and Distribution List**  
**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12**  
**Schedule 1 : Fault Recording System**

Item No.	Description	Qty	Job no.	Substation	Delivery Required by EGAT (within months after receipt of Award of Contract)
					DDP EGAT's Store
1-19	DIGITAL ISOLATOR MODULE	1	TS12-16-RSV	SPARE	10
1-20	HARD DISK & HARD DISK CONTROLLER	1	TS12-16-RSV	SPARE	10
1-21	TELE- COMMUNICATION BOARD	1	TS12-16-RSV	SPARE	10

EGAT's Store = KHLONG MAI

**DRAFT**

**SECTION D  
CONTRACT**

**CONTRACT**  
**SUPPLY OF FAULT RECORDING SYSTEM**  
**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12**

---

No. \_\_\_\_\_

This Contract is executed and delivered this \_\_\_\_\_ day of \_\_\_\_\_,  
B.E. \_\_\_\_\_ (A.D. \_\_\_\_\_), between

ELECTRICITY GENERATING AUTHORITY OF THAILAND

represented by \_\_\_\_\_ of said Authority, hereinafter called "EGAT", and

\_\_\_\_\_  
(Contractor)

represented by \_\_\_\_\_, age \_\_\_\_\_ years, nationality \_\_\_\_\_, hereinafter called  
the "Contractor".

EGAT and the Contractor mutually agree as follows :

**D-1. Contract Documents**

The following documents attached to this Contract are incorporated and made a part of this  
Contract, as though fully written out and set forth herein :

**Data Sheet**

- A. Invitation to Bid
- B. Instructions to Bidders
- C. Contract Price, Delivery Time of Equipment and Proposal Data
- D. Contract
- E. General Conditions
- F. Special Conditions
- G. Ratings and Features (None)
- H. Bill of Materials (None)
- I. Specifications
- J. Drawings
- K. Supplemental Notices

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

L. Attachments :

---

---

---

M. Changes :

---

---

---

All of the foregoing documents are referred to herein as the Contract Documents. They are also incorporated into this Contract and made a part hereof all codes, designations, standards, standard specifications and similar Equipment which are referred to in the Specifications and Special Conditions.

**D-2. Acceptance of Proposal**

EGAT has accepted the proposal of the Contractor for furnishing the Equipment in conformity and in accordance with and subject to all the terms and conditions of these Contract Documents.

**D-3. Agreement**

The Contractor agrees to sell and EGAT agrees to buy the Equipment as described in these Contract Documents.

**D-4. Obligation of Contractor**

The Contractor agrees to perform well and faithfully all of the services and to furnish all of the Equipment described in these Contract Documents, and to supply and provide all Equipment, labor and other things requisite for or incidental to the said Work.

**D-5. Obligation of EGAT**

EGAT agrees, subject to the terms and conditions of these Contract Documents, to pay to the Contractor the amount shown, and at the rates and times and in the manner set forth in these Contract Documents.

**D-6. Mutual Obligations**

EGAT and the Contractor mutually agree to perform, fulfill, abide by, and submit to any and all of the provisions and requirements and all matters and things contained or expressed in, or reasonably to be inferred from these Contract Documents.

**D-7. Deposit of Performance Security**

The Contractor agrees to deposit with EGAT an acceptable performance security in accordance with the Contract Documents.

**D-8. Assignment**

The Contract or any part thereof shall not be assigned or pledged without the written consent of EGAT, nor shall the Contractor assign or pledge any money due, or to become due, to him hereunder, without the prior written consent of EGAT.

**D-9. Notices**

All notices called for by the terms of this Contract shall be effective only at the time of receipt thereof and only when received by the parties to whom they are addressed at the following addresses :

EGAT : Governor  
Electricity Generating Authority of Thailand  
Bangkrui, Nonthaburi 11130  
Thailand

Contractor :

---

---

---

---

All notices called for by the terms of this Contract shall be in the form of registered letters or facsimile in the English language.



**D-10. Integration**

EGAT and the Contractor agree that this Contract, including the Contract Documents, expresses all of the agreements, understandings, promises, and covenants of the parties, and that it integrates, combines, and supersedes all prior and contemporaneous negotiations, understandings, and agreements, whether written or oral, and that no modification or alteration of this Contract shall be valid or binding on either party, unless expressed in writing and executed with the same formality as this Contract, except as may otherwise be specifically provided in this Contract.

**D-11. Counterpart**

This Contract is executed in three (3) identical counterparts: two (2) for EGAT and one (1) for the Contractor.

ELECTRICITY GENERATING AUTHORITY  
OF THAILAND

CONTRACTOR :

BY \_\_\_\_\_  
( )

BY \_\_\_\_\_  
( )

WITNESS :

WITNESS :

BY \_\_\_\_\_  
( )

BY \_\_\_\_\_  
( )



DRAFT

**SECTION E  
GENERAL CONDITIONS**

## GENERAL CONDITIONS

### **E-1. Definitions**

Whenever the following terms are used in the Contract Documents, they will have the following meanings :

- EGAT : The Electricity Generating Authority of Thailand, having its Head Office at Nonthaburi, Thailand, and its authorized representative or representatives
- Engineer : Firm or company assigned by EGAT to provide engineering, consulting or construction management services in support of EGAT
- Bidder : Any person or firm or company or joint venture or consortium of firms submitting bid to EGAT for furnishing the services and Equipment described in the Contract Documents, in response to this Invitation to Bid
- Contractor : Any person or firm or company or joint venture or consortium of firms including appointed representatives, successors and assignees thereof, whose bid has been accepted by EGAT for furnishing of the services and Equipment described in the Contract Documents
- Subcontractor : Any person or firm or company (other than the Contractor) to whom any part of the Contract has been sublet, with the consent of EGAT, by the Contractor
- Contract : The agreement between EGAT and the Contractor, and all Appendices and Schedules thereto including Invitation to Bid, Instructions to Bidders, Proposal, General Conditions, Special Conditions, Specifications, Ratings and Features, Drawings, Supplemental Notices and any other documents referred to in, or connected with the Contract, even though the said documents are issued after execution of the Contract

Contract Price	:	The sum specified in Section C which is inclusive of VAT (if any) subject to such additions thereto or deductions therefrom as may be made under the provisions hereinafter contained
Equipment	:	Machinery, apparatus, materials, goods, including accessories and spare parts to be supplied under the Contract and specifically described in the Specifications
Work	:	All the work to be done by the Contractor for design manufacture, shop test, transportation and delivery of the Equipment to EGAT's store as agreed, including, if required, supervision for installation at site and supervision for field tests of the Equipment under the Contract
Supervisor (if required)	:	Contractor's employee assigned as installation supervisor including assistant supervisor, to supervise and be responsible for the installation, erection, adjustment, field tests, and commissioning of the Equipment supplied under the Contract
Option (if any)	:	Equipment to be quoted by the Bidder which EGAT reserves the right to accept or omit in whole or in part
Year	:	Calendar year
Month	:	Calendar month
Day	:	Calendar day

**E-2. Intent of Contract Documents**

All of the Contract Documents are complementary, and what is called for by one shall be as binding as if called for by all. In the case of any discrepancy between any of the Contract Documents, or any defective description or ambiguity, the matter shall be promptly submitted to EGAT, which shall promptly make a determination in writing. Any adjustment by the Contractor without this determination shall be at the Contractor's own risk and expense. In all cases of discrepancy, defective description, or ambiguities, the interpretation given by EGAT shall be binding on the Contractor, subject to the provisions of Article E-29. Dispute Resolution included in these General Conditions.

**E-3. Applicable Law and Legal Jurisdiction**

The applicable law of this Contract shall be the law in force in the Kingdom of Thailand. Should there be any ambiguity or discrepancy rising out of or in connection with the Contract Documents, the interpretation thereof shall be made in accordance with Thai laws. Any litigations between the parties that may arise out of or in connection with this Contract or the breach or termination thereof or the performance of work thereunder shall be submitted to the Court of Thailand for decision, except as may be otherwise specifically provided in these Contract documents.

**E-4. Statutory Requirements**

Throughout the continuance of the Contract, the Contractor shall conform to all laws of the Kingdom of Thailand, and to all regulations, by-laws, ordinances, or orders made thereunder, and to the lawful requirements of any public, municipal, or other authority, in any way affecting or applicable to the Contractor or its operations.

**E-5. Patents and Copyrights**

The Contractor shall indemnify and hold EGAT, its officers, agents, and employees harmless against and from liability of any nature or kind, including costs and expenses for or on account of any copyrighted or uncopied composition, secret process, patented or unpatented invention, article, or appliance manufactured, delivered, or used in carrying out the Work under the Contract. All drawings and the information contained therein as well as the use of any process, material or Equipment developed in the course of carrying out the Work under the Contract shall become the property of EGAT where EGAT shall have the right to use any or all of them for any purpose either for present or future projects. For the avoidance of doubt, none of them will be used solely for any commercial benefit which is not related to EGAT work.

**E-6. Subcontracts**

The Contractor shall not assign or transfer the Contract or any part thereof or any benefit or interest therein or thereunder, any monies due or become due under this Contract to any other person or persons.

The Contractor shall not be allowed to subcontract the whole of the Work under this Contract. Subcontracting of any part of the Work shall be subject to the prior written

consent of EGAT. Such consent, if given, shall not relieve the Contractor from full and entire responsibility under this Contract.

If the Contractor desires to subcontract any part or parts of the Work called for by the Contract, he shall notify EGAT in writing to that effect and shall state in such notice the nature and extent of the part or parts of the Work called for by the Contract proposed to be subcontracted and name of the person proposed as Subcontractor. Unless and until written approval is given by EGAT, approval for which shall not be unreasonably withheld, the Contractor shall not subcontract any part of the Work. All requirements specified in these Contract Documents shall be applicable to Subcontractors also.

No contractual relation shall exist between EGAT and the Subcontractors, and the Subcontractors are not to enjoy any privileges conferred on the Contractor by this Contract.

Any Work done by any Subcontractor who has not been approved by EGAT shall be subject to rejection or stoppage of Work by EGAT. In such case the Contractor cannot claim delay or request for time extension of the Contract completion date and/or make financial claim to EGAT.

**E-7. Export Charges**

All tariffs, duties and other taxes or charges levied by the country of origin of the Equipment shall be paid by the Contractor, and such expenses shall be included in the cost of the Equipment.

**E-8. Customs Clearance, Import Duty and Taxes**

The Contractor shall be responsible for customs clearance of the Equipment at the port of entry and transporting the Equipment to EGAT's store. All expenses on customs clearance including godown rent, landing and handling charges shall be paid by the Contractor. The Contractor shall also pay all costs of procuring the necessary permits and licenses for importation into Thailand, and the Contractor shall pay import duty and any taxes (including VAT) imposed at the port of entry on the Equipment to be supplied by the Contractor and imported into Thailand for the Work under the Contract.

**E-9. Value Added Tax**

Pursuant to the Revenue Code of Thailand, EGAT shall be responsible and pay when due for the value added tax imposed on the supply of Equipment, including local transportation

(if any) and/or on the provision of services under this Contract. EGAT shall in no case be responsible for the value added tax collectible on any payment made by the Contractor under any subcontract or under any other circumstances and the Contractor shall comply with the rules and regulations of the Revenue Code of Thailand.

In case there is any change on the rate of value added tax imposed by the Government of Thailand, the amount of value added tax comprised in the Contract Price shall be adjusted to reflect such change, provided that the price of the Work shall remain unchanged.

**E-10. Income and Other Taxes**

Income and other taxes assessed or collected by the Government of Thailand, or any subdivision thereof, or any municipality therein on the Contractor and his employees shall be under the responsibility and account of the Contractor.

In accordance with the Revenue Code of Thailand, should the payment under this Contract be subject to income tax and withholding tax of any kind is required to be withheld by EGAT, such withholding tax shall be deducted by EGAT from each payment and EGAT will be responsible to remit such withholding tax to the Revenue Department of Thailand on behalf of the Contractor.

**E-11. Fees and Duties**

Any and all immigration fees, stamp duties, and other fees, if any, assessed or collected by the Government of Thailand, or by any subdivision thereof, or by any municipality therein, on this Contract, on the Contractor and/or his personnel shall be paid by the Contractor. Any taxes collectible under this Contract, other than those stipulated in this Contract, shall be at the responsibility and account of the Contractor.

The stamp duty for any service contract (Construction, Hire of Work, Consultancy Service, Transportation, Supervisor, etc.) with the Contract value of the service portion lower than baht 200,000.- is required to be affixed by the Contractor on the original copy and the counterpart of the Contract. In case the value of the service portion is baht 200,000.- and over, payment of such stamp duty by the Contractor shall be made in cash to the Revenue Department of Thailand or its authorized subdistrict offices. In either case, the stamp duty is required to be affixed or paid, as the case may be, within fifteen (15) Days after the date of Contract execution, otherwise the Contractor shall be liable to pay for any and all penalties imposed for the delay as required by law.

The Contract value of the service portion to be calculated for stamp duty under this provision shall be the price excluding value added tax.

For a foreign Contractor who has no representative in Thailand, EGAT will, upon receipt of written request from the Contractor, affix or pay for stamp duties from EGAT's own fund on behalf of the Contractor, the Contractor is therefore required to reimburse EGAT for such stamp duties plus any and all penalties imposed by law for delay, if such delay is due to Contractor's failure to make written request to EGAT as aforesaid within a reasonable period of time.

If the Contractor fails to reimburse EGAT for any and all amount as required under this Article within the period of time fixed by EGAT, such period not to be shorter than fifteen (15) Days from the date of EGAT's notice for payment, EGAT has the right to claim directly from the Contractor or claim from Performance Security or Maintenance Security, as the case may be, or deduct or setoff from any and all money due to the Contractor under this Contract for the outstanding amount together with interest at the rate of Minimum Overdraft Rate (MOR) plus two (2) per cent calculated from the due date up to the date the payment is made in full.

#### **E-12. Performance Security**

The Contractor shall, at the time of execution of the Contract, deposit with EGAT a performance security for the due and proper performance of this Contract in the amount of ten (10) per cent of the total Contract Price. The performance security shall insure payment of any obligations, penalty, damages, liquidated damages, or expenses for which the Contractor may become liable to EGAT.

The amount of the performance security shall be adjusted or the Contractor may deposit a new performance security in the amount of ten (10) per cent of the additional Contract Price to cover the Contractor's obligation in case the Contract Price is increased due to change of the Equipment and/or Work under Article E-19. Changes and Extra or Omitted Work.

The performance security shall be in the form of a cash deposit *or a certified cheque issued by a local bank, or a cashier cheque issued by a local bank*, or a bank guarantee or a letter of guarantee issued by a local bank or an acceptable financial institution in Thailand, or by a foreign bank counter-guaranteed by a local bank and made payable to EGAT in the same currency as that of the Contract. EGAT may at any time, upon application by the Contractor, approve the substitution for any performance security held under this Article by other performance security on such terms and conditions as may be approved by EGAT. The Contractor shall bear the cost of the performance security.



The conditions of the guarantor's obligations in the performance security shall include, inter alia, the following:

- (1) The guarantor shall unconditionally guarantee, as primary obligor and not as surety merely, payment of any obligations, penalties, damages, liquidated damages, or expenses for which the Contractor may become liable to EGAT.
- (2) No extension of time, change in, addition to, or other modification of the terms of the Contract or Work to be performed thereunder, or of the specifications or other Contract Documents shall in anyway release the guarantor from any liability under the performance security, and the guarantor shall thereby waive notice of any such extension of time, change, addition or modification.
- (3) The performance security shall be valid and remain in full effect from the date of execution of the Contract until the issuance of the Acceptance Certificate by EGAT or the acceptance of Equipment deemed to be made by EGAT against submission of the Maintenance Security accepted by EGAT.

Unless and until an official receipt is issued in respect to a security deposit, EGAT will not recognize or accept any such deposit as fulfilling the requirements of this Article. Failure to deposit a performance security at the time specified above in this Article or such extended time as may be approved by EGAT shall be a breach of this Contract and EGAT is entitled to terminate the Contract or suspend any payment for Work performed until the performance security has been accepted by EGAT. EGAT shall not be liable for any losses, expenses and/or damages resulting from such payment suspension.

If any performance security furnished under this Article becomes unacceptable to EGAT, or if any guarantor fails to furnish reports as to guarantor's financial condition from time to time, as requested by EGAT, the Contractor shall promptly furnish such additional or alternative security as may be required by EGAT from time to time to protect the interests of EGAT up to an amount equal to the amount of the security.

In the event of any default or breach of this Contract by the Contractor, EGAT may convert into money any performance security which does not consist of money, and the proceeds shall be deemed to be a cash deposit under this Article. EGAT shall not be liable for any cost, expenses and/or loss incurred in connection with such conversion.

The performance security, in case of a bank guarantee, or letter of guarantee, shall be in conformity with the specimen acceptable to EGAT as shown herein at the end of these General Conditions.

**E-13. Inspection and Tests**

All Equipment furnished and all work performed under this Contract shall be subject to inspection by EGAT or EGAT's authorized representative(s) at its option. EGAT shall have the right to inspect all Equipment during its manufacture or fabrication and prior to its preparation for shipment, and to witness any or all shop tests for which results are required under this Contract to be approved by EGAT.

The Contractor shall notify EGAT at least two (2) months in advance when and where the Equipment will be available for each inspection or test. Any expenses incurred by EGAT or EGAT's representative(s) to inspect the Equipment or attend the test caused by false call of the Contractor for inspection and tests shall be borne by the Contractor. The acceptance of any services and Equipment covered by these Contract Documents, or the making or waiving of any inspection or witnessing of any test, shall in no way relieve the Contractor of the responsibility for furnishing services and Equipment meeting all of the requirements of this Contract.

Shop tests required in the Specifications shall be at the Contractor's expense. All tools, instruments and other materials necessary for performance of the tests shall be furnished by the Contractor.

In the event the results of the tests do not satisfy the requirements of the Specifications or the guaranteed performance, the Contractor shall rectify to improve the Equipment until satisfactory results are obtained and shall conduct all necessary retests at his own expense.

Any delay in delivery due to the retest shall not constitute a release of the Contractor from his responsibility for delay. Any expenses incurred by EGAT in attending these retests shall be borne by the Contractor. EGAT shall have the right to send one or more of EGAT's employees, not as inspectors, to the Contractor's plant to witness the fabrication, assembly and testing of any or all parts of the Equipment being furnished under this Contract. The purpose of the visit is to familiarize EGAT's personnel with Equipment details and to assist them in future operation and maintenance. Travelling expenses and per diem of such employee or employees shall be borne by EGAT.

**E-14. Preparation for Delivery**

The Contractor shall submit delivery schedule for EGAT's approval at least thirty (30) Days in advance before each delivery is made. No delivery shall be made prior to EGAT's approval which will be notified to the Contractor within fifteen (15) Days after receipt of the said delivery schedule.

All imported and local Equipment to be delivered under this Contract shall be satisfactorily packaged in such a manner to protect them from damage during transportation and for outdoor storage at the site in hot, wet, humid and dusty conditions. In addition, the imported Equipment shall also be satisfactorily packaged for moist tropical ocean shipment. Where necessary, heavy parts shall be mounted on skids so that cable slings for handling can readily be attached. Where it is unsafe to apply external slings to a package, attached slings shall be provided and shall project through the package so that attachment can readily be made.

In order to keep the damage to non-water proof Equipment during the transportation at minimum level, the Contractor and/or supplier is required to put an umbrella mark on every package of the Equipment.

In order to accelerate the dispatch of the Equipment to the site, the Contractor is required to arrange packaging of the Equipment in such a manner that a complete set of one unit shall be packed in package(s) or crate(s) with indication of designated substation but each individual package or crate shall contain the Equipment for only one unit or part of a complete set of one unit or otherwise as directed in the Instructions for Packaging attached at the end of Section E. General Conditions.

Detailed breakdown prices for spare parts shall be also indicated in the invoice.

Prior to delivery of all Equipment, packaging details shall also be submitted to EGAT for approval.

The cost incurred for repair or replacement of any damages to the Equipment due to improper packaging shall be at the Contractor's expense.

Each individual package or crate shall be clearly and plainly tagged or marked for identification as follows:

EGAT, THAILAND

PROJECT NAME : \_\_\_\_\_

CONTRACT NO. : \_\_\_\_\_

SUBSTATION : \_\_\_\_\_

CASE NO. : \_\_\_\_\_

ITEM NO. : \_\_\_\_\_

DESCRIPTION : \_\_\_\_\_

EGAT'S SERIAL NO. : \_\_\_\_\_ (if any)

**E-15. Shipment**

Shipment of equipment from port of embarkation to the final port of discharge shall be effected by using Thai vessels.

According to the regulations of the Maritime Promotion Bureau, Marine Department (as amended from time to time), shipments by non-Thai vessels can be made after receipt of permission granted by the Maritime Promotion Bureau, Marine Department as requested by the Contractor.

The Contractor is, therefore, required to immediately contact the Maritime Promotion Bureau, Marine Department for such permission with supporting documents of the case thereof for arrangement of the permission in advance.

The Contractor shall follow all other regulations stated in the Mercantile Marine Promotion Act B.E. 2521 and the regulations of the Maritime Promotion Bureau, Marine Department (as amended from time to time).

The Contractor shall be liable for any and all costs and expenses, losses and/or damages suffered by EGAT as a result of the Contractor's failure to comply with such regulations.

For more information, the Contractor may contact the Maritime Promotion Bureau, Marine Department at telephone No. 66 2233 1311-8 extension 391, 393 and facsimile No. 66 2639 4780.

**E-16. Force Majeure**

The Contractor shall not be in default under this Contract because of any delay in delivery or in completion of the Work on the separable parts thereof which delays are caused by force majeure; provided that the Contractor shall notify EGAT in writing of the cause of any such delay within fifteen (15) Days after the end of the event which results in the delay. Upon receipt of any such notice of delay, EGAT will promptly ascertain the facts and the extent of the delay and will extend the time for the delivery and assembly of the Equipment or the time for completing the Work when, in the opinion of EGAT, the delay is caused by force majeure or the findings of fact to justify an extension. EGAT's decision shall be binding on the Contractor, subject to the provision of Article E-29. Dispute Resolution included in these General Conditions.

"Force Majeure" shall be defined as any event, the happening or pernicious results of which could not be prevented even though a person against whom it happened or threatened to happen were to take such appropriate care as might be expected from him in this situation. (Normal rains, inundation, dearth of water, and the overturning or

sinking of barges in canals, rivers, or streams and similar events shall not be considered as force majeure).

**E-17. Transportation Insurance**

Transportation insurance from the Contractor's premises to EGAT's Store shall be under the responsibility of Contractor.

**E-18. Transfer of Title**

The title of ownership for the Equipment furnished under this Contract shall be passed to EGAT at the time the Equipment is actually delivered to EGAT's store and the Contractor's statement or delivery order confirming delivery of the Equipment has been certified by EGAT's representative.

However, this transfer of title shall not be construed as an acceptance of the Equipment. The Contractor shall continue to be responsible for the quality and performance of the Equipment, and for their compliance with the Specifications until acceptance of the Equipment by EGAT and the fulfillment of the guarantee provision of the Contract.

**E-19. Changes and Extra or Omitted Work**

EGAT may at any time authorize changes in, additions to, or deductions from the Equipment to be furnished under the Contract. Changes, additions, or deductions shall be authorized only by written notice served by EGAT upon the Contractor and such notice shall be treated as an integral part of the Contract. Adjustments, if any, in the amounts to be paid to the Contractor by reason of any such change, addition, or deduction shall be determined by one or more of the following methods:

- a. by unit price contained in the Price Schedules
- b. by an acceptable lump sum or unit price proposal from the Contractor
- c. on a cost-plus limited basis not to exceed a specific limit. A cost-plus limited basis is defined as the cost of Equipment, labor, and insurance, plus fifteen (15) per cent of the said cost to cover superintendence, general expense, and profit.

No claim for an addition to the Contract Price shall be valid unless authorized as described in this Article. If the parties are unable to agree to the method to be employed in determining adjustments in the Contract Price, the method shall be determined by EGAT.

**E-20. Termination and Suspension of Contract**

EGAT may, by written notice sent to the Contractor, terminate the Contract, in whole or in part, at any time for its convenience. The notice of termination shall specify that termination is for EGAT's convenience, the extent to which performance of work under the Contract is terminated, and the date upon which such termination becomes effective.

The Equipment that are completed and ready for shipment within thirty (30) Days after the Contractor's receipt of notice of termination shall be purchased by EGAT at the Contract terms and prices. For the remaining Equipment, EGAT may elect:

- a. to have any portion completed and delivered at the Contract terms and prices and/or
- b. to cancel the remainder and pay to the Contractor an agreed amount for partially completed Equipment and for materials and parts previously procured by the Contractor.

**E-21. Default and Termination**

Should the Contractor:

- a. fail to furnish the Equipment or carry out the Work in accordance with this Contract; or
- b. refuse or fail to prosecute the Work or any part thereof which shall ensure its completion within the time specified in this Contract or any authorized extension of time by EGAT; or
- c. fail to furnish the Equipment and/or complete the Work or any part thereof within the time specified in this Contract or any authorized extension of time by EGAT; or
- d. commit any breach or fail to comply with any of the provisions of this Contract; or
- e. notify EGAT in writing that the Contractor is unable or unwilling to furnish the Equipment or complete the Work or any part thereof; or

- f. become insolvent or bankrupt or make an arrangement or composition with the Contractor's creditors or, being a corporation, go into liquidation whether compulsory or voluntary (except for the purpose of reorganization); or
- g. by himself or by any person on his behalf, give or offer any money or benefit of forbearance to any employee of EGAT and/or any employee of the Engineer who has duties or responsibilities in connection with the acceptance of the proposal or the making of this Contract;

then, in any of such events, the Contractor shall be in default under this Contract, and EGAT may at his sole discretion take any one or more of the following actions that it considers appropriate :

- (i) suspend payments under this Contract until the default has been rectified;
- (ii) cancel or terminate the Contract in whole or in part;
- (iii) take that part of the furnishing of Equipment or the Work, in respect of which the delay or default has occurred, out of the hands of the Contractor or any other person in whose control or possession it is;
- (iv) reduce the Contract Price by an amount equal to the reduction in value to EGAT of the Equipment as actually delivered.

The Contractor shall be liable for all losses and/or damages including but not limited to the increased installation costs and increased administrative costs, suffered by EGAT as a result of the Contractor's default. The Contractor shall have no claim for payment with respect to Work thereafter performed.

All such damages may be recovered by EGAT from the Contractor in any court of competent jurisdiction or, without prejudice to that right, by deduction from any money due or becoming due to the Contractor under this Contract, or from any security deposited, or, after use of the property and materials of the Contract for completion of the work, as provided in this Contract, such property and materials may be sold and the proceeds shall be applied to any remaining obligations of the Contractor.

#### **E-22. Indemnification by the Contractor**

The Contractor shall fully indemnify and hold harmless EGAT and his employees and officers from and against any and all suit, actions (including any claim for copyright or patent infringement), demands, losses, costs, expenses (including attorney's fees and expenses) and damages of whatsoever nature, except for breach of contract, in respect of death or injury of any person or loss of damage to any property caused by

any act or omission of the Contractor or the Contractor's own officers, directors, agents, employees, contractors or sub-contractors arising in any manner whatsoever, except any injury, death or property damage caused by the negligence of EGAT, his contractors, employees, officers, or agents.

**E-23. Limitation of Liability**

The liability of the Contractor to EGAT arising from default or termination under the Contract in aggregate shall not exceed the total Contract Price.

**E-24. Consequential Damages**

Neither party shall be liable to the other party for any indirect, incidental, consequential or punitive damages as a result of the performance or nonperformance of the obligations imposed pursuant to this Contract, unless such indirect, incidental, consequential or punitive damages are foreseen or could have been foreseen at the time of execution of the Contract.

**E-25. Vesting of Contract in Receiver**

If the Contractor shall compound with his creditors, or shall become bankrupt or insolvent, or carry on business under a receiver, or become incapable from any cause whatsoever of carrying out the Work, any such receiver or any person in whom by law the Contract shall become vested, shall forthwith give notice to EGAT of the fact that the Contract has become vested in it and shall take all reasonable steps to carry on the Work at a rate fulfilling the Contract requirements. Thereupon, if EGAT so desires, such receiver or other such person as aforesaid shall have the option, during the period of one (1) Month from the date when the Contract becomes so vested in it, of carrying out the Contract. In the event of the Work being stopped, this option shall be opened only for a period of fourteen (14) Days from the stoppage date. In the event of the receiver or such other person not electing to carry out the Contract or EGAT not approving the carrying out of the Contract by the receiver, the Contractor shall then be in default and EGAT may proceed in accordance with Article E-21. Default and Termination.



**E-26. Extension of Time**

If, by reason of any of the following:

- a. Negligence or default on the part of EGAT or its agents,
- b. Alteration in or addition to the Work,
- c. Suspension of the Work at the written direction of EGAT for reasons beyond the control of the Contractor,
- d. War, insurrection, riot or civil commotion or delay caused thereby,
- e. Strikes, not caused by the Contractor's management,
- f. Lawful order of civil or military authorities,
- g. Unusually natural calamities, acts of God,
- h. Any other unforeseen circumstance beyond the Contractor's control.

The Contractor claims that he has been unduly delayed in the progress of the Work, he shall make written request to EGAT for an extension of time for completion of the Work or any portion of it.

Should EGAT consider such claim to be valid, it will grant such extension of time as may seem reasonable to EGAT, without thereby prejudicing or in any manner affecting the validity of the Contract. No extension of time will be granted unless the Contractor makes the written request within fifteen (15) Days after the end of the event which results in the delay.

Other than claiming an extension of time for completion of the Work or any portion of it, the Contractor shall not have any further recourse or claim against EGAT, nor shall he have any right of action against EGAT for loss or damage suffered by reason of such delay.

**E-27. Failure to Meet Requirements**

EGAT shall have the right to require the Contractor to make any changes in the Equipment or Work covered by this Contract, which may be necessary in the opinion of EGAT, to make the Equipment or Work conform to the requirements of the Contract Documents, without additional cost to EGAT. Any defects in the Equipment or workmanship or other failure, to meet the requirements of the Contract, including errors and omissions on the part of the Contractor, which are disclosed prior to final payment or prior to acceptance by EGAT, or after completion of all tests, whichever occurs at the later date, shall, if so directed by EGAT, be corrected or replaced promptly by the Contractor at the expense of the Contractor.

Any latent defects not disclosed prior to the date of final payment or prior to acceptance or after completion of all tests, whichever occurs at the later date, but disclosed within the guarantee period as specified in Article F-10.a., shall be corrected or replaced promptly by the Contractor at the expense of the Contractor, except that the cost of installation for the replacement parts of the Equipment will be borne by EGAT.

The Contractor shall extend the provisions of his liability to cover all repair and replacement parts furnished under this Article as follows:

- (1) All Equipment except Control and Protection Equipment and Fault Recording System
  - Any malfunctioning and/or defect : For a new period of one (1) Year found within the guarantee period from the day immediately following the date of completion of such repair or replacement
- (2) Control and Protection Equipment and Fault Recording System
  - Any malfunctioning and/or defect : For a new period of two (2) Years found within the first Year of guarantee period from the day immediately following the date of completion of such repair or replacement
  - Any malfunctioning and/or defect : For a new period of one (1) Year found within the second Year of guarantee period from the day immediately following the date of completion of such repair or replacement

The Contractor shall, if required by EGAT in writing, search under the directions of EGAT for the cause of any defect, imperfection or fault appearing prior to the acceptance of Equipment or in the period of maintenance guarantee. Unless such defect, imperfection or fault shall be one for which the Contractor is liable under the Contract, the cost of the work carried out by the Contractor in searching as aforesaid shall be borne by EGAT. If such defect, imperfection or fault shall be one for which the Contractor is liable under the Contract, the cost of the work carried out in searching as aforesaid shall be borne by the Contractor and he shall in such case repair, rectify and make good such defect, imperfection or fault at his own expense.

**E-28 Operation or Use of Unsatisfactory Equipment**

If the operation or use of the Equipment proves to be unsatisfactory to EGAT, EGAT shall have the right to operate and use such Equipment until they can be taken out of service for correction by the Contractor of such latent defects, error, or omissions and for replacement in whole or in part, if correction is unsuccessful or infeasible. The period of such operation or use shall not exceed one (1) Year from the day immediately following the date of acceptance of Equipment by EGAT.

**E-29. Dispute Resolution**

Any dispute arising out of or in connection with this Contract, interpretation, breach, or termination thereof shall be settled by amicable discussion between authorized representatives of each Party. Either Party may at any time send a written notice to the other Party requesting for an appointment of authorized representative for a settlement of any dispute hereunder. The Parties agree to make diligent and good faith attempt to resolve such dispute in an equitable manner. If the authorized representatives of both Parties are unable to resolve such dispute within 30 Days after commencement of the discussion for dispute resolution or other extended period of time as mutually agreed by both Parties, either Party may file a lawsuit to the court having jurisdiction in Thailand for settlement of such dispute. Each Party agrees that the final court judgment shall be conclusive and binding upon the Parties.

Pending decision of the court, both Parties shall continue to perform their respective obligations under this Contract.

**E-30. Language and Numbers**

All drawings, designs, specifications, manuals, nameplates, markings, operating instructions, statements, schedules, notices, documents, and all written communications between EGAT and the Contractor, concerning this Contract, shall be in the English language and in the metric system of weights and measures unless otherwise specified.

**SPECIMEN OF GUARANTEE**

To :

Date

Electricity Generating Authority of Thailand  
Bangkruai, Nonthaburi, 11130

Thailand

Re : Performance Security for Contract No. \_\_\_\_\_

Gentlemen :

In accordance with the provision of the Contract for \_\_\_\_\_ No. \_\_\_\_\_ (hereinafter referred to as the Contract) the contents of which have been noted by us that Messrs. \_\_\_\_\_ (hereinafter referred to as the Contractor) has to deposit with Electricity Generating Authority of Thailand (hereinafter referred to as EGAT) a Performance Security for the proper and faithful performance of the Contract in the amount of \_\_\_\_\_ (in words : \_\_\_\_\_) which is \_\_\_\_\_ per cent of the total Contract Price, we, the \_\_\_\_\_ as instructed by the Contractor, agree unconditionally to irrevocably guarantee as primary Obligor, the payment to EGAT on its first demand, without whatsoever right of objection on our part and without its first claim to the Contractor, in the amount not exceeding : \_\_\_\_\_ (in words : \_\_\_\_\_) in the event the obligations expressed in the above mentioned Contract have not been fulfilled by the Contractor, giving EGAT the right of claim for penalty, damages, liquidated damages or any expenses for which the Contractor may become liable to EGAT under the Contract.

We further agree that no extension of time, change in, addition to or other modification of terms of the Contract or Work to be performed thereunder, or of the Specifications or other Contract Documents, which may be made between EGAT and the Contractor, shall in any way release us from any liability under this guarantee, and we shall thereby waive notice of any such change, addition or modification.

This Performance Security shall be valid and remain in full effect from the date of execution of the Contract until the issuance of the Acceptance Certificate by EGAT or the acceptance of Equipment deemed to be made by EGAT against submission by the Contractor of the Maintenance Security accepted by EGAT.

Yours very truly,

\_\_\_\_\_  
Authorized Signature

**Instructions for Packaging**

Name of Equipment	Packed per complete set of one unit/units	Packed per Substation
1. Power Transformer	√(1)	-
2. Distribution Transformer	√(1)	-
3. Shunt Reactor	√(1)	-
4. Surge Arrester	√(1 or 3)	-
5. Current Transformer	√(1)	-
6. CC, CCVT, VT	√(1)	-
7. GIS	-	√
8. Shunt Capacitor Bank	-	√
9. Power Circuit Breaker	√(1)	-
10. Disconnecting Switch	-	√
11. AC/DC Dist. Board, LCUS, LRP	√(1)	-
12. Stationary Battery	√(1)	-
13. Lighting Fixture	-	√
14. Identification and Danger Notice Plate	-	√
15. Control and Protection System	√(1)*	-
16. Computerized Control System	-	√
17. Power Line Carrier	-	√
18. Teleprotection	-	√
19. Line Trap	-	√
20. Battery Charger	√(1)	-

- Note :**
1. Number in parenthesis represents maximum number of complete set of one unit/units packed in an individual package or crate.
  2. \* In case of spare for control and protection system, such Equipment shall be packed per board, but in case of loose control and protection system, such Equipment of whichever substation shall be packed in the same package or crate of that substation.
  3. Other substation Equipment not mentioned shall be packaged in such a manner that it will not cause unreasonable expenses or delay to EGAT in distribution of such Equipment to the designated substation.
  4. Prior to delivery of all Equipment, packaging details shall be submitted to EGAT for approval.

**DRAFT**

**SECTION F  
SPECIAL CONDITIONS**

## SPECIAL CONDITIONS

### **F-1. Scope of Work**

The Contractor shall perform, furnish and deliver the Equipment to EGAT's store as required by these Contract Documents.

### **F-2. Responsibility of Contractor**

The Contractor shall be solely responsible for ensuring that the Work throughout is executed in the most substantial, proper and workmanlike manner, with the best quality materials and conforming to the best engineering practice for the operating conditions specified; the drawings and quality control are performed or made in accordance with the Contract; and services reasonably to be furnished though not specifically provided in the Contract are furnished; all to EGAT's entire satisfaction notwithstanding that certain portions of the work may be executed by the Subcontractor.

### **F-3. Cooperation with Other Contractors**

The Contractor, if required, shall exchange with other Contractor furnishing associated Equipment, all necessary drawings and other information required to insure the complete and proper design and manufacture of the Equipment to be furnished under these Specifications. One (1) copy of all drawings and correspondence, relating to information interchanged between Contractors, shall be sent to EGAT in Nonthaburi, Thailand.

### **\*F-4. Supervision of Installation**

Subject to the desire and decision of EGAT, the Contractor may be required to furnish the services of qualified and experienced supervisor(s) who has at least three years experience on the particular Work required under the Contract and shall be the permanent employee of the manufacturer of the Equipment. For 230 kV (or lower) Power Circuit Breaker and 115 kV (or lower) Gas-Insulated Switchgear, the permanent employee of the representative of the manufacturer is acceptable, provided that such employee is certified by the manufacturer.

The scope of responsibility of the supervisor on behalf of the Contractor is as follows :

- a. Supervise and be responsible for the start-up, field test and commissioning of the Equipment.
- b. Prepare formulation sheets for a check list, test sheet, release form and field report to be discussed with EGAT before performing the installation work.
- c. Submit one copy of report summarizing the work performance, from the beginning to the completion of the supervisory period, to EGAT within fifteen (15) days after finish the installation work or final inspection. The report shall include the following:
  1. Note on pending matter i.e. faulty and omitted equipment, performance deficiency etc.
  2. Problem concerning installation performance.
  3. Photographs showing progress of the installation work periodically until the work is completed.

The Contractor shall, in each and every instance, cooperate fully with the construction personnel installing and/or operating the Equipment and the Work, the operations of the supervisor shall be coordinated with the program of construction at the site as directed by EGAT.

The supervisor shall report at EGAT in Nonthaburi, Thailand, on the date designated by EGAT after a reasonable advance notice from EGAT, and shall remain until the Equipment have been in satisfactory operation for at least ten (10) working days as determined by EGAT, unless released earlier by EGAT.

The installation supervisor must be able to understand, speak, read and write the English language fluently. Should an interpreter be necessary, the cost of such interpretation service shall be at the Contractor's expense.

\*If installation supervisor is required as specified in Price Schedule, this provision shall apply to this Contract.

#### **F-5. Acceptance Tests**

After the Equipment have been installed and placed in satisfactory operation, they may be tested by and at the expense of EGAT to determine whether or not all requirements of these Contract Documents have been met and the Contractor's guarantees have been fulfilled.



The Contractor will be permitted to have his representative present at his own expense. If the tests show that the requirements or guarantee have not been met, the Contractor shall, at his own expense, make all necessary corrections. Additional tests will then be made to demonstrate to EGAT's satisfaction the effectiveness of these corrections. These additional tests will be at the Contractor's expense. Unless the necessary corrections have been made, the conditions of the Contract shall be considered unfulfilled.

All tests will be performed in accordance with the latest applicable Test Codes, unless otherwise stated.

**F-6. Failure to Meet Performance Guarantees**

If EGAT elects to accept the Equipment which do not meet any performance guarantee or which do not meet other requirements of these Contract Documents, as may be determined by factory test, field test or operation under service conditions, appropriate adjustment will be made of the Contract Price for such Equipment; provided that no such adjustment will be made until after the Contractor has been given a reasonable opportunity to repair, improve, or replace defective Equipment or parts thereof wherever practicable.

**F-7. Acceptance Certificate**

When EGAT is satisfied with the Equipment or agrees to accept the Equipment under the provision of Article F-6. Failure to Meet Performance Guarantees and there are no major unsettled claims against the Contractor by EGAT, EGAT will issue a written Acceptance Certificate against submission by the Contractor of a maintenance security effective for a period of time as specified in Article F-10.a.

The Acceptance Certificate will list all deficiencies and reservations as a result of the inspection and tests performed, if any.

The purpose of the maintenance security is to guarantee the proper functioning of the Equipment supplied by the Contractor with a provision that the effective period of the maintenance security shall automatically be extended in case that the obligations stipulated in Article F-10. Maintenance Guarantee are not fulfilled.

A form of maintenance security acceptable to EGAT is shown in Article F-12. Maintenance Security.

**F-8. Payment**

Payment in local currency will be made directly by EGAT in the following manner:

1. Eighty (80) per cent of the Contract price will be paid on the basis of pro rata value of each delivery against presentation of the Contractor's statement or delivery order confirming the delivery of Equipment at EGAT's store duly certified by EGAT's representative\*, EGAT's letters of approval for delivery, EGAT's letter of approval for test report\*\* of the relevant Equipment including EGAT's letter(s) of approval for final drawings only for Control and Protection Equipment and Fault Recording System.

\*EGAT's representative means the authorized EGAT's Store personnel to verify the quantity of Equipment according to the packing list to be delivered to the Site.

\*\*Test report means the report of tests specified in Article E-13. Inspection and Tests.

2. Ten (10) per cent of the Contract Price of each Schedule will be paid against presentation of Drawing and Document Acceptance Certificate to be issued by EGAT to certify the receipt of all drawings and documents required from the Contractor under Article F-11. Drawings and Documents to be Furnished by Contractor for such schedule, provided that payment shall not be made until EGAT has received from the Contractor the statement or delivery order and appertaining documents giving evidence of delivery of the main Equipment of that Schedule.
3. Ten (10) per cent of the Contract Price of each Schedule will be paid after the Equipment have been installed, tested and operated or used for a period of 30 Days and the acceptance of the said Equipment has been made by EGAT against presentation of Acceptance Certificate to be issued by EGAT and submission of maintenance security by the Contractor. EGAT will list the minor pending claim(s), if any, and payment will be made by deducting such claimed amount.

However, if, through no fault of the Contractor or of the Equipment, such installation, test and operation or use of the Equipment are delayed beyond a period of six (6) Months after complete delivery at EGAT's store; payment of this ten (10) per cent will be made as soon as possible but not later than the ninth (9<sup>th</sup>) Month after complete delivery and it shall be deemed as if acceptance of Equipment is made by EGAT at the end of the said sixth (6<sup>th</sup>) Month and the guarantee period shall start therefrom against submission of maintenance security by the Contractor.

In case there is some minor claim(s) or minor fault of the Contractor, the payment of this ten (10) per cent shall be made by deducting such claimed amount and the guarantee period of this part will start after such minor claim(s) has been settled by the Contractor and acceptance of which has been made by EGAT.

**F-9. Liquidated Damages for Late Delivery of Equipment**

In the event of failure by the Contractor to make delivery of any Equipment within the time set forth in the Contract, plus any extension thereof authorized by EGAT as provided in the Contract, such failure shall be a default under the Contract for which the Contractor shall be liable for payment to EGAT as liquidated damages at the rate specified in Data Sheet.

Whenever any Equipment under any item is to be used together with other Equipment in other item as specified in Price Schedule as a complete set or unit, the Contractor shall make sure that they shall be shipped together as a complete set or unit. Failure on the part of the Contractor to comply with this requirement, the liquidated damages for late delivery of partial shipment shall be imposed on the Contractor for the whole amount of the Contract Price of such related items and the total claim of payment shall not exceed ten (10) per cent of the Contract Price of such related items.

Notwithstanding, in case the Contractor fails to make delivery of minor part of any Equipment within the time set forth in the Contract and such late delivery does not have any effect to the performance of the Equipment, the Contractor shall be liable for payment to EGAT as liquidated damages at the rate of one-tenth of one (0.10) per cent of the total price of the minor part of the Equipment not timely delivered for each Day of delay and the total claim of liquidated damages shall not exceed ten (10) per cent of the price of such delayed minor part of the Equipment. The price of such delayed minor part of the Equipment shall be determined by EGAT. EGAT shall, at his own discretion, determine whether such late delivery Equipment is the minor part and has any effect to the performance of the Equipment or not.

The payment of such liquidated damages shall not relieve the Contractor of his obligations to complete the Work under the Contract.

In case any Equipment is defective or does not conform to the requirements or specifications of the Contract where replenishment or correction or replacement must be made by the Contractor as per Article E-27. Failure to Meet Requirements, it shall be deemed that such Equipment has not yet been delivered unless such Equipment has been replenished or corrected or replaced, as the case may be, and delivered to EGAT at the delivery point specified in the Contract.

Payment of liquidated damages is contingent exclusively upon late delivery; in no case shall EGAT be required to substantiate any claim for payment of liquidated damages with proof of loss and/or damages. The liquidated damages shall be calculated for each Day of delay until the Equipment is delivered to EGAT excluding a period of time from the actual delivery date at the delivery point set forth in the Contract until the issuance of notification of defect or short pack or out of specification made by EGAT to the Contractor. This sum is payable regardless of the actual loss and/or damages incurred.

The Contractor shall not be liable for liquidated damages in the event of delay caused by force majeure.

**F-10. Maintenance Guarantee**

a. The Contractor shall guarantee the proper functioning of the Equipment for a period as specified hereunder :

- (1) All Equipment except : One (1) Year from the day  
Control and Protection immediately following the date of  
Equipment and Fault acceptance of Equipment by EGAT  
Recording System as stated in Article F-7. Acceptance  
Certificate
- (2) Control and Protection : Two (2) Years from the day  
Equipment and Fault immediately following the date of  
Recording System acceptance of Equipment by EGAT  
as stated in Article F-7. Acceptance  
Certificate

Provided, however, that should any malfunctioning and/or latent defect in Equipment under normal use and service be found during the said period, and such malfunctioning and/or defective portion be repaired or replaced as stipulated in (c) and (d) hereinafter, then the guarantee period for such portion shall be extended as follows:-

- (1) All Equipment except Control and Protection Equipment and Fault  
Recording System  
  
-Any malfunctioning and/or : For a new period of one (1) Year  
defect found within the from the day immediately  
guarantee period following the date of completion of  
such repair or replacement

(2) Control and Protection Equipment Fault Recording System

- Any malfunctioning and/or defect found within the first Year of guarantee period : For a new period of two (2) Years from the day immediately following the date of completion of such repair or replacement
- Any malfunctioning and/or defect found within the second Year of guarantee period : For a new period of one (1) Year from the day immediately following the date of completion of such repair or replacement

The premium for the maintenance guarantee shall be paid by the Contractor.

- b. On the expiration of the maintenance guarantee period and if the Equipment is functioning normally, the Contractor shall thereafter be released of all obligations and responsibilities under the Contract and the maintenance security will be released and returned to the Contractor.
- c. If during the guarantee period EGAT finds any malfunctioning and/or defect in the Equipment, EGAT shall inform without delay the Contractor thereof, stating in writing the nature of the malfunctioning and/or defect, and the Contractor shall promptly commence to repair and make good or replace such malfunctioning and/or defect at the expense of the Contractor, except that the cost of installation of the replacement parts of the Equipment will be borne by EGAT.
- d. If, after the repair or replacement performed in accordance with this Article, such Equipment continues to show malfunctioning and/or defect, EGAT may, at its option, demand further repair or replacement, and reserve the right to claim damages, if applicable, arising therefrom.
- e. If the Contractor fails to take action for starting up the necessary works for repair or replacement within fourteen (14) Days after receipt of EGAT's written notice of defect, the defect will be corrected by EGAT or any third party selected by EGAT at EGAT's discretion, and the cost of the corrections shall be on the responsibility and account of the Contractor.

In the event of an emergency where in the judgement of EGAT the delay resulting from giving formal notice would cause serious loss or damage which could be prevented by immediate action, defects may be corrected by EGAT or a third party chosen by EGAT without giving prior notice to the Contractor, and the cost of the corrections shall be paid by the Contractor. In the event such action is taken by EGAT, the Contractor will be notified promptly and shall assist wherever possible in making the necessary corrections.

**F-11. Drawings and Documents to be Furnished by Contractor**

The Contractor shall submit by registered airmail for foreign mail and registered mail for local mail with the drawings and other documents as listed in the tables attached at the end of this Section.

After the requirement under this Article has been fulfilled by the Contractor, a Drawing and Document Acceptance Certificate will be issued by EGAT to certify the receipt of all required drawings and documents:

a. Drawings

- (1) Drawing Title and Sizes. The title of Contractor's drawing shall also include the followings :

ELECTRICITY GENERATING AUTHORITY OF THAILAND

EGAT's Contract No. \_\_\_\_\_

Item No. \_\_\_\_\_

Subs. Name \_\_\_\_\_

The sizes of the drawings except otherwise specified in the Specification shall be as follows :

<u>Size Designation</u>	<u>Dimensions in MM</u>	<u>Dimensions in Inches</u>
A0	841 x 1,189	(33.11 x 46.81)
A1	594 x 841	(23.39 x 33.11)
A2	420 x 594	(16.54 x 23.39)
A3	297 x 420	(11.69 x 16.54)
A4	210 x 297	( 8.27 x 11.69)

- (2) Reference Drawings and Catalogues. General drawings showing principal dimensions and weights of Equipment, including controlling dimensions which affect space and handling requirements.
- (3) Drawings and Data for Approval. The Contractor shall submit for approval checked detail assembly drawings including firm dimensions, foundation details and setting

diagrams, physical size and weights of all principal parts, complete operating characteristics and ratings of Equipment, connection and schematic wiring diagrams, descriptive information and any other information sufficient to demonstrate fully that the Equipment to be furnished will conform to the requirements and intent of these Contract Documents.

Schematic diagrams shall indicate the operation and function of all electrical Equipment, accompanied, where necessary, with explanatory notes. Wiring diagrams shall show the external connection required, sufficient for EGAT to complete interconnection cable diagrams.

One print each of the drawings submitted for approval will be returned to the Contractor by EGAT or its authorized representative within thirty (30) Days after receipt at EGAT's office, marked either "Approved", "Approved Except as Noted", or "Returned for Correction"/"Not Reviewed". The notations "Approved" or "Approved Except as Noted" will authorize the Contractor to proceed with the manufacture of the Equipment covered by such drawing, subject to the correction, if any, indicated thereon. When prints of drawings have been "Returned for Correction"/"Not Reviewed", the Contractor shall make the necessary revisions on the drawings and shall within thirty (30) Days resubmit drawings for approval in the same manner as before.

Any manufacturing done before approval of the drawings will be at the Contractor's risk. EGAT shall have the right to require the Contractor to make any changes in the design which may be necessary, in the opinion of EGAT, to make the Equipment conform to the requirements and intent of these Contract Documents without additional cost to EGAT. Approval of the Contractor's drawings shall not be held to relieve the Contractor of any part of his obligation to meet all of the requirements of these Contract Documents or of the responsibility for the correctness of his drawings.

The Contractor shall submit final drawings when the manufacturing is completed. The letter of approval for final drawings will be issued if final drawings are accepted.

- b. Report of Shop Test. The Contractor shall furnish certified copies of reports of all tests required of the manufacturer to show compliance with the applicable standards and specifications. The cost of all tests and reports shall be borne by the Contractor.
- c. Instruction Manuals. The Contractor shall furnish complete set of instruction manuals and all final approved drawings (if any) for erection, operation, maintenance and repair of the Equipment, and for identification of parts. The

instruction manuals shall be combined, assembled and bound in binders. Each binder cover shall be stamped with proper identification indicating name of Equipment, manufacturer's name and address, EGAT's Contract number, manufacturer's reference, etc.

Prior to the assembly and submittal of the instruction manuals, a proof of the cover lettering and the table of contents shall be submitted in sufficient time for EGAT's acceptance without delaying submittal of the finished manuals.

The CD-ROM (Compact Disc-Read Only Memory) of final drawings, final documents, test report and instruction manual, if required, shall conform to the applicable International Standard Organization 9660 (ISO 9660) and have capacity of approximately 700 Mbytes.

The data in CD-ROM shall be created by the following software :

#### Drawing

The Contractor shall submit all drawings created by CAD software as follows:

1. MICROSTATION software Version SE or
2. AUTOCAD software Version 2000

Any necessary information supporting the completion of reading files (such as special font etc.) shall be included in CD-ROM.

#### Documents

The Contractor shall submit all documents in Adobe Portable Document Format File (PDF format) and also Program of Acrobat Reader in order to read the file completely in CD-ROM.

#### Drawing/Document List

The Contractor shall submit the drawings/documents listing information in work sheets file provided by EGAT in CD-ROM in Microsoft Excel file format.

Drawing list of design drawings, as built drawings, manufacturing drawings shall also be submitted together with the drawings in the CD-ROM.

#### F-12. Maintenance Security

The Contractor shall provide to EGAT prior to the issuance of the acceptance certificate and as a condition for the release of the payment of the last instalment as specified in Article F-8. Payment, a maintenance security in the amount of ten (10) per cent of the



total Contract Price or ten (10) per cent of each schedule, guaranteeing the Contractor's performance of the provision of Article F-10. Maintenance Guarantee. The Contractor shall oblige himself to attend to and replace, during the period of maintenance, all malfunctioning parts and for repair of all defects noted in the Work and communicated to the Contractor in writing by EGAT. In case of extended guarantee of the repaired or replaced Equipment, the Contractor may request for return of the original maintenance security and submit a new maintenance security in the amount of ten (10) per cent of the Contract Price of Equipment under the extended guarantee.

The maintenance security shall be in the form of a cash deposit, *or a certified cheque issued by a local bank, or a cashier cheque issued by a local bank*, or a letter of guarantee or a bank guarantee issued by a local bank or an acceptable financial institution in Thailand, or by a foreign bank counter-guaranteed by a local bank and made payable to EGAT in the same currency as that of the Contract. EGAT may at its absolute discretion refuse to approve any maintenance security offered or may at any time, upon application by the Contractor, approve of the substitution for any maintenance security held under this Article by other maintenance security on such terms and conditions as may be approved by EGAT.

The conditions of guarantor's obligations in the maintenance security shall include, inter alia; the following :

1. The guarantor shall unconditionally guarantee, as primary obligor and not as surety merely, payment of any obligations, damages, liquidated damages, performance penalties, or expenses for which the Contractor may become liable to EGAT.
2. No extension of time, change in, addition to, or other modification of the terms of the Contract or Work to be performed thereunder, or of the Specifications or other Contract Documents shall in anyway release the guarantor from any liability under the maintenance security, and the guarantor shall thereby waive notice of any such extension of time, change, addition or modification.
3. The maintenance security shall be valid and remain in full effect from the date of acceptance of Work until all obligations on the part of the Contractor under the Contract have been fulfilled.

Unless and until an official receipt is issued in respect to a maintenance security deposit, EGAT will not recognize or accept any such deposit as fulfilling the requirements of this Article. Failure to deposit a maintenance security at the time specified above in this Article or such extended time as may be approved by EGAT shall be a breach of this Contract and EGAT may, at its discretion, retain the payment of the last instalment of the total Contract Price.

If any maintenance security furnished under this Article shall become unacceptable to EGAT, or if any guarantor shall fail to furnish reports as to guarantor's financial condition from time to time, as requested by EGAT, the Contractor shall promptly furnish such additional or alternative maintenance security as may be necessary to satisfy the Contract requirements for a maintenance security.

In the event of any default or breach of this Contract on the part of the Contractor, EGAT may convert into money any maintenance security which does not consist of money, and the proceeds shall be deemed to be a cash deposit under this Article. EGAT shall not be liable for any cost, expenses and/or loss resulting from the conversion of any maintenance security deposit into money as herein provided. The Contractor shall bear the cost of the maintenance security.

The maintenance security, in case of a bank guarantee, or letter of guarantee, shall be in conformity with the following specimen.

**SPECIMEN OF MAINTENANCE GUARANTEE**

(For Equipment with Two-Year Guarantee Period)

To :

Date :

Electricity Generating Authority of Thailand  
Bangkruai, Nonthaburi 11130  
Thailand

Re : Maintenance Security for Contract  
No. EGAT \_\_\_\_\_

Gentlemen :

In accordance with the provision of the Contract for \_\_\_\_\_ No. EGAT \_\_\_\_\_ dated \_\_\_\_\_ (hereinafter referred to as the Contract), the contents of which have been noted by us that Messrs. \_\_\_\_\_ (hereinafter referred to as the Contractor) has to deposit with Electricity Generating Authority of Thailand, (hereinafter referred to as EGAT) a Maintenance Security to guarantee the proper functioning of the \_\_\_\_\_ of the Contract as specified in Article F-10. Maintenance Guarantee in the amount of \_\_\_\_\_ (in words : \_\_\_\_\_) which is equivalent to ten (10) per cent of the total Contract Price or ten (10) per cent of each schedule of the said Work, we, the \_\_\_\_\_ as instructed by the Contractor, agree unconditionally to irrevocably guarantee as primary Obligor, the payment to EGAT at its first demand, without whatsoever right of objection on our part and without its first claim with the Contractor giving EGAT the right of claim for penalty, damages, liquidated damages or any expenses for which the Contractor may become liable to EGAT under the Contract.

We further agree that no extension of time, change in, addition to or other modification of terms of the Contract or work to be performed thereunder, or of the Specifications or other Contract Documents, which may be made between EGAT and the Contractor, shall in any way release us from any liability under the Maintenance Security, and we shall thereby waive notice of any such extension of time, change, addition or modification.

This Maintenance Security shall be valid and remain in full effect for a period of two (2) Years from the day immediately following the date of the acceptance of Equipment. If necessary, this Maintenance Security shall be extended as specified in Article F-10. Maintenance Guarantee.

Yours very truly,

\_\_\_\_\_  
Authorized Signature

**SPECIMEN OF MAINTENANCE GUARANTEE**

(For Equipment with One-Year Guarantee Period)

To :

Date :

Electricity Generating Authority of Thailand  
Bangkrui, Nonthaburi 11130  
Thailand

Re : Maintenance Security for Contract  
No. EGAT \_\_\_\_\_

Gentlemen :

In accordance with the provision of the Contract for \_\_\_\_\_ No. EGAT \_\_\_\_\_ dated \_\_\_\_\_ (hereinafter referred to as the Contract), the contents of which have been noted by us that Messrs. \_\_\_\_\_ (hereinafter referred to as the Contractor) has to deposit with Electricity Generating Authority of Thailand, (hereinafter referred to as EGAT) a Maintenance Security to guarantee the proper functioning of the \_\_\_\_\_ of the Contract as specified in Article F-10. Maintenance Guarantee in the amount of \_\_\_\_\_ (in words : \_\_\_\_\_) which is equivalent to ten (10) per cent of the total Contract Price or ten (10) per cent of each schedule of the said Work, we, the \_\_\_\_\_ as instructed by the Contractor, agree unconditionally to irrevocably guarantee as primary Obligor, the payment to EGAT at its first demand, without whatsoever right of objection on our part and without its first claim with the Contractor giving EGAT the right of claim for penalty, damages, liquidated damages or any expenses for which the Contractor may become liable to EGAT under the Contract.

We further agree that no extension of time, change in, addition to or other modification of terms of the Contract or work to be performed thereunder, or of the Specifications or other Contract Documents, which may be made between EGAT and the Contractor, shall in any way release us from any liability under the Maintenance Security, and we shall thereby waive notice of any such extension of time, change, addition or modification.

This Maintenance Security shall be valid and remain in full effect for a period of one (1) Year from the day immediately following the date of the acceptance of Equipment. If necessary, this Maintenance Security shall be extended as specified in Article F-10. Maintenance Guarantee.

Yours very truly,

\_\_\_\_\_  
Authorized Signature

**Drawings and Documents to be Furnished by the Contractor**  
**(For Control and Protection Equipment)**

The Contractor shall submit by registered mail with the drawings and other documents listed below by the designated deadlines :

Drawings/Documents	No. of copies		Deadline and Remarks
	P	CD-ROM	
Manufacturing and Delivery Schedule	2	-	Within 60 Days after receipt of Notice of Award of Contract
Quality Assurance Program ( If requested by EGAT )	2	-	Within 60 Days after receipt of Notice of Award of Contract
Drawings or Documents "RELAY AND EQUIPMENT INSTRUCTION MANUAL"	1	-	Within 90 Days after receipt of Notice of Award of Contract
Drawings or Documents "FOR APPROVAL"	2	-	Within 90 Days after receipt of Notice of Award of Contract
Drawings or Documents "FOR REAPPROVAL"	2	-	Within 30 Days after receipt of returned approval drawings for correction
Drawings "DRAFT-FINAL DRAWING"	2	-	Within 30 Days for P and 60 Days for CD-ROM after receipt of returned approved drawings
Drawings and Documents "FINAL DRAWING or FINAL DOCUMENT"	2	1	Within 20 Days after Equipment delivery
Test Procedure (Factory Test)	2	-	Within 90 Days after receipt of Notice of Award of Contract
Test Schedule (Factory Test)	2	-	Not less than 60 Days before testing for foreign supply  Not less than 30 Days before testing for local supply
Test Report (Factory Test)	2	-	Upon completion of tests
Instruction Manuals	3	3	30 Days before first shipment/delivery

**Note :** P = Print Drawing or Document  
CD-ROM = Compact Disc-Read Only Memory with capacity of approximate 700 Mbytes conforming to ISO 9660

**Drawings and Documents to be Furnished by the Contractor**  
**(For Fault Recording System)**

The Contractor shall submit by registered airmail for foreign mail and registered mail for local mail with the drawings and other documents listed below by the designated deadlines:

Drawings/Documents	No. of copies		Deadline and Remarks
	P	CD-ROM	
Manufacturing and Delivery Schedule	2	-	Within 60 Days after receipt of Notice of Award of Contract
Quality Assurance Program ( If requested by EGAT )	2	-	Within 60 Days after receipt of Notice of Award of Contract
Drawings or Documents "FRS AND EQUIPMENT INSTRUCTION MANUAL"	1	-	Within 90 Days after receipt of Notice of Award of Contract
Drawings or Documents "FOR APPROVAL"	2	-	Within 90 Days after receipt of Notice of Award of Contract
Drawings or Documents "FOR REAPPROVAL"	2	-	Within 30 Days after receipt of returned approval drawings for correction
Drawings "DRAFT-FINAL DRAWING"	2	-	Within 30 Days for P and 60 Days for CD-ROM after receipt of returned approved drawings
Drawings and Documents "FINAL DRAWING or FINAL DOCUMENT"	2	1	Within 20 Days after Equipment delivery
Test Procedure (Factory Test)	2	-	Within 90 Days after receipt of Notice of Award of Contract
Test Schedule (Factory Test)	2	-	Not less than 60 Days before testing for foreign supply Not less than 30 Days before testing for local supply
Test Report (Factory Test)	2	-	Upon completion of tests
Instruction Manuals	3	3	30 Days before first shipment / delivery

**Note :** P = Print Drawing or Document  
CD-ROM = Compact Disc-Read Only Memory with capacity of approximate 700 Mbytes conforming to ISO 9660

**Drawings and Documents to be Furnished by the Contractor**  
**(For All Equipment except Control and Protection Equipment and Fault Recording System)**

The Contractor shall submit by registered airmail for foreign mail and registered mail for local mail with the drawings and other documents listed below by the designated deadlines :

Drawings/Documents	No. of copies		Deadline and Remarks
	P	CD-ROM	
Manufacturing and Delivery Schedule	4	-	Within 60 Days after receipt of Notice of Award of Contract
Quality Assurance Program ( If requested by EGAT )	2	-	Within 60 Days after receipt of Notice of Award of Contract
Drawings or Documents "FOR REFERENCE"	4	-	Within 90 Days after receipt of Notice of Award of Contract
Drawings or Documents "FOR APPROVAL"	4	-	Within 60 Days for foundation, steel supporting structure (if any) and within 90 Days for others after receipt of Notice of Award of Contract
Drawings or Documents "FOR REAPPROVAL"	4	-	Within 30 Days after receipt of returned approval drawings for correction
Drawings and Documents "FINAL DRAWING or FINAL DOCUMENT"	4	-	Within 30 Days after receipt of approved drawings
Final Design Data	4	-	Within 150 Days after receipt of Notice of Award of Contract
Test Procedure (Factory Test)	2	-	Within 150 Days after receipt of Notice of Award of Contract
Test Schedule (Factory Test)	2	-	Not less than 60 Days before testing for foreign supply Not less than 30 Days before testing for local supply
Test Report (Factory Test)	4	4*	Upon completion of tests
Installation Instruction	10	4*	60 Days before first Shipment / Delivery
Instruction Manuals	10	4*	Before Shipment / Delivery

**Note :** P = Print Drawing or Document  
CD-ROM = Compact Disc-Read Only Memory with capacity of approximate 700 Mbytes conforming to ISO 9660

\*CD-ROM of Test Report (Factory Test), Installation Instruction and Instruction Manuals may be created in the same disc.

**DRAFT**

**SECTION I  
SPECIFICATIONS**



**I. SPECIFICATIONS**

**I-1. Specifications**

The following specifications are attached hereto and made a part of the Contract Documents :

<u>Specification No.</u>	<u>Description</u>	<u>Page</u>
1003 (Aug-14)	Fault Recording System	1003-1 – 1003-9

DRAFT

**SPECIFICATION NO. 1003**  
**FAULT RECORDING SYSTEM**

		<b><u>PAGE</u></b>
1003.1.	Fault Recording System (FRS)	1003-1
1003.2.	Cabinet	1003-1
1003.3.	Terminals and Wiring	1003-2
1003.4.	Fault Recorder	1003-2
	- General	1003-2
	- Analog Inputs	1003-3
	- Digital Inputs	1003-3
	- Sampling	1003-3
	- Storage	1003-3
	- Security	1003-3
	- Triggering	1003-3
	- Phasor Measurement Unit (PMU)	1003-4
	- System Alarm	1003-5
	- Communications	1003-5
	- Clock	1003-6
	- Synchronizing	1003-6
	- Recorded Information	1003-6
1003.5.	Front Panel	1003-6
1003.6.	Power Supply	1003-6
1003.7.	Software	1003-7
1003.8.	Master Station and Server	1003-9
1003.9.	Service and Training	1003-9
1003.10.	Documentation	1003-9

tse  
เอกสารควบคุม

**SPECIFICATION NO. 1003**  
**FAULT RECORDING SYSTEM**

1003.1 **Fault Recording System. (FRS)**

The fault recording system (FRS) shall be a microprocessor-based instrument designed for sensing, acquiring, storing and recording critical high speed data during power system faults and disturbances. The FRS shall be tested to comply with the international standards of the IEC and *ANSI/IEEE C37.2-2008*. The system which is supplied to EGAT shall be standard version. Any additional modification to the standard version in order to meet EGAT specification shall not be accepted. Details of each function in the system shall be completely described in the manual.

The proposed FRS shall be the product from the manufacturers that have had supply record for EGAT or have been approved by EGAT. A prototype of new types, models or software of the fault recording equipment which has never been used in EGAT shall be provided to be tested in our substation at least three (3) months and there must be a training course or workshop upon EGAT's requests.

1003.2 **Cabinet.**

***The completely-wired FRS shall be supplied with all accessories mounted on standard 19-inch racks which are enclosed in cabinet(s).*** The cabinet size shall be dual type, 1,000 mm deep, 900 mm wide and the height shall be 2,300 mm plus a 40 mm channel base. The construction details dual type cabinet shall be as shown on Drawing No. TP-E-10.2. Finished panel surfaces shall be free from waves, bellies, or other imperfections. Exterior and interior surfaces shall be cleaned by sanding and steam cleaning, ground smooth, filled, primed, sanded and shall be finished-painted inside and outside with ANSI 61 medium gray (RAL 7036 full gloss). The cabinets shall be built from not less than No. 11 USS gage (3 mm) leveled sheet steel. The cabinet shall be designed without any permanent bottom braces and the bottom shall be open. The cabinet shall be furnished with channel base. The 6 mm by 25 mm cross-section bar copper ground bus shall be provided at the bottom of the cabinet, to which the metallic cases and grounding circuits of all equipment shall be connected. The grounding buses shall be solidly bolted to the steel framework so as to make a good electrical contact. Solderless lugs or terminals shall be provided on the ground buses for terminating No. 4/0 AWG stranded copper ground cable from the substation grounding system. All incoming and outgoing cable shall enter the cabinet through slots in the floor underneath the cabinet.

Three (3) of six (6) inches ventilation fans per cabinet shall be mounted inside at the top. Their switch shall be located inside the cabinet. The power supply shall be 230 V, single-phase, 50 Hz, AC.

***One (1) of LED light bulb*** per cabinet section shall be mounted inside at the top for interior lighting with one toggle switch located inside the cabinet. One (1) of receptacle outlet of single-phase, 2-pole, 3 wire grounded type rated 15A at 250 V shall be furnished inside the cabinet. The light and the receptacle outlet shall be completely wired for connection to 230 V, single-phase, 50 Hz, AC source which is furnished by EGAT.

tse เอกสารควบคุม
---------------------

The analog points in each cabinet shall not be more than 48 points.

1003.3 Terminals and Wiring.

The cabinet and all equipment shall be completely wired. Internal wiring of each basic panel assembly and each cabinet shall be neatly and carefully installed in suitable wiring ducts with removable covers and conveniently located terminal blocks for connection to incoming and outgoing leads. The size of control wire shall be 2.5 mm<sup>2</sup> and 1.5 mm<sup>2</sup> for AC circuitry and DC circuitry respectively. **All current and voltage inputs to the FRS shall be completely wired through test switches which shall be flexitest switches manufactured from United States of America (US Made), type FT-1, FT, FMS-10A for voltage channels and type FMS-10F for current channels.**

For the terminal arrangement, all leads shall be grouped for each particular function to facilitate connections to the incoming and outgoing cables. The arrangement shall be subjected to approval by EGAT. Not less than ten (10) percent spare terminals shall be provided for each group of terminal blocks for future use.

The terminal blocks shall be **at least 400 V** insulating barrier between terminals. The terminal blocks provided for analog signal shall be spring loaded screw-on type. **All CT terminal blocks shall be sized for 2×4mm<sup>2</sup> (nominal current 1A) or 2×6 mm<sup>2</sup> (nominal current 5A) conductors** and provided without sliding switch bridge and test socket screws. The terminal blocks provided for event signal shall be knife switch type of the spring-loaded screw-on type, screw-on type, or screw-less type. Both ends of wires shall be terminated by compression type and ring type terminal lug. Identical designation shall be assigned for each corresponding terminal block and wire. The said designation shall also be indicated in the schematic and wiring diagrams. All wiring shall be designated at both ends by printing on wire designation sleeves. Wire designation shall be made by permanent method which is unaffected by heat, solvents, steam, and not easily dislodged. Each designation on the terminal blocks shall be machine-lettered, stamped or engraved with permanent ink on the removable marking strips. Adhesive labels shall not be acceptable.

1003.4 Fault Recorder.

General.

Cables shall be provided to link fault recorder cubicles together in order to operate as one system. The linked configuration shall include complete time synchronization and initiation of all recorders from any starting sensor by means of cross triggering.

The FRS shall be a modular design. All Plug-In circuit boards and modules shall be equipped with card guides to prevent damage resulting from misalignment of connectors and sockets during insertion and removal of circuit boards and modules. Circuit boards and modules shall be easily replaceable without requiring the removal of the entire fault recorder, or other circuit boards or modules of the fault recorder from the rack. Modular units of the fault recorder shall be self-supporting and require no external supports of bracing.

ise เอกสารควบคุม
---------------------

Analog Inputs.

The CT secondary nominal rating shall be 1A or 5A (In). A current shunt shall be able to withstand fault current up to  $20 \cdot I_n$  for 1 second and  $2 \cdot I_n$  on a continuous basis. The PT secondary rating shall be selectable for either 66.4 VAC or 115 VAC. Signal isolators connected to this circuit shall be able to withstand two-per-unit overvoltage on a continuous basis.

Digital Inputs.

Each event input shall be dry contact. The maximum time resolution of the event input shall be at least one millisecond. Each individual event channel shall be electrically independent and selectable for either normally open or normally closed contact input. The event channels shall be synchronized with the analog channels.

Corresponding to any change of status which is normal-to-alarm or alarm-to-normal, all event inputs shall be capable of initiating the recorder to operate simultaneously.

Sampling.

Each analog channel shall be completely supplied with input signal conditioning with the frequency response of DC to 2,000 Hz. The sampling shall be adjustable at both fast and slow scan rates in order to capture both faults and slow disturbances. The pre-fault recording interval shall be selectable over the range of 50 to 500 milliseconds for High Scan and 10-600 seconds for Slow Scan. The resolution of A/D conversion shall be at least 16 bits.

Storage.

The fault recorder shall be equipped with at least 16 GB of internal hard disk for data storage. The internal hard disk shall be IDE, EIDE or SCSI interfaces. Warranty shall be more than 5 years. The total storage used for fault records shall not be less than 128 MB per DAU.

Security.

For access security to the FRS, there shall be password access for users.

Triggering.

The inputs to the sensors of each fault recorder shall be selectable from any combination of recorded channels for that recorder. The operation sensor shall automatically reset when the sensor input returns to normal. Limited operation on one sensor shall not affect the operation of any other sensors in the system. The following starting sensors shall be supplied:

Overcurrent Starting Sensors. The minimum of three (3) single phase overcurrent starting sensors shall be provided with 1 or 5 Ampere nominal rating. Each sensor shall be supplied with an adjustable setting range 0.02 to 200% of current rated with less than three (3) percent rated current accuracy. The thermal rating shall be 20 times nominal for one second.

Under/Overvoltage Starting Sensor. The minimum of three (3) single phase under/overvoltage starting sensors shall be provided for sensing under/overvoltage conditions of the buses or line. Each sensor shall be

adjustable from 50 to 150 percent of 66.4 VAC or 115 VAC, 50 Hz. The sensor shall be supplied with three (3) percent rated voltage accuracy.

Frequency Starting Sensor. One (1) single phase frequency starting sensor shall be provided for sensing abnormal frequency conditions. The sensor shall be adjustable from 0 to 2 Hz. over or under the normal frequency with a step of 0.1 Hz and 0.01 Hz accuracy. The sensor shall monitor the system frequency for at least 40 ms before starting the recorder. The frequency sensor shall include a transducer output which can be recorded on one of the analog channels to provide accurate cycle-by-cycle plots of frequency versus time during the disturbance. The sensor shall trigger the fault recorder to operate at low scan rate (less than 500 samples per second).

Zero Sequence Voltage Starting Sensor. One (1) zero sequence voltage starting sensor shall be provided for sensing earth-fault conditions. The sensor shall be adjustable from 1 to 20 Vrms. The sensor shall be supplied with three (3) percent full scale accuracy.

Power Swing Starting Sensor. Power swing starting sensor shall be provided for detecting power swing conditions in transmission line. The power swing sensor shall trigger the fault recorder to operate at low scan rate. (less than 500 samples per second).

The fault recorder shall automatically trigger, record data, and shall also automatically transmit data to the master station.

**Phasor Measurement Unit (PMU)**

*The FRS shall be equipped with PMUs functions. The PMUs to be supplied under this specification shall provide phasor and analog data at the selected periodicity. The offered PMUs shall be complete in all respect so that they can be installed at the substation and can communicate with the existing of Phasor Data Concentrator (PDC) at EGAT center. The necessary cable and connector and installation hardware shall also be supplied by the bidder. The PMUs shall be conformed to IEEE C37.118-2011 standard and shall be designed to meet the following requirements:*

- 1. The PMUs shall be designed to measure the electrical parameters in the power system frequency band of 45-55 Hz ensure that the impact of frequency fluctuation (45-55 Hz) on accuracy is within permissible limit as per prevailing standards.*
- 2. All the measurements shall be tagged with UTC (Coordinated Universal Time). The time tagging accuracy shall be at least one micro-second.*
- 3. The PMU output shall be in IEEE C37.118-2011 format and shall communicate with the PDC at EGAT center in the same format. The accuracy of the measurements shall be as per the IEEE C37.118-2011 standard.*
- 4. The PMUs shall be used to measure the following:*

tse เอกสารควบคุม
---------------------

- *3 phase positive sequence voltages as magnitude and angle (polar form) quantities.*
  - *3 phase positive sequence currents magnitude and angle (polar form) quantities*
  - *Frequency, Rate of change of frequency & Active and Reactive power may be derived at PMUs the measured values. The PMUs shall be capable of transferring the all the measured & derived quantities to PDC at EGAT center along with timestamp.*
5. *Data of Phasor Monitoring Unit (PMU) shall be provided for every channel.*
  6. *The PMUs shall be suitable for configuring the data sampling rate of 10, 25, 50 samples per second. Actual rate shall be user selectable.*
  7. *The PMUs shall have continuous self-monitoring, diagnostic feature and capable to identify & communicate problems and shall generate alarm in case of any abnormality which shall be displayed locally as well as shall be transferred to the PDC at EGAT center.*
  8. *The PMUs shall communicate with PDC at EGAT center on Ethernet interface thru communication ports of 10/100/1000 Base Tx for TCP/IP for streaming data in IEEE C 37.118-2011 format.*
  9. *There shall be provision for HMI (Human Machine Interface) in PMU to perform setting changes In addition HMI should display the measured quantities for ease during testing. The Operation indications and time tagged events shall be available by the Local HMI. Alternatively Portable configuration device for PMUs at local/Remote end can be provided for configuring the PMUs.*

*Remote configuration facility for PMUs required.*

System Alarm.

The FRS shall be equipped with a continuous self-diagnostic which detects and alarms the particular diagnosed condition. The system shall detect, indicate, and alarm the following conditions:

- Operate      Fault Recorder Operate
- Fail          FRS fail, CPU fail, power fail
- Not Ready    Communication fail, etc.

External reset shall be provided.

The alarm output shall include both normally open and normally closed contact output.

Communications.

The communication to the FRS shall be provided by two (2) methods.

1. Direct connect communication
2. Ethernet communication by TCP/IP protocol

Ethernet communication must support the connection speed of 10/100 Mbps (via RJ-45 connector) and must communicate on TCP/IP protocol (or internet network).

### Clock.

The fault recorder shall be supplied with built-in calendar and clock to provide accurate date and time including month, day, year (or day, month, year) hour, minute, second, and millisecond for each operation of the recorder. The linked fault recorder shall be time-coordinated to each other within one millisecond.

### Synchronizing.

The FRS shall be provided with the following time synchronizing features:

- Synchronizing the fault recording system clock with an external clock (using the external clock from GPS System).
- The synchronizing input and output for any external clock shall be approved by EGAT to ensure proper interfacing.
- GPS time Synchronization should be synchronized to UTC time with maximum error of 1  $\mu$ s to meet the accuracy requirement of IEEE C37.118 standard.

### Recorded Information.

The following data shall be provided :

- Station Identification up to 32 alphanumeric characters
- Day, Month, Year, Hour, Minute, Second and Millisecond
- Sampling Rate
- Time Marker
- Operation Number
- All Analog, Event Channel Waveform, Sensor Operation, Time Mark
- Channel Identification
- Channel Zero Deflection Line
- Scale Factor

A horizontal dotted line crossing each channel of the fault recorder shall be printed to mark the end of pre-fault data and the beginning of the fault data.

#### 1003.5 Front Panel.

The FRS shall provide local man machine interface to set up the system and permit easy field modification, either through a built-in patch panel or a monitor, and a keyboard or a keypad. The local man machine interface shall be provided for programming, display status, waveform or diagnostics. The following status indicators shall be provided :

- CPU failure
- Operation
- Loss of clock synchronizing
- Loss of Power
- others

The FRS shall be furnished with the local man machine interface; otherwise, the industrial personal computer with a monitor shall be provided.

#### 1003.6 Power Supply.

The FRS shall be designed to operate from the 125 VDC ungrounded station battery. The recorder shall be designed for continuous operation over the voltage range of 100 to 143.75 VDC without malfunction to allow for the discharged and fully charged condition of the battery, ambient temperature of 10°C to 55°C, and



humidity of 0 to 95 percent. The recorder shall be immune to damage from accidental short circuiting of the input or output DC supply. The recorder shall not produce any signal, noise, or impulse which is greater than 300 millivolts peak-to-peak on the input DC supply leads.

Main ON-OFF switch for AC circuit and main DC circuit breaker for the power supply unit of the fault recorder shall be provided.

Power supplies for each module shall be provided with miniature circuit breaker (MCB) connected to isolate the devices from power supplies in the tripped or open condition. MCB shall be located within the panels. Engraved nameplates shall be installed beside each set of MCB for identification.

1003.7 Software.

The master station software package (i.e. Data-Analysis, communication software) shall be designed for multi-tasking operation, preferably using Microsoft's Windows with the latest version which supports Thai edition to allow multifunction to run simultaneously. The master station software shall be menu-driven and user-friendly with the following minimum features:

- 1003-7.1 The fault-recording-database at the master station shall be operated with the highest reliability without collapse or failure.
- 1003-7.2 For data transmission, both the FRS and the master station (equipment and software) shall be initialized or reset within the shortest possible time.
- 1003-7.3 It shall be capable of automatic or manual selection by user, retrieving fault data upon detection of fault or disturbance conditions at any of the remote fault recorder sites over TCP/IP.
- 1003-7.4 All selected parts of a fault record can be transmitted on the entire record.
- 1003-7.5 A printout of each record shall begin by automatic or manual selection by user.
- 1003-7.6 The function "Automatically Poll" and "Received Calls" from the remote sites for any change of status including diagnosed problems or data shall be provided.
- 1003-7.7 Communication link shall be able to read, down-load, and up-load all operating parameters of any of the remote fault recorder sites. If any communication error occurs during up-loading and down-loading parameters, the master station and the remote FRS shall roll back to use the old parameters so as to prevent improper operation.
- 1003-7.8 A remote fault record shall be saved into a single file or single folder in the hard disk of the master station. A large number of remote fault records shall not reduce operating speed or cause malfunction of the master station.
- 1003-7.9 Simple backup or restored backup record data with OS command. (Windows).
- 1003-7.10 It shall be able to perform File-sharing function on LAN system.
- 1003-7.11 It shall be capable of initiating and receiving a complete test of the remote fault recorder and shall be capable of sending a trigger to any remote fault recorder to take a recording for calibration check.

tsc เอกสารควบคุม
---------------------

1003-7.12 The application software shall include the following features as a minimum:

- There shall be at least two (2) levels of sorting record data, i.e. by record name and by record date, and shall be able to open or display many records at the same time (multi-records).
- It shall be able to select amplitude, time bases and waveform placement. It shall be able to place on any position and to place multiple waveforms on the same axis. Moreover, it shall be able to insert or delete any waveform (analog and digital) on a current screen.
- All waveforms which are shown on the screen and on the print preview shall be exactly the same.
- It shall be able to calculate RMS value and time interval of the waveform in each cycle or in the specified range of time.
- It shall be able to print the selected waveforms on one single.
- It shall be able to make up a composite record of analog traces and event traces from any different fault recorders in any desired combination. Such composite record shall be able to be saved as a new file.
- It shall be able to automatically convert waveform record data files to both of the binary and ASCII formats of standard IEEE COMTRADE files (at least version IEEE C37.111 – 1999). The exported COMTRADE files must have data units specified in COMTRADE 1999 format and the data shown in actual corresponding units.
- The Auto-exporting COMTRADE files shall be saved in a specified directory. The name of backup file shall be specify substation name, date and time of fault.
- It is able to arrange Authorization Setting in the directory of output COMTRADE files so that Automated Fault Analysis (AFA) Application Server can process on Data Acquisition procedures through EGAT LAN.
- The COMTRADE files performed on Auto-export mode shall be named and renamed by user.
- The channel identification shall consist of at least 16 digits which are digit number, alphabet and punctuation mark.
- Graphic display for all analog and event channels shall include channel identification, engineering unit, scaling, date and time with resolution of one millisecond.
- It shall be able to accurately calculate RMS voltage and current, peak voltage and current, sequence voltages and currents, phase angle, active and reactive powers, apparent impedance, frequency, and distance to fault.
- The calculated channels function which has already been created and saved shall be available whenever a record is displayed.
- It shall be able to provide impedance plot on R – X diagram from selected analog channels.
- For the Distance to Fault Calculation of any feeder, it shall require only three (3) voltage channels (Va, Vb, Vc, either bus voltage or line

voltage) and three (3) current channels of the faulted feeder (Ia, Ib, Ic) without requirement on the neutral voltage and current channels.

- It shall be able to provide calculated channels which a user can make a basic formula like summation or difference as well as be able to save, retrieve, print, display, or export.
- It shall be able to accurately measure and display on the screen the instantaneous time and the magnitude values at the location of the cursor at any point on the trace waveform.
- Time base expansion or compression shall be provided for graphic display.
- Harmonic analysis (up to 13<sup>th</sup> harmonic) using FFT of a selected trace waveform shall be provided.

1003-7.13 For the start up, all application software and all setting parameters shall be supplied in CD-ROM.

1003-7.14 Both software & hardware (for example : hard lock, etc.) shall be well-prepared for the system extension in the future.

1003.8 Master Station and Server.

Each master station and server (if required as indicated in Price Schedule) shall be as specified in the attached Specification for Master Station and Server.

1003.9 Service and Training.

Start-up supervisors shall be provided to assure that the FRS has been properly set-up by Contractor. Supervisors shall be able to set up the master station so that it can retrieve all data and parameters to and from the FRS which is located at the substation. In addition, an on-site training and the installation of software at the master station, the use of application software, the operation and maintenance of the systems shall be provided.

1003.10 Documentation.

1003-10.1 A copy of wiring connection diagrams and installation instructions shall be supplied for the FRS. Wiring diagrams shall be provided and shall show all connections from point-to-point for all equipment. All wiring connections among all the equipment mounted on each panel shall be shown on the same drawing. All approved final drawings, i.e. AC schematic diagrams, DC schematic diagrams, and internal wiring diagrams shall be provided and printed as follows:

Sheet size : A3 297 x 420 mm

1003-10.2 A complete set of operation and maintenance manuals of all equipment (FRS, GPS, Master station etc.).

1003-10.3 One certified copy of factory test report shall be supplied for the FRS *and PMU*.

All documents shall be in English or Thai.

The procedures for being listed in EGAT's Specification and EGAT ACCEPTED FRS LIST can be requested from Transmission System Engineering Division.

**DRAFT**

**SECTION J  
DRAWINGS**

## J. DRAWINGS

### J-1. Drawings

The following drawings are attached hereto and made a part of the Contract Documents :

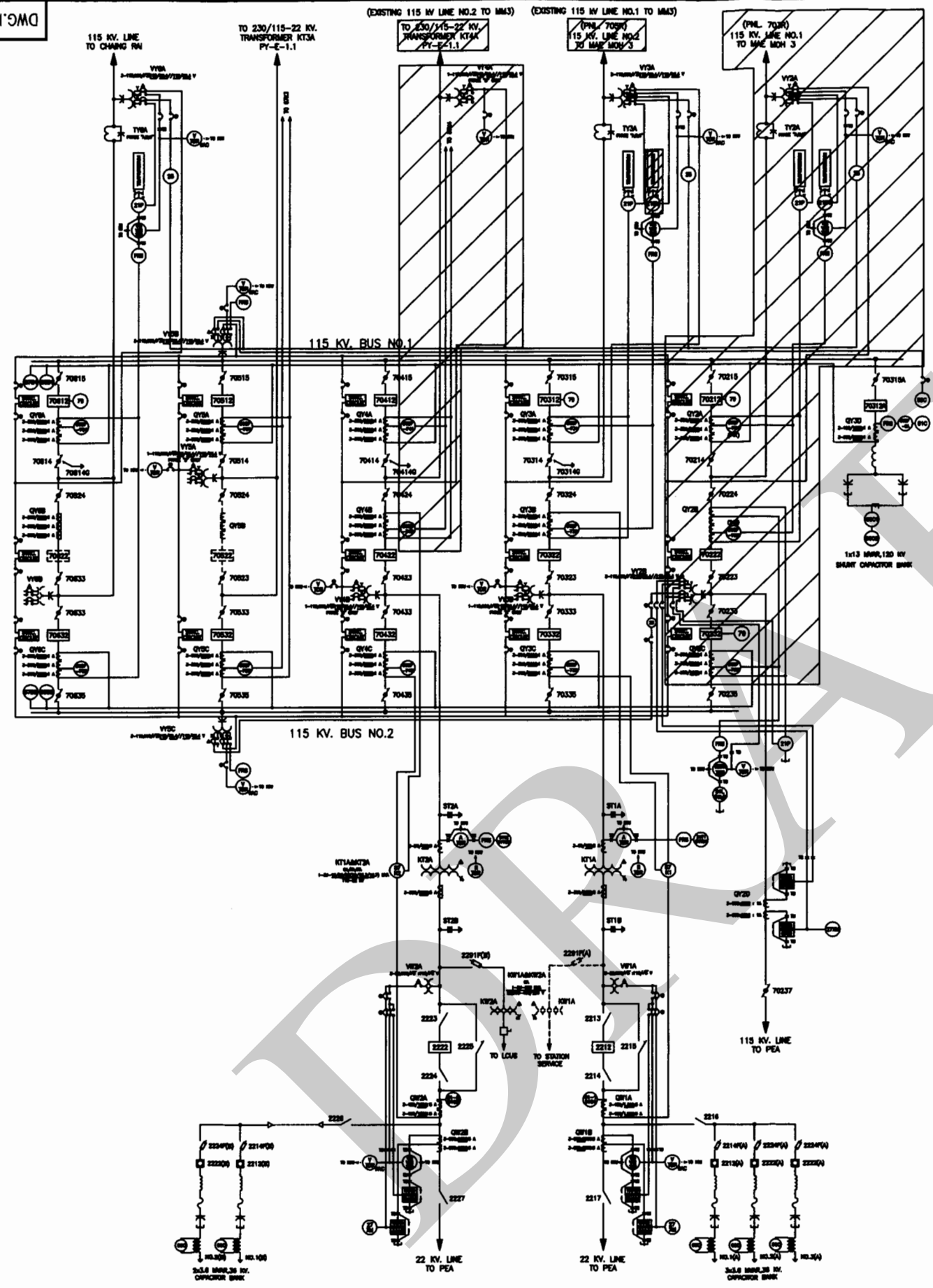
#### List of Design Drawings

No.	Description	Dwg. No.	Sheet	Rev.
1	230 KV. METERING AND RELAYING DIAGRAM	PY-E-1.1	-	-
2	115 KV. METERING AND RELAYING DIAGRAM	PY-E-1.2	-	-
3	230 KV. METERING AND RELAYING DIAGRAM	MM4-E-1	-	-
4	500 KV METERING AND RELAYING DIAGRAM	WN-E-1.1	-	-
5	115 kV METERING AND RELAYING DIAGRAM	MM3-E-1.3	1/1	1
6	RELAYING & METERING DIAGRAM	UD3-E-1.2	-	-
7	RELAYING & METERING DIAGRAM	SO2-E-1.1	-	-
8	RELAYING & METERING DIAGRAM	RE-E-1.2	2/2	-
9	115 kV METERING AND RELAYING DIAGRAM	TTK-E-1.3	-	-
10	METERING AND RELAYING DIAGRAM	TA2-E-1.1	-	-
11	230 kV METERING AND RELAYING DIAGRAM	SLB-E-1.1	-	-
12	115 kV METERING AND RELAYING DIAGRAM	SLB-E-1.2	-	-
13	230 KV AIS METERING AND RELAYING DIAGRAM	HY2-E-1.1	2/2	-

**List of Standard Drawings**

<b>No.</b>	<b>Description</b>	<b>Dwg. No.</b>	<b>Sheet</b>	<b>Rev.</b>
14	INTERPOSING RELAY OR TRANSDUCER CABINET AND DUAL TYPE MAIN CONTROL BOARD	TP-E-10.2	-	5
15	TYPICAL SCHEDULE FOR NAMEPLATES	TP-E-11	1/6	4
16	TYPICAL SCHEDULE FOR NAMEPLATES	TP-E-11	2/6	1
17	TYPICAL SCHEDULE FOR NAMEPLATES	TP-E-11	3/6	1
18	TYPICAL SCHEDULE FOR NAMEPLATES	TP-E-11	4/6	1
19	TYPICAL SCHEDULE FOR NAMEPLATES	TP-E-11	5/6	1
20	TYPICAL SCHEDULE FOR NAMEPLATES	TP-E-11	6/6	1





LEGEND	DESCRIPTION
21P	DIRECTIONAL PHASE DISC RELAY - CARRIER TRIP
2S	SWING-CHECK RELAY
27M	LOSS OF POTENTIAL ALARM RELAY
28P	FAULT DETECTION FOR BREAKER FAILURE
31,31T	NON-DIRECTIONAL OVERCURRENT RELAY
31S	NON-DIRECTIONAL OVERCURRENT RELAY
31C	DIRECTIONAL OVERCURRENT RELAY
32C	LINEBACK RELAY
7R	AUTO RESETTING RELAY
47R	115 KV BUS DIFFERENTIAL RELAY
47K	TRANSFORMER DIFFERENTIAL RELAY
A3	3-AMMETER ONE PER PHASE
V	VOLTMETER
W & WR	WATT AND WATT HOUR METER
F	FREQUENCY METER
S	SYNCHROSCOPE
SS	SYNCHRONIZING SWITCH
VS	VOLTMETER SELECTOR SWITCH
WSM	WATT HOUR METER
DTOR	PROGRAMMABLE TELECONTROLLING INSTRUMENTS
L	RECORDING LAMP
LL	RECORDING LINE LAMP
A-TR	CURRENT TRANSFORMER
V-TR	VOLT TRANSFORMER
WRM-TR	WATT AND WATT HOUR TRANSFORMER
A-TR	RECORDING TRANSFORMER FOR TRANSFORMER O/P POSITION INDICATION
○	RECORDING INSTRUMENT OR RELAY
□	RECORDING INSTRUMENT
⊕	WYE CONNECTED CURRENT TRANSFORMER
⊕	DELTA CONNECTED CURRENT TRANSFORMER
⊕	CURRENT TEST SWITCH
⊕	POTENTIAL TEST SWITCH
⊕	PHASE LOCKED AT SWITCHYARD
⊕	PHASE LOCKED AT MAIN CONTROL BOARD
⊕	CURRENT & POTENTIAL TEST SWITCH FOR THE MOBILE RELAY (SUPPLY BY BATTERY CHARGING AND WINDING WILL BE REQUIRED)
⊕	MOB LOCKED AT SWITCHYARD
⊕	MOB LOCKED AT MAIN CONTROL BOARD

REFERENCE DRAWING  
 PHAYAO SUBSTATION  
 SINGLE LINE DIAGRAM.....DWG. NO. PY - S - 1 SH.02/02 REV.-

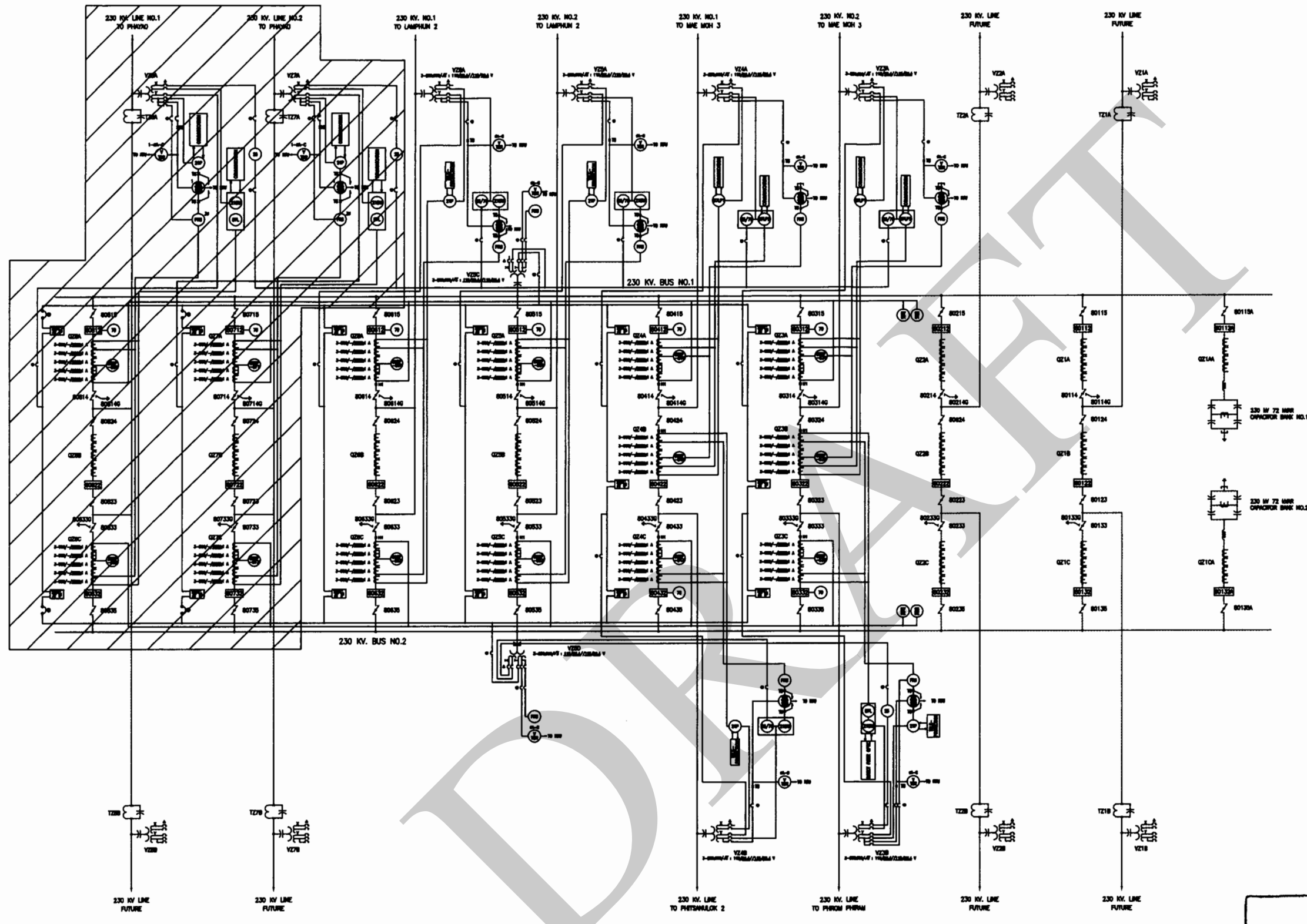
วิศวกรควบคุม  
 ตรี. ชัยวัฒน์ (1/1/11)  
 (นายสมชาย วัฒนกุล)  
 วิศวกร  
 กบ.ส. ส. นว. 6  
 วิศวกรควบคุมระบบควบคุมการเดินเครื่อง

FOR BIDDING ONLY

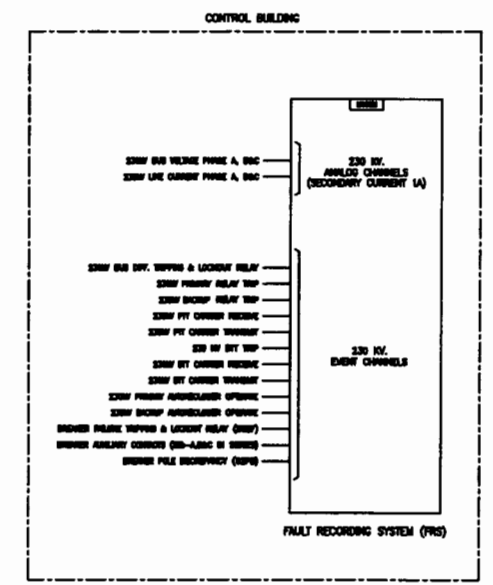
129	ISO 9001	TSEB1999	CAD CENTER	DO NOT AMEND MANUALLY	REV. NO.	JOB NO.	JOB DESCRIPTION	DRAWN	DESIGNED	VERIFIED	VALIDATED	RECOMMENDED	CONCLUDED	APPROVED	DATE
-	TS12-08-002	ADDITIONAL 115 KV. LINES NO. 1 & 2 TO MHE MON 4 230 KV. LINES NO. 3&4 TO CHANG PHU AND 230/115 KV. 200 MVA. TR TRANSFORMER KT4A	-	-	-	-	-	-	-	-	-	-	-	-	-

ELECTRICITY GENERATING AUTHORITY OF THAILAND			
DRAWN	S. CHANBUT	VALIDATED	CHY. CHANSAWANG
DESIGNED	S. CHANBUT	RECOMMENDED	CHY. CHANSAWANG
VERIFIED		CONCLUDED	CHY. CHANSAWANG
APPROVED			CHY. CHANSAWANG
DRAWING NAME		PHAYAO SUBSTATION	
DESCRIPTION OF DETAIL DRAWING		115 KV. METERING AND RELAYING DIAGRAM	
JOB NO.	REPLACING DWG. NO.	DWG. NO.	REV.
TS12-08-002		PY - E - 1.2	-





LEGEND	DESCRIPTION	TYPE	MANUFACTURER
801	230 KV BUS DIFFERENTIAL RELAY, HIGH IMPEDANCE TYPE	801.07Z	SEL
808	BUS SUSPENSION RELAY		
801P1	PRIMARY 1 LINE PROTECTION CURRENT DIFFERENTIAL RELAY	801.31L	SEL
801P2	PRIMARY 2 LINE PROTECTION CURRENT DIFFERENTIAL RELAY	78022	SIEMENS
21P	PRIMARY LINE PROTECTION DISTANCE RELAY	78012	SIEMENS
21N	SECONDARY LINE PROTECTION DISTANCE RELAY	REL870	ABB
25	SYNCHRONIZING CHECK RELAY (INCLUDE IN LINE PROTECTION)		
70	AUTO RECLOSED RELAY (INCLUDE IN LINE PROTECTION)		
805F	FAULT DETECTOR FOR BRANCH FAILURE	FD21	AREDA
V-301	VOLT TRANSFORMER	80416	SIEMENS
TRMPT-TR	TEST AND TRIP TRANSFORMER	80403	SIEMENS
MSB	MSB LOCKED AT SWITCHING		
MSB	MSB LOCKED AT MCH CONTROL BOARD		
○	INDICATING METERING OR RELAY		
	CURRENT TEST SWITCH	FT-1	ABB
	POTENTIAL TEST SWITCH		
	WYE CONNECTED CURRENT TRANSFORMER		
	DELTA CONNECTED CURRENT TRANSFORMER		



REFERENCE DRAWINGS  
 MAE MOH 4 SUBSTATION  
 1. 230 KV SINGLE LINE DIAGRAM (DWG. NO. MM-4-S-1)

NOTE  
 ADDITIONAL FOR JOB NO. TS12-08-001 (BY E04)

ได้ตรวจสอบแล้ว  
 ลงชื่อ..... (นายเมธา ธิปไตย)  
 (นายเมธา ธิปไตย)  
 ภาว.ส. ๑๑ ม.๖  
 กองวิศวกรรมระบบควบคุมและป้องกัน

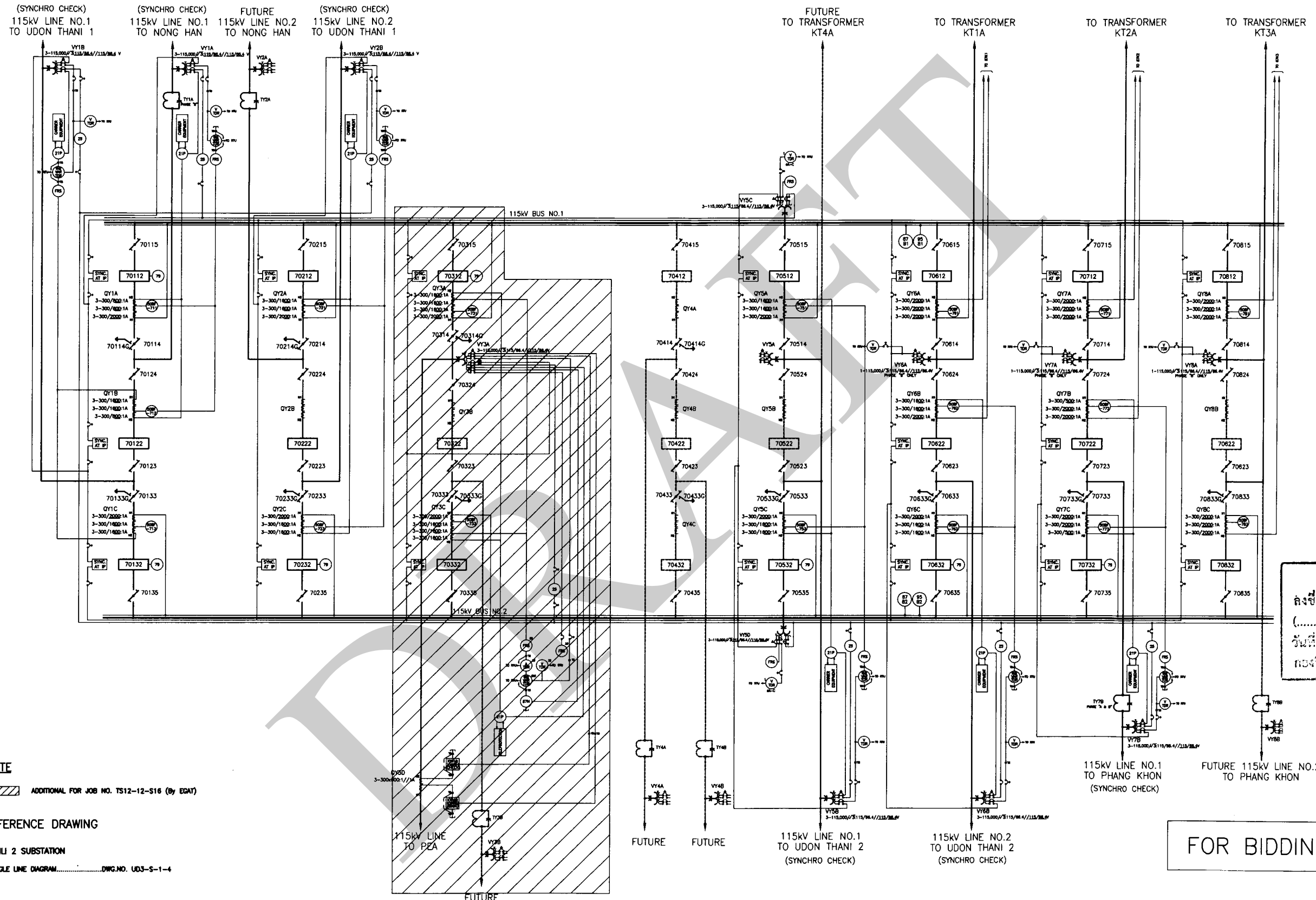
FOR BIDDING ONLY



ELECTRICITY GENERATING AUTHORITY OF THAILAND									
MAE MOH 4 SUBSTATION									
230 KV. METERING AND RELAYING DIAGRAM									
NO.	REVISION	DATE	BY	CHECKED	APPROVED	DATE	REVISION	DATE	BY
1	TS12-08-001								







ได้ตรวจสอบแล้ว  
 ลงชื่อ..... (นายเมธา ธิกุลพานิช)  
 กวบ-ส.  
 วันที่.....  
 กองวิศวกรรมระบบควบคุมและป้องกันภัย

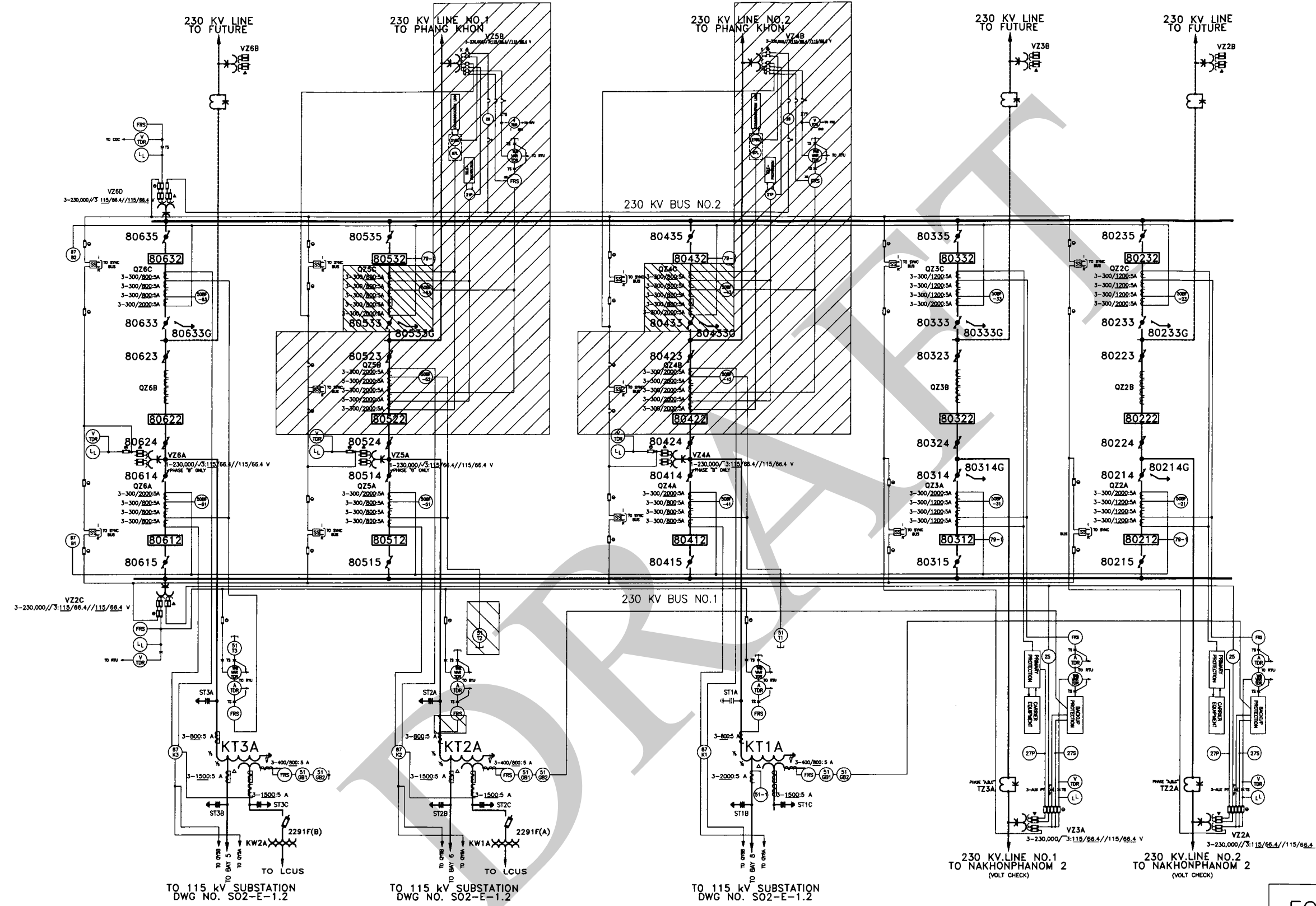
**NOTE**  
 1. [Hatched Area] ADDITIONAL FOR JOB NO. TS12-12-S16 (By EDA1)

**REFERENCE DRAWING**  
 TAKHLI 2 SUBSTATION  
 1. SINGLE LINE DIAGRAM.....DWG. NO. UD3-S-1-4

FOR BIDDING ONLY



ELECTRICITY GENERATING AUTHORITY OF THAILAND										
DRAWN	J. WEERAVUT	VALIDATED	CHY. CHONGSAK	CHY. CHONGSAK	CHY. CHONGSAK	CHY. CHONGSAK	CHY. CHONGSAK	CHY. CHONGSAK	CHY. CHONGSAK	CHY. CHONGSAK
DESIGNED	J. WEERAVUT	RECOMMENDED	CHY. CHONGSAK	CHY. CHONGSAK	CHY. CHONGSAK	CHY. CHONGSAK	CHY. CHONGSAK	CHY. CHONGSAK	CHY. CHONGSAK	CHY. CHONGSAK
VERIFIED		CONCURRED								
APPROVED										
DRAWING NAME: UDON THANI 3 115KV (UD3) SUBSTATION										
DESCRIPTION OF DETAIL DRAWING: RELAYING & METERING DIAGRAM										
REV. NO.	JOB NO.	JOB DESCRIPTION	DRAWN	DESIGNED	VERIFIED	VALIDATED	RECOMMENDED	CONCURRED	APPROVED	DATE
-	TS12-12-S16	ADDITIONAL 115KV. LINE TO PEA.	J. WEERAVUT	J. WEERAVUT	-	-	-	-	-	-
			JOB NO. TS12-12-S16		REPLACING DWG. NO. -		DWG. NO. UD3-E-1.2		REV. -	



- NOTES
1. [Hatched Box] ADDITIONAL FOR JOB NO. TS12-05-S04 (By EGAT)
  2. [Cross-hatched Box] MODIFICATION FOR JOB NO. TS12-05-S04 (By EGAT)

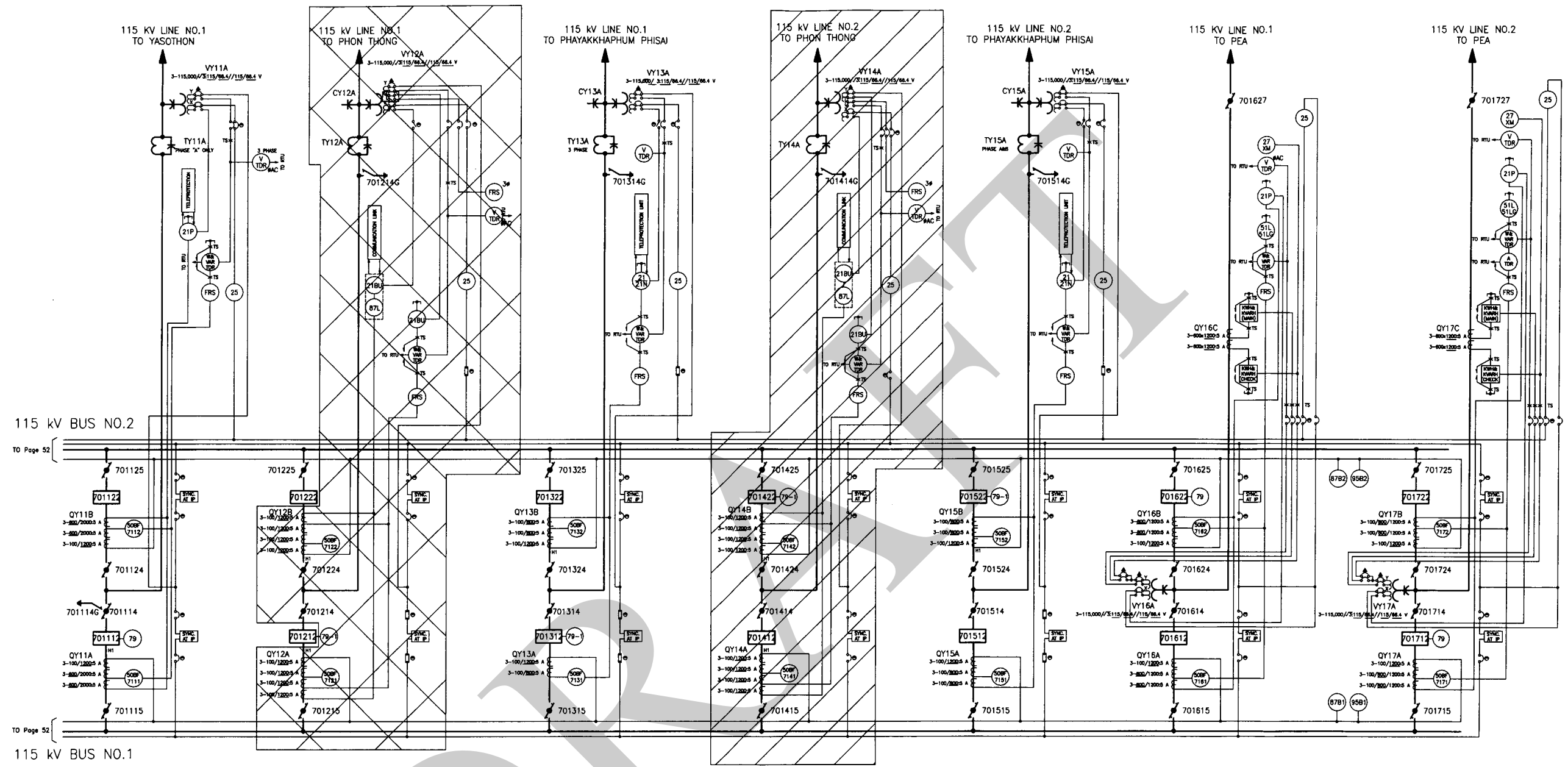
ได้ตรวจสอบแล้ว  
 ลงชื่อ..... (นายเมธา ธิกุลปาน)  
 วันที่..... กว.ศ. ๑๖ เม.ย. ๖๒  
 กองวิศวกรรมระบบควบคุมและป้องกัน

FOR BIDDING ONLY

134  
 ISO 9001  
 TSEB1999  
 CAD CENTER  
 DO NOT AMEND MANUALLY

REV. NO.	JOB NO.	JOB DESCRIPTION	DRAWN	DESIGNED	VERIFIED	VALIDATED	RECOMMENDED	CONCURRED	APPROVED	DATE
-	TS12-05-S04	ADDITIONAL 230KV LINE NO.1 & NO.2 TO PHANG KHON	J.WEEPAVUT	J.WEEPAVUT	-	-	-	-	-	-

ELECTRICITY GENERATING AUTHORITY OF THAILAND									
DRAWN					VALIDATED				
DESIGNED					RECOMMENDED				
VERIFIED					CONCURRED				
APPROVED					APPROVED				
DRAWING NAME: SAKON NAKHON 2 230KV (SO2) SUBSTATION									
DESCRIPTION OF DETAIL DRAWING: RELAYING & METERING DIAGRAM									
JOB NO. TS12-05-S04		REPLACING DWG. NO. -		DWG. NO. SO2-E-1.1		REV. -		DATE	



- NOTE**
- ▨ ADDITIONAL FOR JOB NO. TS12-13-S03 (By EGAT)
  - ▣ REPLACEMENT FOR JOB NO. TS12-13-S03 (By EGAT)

ได้ตรวจสอบแล้ว  
 ลงชื่อ.....  
 (นายเมธา ธิกุลาน)  
 วิศวกร  
 วันที่..... 26.11.02  
 กองวิศวกรรมระบบควบคุมและป้องกัน

**REFERENCE DRAWING**  
 TAKHLI 2 SUBSTATION  
 1.SINGLE LINE DIAGRAM.....DWG.NO. RE-S-1-02-03

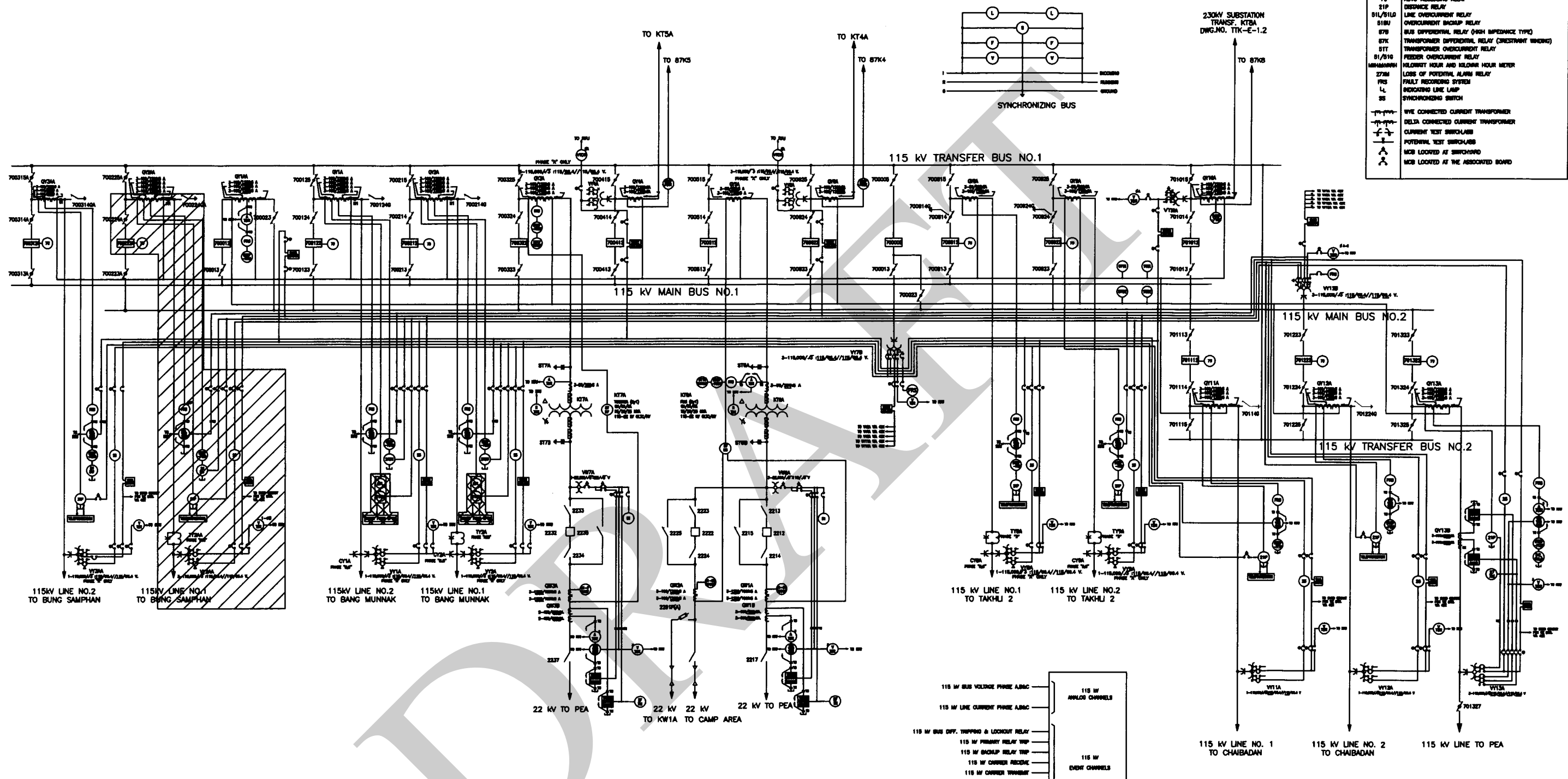
**FOR BIDDING ONLY**



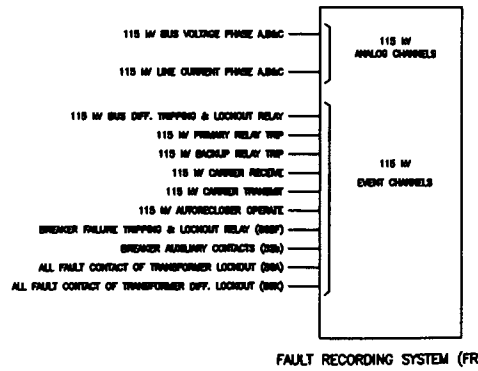
ELECTRICITY GENERATING AUTHORITY OF THAILAND										
DESIGNED	J.WEEMAYUT	VALIDATED	CHY. CHUMMAK	CHY. CHUMMAK	CHY. CHUMMAK	CHY. CHUMMAK	CHY. CHUMMAK	CHY. CHUMMAK	CHY. CHUMMAK	CHY. CHUMMAK
DESIGNED	J.WEEMAYUT	RECOMMENDED	CHY. CHUMMAK	CHY. CHUMMAK	CHY. CHUMMAK	CHY. CHUMMAK	CHY. CHUMMAK	CHY. CHUMMAK	CHY. CHUMMAK	CHY. CHUMMAK
VERIFIED		CONCURRED								
APPROVED										
DRAWING NAME: ROI ET 1 115KV (RE1) SUBSTATION										
DESCRIPTION OF DETAIL DRAWING: RELAYING & METERING DIAGRAM										
JOB NO.	TS12-13-S03	REPLACING DWG.NO.	-	DWG.NO.	RE-E-1.2	REV.	2	REV.	2	

REV.NO.	JOB NO.	JOB DESCRIPTION	DRAWN	DESIGNED	VERIFIED	VALIDATED	RECOMMENDED	CONCURRED	APPROVED	DATE
-	TS12-13-S03	ADDITIONAL 115KV LINE NO.2 TO PHONTHONG	J.WEEMAYUT	J.WEEMAYUT	-	-	-	-	-	-

LEGEND	DESCRIPTION
B-TER	RESISTOR TRANSFORMERS FOR TRANSFORMER TAP POSITION
A-TER	CURRENT TRANSFORMERS
V-TER	VOLT TRANSFORMERS
WBAAR-TER	WATT AND VAR TRANSFORMER
80BF	BREAKER FAILURE RELAY
3S	SYNCHRONISM CHECK RELAY
7S	AUTO RECLOSING RELAY
21P	DISTANCE RELAY
51L/51D	LINE OVERCURRENT RELAY
51BU	OVERCURRENT BACKUP RELAY
57B	BUS DIFFERENTIAL RELAY (HIGH IMPEDANCE TYPE)
57K	TRANSFORMER DIFFERENTIAL RELAY (RESTRAINT WINDING)
57T	TRANSFORMER OVERCURRENT RELAY
51/51B	FEEDER OVERCURRENT RELAY
88/88B/88C	HOLODRIFT HOUR AND KLODRIFT HOUR METER
577B	LOSS OF POTENTIAL ALARM RELAY
FRS	FAULT RECORDING SYSTEM
L	INDICATING LINE LAMP
SS	SYNCHRONIZING SWITCH
CTA	WYE CONNECTED CURRENT TRANSFORMER
CTB	DELTA CONNECTED CURRENT TRANSFORMER
CTC	CURRENT TEST SWITCH/CLASS
PTA	POTENTIAL TEST SWITCH/CLASS
MTB	MCB LOCATED AT SWITCHBOARD
MTA	MCB LOCATED AT THE ASSOCIATED BOARD



ให้ตรวจสอบ  
 ลังชื่อ.....  
 (นายเมธา ธิกุล).....  
 (.....)  
 วันที่..... กว.ส. ๑๖/๗/๖๒  
 กองวิศวกรรมระบบควบคุมและป้องกัน

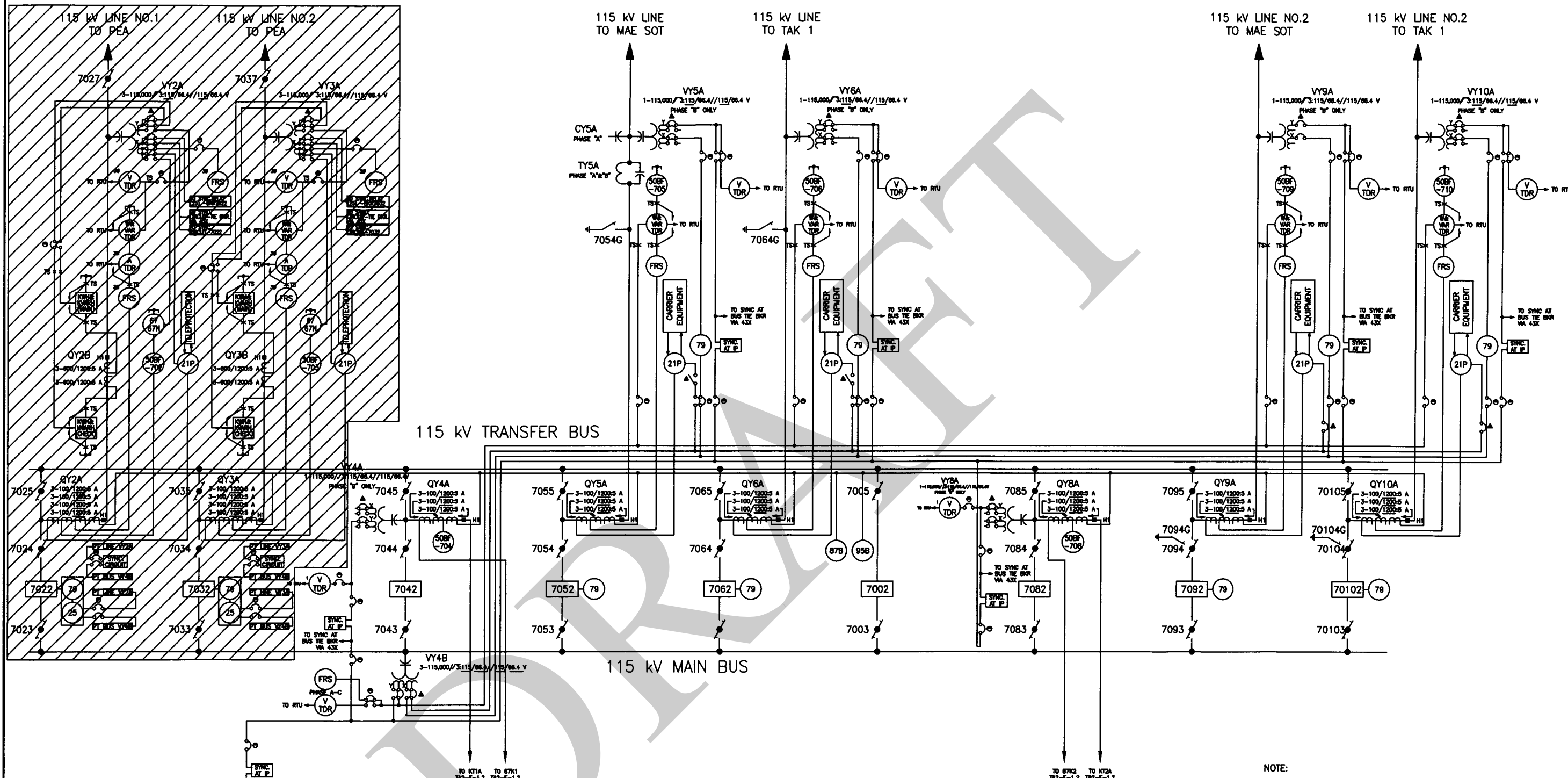


REFERENCE DRAWING  
 THA TAKO SUBSTATION  
 1. SINGLE LINE DIAGRAM..... DWG.NO. TTK - 5 - 1 SH.3/4  
 NOTE  
 1. [Hatched box symbol] ADDITIONAL FOR JOB NO. TS12-13-S19  
 2. [Cross-hatched box symbol] REPLACED FOR JOB NO. TS12-13-S19  
**FOR BIDDING ONLY**

136  
 ISO 9001 TSEB1999  
 CAD CENTER  
 DO NOT AMEND MANUALLY

REV.NO.	JOB NO.	JOB DESCRIPTION	DRAWN	DESIGNED	VERIFIED	VALIDATED	RECOMMENDED	CONCLUDED	APPROVED	DATE
-	TS12-13-S19	ADDITIONAL 115 kV LINE NO.2 TO BANG MUN NAK	-	-	-	-	-	-	-	-

ELECTRICITY GENERATING AUTHORITY OF THAILAND									
DRAWING NAME					DESCRIPTION OF DETAIL DRAWING				
DRAWN	P. JETI	VALIDATED	ONLY CONTROL JOB PRODUCTION DEPARTMENT		DRAWING NAME	THA TAKO SUBSTATION			
DESIGNED	P. JETI	RECOMMENDED	APPROVED ELECTRICAL TRANSMISSION SYSTEM ENGINEERING DEPARTMENT		DESCRIPTION OF DETAIL DRAWING	115 kV METERING AND RELAYING DIAGRAM			
VERIFIED		CONCLUDED	SUPERVISOR, TRANSMISSION SYSTEM ENGINEERING DEPARTMENT		JOB NO.	TS12-13-S19	REPLACING DWG.NO.	DWG.NO.	TTK-E-1.3
APPROVED					DATE				



NOTE:  
1. [Hatched Box] ADDITIONAL FOR JOB TS12-16-S29

ได้ตรวจสอบแล้ว  
 ลงชื่อ นายเมธา ธิกุลพานิชย์  
 (นายเมธา ธิกุลพานิชย์)  
 ควบคุม-ส.  
 อนุมัติโครงการระบบควบคุมและป้องกัน

FOR BIDDING ONLY

REFERENCE DRAWING

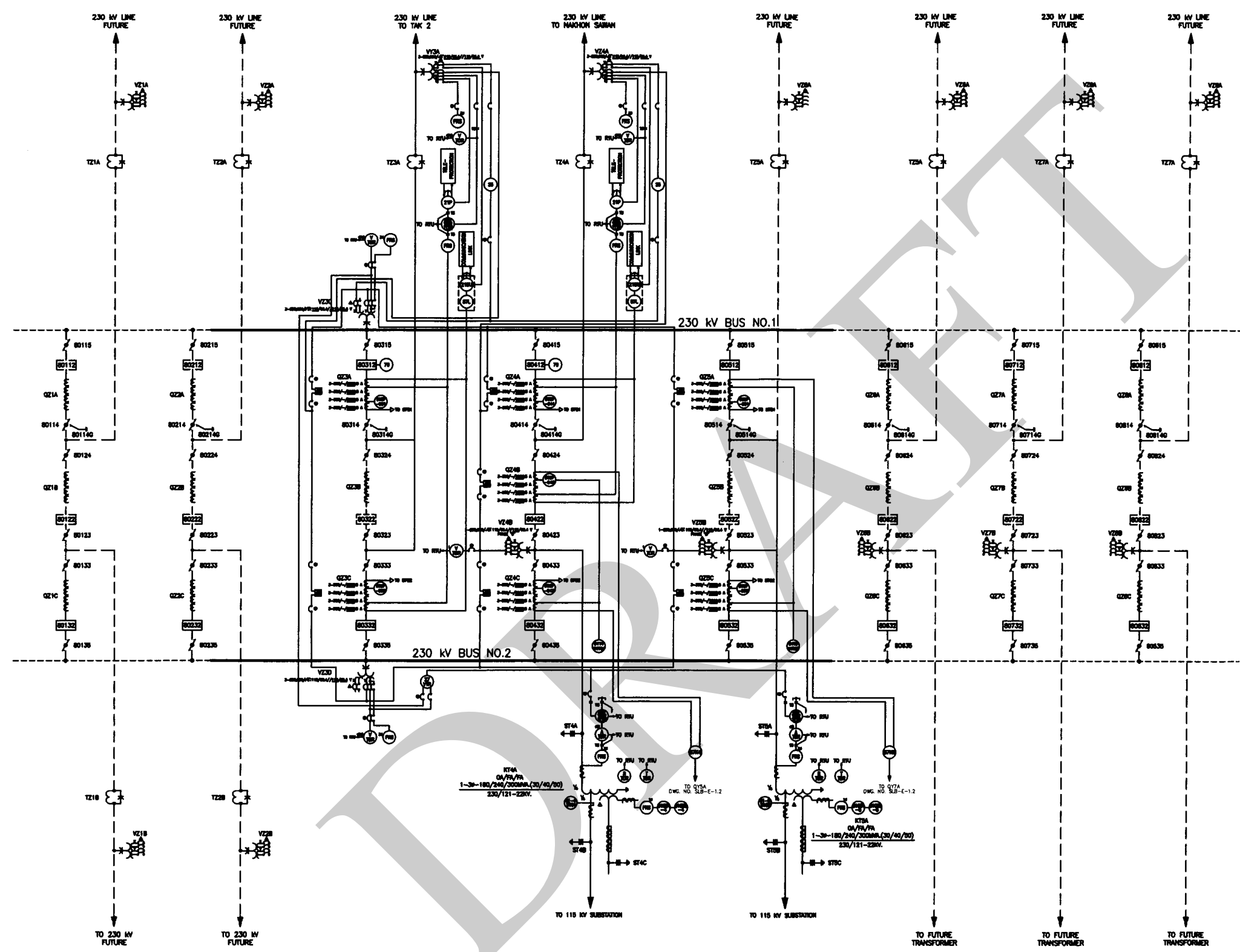
TAK 2 SUBSTATION  
 SINGLE LINE DIAGRAM.....DWG.NO. TA2-S-1

137  
 ISO 9001  
 TSCB1999  
 CAD CENTER

REV. NO.	JOB NO.	JOB DESCRIPTION	DRAWN	DESIGNED	VERIFIED	VALIDATED	RECOMMENDED	CONCURRED	APPROVED	DATE
-	TS12-16-S29	ADDITIONAL 115 kV LINE NO.1 & NO.2 TO PEA	-	-	-	-	-	-	-	-

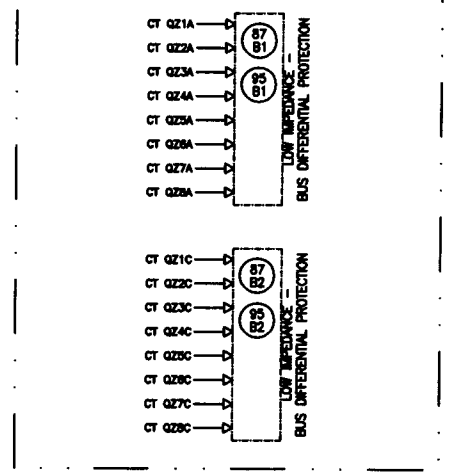
ELECTRICITY GENERATING AUTHORITY OF THAILAND				DRAWING NAME	
DRAWN	A.ATTARAFON	VALIDATED	CHY. CHUMCHAI AND PRASITTHAN SUPANPORN	TAK 2 SUBSTATION	
DESIGNED	A.ATTARAFON	RECOMMENDED	ASSISTANT DIRECTOR, TRANSMISSION SYSTEMS ENGINEERING DEPARTMENT	DESCRIPTION OF DETAIL DRAWING	
VERIFIED		CONCURRED	DIRECTOR, TRANSMISSION SYSTEMS ENGINEERING DEPARTMENT	METERING AND RELAYING DIAGRAM	
APPROVED				JOB NO.	TS12-16-S29
				REPLACING DWG. NO.	TA2-E-1.1
				DWG. NO.	TA2-E-1.1
				REV.	-





LEGEND	DESCRIPTION
87BP	LOW IMPEDANCE - PRIMARY BUSBAR DIFFERENTIAL PROTECTION
95B	BUS WIRE SUPERVISION PROTECTION
87L	LINE DIFFERENTIAL PROTECTION
21P	PRIMARY DISTANCE PROTECTION
2S	SYNCHRO-CHECK RELAY
79	AUTORECLOSEURE DEVICE
51/51C	UNIVERSAL OVERCURRENT RELAY
50BF	BREAKER FAILURE PROTECTION
87K	TRANSFORMER DIFFERENTIAL PROTECTION
FRS	FAULT RECORDING SYSTEM
RTU	REMOTE TERMINAL UNIT
A-TDR	CURRENT TRANSDUCER
V-TDR	VOLT TRANSDUCER
WVAR-TDR	WAT AND VAR TRANSDUCER
T-TDR	TEMPERATURE TRANSDUCER
R-TDR	RESISTOR TRANSDUCER FOR TRANSFORMER TAP POSITION INDICATION
○	INDICATING INSTRUMENT OR RELAY
CT SYMBOL	CT DEVICE CLASS "TPY"
CT SYMBOL	CT DEVICE CLASS "SP20"
WYE SYMBOL	WYE CONNECTED CURRENT TRANSFORMER
DELTA SYMBOL	DELTA CONNECTED CURRENT TRANSFORMER
TEST SWITCH	CURRENT TEST SWITCH
POTENTIAL TEST SWITCH	POTENTIAL TEST SWITCH
MCB SYMBOL	MCB LOCATED AT SWITCHYARD
MCB SYMBOL	MCB LOCATED AT THE ASSOCIATED BOARD

BUSBAR PROTECTION DEVICE

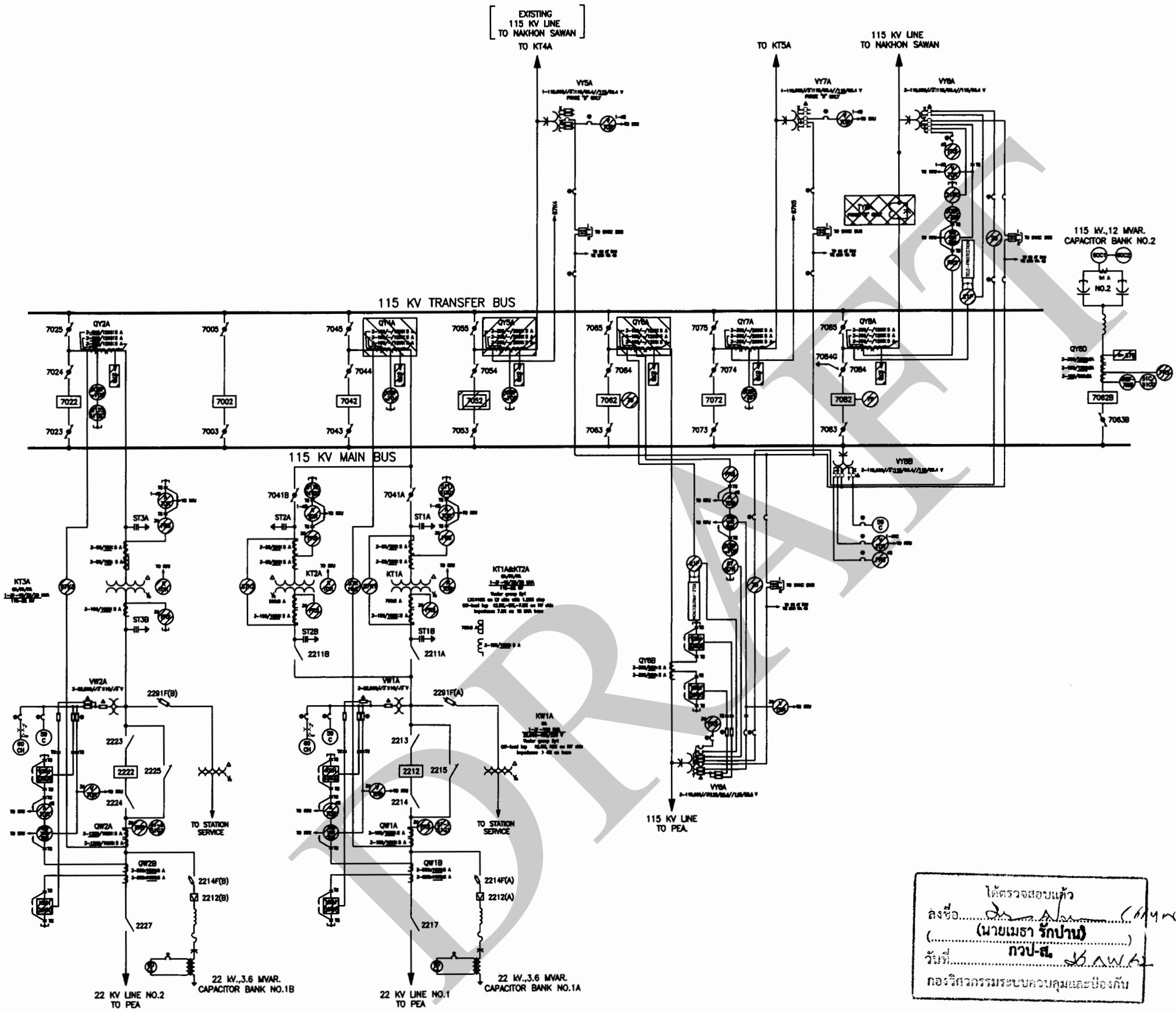


ได้ตรวจสอบแล้ว  
 ลงชื่อ..... (นายเมธา รักปาน)  
 (นายเมธา รักปาน)  
 วันที่..... กว.ป.ส. ๒๖ พ.ย. ๖๒  
 กองวิศวกรรมระบบควบคุมและป้องกัน

FOR BIDDING ONLY



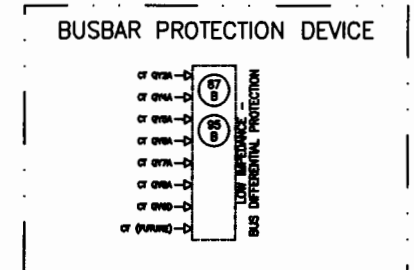
ELECTRICITY GENERATING AUTHORITY OF THAILAND											
DRWING	LIBRIFAT	VALIDATED	ONLY, CONTROL AND PROTECTION ENGINEERING DEPARTMENT				DRWING NAME	SALOKBAT SUBSTATION			
DESIGNED	LIBRIFAT	RECOMMENDED	RECOMMENDED				DESCRIPTION OF DETAIL DRAWING				
VERIFIED	CONCURRED	CONCURRED	CONCURRED				230 KV METERING AND RELAYING DIAGRAM				
APPROVED	DATE	DATE	DATE	DATE	DATE	DATE	JOB NO.	REPLACING DWG. NO.	DWG. NO.	REV.	
TS12-07-001	TS12-07-001	TS12-07-001	TS12-07-001	TS12-07-001	TS12-07-001	TS12-07-001	TS12-07-001	-	SLB-E-1.1	-	



LEGEND	DESCRIPTION
21P	LINE DISTANCE RELAY
21B	LINE DISTANCE RELAY
50BF	FAULT DETECTOR FOR BROWER FAILURE
79	RELOADING RELAY
87B	LOW IMPEDANCE BUSBAR DIFFERENTIAL RELAY
88B	BUS WIRE SUPERVISION
87K	TRANSFORMER DIFFERENTIAL RELAY
51,51T	NON-DIRECTIONAL OVERCURRENT RELAY
51G	NON-DIRECTIONAL GROUND OVERCURRENT RELAY
89C	OVERCURRENT RELAY
89C	UNBALANCE SENSING RELAY
25	SYNCHRO-CHECK RELAY
25 CCS	SYNCHRONIZING BY CCS
FRS	FAULT RECORDING SYSTEM
RTV	REMOTE TERMINAL UNIT
F-TX	FREQUENCY TRANSDUCCERS
A-TX	CURRENT TRANSDUCCERS
V-TX	VOLT TRANSDUCCERS
25BAR-TX	BAR AND BAR TRANSUDCER (ONE PER LINE, ONE PER TRANSFORMER)

○	INDICATING INSTRUMENT OR RELAY
□	RECORDING INSTRUMENT
—○—	WYE CONNECTED CURRENT TRANSFORMER
—△—	DELTA CONNECTED CURRENT TRANSFORMER
—	CURRENT TEST SWITCH
—	POTENTIAL TEST SWITCH
—	MCB LOCKED AT SHORTCIRCUIT
—	MCB LOCKED AT THE ASSOCIATED BOND



LEGEND

▨	Added for Job No. TS12-07-S01 (By E207)
▧	Replaced for Job No. TS12-07-S01 (By E207)
▩	Revised for Job No. TS12-07-S01 (By E207)

REFERENCE DRAWINGS  
 SALOKBAT SUBSTATION  
 1. 115 KV SINGLE LINE DIAGRAM DWG. NO. SLB-S-1 SH2/2

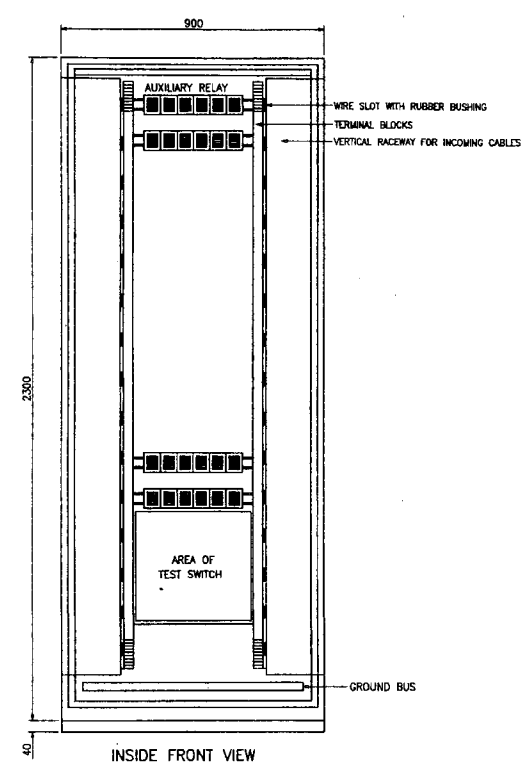
ได้ตรวจสอบแล้ว  
 ลงชื่อ: นายเมธา ธิกุลพานิชย์ (นายเมธา ธิกุลพานิชย์)  
 (นายเมธา ธิกุลพานิชย์)  
 วันที่: กว.ศ. 26.11.2552  
 กองวิศวกรรมระบบควบคุมและป้องกัน

FOR BIDDING ONLY

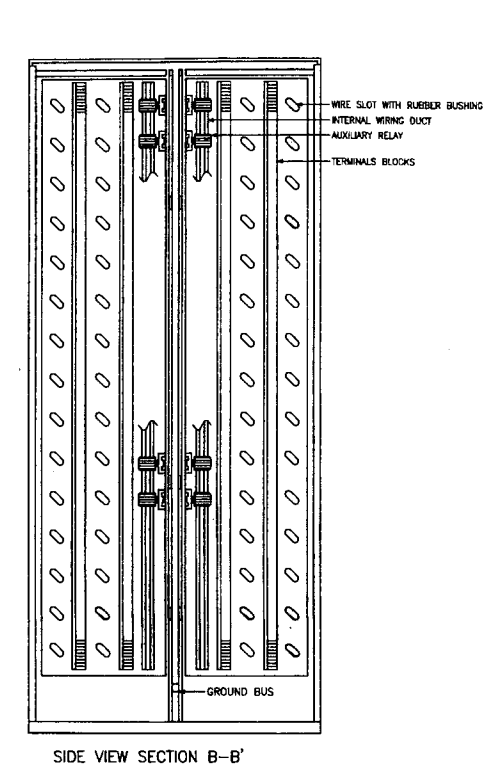
REV. NO.	JOB NO.	JOB DESCRIPTION	DRWEN	DESIGNED	VERIFIED	VALIDATED	RECOMMENDED	CONCURRED	APPROVED	DATE
-	TS12-07-S01	REV 238 OF SUBSTATION, ADDITIONAL 115 KV TRANSFORMER (QY7A and QY8A) 22KV/115 KV, 3000VA, RELOADING 115 KV LINE TO NAKHON SAWAN AND RELOADING 115 KV ALL THE CONTROL AND PROTECTION EQUIPMENT	-	-	-	-	-	-	-	-

ELECTRICITY GENERATING AUTHORITY OF THAILAND										
DRWEN	L. SIBAPAT	VALIDATED	CHY, CHONG, AND PONGSUK	ENGINEERING DEPARTMENT	DRAWING NAME	SALOKBAT SUBSTATION				
DESIGNED	L. SIBAPAT	RECOMMENDED	ASSISTANT ENGINEER, TRANSMISSION SYSTEM ENGINEERING DEPARTMENT	DESCRIPTION OF DETAIL DRAWING	115 KV METERING AND RELAYING DIAGRAM					
VERIFIED	-	CONCURRED	ENGINEER, TRANSMISSION SYSTEM ENGINEERING DEPARTMENT	JOB NO.	TS12-07-S01	REPLACING DWG. NO.	SLB-E-1.2	DATE	-	REV.
APPROVED	-	-	-	DATE	-	-	-	-	-	-

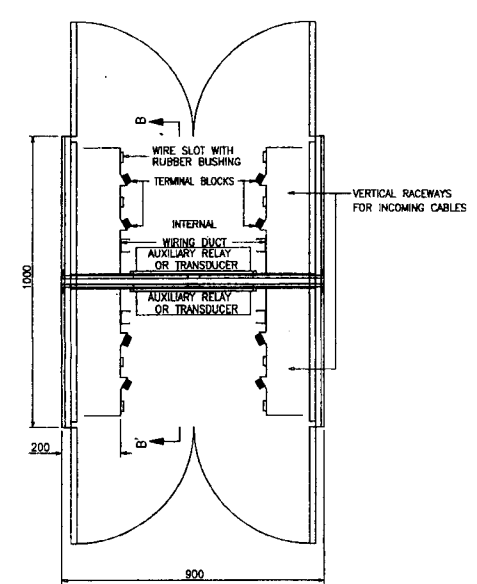




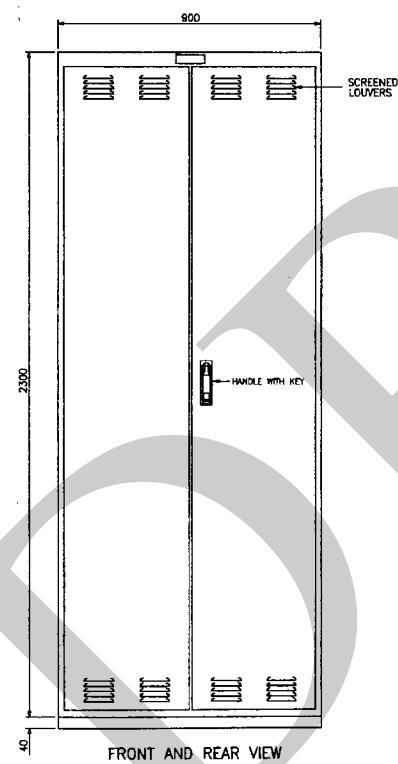
INSIDE FRONT VIEW



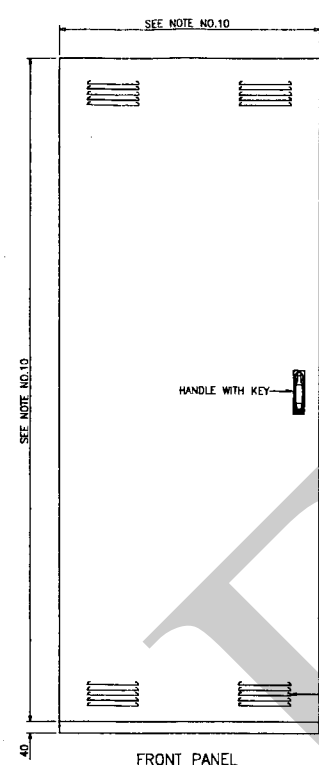
SIDE VIEW SECTION B-B'  
INTERPOSING RELAY OR TRANSDUCER CABINET



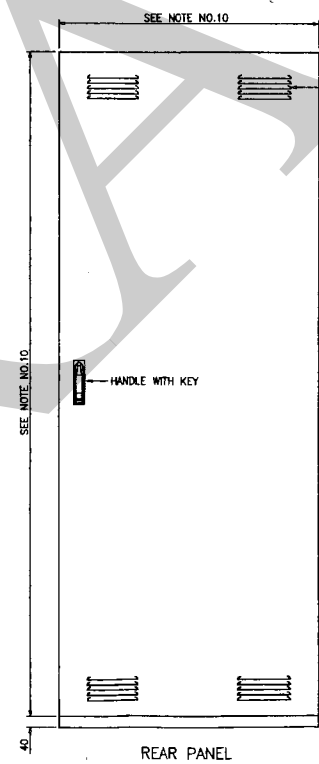
INTERPOSING RELAY OR TRANSDUCER CABINET



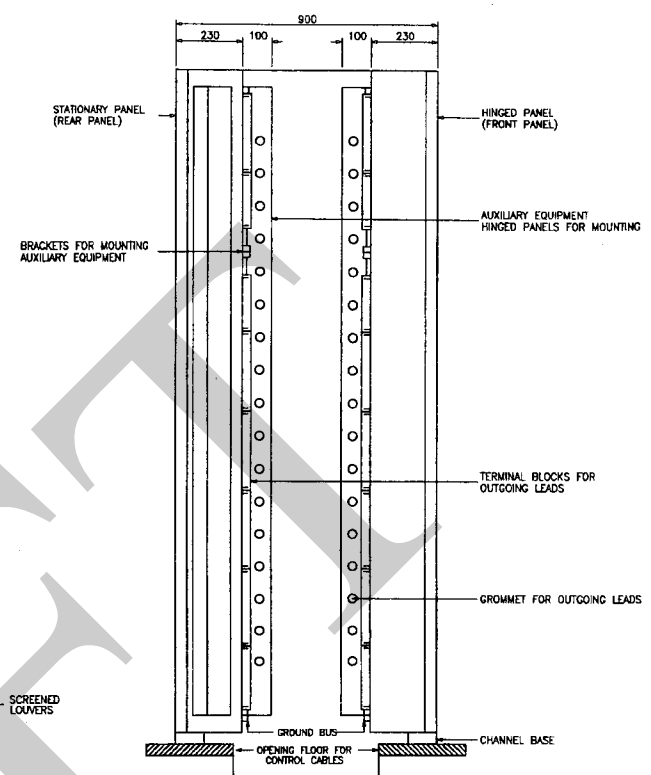
FRONT AND REAR VIEW



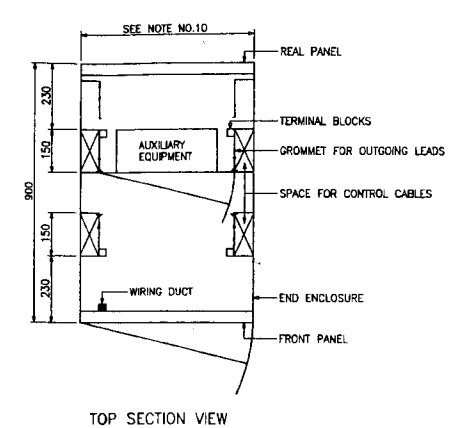
FRONT PANEL



REAR PANEL



SIDE SECTION VIEW  
DUAL TYPE MAIN CONTROL BOARD



TOP SECTION VIEW

NOTES

- ALL DIMENSIONS ON THIS DRAWING ARE IN MILLIMETERS.
- THIS DRAWING SHOWS GENERAL REQUIREMENT FOR THE CONSTRUCTION OF THE INTERPOSING RELAY OR TRANSDUCER CABINET. THE CONTRACTOR SHALL SUBMIT DETAIL DESIGN DRAWINGS TO EGAT FOR APPROVAL.
- THE CABINET SHALL CONSIST OF THE ASSEMBLIES MADE FROM NOT LESS THAN NO.11 USS.gage (3 mm) LEVELED SHEET STEEL AND FORMED STEEL MEMBERS AS REQUIRED TO FORM A RIGID SELF-SUPPORTING STRUCTURE.
- THE INTERPOSING RELAYS OR TRANSDUCERS TO BE INSTALLED INSIDE THE INTERPOSING RELAY CABINET OR TRANSDUCER CABINET SHALL BE OF SUFFICIENT QUANTITIES TO FULFIL ALL THE REQUIREMENTS AS DESCRIBED IN SPECIFICATIONS NO.1002 & 1004 AND AS SHOWN ON THE ACCOMPANYING DRAWINGS.
- NOT LESS THAN 10 PER CENT SPARE INTERPOSING RELAYS SHALL ALSO BE INSTALLED INSIDE THE INTERPOSING RELAY CABINET.
- NOT LESS THAN 25 PER CENT SPARE TERMINALS SHALL BE PROVIDED FOR FUTURE MODIFICATION.
- THE TERMINAL BLOCKS SHALL BE SIZED TO ACCEPT 1.5 TO 6 SQUARE MILLIMETERS CONDUCTOR.
- A 6 sq.mm. BY 25 sq.mm. CROSS-SECTION BARE COPPER GROUND BUS COMPLETE WITH SOLDERLESS LUG FOR TERMINATING NO.4/0 AWC.STRANDED COPPPER GROUND CABLE SHALL BE PROVIDED AT THE BOTTOM OF EACH CABINET.
- THE CABINET SHALL BE FINISH-PAINTED INSIDE AND OUTSIDE WITH ANSI 61 MEDIUM GRAY (RAL 7036 FULL GLOSS).
- THE DUAL TYPE PANEL WIDTH AND HEIGHT FOR EACH SUBSTATION SHALL BE INDICATED ON ENTITLE "MAIN CONTROL BOARD EQUIPMENT LAY-OUT".

ห้องเก็บแบบฝ่ายวิศวกรรมระบบส่ง  
ปรับปรุงสำเนาโดย  
P. Jirasak, P. Thinnakorn, S. Thinnakorn  
เพื่อความถูกต้อง ก่อนนำไปใช้งานให้  
เทียบกับ Revision ล่าสุด จากฐานข้อมูลบัญชี  
แม่บทเอกสารผลการออกแบบ

141

ISO 9001  
TSEB1999  
CAD CENTER

REV. NO.	JOB NO.	DESCRIPTION	DRAWN	DESIGNED	VERIFIED	VALIDATED	RECOMMENDED	CONCURRED	APPROVED	DATE
5	-	ADDITION OF SCREENED LOUVERS	P.Jirasak	-	-	-	-	-	-	-
4	-	CORRECT THE REAR PANEL OF DUAL TYPE MAIN CONTROL BOARD	S.Thinnakorn	-	-	-	-	-	-	-
3	-	REVISE THE HEIGHT AND THE WIDTH	S.Thinnakorn	-	-	-	-	-	-	-
2	-	REVISE THE STRUCTURE OF CABINET DOORS	S.Thinnakorn	-	-	-	-	-	-	-
1	-	ADDITION OF DUAL TYPE MAIN CONTROL BOARD	S.Thinnakorn	-	-	-	-	-	-	-

ELECTRICITY GENERATING AUTHORITY OF THAILAND									
TYPICAL DRAWING									
DRAWING NAME					DESCRIPTION OF DETAIL DRAWING				
DRAWN P.Jirasak					INTERPOSING RELAY OR TRANSDUCER CABINET AND DUAL TYPE MAIN CONTROL BOARD				
DESIGNED P. Jirasak					REPLACING DRG. NO.				
VERIFIED P. Jirasak					DWG. NO.				
APPROVED J. H.					TP - E - 10.2				
ASSISTANT GOVERNOR - TRANSMISSION SYSTEM ENGINEERING					REV. 5				

TYPICAL NAMEPLATE FOR BUS PROTECTION (LOW IMPEDANCE)

NAMEPLATE SCHEDULE PANEL 801R				
SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
35x160	801R	PANEL 801R	230KV BUS NO.1	PRIMARY PROTECTION
20x140	EGAT S/N	Contract No.	EGAT serial No.	
20x50	8781P-A	BUS DIFF. NO.1 PRI	& CT SUPERVISION	RELAY PH.A
20x50	8781P-B	BUS DIFF. NO.1 PRI	& CT SUPERVISION	RELAY PH.B
20x50	8781P-C	BUS DIFF. NO.1 PRI	& CT SUPERVISION	RELAY PH.C
20x50	8781P-CO	BUS DIFF. NO.1 PRI	CUT-OFF SWITCH	
20x50	8681P-PB	BUS DIFF. LOCKOUT RELAY	RESET PUSH BUTTON	
20x50	8781P-TB1	BUS DIFF. NO.1 PRI	& CT SUPERVISION	TEST BLOCK 1
20x50	8781P-TB2	BUS DIFF. NO.1 PRI	& CT SUPERVISION	TEST BLOCK 2
20x50	8781P-TB3	BUS DIFF. NO.1 PRI	& CT SUPERVISION	TEST BLOCK 3
20x50	8681P-1	BUS DIFF. NO.1 PRI	LOCKOUT RELAY 1	
20x50	8681P-2	BUS DIFF. NO.1 PRI	LOCKOUT RELAY 2	
20x50	27XR1	27XR1	DC UNDERVOLTAGE FOR	BUS DIFF. RELAY
20x50	27XR2	27XR2	DC UNDERVOLTAGE FOR	LOCKOUT BUS DIFF.
12x28	DSW	DSW		
12x28	LAMP	LAMP		
12x28	OUTLET	OUTLET		

MCB NAMEPLATE SCHEDULE				
SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET	
20x50	MCB2	MCB2 125VDC FOR	BUS DIFF. NO.1 PRI	& CT SUPERVISION

TYPICAL NAMEPLATE FOR BUS PROTECTION (HIGH IMPEDANCE)

NAMEPLATE SCHEDULE PANEL 802R				
SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
35x160	802R	PANEL 802R	230KV BUS NO.1	SECONDARY PROTECTION
20x140	EGAT S/N	Contract No.	EGAT serial No.	
20x50	8781S	BUS DIFF. NO.1 SEC	RELAY	
20x50	8781S-TB	BUS DIFF. NO.1 SEC	TEST BLOCK	
20x50	8681S-1	BUS DIFF. NO.1 SEC	LOCKOUT RELAY 1	
20x50	8681S-2	BUS DIFF. NO.1 SEC	LOCKOUT RELAY 2	
20x50	9581SX	CT SUPERVISION		
20x50	8781S-CO	BUS DIFF. NO.1 SEC	CUT-OFF SWITCH	
20x50	8681S-PB	BUS DIFF. LOCKOUT	RESET PUSH BUTTON	
20x50	9581SX-PB	CT SUPERVISION LOCKOUT	RESET PUSH BUTTON	
20x50	27XR1	27XR1	DC UNDERVOLTAGE FOR	BUS DIFF. RELAY
20x50	27XR2	27XR2	DC UNDERVOLTAGE FOR	LOCKOUT BUS DIFF.
20x50	R1A	R1A	RESISTOR WITH METROSIL	FOR PH.A
20x50	R1B	R1B	RESISTOR WITH METROSIL	FOR PH.B
20x50	R1C	R1C	RESISTOR WITH METROSIL	FOR PH.C
12x28	DSW	DSW		
12x28	LAMP	LAMP		
12x28	OUTLET	OUTLET		

MCB NAMEPLATE SCHEDULE				
SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET	
20x50	MCB2	MCB2 125VDC FOR	BUS DIFF. NO.1 SEC	

TYPICAL NAMEPLATE FOR REMOTE I/O

NAMEPLATE SCHEDULE EGAT-PEA INTERFACING PANEL				
SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
35x160	RIO	EGAT-PEA INTERFACING	115KV LINE TO PEA	
20x140	EGAT S/N	Contract No.	EGAT serial No.	
20x50	RIO-1	REMOTE I/O NO.1	115KV PEA NO.1	
20x50	RIO-2	REMOTE I/O NO.2	115KV PEA NO.2	
20x50	RIO-3	REMOTE I/O NO.3	115KV PEA NO.3	
20x50	FTC	FIBER OPTIC BOX	(EGAT'S FTC)	
20x50	K11	PEA NO.1 BKR.1A	AUX. RELAY	
20x50	K12	PEA NO.1 BKR.2A	AUX. RELAY	
20x50	K13	PEA NO.1 DS	AUX. RELAY	
20x50	K14	PEA NO.1 DTT RECEIVE	AUX. RELAY	
20x50	K15	SPARE	AUX. RELAY	
20x50	K16	SPARE	AUX. RELAY	
20x50	K17	SPARE	AUX. RELAY	
20x50	K18	SPARE	AUX. RELAY	
20x50	27XR1	27XR1	DC UNDERVOLTAGE FOR	REMOTE I/O NO.1
12x28	DSW	DSW		
12x28	LAMP	LAMP		
12x28	OUTLET	OUTLET		

MCB NAMEPLATE SCHEDULE				
SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET	
20x50	MCB2	MCB2 125VDC FOR	REMOTE I/O NO.1	

TYPICAL NAMEPLATE FOR TRANSDUCER

NAMEPLATE SCHEDULE PANEL TDR11(FRONT)				
SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
35x160	TDR1	230KV TRANSDUCER PANEL	TDR1 (FRONT)	
20x140	EGAT S/N	Contract No.	EGAT serial No.	
20x50	DC-TDR1	DC-TDR1	125VDC DISTRI. BOARD	
20x50	DC-TDR2	DC-TDR2	48VDC DISTRI. BOARD	
20x50	AC-TDR1	AC-TDR1	230VAC DISTRI. BOARD	
20x50	V-TDR1	V-TDR1	BUS NO.1	
20x50	V-TDR2	V-TDR2	BUS NO.2	
20x50	T-TDR3	T-TDR3	CONTROL ROOM	
20x50	W&V-TDR1	W&V-TDR1	LINE NO.1 TO WN	
20x50	V-TDR3	V-TDR3	LINE NO.1 TO WN	
20x50	W&V-TDR2	W&V-TDR2	KT1A	
20x50	V-TDR6	V-TDR6	KT1A	
20x50	A-TDR1	A-TDR1	KT1A	
20x50	R-TDR1	R-TDR1	KT1A	
20x50	T-TDR1	T-TDR1	KT1A	
20x50	W&V-TDR3	W&V-TDR3	LINE NO.1 TO PEA	
20x50	V-TDR7	V-TDR7	LINE NO.1 TO PEA	PHASE A-B
20x50	V-TDR8	V-TDR8	LINE NO.1 TO PEA	PHASE B-C
20x50	V-TDR9	V-TDR9	LINE NO.1 TO PEA	PHASE C-A
20x50	A-TDR2	A-TDR2	LINE NO.1 TO PEA	
20x50	TS1	W&V-TDR1	CURR.&POT.TEST SW.	
20x50	27VTR	VOLTAGE TRANSFER	RELAY	
12x28	DSW	DSW		
12x28	LAMP	LAMP		
12x28	OUTLET	OUTLET		

MCB NAMEPLATE SCHEDULE PANEL TDR11(FRONT)				
SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET	
20x50	MCB2	MCB2 125VDC FOR	SUPPLY TDR (LINE)	
20x50	MCB3	MCB3 125VDC FOR	SUPPLY TDR (TR.)	
20x50	MCB4	MCB4 125VDC FOR	SUPPLY TDR (PEA)	
20x50	MCB5	MCB5 125VDC FOR	SUPPLY TDR (COMMON)	
20x50	MCB6	MCB6 230VAC FOR	V-TDR1 AC DIST. BOARD	
20x50	MCB7	MCB7 125VDC FOR	V-TDR1 DC DIST. BOARD	
20x50	MCB8	MCB8 48VDC FOR	V-TDR2 DC DIST. BOARD	
20x50	MCB9	MCB9 115VAC FOR	PT BUS NO.1 (27VTR)	
20x50	MCB10	MCB10 115VAC FOR	PT BUS NO.2 (27VTR)	
20x50	MCB11	MCB11 115VAC FOR	PT BUS NO.1 (V-TDR1)	
20x50	MCB12	MCB12 115VAC FOR	PT BUS NO.2 (V-TDR2)	
20x50	MCB13	MCB13 115VAC FOR	W&V-TDR1	
20x50	MCB14	MCB14 115VAC FOR	W&V-TDR2	
20x50	MCB15	MCB15 115VAC FOR	W&V-TDR3	
20x50	MCB16	MCB16 115VAC FOR	V-TDR6	

TYPICAL NAMEPLATE FOR INTERPOSING

NAMEPLATE SCHEDULE PANEL IP11(FRONT)			
SIZE	LEGEND	FIRST LINE	SECOND LINE
35x160	IP11 (F)	PANEL IP11 (FRONT)	230KV INTERPOSING RELAY
20x140	EGAT S/N	Contract No.	EGAT serial No.
20x50	CTX-851	CTX-851	BKR.80512
20x50	CCX-851	CCX-851	BKR.80512
20x50	CCDC-851	CCDC-851	BKR.80512
20x50	CCAC-851	CCAC-851	BKR.80512
20x50	CTX-852	CTX-852	BKR.80522
20x50	CCX-852	CCX-852	BKR.80522
20x50	CCDC-852	CCDC-852	BKR.80522
20x50	CCAC-852	CCAC-852	BKR.80522
20x50	CTX-853	CTX-853	BKR.80532
20x50	CCX-853	CCX-853	BKR.80532
20x50	CCDC-853	CCDC-853	BKR.80532
20x50	CCAC-853	CCAC-853	BKR.80532
20x50	RX1	RX1	RAISE KT1A
20x50	LX1	LX1	LOWER KT1A
20x50	7900CX-851	7900CX-851	LATCHING RELAY
20x50	27XB1-851	27XB1-851	DC SUPPLY ALARM
20x50	27XB2-851	27XB2-851	DC SUPPLY ALARM
20x50	27XB1-852	27XB1-852	DC SUPPLY ALARM
20x50	27XB2-852	27XB2-852	DC SUPPLY ALARM
20x50	27XB1-853	27XB1-853	DC SUPPLY ALARM
20x50	27XB2-853	27XB2-853	DC SUPPLY ALARM
20x50	27R	DC UNDERVOLTAGE	RELAY
20x50	27R-7B	DC UNDERVOLTAGE	AUX. RELAY
20x50	27R-TB	DC UNDERVOLTAGE	TEST BLOCK
20x50	PBC-851	PBC-851	CLOSE BKR.80512
20x50	PBT-851	PBT-851	OPEN BKR.80512
20x50	PBC-852	PBC-852	CLOSE BKR.80522
20x50	PBT-852	PBT-852	OPEN BKR.80522
20x50	PBC-853	PBC-853	CLOSE BKR.80532
20x50	PBT-853	PBT-853	OPEN BKR.80532
20x50	PB-SYNC	PB MANUAL	SYNC. BYPASS
20x50	KS-851	KS-851	CONTROL BKR.80512
20x50	KS-852	KS-852	CONTROL BKR.80522
20x50	KS-853	KS-853	CONTROL BKR.80532
20x50	PB-R1	PB-R1	RAISE KT1A
20x50	PB-L1	PB-L1	LOWER KT1A
20x50	V	VOLTMETER	
20x50	VS	VOLTMETER	SELECTOR SW.
12x28	DSW	DSW	
12x28	LAMP	LAMP	
12x28	OUTLET	OUTLET	

MCB NAMEPLATE SCHEDULE			
SIZE	LEGEND	FIRST LINE	SECOND LINE
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET
20x50	MCB2	MCB2 115VAC VZ5A FOR	SYNC CHECK RELAY
20x50	MCB3	MCB3 115VAC VZ5B FOR	SYNC CHECK RELAY
20x50	MCB4	MCB4 115VAC FOR	LOW SIDE VOLTAGE KT1A
20x50	MCB5	MCB5 125VDC FOR	REACTOR UNDERVOLTAGE RELAY
20x50	MCB-851	MCB 125VDC FOR	CONTROL BKR.80512
20x50	MCB-852	MCB 125VDC FOR	CONTROL BKR.80522
20x50	MCB-853	MCB 125VDC FOR	CONTROL BKR.80532

TYPICAL NAMEPLATE FOR METERING

NAMEPLATE SCHEDULE PANEL				
SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
35x160	MP1	PANEL MP1	115KV METERING PANEL	
20x140	EGAT S/N	Contract No.	EGAT serial No.	
20x50	KW&KVArH1	KWH1 (MAIN)	115KV LINE NO.1 TO PEA	
20x50	KW&KVArH2	KWH2 (CHECK)	115KV LINE NO.1 TO PEA	
20x50	TS1	KWH1 (MAIN)	CURR.&POT.TEST SW.	
20x50	TS2	KWH2 (CHECK)	CURR.&POT.TEST SW.	
20x50	27XD1	27XD1	DC UNDERVOLTAGE FOR	KWH (MAIN)
20x50	27XD2	27XD2	DC UNDERVOLTAGE FOR	KWH (CHECK)
12x28	DSW	DSW		
12x28	LAMP	LAMP		
12x28	OUTLET	OUTLET		

MCB NAMEPLATE SCHEDULE PANEL				
SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET	
20x50	MCB2	MCB2 125VDC FOR	KWH1 (MAIN) SUPPLY	
20x50	MCB3	MCB3 125VDC FOR	KWH2 (CHECK) SUPPLY	
20x50	MCB4	MCB4 PT FOR	KWH1 (MAIN)	115KV LINE NO.1 TO PEA
20x50	MCB5	MCB5 PT FOR	KWH2 (CHECK)	115KV LINE NO.1 TO PEA
20x50	MCB6	MCB6 220VAC FOR	MODEM METERING	

W&V-TDR1 (CHECK) จากข้อมูลบัญชี  
เพื่อความปลอดภัย ก่อนนำไปใช้งานให้เช็ค  
เทียบกับ Rev.ล่าสุด จากข้อมูลบัญชี  
แบบแปลนผลการออกแบบ

W!  
BLN NO. 1603

NOTES

- THE DRAWING SHOWS NAMEPLATE SCHEDULE FOR SUBSTATION IN ORDER TO BE GUIDELINE FOR THE CONTRACTOR'S DESIGN IN GENERAL. THE CONTRACTOR SHALL DESIGN SPECIFIC OR ACTUAL SCHEDULE AND THEN SUBMIT TO EGAT FOR APPROVAL.
- NAMEPLATES ARE ALSO REQUIRED FOR ALL EQUIPMENT ON THE MOUNTING BRACKETS OR HINGED PANEL INSIDE THE BOARD.
- Contract No. AND EGAT Serial No. SHALL BE INFORMED LATER BY EGAT.



ELECTRICITY GENERATING AUTHORITY OF THAILAND

DRAWN	P.Sirawich	VALIDATED	W.S.M.	DESIGNED	F.Sirawich	RECOMMENDED	C.Sirawich	VERIFIED	[Signature]	CONCURRED	[Signature]	APPROVED	[Signature]	DATE	22/1/18
DRAWING NAME				TYPICAL DRAWING				DESCRIPTION OF DETAIL DRAWING				TYPICAL SCHEDULE FOR NAMEPLATES			
JOB NO.		REPLACING DWG. NO.		DWG. NO.		TP - E - 11		1		REV.		6		4	

REV. NO.	JOB NO.	JOB DESCRIPTION	DRAWN	DESIGNED	VERIFIED	VALIDATED	RECOMMENDED	CONCURRED	APPROVED	DATE
4	-	REVISE TYPICAL NAMEPLATE DESCRIPTION	P.Sirawich	-	-	-	-	-	-	-
3	-	REVISE AND ADD TYPICAL NAMEPLATE DESCRIPTION	K.Napat	-	-	-	-	-	-	-
2	-	ADD NAMEPLATE OF EGAT SERIAL NO.	W.Nattthapong	-	-	-	-	-	-	-
1	-	REVISE NAMEPLATE DESCRIPTION	W.Nattthapong	-	-	-	-	-	-	-

TYPICAL NAMEPLATE FOR 22 kv C-BANK

NAMEPLATE SCHEDULE PANEL C22-1			
SIZE	LEGEND	FIRST LINE	SECOND LINE
35x160	C-BANK NO.1	PANEL C22-1	22 kv CAPACITOR BANK NO.1
20x140	EGAT S/N	Contract No.	EGAT serial No.
20x50	27XB1	DC SUPPLY ALARM	FOR BKR.
20x50	27XB2	DC SUPPLY ALARM	FOR BKR.
20x50	27XR1	DC SUPPLY ALARM	FOR 59,60CH,60CL
20x50	27XR2	DC SUPPLY ALARM	FOR 52bx
20x50	52bx	CB STATUS	AUX.TRIP
20x50	59C	OVERVOLTAGE RELAY	RELAY
20x50	59C-TB	OVERVOLTAGE RELAY	TEST BLOCK
20x50	60CH	VOLTAGE UNBALANCE	SENSING RELAY
20x50	60CH-TB	VOLTAGE UNBALANCE	SENSING TEST BLOCK
20x50	60CL	VOLTAGE UNBALANCE	SENSING RELAY
20x50	60CL-TB	VOLTAGE UNBALANCE	SENSING TEST BLOCK
20x50	62bx	BREAKER TIME DELAY	
20x50	AUX-PT-A	AUX. PT	PHASE A
20x50	AUX-PT-B	AUX. PT	PHASE B
20x50	AUX-PT-C	AUX. PT	PHASE C
20x50	CS	BREAKER CONTROL	SWITCH
20x50	KS	CONTROL BREAKER	
20x50	SMP	DISCONNECTOR	STATUS
12x28	DSW	DSW	
12x28	LAMP	LAMP	
12x28	OUTLET	OUTLET	

TYPICAL NAMEPLATE FOR 115 kv C-BANK

NAMEPLATE SCHEDULE PANEL C115-2			
SIZE	LEGEND	FIRST LINE	SECOND LINE
35x160	C-BANK NO.2	PANEL C115-2	115 kv CAPACITOR BANK NO.2
20x140	EGAT S/N	Contract No.	EGAT serial No.
20x50	27XB1	DC SUPPLY ALARM	FOR BKR.
20x50	27XB2	DC SUPPLY ALARM	FOR BKR.
20x50	27XR1	DC SUPPLY ALARM	FOR 51C,59C,27C,60C1
20x50	27XR2	DC SUPPLY ALARM	FOR 60C2
20x50	27XR3	DC SUPPLY ALARM	FOR 50BF
20x50	27C	UNDERVOLTAGE	RELAY
20x50	27C-TB	UNDERVOLTAGE	TEST BLOCK
20x50	50BF	BREAKER FAILURE	RELAY
20x50	50BF-CO	BREAKER FAILURE	CUT-OFF SWITCH
20x50	50BF-TB	BREAKER FAILURE	TEST BLOCK
20x50	51C/51CG	OVERCURRENT	RELAY
20x50	51C/51CG-TB	OVERCURRENT	TEST BLOCK
20x50	59C	OVERVOLTAGE	RELAY
20x50	59C-TB	OVERVOLTAGE	TEST BLOCK
20x50	60C1	CURRENT UNBALANCE	SENSING RELAY 1
20x50	60C2	CURRENT UNBALANCE	SENSING RELAY 2
20x50	60C-TB	CURRENT UNBALANCE	SENSING TEST BLOCK
20x50	62bx	BREAKER TIME DELAY	
20x50	86BF	BREAKER FAILURE	LOCKOUT RELAY
20x50	86BF-PB	BREAKER FAILURE LOCKOUT	RESET PUSH BUTTON
20x50	94C1	OVERCURRENT AND OVERVOLTAGE	TRIPPING RELAY
20x50	94C2	CURRENT UNBALANCE SENSING	TRIPPING RELAY
20x50	CS	BREAKER CONTROL	SWITCH
20x50	KS	CONTROL BREAKER	
20x50	SMP	DISCONNECTOR	STATUS
12x28	DSW	DSW	
12x28	LAMP	LAMP	
12x28	OUTLET	OUTLET	

TYPICAL NAMEPLATE FOR 230 kv C-BANK

NAMEPLATE SCHEDULE PANEL C230-3			
SIZE	LEGEND	FIRST LINE	SECOND LINE
35x160	C-BANK NO.3	PANEL C230-3	230 kv CAPACITOR BANK NO.3
20x140	EGAT S/N	Contract No.	EGAT serial No.
20x50	27XB1	DC SUPPLY ALARM	FOR BKR.
20x50	27XB2	DC SUPPLY ALARM	FOR BKR.
20x50	27XR1	DC SUPPLY ALARM	FOR 51C,59C
20x50	27XR2	DC SUPPLY ALARM	FOR 60C1,60C2
20x50	27XR3	DC SUPPLY ALARM	FOR 50BF
20x50	50BF	BREAKER FAILURE	RELAY
20x50	50BF-CO	BREAKER FAILURE	CUT-OFF SWITCH
20x50	50BF-TB	BREAKER FAILURE	TEST BLOCK
20x50	51C/51CG	OVERCURRENT	RELAY
20x50	51C/51CG-TB	OVERCURRENT	TEST BLOCK
20x50	59C	OVERVOLTAGE	RELAY
20x50	59C-TB	OVERVOLTAGE	TEST BLOCK
20x50	60C1	CURRENT UNBALANCE	SENSING RELAY 1
20x50	60C1-TB	CURRENT UNBALANCE	SENSING TEST BLOCK 1
20x50	60C2	CURRENT UNBALANCE	SENSING RELAY 2
20x50	60C2-TB	CURRENT UNBALANCE	SENSING TEST BLOCK 2
20x50	62bx	BREAKER TIME DELAY	
20x50	86BF	BREAKER FAILURE	LOCKOUT RELAY
20x50	86BF-PB	BREAKER FAILURE LOCKOUT	RESET PUSH BUTTON
20x50	94C1	OVER CURRENT AND OVERVOLTAGE	TRIPPING RELAY
20x50	94C2	CURRENT UNBALANCE SENSING	TRIPPING RELAY
20x50	CS	BREAKER CONTROL	SWITCH
20x50	KS	CON.ROL BREAKER	
20x50	SMP	DISCONNECTOR	STATUS
12x28	DSW	DSW	
12x28	LAMP	LAMP	
12x28	OUTLET	OUTLET	

MCB NAMEPLATE SCHEDULE

SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET	
20x50	MCB2	MCB2 110VAC FOR	AUX. PT	
20x50	MCB3	MCB3 110VAC FOR	OVERVOLTAGE RELAY	
20x50	MCB4	MCB4 110VAC FOR	VOLTAGE UNBALANCE	SENSING RELAY
20x50	MCB5	MCB5 125VDC FOR	MAIN DC PROTECTION SYSTEM	
20x50	MCB6	MCB6 125VDC FOR	52BX	
20x50	MCB7	MCB7 125VDC FOR	CONTROL BKR.	
20x50	MCB8	MCB8 125VDC FOR	SEMAPHORE INDICATOR	AND OUTLET

MCB NAMEPLATE SCHEDULE

SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET	
20x50	MCB2	MCB2 115VAC FOR	OVERVOLTAGE RELAY	
20x50	MCB3	MCB3 115VAC FOR	UNDERVOLTAGE RELAY	
20x50	MCB4	MCB4 125VDC FOR	OVERCURRENT &	OVERVOLTAGE RELAY
20x50	MCB5	MCB5 125VDC FOR	CURRENT UNBALANCE	SENSING RELAY
20x50	MCB6	MCB6 125VDC FOR	BREAKER FAILURE RELAY	
20x50	MCB7	MCB7 125VDC FOR	CONTROL BKR.	
20x50	MCB8	MCB8 125VDC FOR	SEMAPHORE INDICATOR	AND OUTLET

MCB NAMEPLATE SCHEDULE

SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET	
20x50	MCB2	MCB2 115VAC FOR	OVERVOLTAGE RELAY	
20x50	MCB3	MCB3 125VDC FOR	OVERCURRENT &	OVERVOLTAGE RELAY
20x50	MCB4	MCB4 125VDC FOR	CURRENT UNBALANCE	SENSING RELAY
20x50	MCB5	MCB5 125VDC FOR	BREAKER FAILURE RELAY	
20x50	MCB6	MCB6 125VDC FOR	CONTROL BKR.	
20x50	MCB7	MCB7 125VDC FOR	SEMAPHORE INDICATOR	AND OUTLET

TYPICAL NAMEPLATE MARSHALLING FOR CONTROL

NAMEPLATE SCHEDULE PANEL MPC11(FRONT)			
SIZE	LEGEND	FIRST LINE	SECOND LINE
35x160	MPC11	PANEL MPC11 (FRONT)	MARSHALLING FOR CONTROL SYSTEM
20x140	EGAT S/N	Contract No.	EGAT serial No.
12x28	DSW	DSW	
12x28	LAMP	LAMP	
12x28	OUTLET	OUTLET	

MCB NAMEPLATE SCHEDULE PANEL MPC11(FRONT)

SIZE	LEGEND	FIRST LINE	SECOND LINE
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET

TYPICAL NAMEPLATE OF MARSHALLING PANEL FOR RTU

NAMEPLATE SCHEDULE PANEL MP-RTU11(FRONT)			
SIZE	LEGEND	FIRST LINE	SECOND LINE
35x160	MP-RTU11	PANEL MP-RTU11 (FRONT)	MARSHALLING FOR RTU
20x140	EGAT S/N	Contract No.	EGAT serial No.
12x28	DSW	DSW	
12x28	LAMP	LAMP	
12x28	OUTLET	OUTLET	

MCB NAMEPLATE SCHEDULE PANEL MP-RTU11(FRONT)

SIZE	LEGEND	FIRST LINE	SECOND LINE
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET

TYPICAL NAMEPLATE OF MARSHALLING PANEL FOR FRS

NAMEPLATE SCHEDULE PANEL MP-FRS11(FRONT)			
SIZE	LEGEND	FIRST LINE	SECOND LINE
35x160	MP-FRS11	PANEL MP-FRS11(FRONT)	MARSHALLING FAULT RECORDING SYSTEM
20x140	EGAT S/N	Contract No.	EGAT serial No.
12x28	DSW	DSW	
12x28	LAMP	LAMP	
12x28	OUTLET	OUTLET	

MCB NAMEPLATE SCHEDULE PANEL MP-FRS11(FRONT)

SIZE	LEGEND	FIRST LINE	SECOND LINE
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET
20x50	MCB2	MCB2 115VAC FOR	BUS NO.1
20x50	MCB3	MCB3 115VAC FOR	BUS NO.2
20x50	MCB4	MCB4 115VAC FOR	LINE NO.1 TO SAI NOI
20x50	MCB5	MCB5 115VAC FOR	LINE NO.2 TO SAI NOI
20x50	MCB6	MCB6	SPARE

TYPICAL NAMEPLATE OF MARSHALLING PANEL FOR TELEPROTECTION

NAMEPLATE SCHEDULE PANEL MP-TELE11(FRONT)				
SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
35x160	MP-TELE11(F)	PANEL MP-TELE11(FRONT)	230KV TELEPROTECTION	
20x140	EGAT S/N	Contract No.	EGAT serial No.	
20x50	27XR1	27XR1	DC SUPPLY ALARM	
20x50	CRF1	CRF1 (PTT1)	230KV LINE NO.1	TO SARABURI 2
20x50	CRR1	CRR1 (PTT1)	230KV LINE NO.1	TO SARABURI 2
20x50	CRS1	CRS1 (PTT1)	230KV LINE NO.1	TO SARABURI 2
12x28	DSW	DSW		
12x28	LAMP	LAMP		
12x28	OUTLET	OUTLET		

MCB NAMEPLATE SCHEDULE PANEL MP-TELE11(FRONT)

SIZE	LEGEND	FIRST LINE	SECOND LINE
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET
20x50	MCB2	MCB2 48VDC FOR	CONTROL CIRCUIT

NOTES

- THE DRAWING SHOWS NAMEPLATE SCHEDULE FOR SUBSTATION IN ORDER TO BE GUIDELINE FOR THE CONTRACTOR'S DESIGN IN GENERAL. THE CONTRACTOR SHALL DESIGN SPECIFIC OR ACTUAL SCHEDULE AND THEN SUBMIT TO EGAT FOR APPROVAL.
- NAMEPLATES ARE ALSO REQUIRED FOR ALL EQUIPMENT ON THE MOUNTING BRACKETS OR HINGED PANEL INSIDE THE BOARD.
- Contract No. AND EGAT Serial No. SHALL BE INFORMED LATER BY EGAT.

ต้องเก็บแบบส่งวิศวกรระบบส่ง  
รับรองสำเนาโดย  
**ทพอ.ส. กสส.ส. อวส.**  
เพื่อความถูกต้อง ก่อนนำไปใช้งานให้ช้  
เทียบกับ Revision ล่าสุด จากฐานข้อมูลบัญชี  
แบบเอกสารผลการออกแบบ

REV. NO.	JOB NO.	JOB DESCRIPTION	DRAWN	DESIGNED	VERIFIED	VALIDATED	RECOMMENDED	CONCURRED	APPROVED	DATE
1	-	REVISE TYPICAL NAMEPLATE DESCRIPTION	P.Sirawich	-	-	-	-	-	-	-
-	-	REVISE AND ADD TYPICAL NAMEPLATE DESCRIPTION	K.Nopit	-	-	-	-	-	-	-

ELECTRICITY GENERATING AUTHORITY OF THAILAND										
DRAWING NAME					DRAWING NO.					
TYPICAL DRAWING					TP - E - 11					
DESCRIPTION OF DETAIL DRAWING					TYPICAL SCHEDULE FOR NAMEPLATES					
DRAWN		VALIDATED		RECOMMENDED		CONCURRED		APPROVED		DATE
DESIGNED		RECOMMENDED		CONCURRED		APPROVED		JOB NO.		REPLACING DWG. NO.
VERIFIED		CONCURRED		APPROVED		APPROVED		JOB NO.		DWG. NO.
APPROVED		CONCURRED		APPROVED		APPROVED		JOB NO.		DWG. NO.
APPROVED		CONCURRED		APPROVED		APPROVED		JOB NO.		DWG. NO.

TYPICAL NAMEPLATE FOR 115 kV LINE PROTECTION

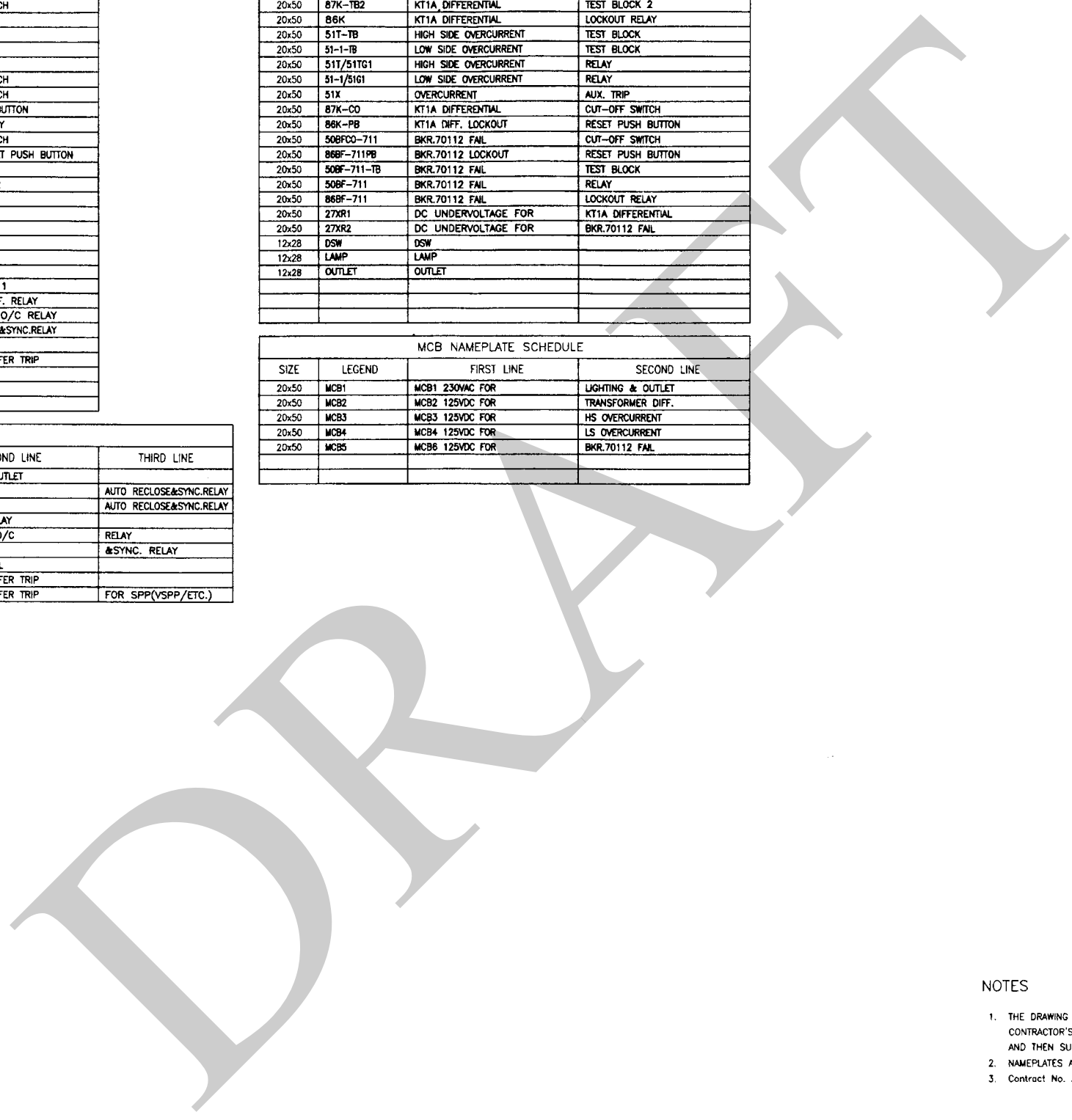
NAMEPLATE SCHEDULE PANEL 701R			
SIZE	LEGEND	FIRST LINE	SECOND LINE
35x160	701R	PANEL 701R	115KV LINE NO.1 TO PE
20x140	EGAT S/N	Contract No.	EGAT serial No.
20x50	87L1	LINE DIFFERENTIAL RELAY	RELAY
20x50	87L1-TB1	LINE DIFFERENTIAL	TEST BLOCK 1
20x50	87L1-TB2	LINE DIFFERENTIAL	TEST BLOCK 2
20x50	87L1-CO	LINE DIFFERENTIAL	CUT-OFF SWITCH
20x50	94P1	LINE DIFFERENTIAL	AUX. TRIP
20x50	67/67N-TB1	DIRECTIONAL O/C	TEST BLOCK
20x50	67/67N	DIRECTIONAL O/C	RELAY
20x50	67X	DIRECTIONAL O/C	AUX. TRIP
20x50	79-CO	AUTO RECLOSE	CUT-OFF SWITCH
20x50	50BFCO-701	BKR.7012 FAIL	CUT-OFF SWITCH
20x50	86BF-701PB	BKR.7012 LOCKOUT	RESET PUSH BUTTON
20x50	86DTT	DIRECT TRANSFER TRIP	LOCKOUT RELAY
20x50	86DTT-CO	DIRECT TRANSFER TRIP	CUT-OFF SWITCH
20x50	86DTT-PB	DIRECT TRANSFER TRIP	LOCKOUT RESET PUSH BUTTON
20x50	79+25-TB1	AUTO RECLOSE&SYNC.RELAY	TEST BLOCK 1
20x50	79+25-TB2	AUTO RECLOSE&SYNC.RELAY	TEST BLOCK 2
20x50	79X	AUTO RECLOSE&SYNC.RELAY	AUX. TRIP
20x50	79+25	AUTO RECLOSE & SYNC.	RELAY
20x50	50BF-701-TB1	BKR.7012 FAIL	TEST BLOCK 1
20x50	50BF-701	BKR.7012 FAIL	RELAY
20x50	52bx	BKR.7012 AUXILIARY	RELAY
20x50	21BU	DISTANCE RELAY	
20x50	21BU-TB1	DISTANCE RELAY	TEST BLOCK 1
20x50	27XR1	DC UNDERVOLTAGE FOR	PR1 LINE DIFF. RELAY
20x50	27XR2	DC UNDERVOLTAGE FOR	DIRECTIONAL O/C RELAY
20x50	27XR3	DC UNDERVOLTAGE FOR	AUTO RECLOSE&SYNC.RELAY
20x50	27XR4	DC UNDERVOLTAGE FOR	BKR.7012 FAIL
20x50	27XR5	DC UNDERVOLTAGE FOR	DIRECT TRANSFER TRIP
12x28	DSW	DSW	
12x28	LAMP	LAMP	
12x28	OUTLET	OUTLET	

TYPICAL NAMEPLATE FOR 115/22,33 kV TRANSFORMER PROTECTION

NAMEPLATE SCHEDULE PANEL 105R			
SIZE	LEGEND	FIRST LINE	SECOND LINE
35x160	105R	PANEL 105R	115/22KV TRANSFORMER KT1A
20x140	EGAT S/N	Contract No.	EGAT serial No.
20x50	87K	KT1A DIFFERENTIAL	RELAY
20x50	87K-TB1	KT1A DIFFERENTIAL	TEST BLOCK 1
20x50	87K-TB2	KT1A DIFFERENTIAL	TEST BLOCK 2
20x50	86K	KT1A DIFFERENTIAL	LOCKOUT RELAY
20x50	51T-TB	HIGH SIDE OVERCURRENT	TEST BLOCK
20x50	51-1-TB	LOW SIDE OVERCURRENT	TEST BLOCK
20x50	51T/51TG1	HIGH SIDE OVERCURRENT	RELAY
20x50	51-1/51G1	LOW SIDE OVERCURRENT	RELAY
20x50	51X	OVERCURRENT	AUX. TRIP
20x50	87K-CO	KT1A DIFFERENTIAL	CUT-OFF SWITCH
20x50	86K-PB	KT1A DIFF. LOCKOUT	RESET PUSH BUTTON
20x50	50BFCO-711	BKR.70112 FAIL	CUT-OFF SWITCH
20x50	86BF-711PB	BKR.70112 LOCKOUT	RESET PUSH BUTTON
20x50	50BF-711-TB	BKR.70112 FAIL	TEST BLOCK
20x50	50BF-711	BKR.70112 FAIL	RELAY
20x50	86BF-711	BKR.70112 FAIL	LOCKOUT RELAY
20x50	27XR1	DC UNDERVOLTAGE FOR	KT1A DIFFERENTIAL
20x50	27XR2	DC UNDERVOLTAGE FOR	BKR.70112 FAIL
12x28	DSW	DSW	
12x28	LAMP	LAMP	
12x28	OUTLET	OUTLET	

MCB NAMEPLATE SCHEDULE			
SIZE	LEGEND	FIRST LINE	SECOND LINE
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET
20x50	MCB2	MCB2 125VDC FOR	TRANSFORMER DIFF.
20x50	MCB3	MCB3 125VDC FOR	HS OVERCURRENT
20x50	MCB4	MCB4 125VDC FOR	LS OVERCURRENT
20x50	MCB5	MCB5 125VDC FOR	BKR.70112 FAIL

MCB NAMEPLATE SCHEDULE				
SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET	
20x50	MCB2	MCB2 115VAC FOR	PT LINE	AUTO RECLOSE&SYNC.RELAY
20x50	MCB3	MCB3 115VAC FOR	PT BUS	AUTO RECLOSE&SYNC.RELAY
20x50	MCB4	MCB4 125VDC FOR	LINE DIFF. RELAY	
20x50	MCB5	MCB5 125VDC FOR	DIRECTIONAL O/C	RELAY
20x50	MCB6	MCB6 125VDC FOR	AUTO RECLOSE	&SYNC. RELAY
20x50	MCB7	MCB7 125VDC FOR	BKR.7012 FAIL	
20x50	MCB8	MCB8 125VDC FOR	DIRECT TRANSFER TRIP	
20x50	MCB9	MCB9 125VDC FOR	DIRECT TRANSFER TRIP	FOR SPP(VSPP/ETC.)



ห้องเก็บแบบฝ่ายวิศวกรรมระบบส่ง  
รับรองสำเนาโดย  
**หพอ-ส. กสส-ส. อวส.**  
เพื่อความถูกต้อง ก่อนนำไปใช้งานให้เช็ค  
เทียบกับ Revision ล่าสุด จากฐานข้อมูลบัญชี  
แบบหรือตรวจสอบกับวิศวกรที่ดูแลอีกแบบ

NOTES

- THE DRAWING SHOWS NAMEPLATE SCHEDULE FOR SUBSTATION IN ORDER TO BE GUIDELINE FOR THE CONTRACTOR'S DESIGN IN GENERAL. THE CONTRACTOR SHALL DESIGN SPECIFIC OR ACTUAL SCHEDULE AND THEN SUBMIT TO EGAT FOR APPROVAL.
- NAMEPLATES ARE ALSO REQUIRED FOR ALL EQUIPMENT ON THE MOUNTING BRACKETS OR HINGED PANEL INSIDE THE BOARD.
- Contract No. AND EGAT Serial No. SHALL BE INFORMED LATER BY EGAT.

CABINET NO. W1  
R1/N NO. 105



ELECTRICITY GENERATING AUTHORITY OF THAILAND

DRAWN	P. Sravich	VALIDATED	<i>[Signature]</i>	DRAWING NAME	TYPICAL DRAWING
DESIGNED	P. Sravich	RECOMMENDED	<i>[Signature]</i>	DESCRIPTION OF DETAIL DRAWING	TYPICAL SCHEDULE FOR NAMEPLATES
VERIFIED	<i>[Signature]</i>	CONCURRED	<i>[Signature]</i>	JOB NO.	REPLACING DWG. NO.
APPROVED	<i>[Signature]</i>	DATE	30/1/18	DWG. NO.	TP - E - 11

REV. NO.	JOB NO.	JOB DESCRIPTION	DRAWN	DESIGNED	VERIFIED	VALIDATED	RECOMMENDED	CONCURRED	APPROVED	DATE
1	-	REVISE TYPICAL NAMEPLATE DESCRIPTION	P. Sravich	-	-	-	-	-	-	-
-	-	REVISE AND ADD TYPICAL NAMEPLATE DESCRIPTION	K. Napat	-	-	-	-	-	-	-

TYPICAL NAMEPLATE FOR 230 KV PRIMARY LINE PROTECTION

NAMEPLATE SCHEDULE PANEL 807R				
SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
35x160	807R	PANEL 807R	230KV LINE NO.2 TO WANG NOI	PRIMARY PROTECTION
20x140	EGAT S/N	Contract No.	EGAT serial No.	
20x50	87L1	PRI LINE DIFFERENTIAL	RELAY	
20x50	87L1-TB1	PRI LINE DIFFERENTIAL	TEST BLOCK 1	
20x50	87L1-TB2	PRI LINE DIFFERENTIAL	TEST BLOCK 2	
20x50	87L1-TB3	PRI LINE DIFFERENTIAL	TEST BLOCK 3	
20x50	87L1-CO	PRI LINE DIFFERENTIAL	CUT-OFF SWITCH	
20x50	94P1	PRI LINE DIFFERENTIAL	AUX. TRIP	
20x50	94P1-A	PRI LINE DIFFERENTIAL	AUX. TRIP PH.A	
20x50	94P1-B	PRI LINE DIFFERENTIAL	AUX. TRIP PH.B	
20x50	94P1-C	PRI LINE DIFFERENTIAL	AUX. TRIP PH.C	
20x50	79+25	AUTO RECLOSE & SYNC.	RELAY	
20x50	79+25-TB1	AUTO RECLOSE&SYNC.RELAY	TEST BLOCK 1	
20x50	79+25-TB2	AUTO RECLOSE&SYNC.RELAY	TEST BLOCK 2	
20x50	79X	AUTO RECLOSE&SYNC.RELAY	AUX. TRIP	
20x50	79-CO	AUTO RECLOSE	CUT-OFF SWITCH	
20x50	27XR1	DC UNDERVOLTAGE FOR	PRI LINE DIFF. RELAY	
20x50	27XR2	DC UNDERVOLTAGE FOR	AUTO RECLOSE&SYNC.RELAY	
20x50	51S/51SG	STUB OVERCURRENT	RELAY	
20x50	51S/51SG-TB	STUB OVERCURRENT	TEST BLOCK	
20x50	51S-CO	STUB OVERCURRENT	CUT-OFF SWITCH	
20x50	86S-PB	STUB OVERCURRENT	LOCKOUT RESET PUSH BUTTON	
20x50	86S	STUB OVERCURRENT	LOCKOUT RELAY	
20x50	89X-8221-1	89X-8221-1	AUX. TRIP 1	
20x50	89X-8221-2	89X-8221-2	AUX. TRIP 2	
12x28	DSW	DSW		
12x28	LAMP	LAMP		
12x28	OUTLET	OUTLET		

MCB NAMEPLATE SCHEDULE				
SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET	
20x50	MCB2	MCB2 115VAC FOR	PT LINE	AUTO RECLOSE&SYNC.RELAY
20x50	MCB3	MCB3 115VAC FOR	PT BUS	AUTO RECLOSE&SYNC.RELAY
20x50	MCB4	MCB4 125VDC FOR	PRI LINE DIFF. RELAY	
20x50	MCB5	MCB5 125VDC FOR	AUTO RECLOSE	&SYNC RELAY

TYPICAL NAMEPLATE FOR 230 KV SECONDARY LINE PROTECTION

NAMEPLATE SCHEDULE PANEL 808R				
SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
35x160	808R	PANEL 808R	230KV LINE NO.2 TO WANG NOI	SECONDARY PROTECTION
20x140	EGAT S/N	Contract No.	EGAT serial No.	
20x50	87L2	SEC LINE DIFFERENTIAL	RELAY	
20x50	87L2-TB1	SEC LINE DIFFERENTIAL	TEST BLOCK 1	
20x50	87L2-TB2	SEC LINE DIFFERENTIAL	TEST BLOCK 2	
20x50	87L2-TB3	SEC LINE DIFFERENTIAL	TEST BLOCK 3	
20x50	87L2-CO	SEC LINE DIFFERENTIAL	CUT-OFF SWITCH	
20x50	94P2	SEC LINE DIFFERENTIAL	AUX. TRIP	
20x50	94P2-A	SEC LINE DIFFERENTIAL	AUX. TRIP PH.A	
20x50	94P2-B	SEC LINE DIFFERENTIAL	AUX. TRIP PH.B	
20x50	94P2-C	SEC LINE DIFFERENTIAL	AUX. TRIP PH.C	
20x50	86DTT	DIRECT TRANSFER TRIP	LOCKOUT RELAY	
20x50	86DTT-CO	DIRECT TRANSFER TRIP	CUT-OFF SWITCH	
20x50	86DTT-PB	DIRECT TRANSFER TRIP	LOCKOUT RESET PUSH BUTTON	
20x50	50BF-841	BKR.80412 FAIL	RELAY	
20x50	50BF-841-TB1	BKR.80412 FAIL	TEST BLOCK 1	
20x50	50BF-841-TB2	BKR.80412 FAIL	TEST BLOCK 2	
20x50	50BF-841	BKR.80412 FAIL	CUT-OFF SWITCH	
20x50	50BF-843	BKR.80432 FAIL	RELAY	
20x50	50BF-843-TB1	BKR.80432 FAIL	TEST BLOCK 1	
20x50	50BF-843	BKR.80432 FAIL	CUT-OFF SWITCH	
20x50	50BF-843	BKR.80432 FAIL	LOCKOUT RELAY	
20x50	86BF-841PB	BKR.80412 LOCKOUT	RESET PUSH BUTTON	
20x50	86BF-843	BKR.80432 FAIL	LOCKOUT RELAY	
20x50	86BF-843PB	BKR.80432 LOCKOUT	RESET PUSH BUTTON	
20x50	27XR1	DC UNDERVOLTAGE FOR	SEC LINE DIFF. RELAY	
20x50	27XR2	DC UNDERVOLTAGE FOR	DIRECT TRANSFER TRIP	
20x50	27XR3	DC UNDERVOLTAGE FOR	BKR.80412 FAIL	
20x50	27XR4	DC UNDERVOLTAGE FOR	BKR.80432 FAIL	
20x50	21P2	SEC DISTANCE RELAY		
20x50	21P2-TB1	SEC DISTANCE RELAY	TEST BLOCK 1	
20x50	21P2-TB2	SEC DISTANCE RELAY	TEST BLOCK 2	
20x50	21P2-TB3	SEC DISTANCE RELAY	TEST BLOCK 3	
20x50	21P2-SG	GROUP SETTING	SELECTOR SW.	
20x50	PIT2-CO	PERMISSIVE TRANSFER TRIP	CUT-OFF SWITCH	
12x28	DSW	DSW		
12x28	LAMP	LAMP		
12x28	OUTLET	OUTLET		

MCB NAMEPLATE SCHEDULE				
SIZE	LEGEND	FIRST LINE	SECOND LINE	
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET	
20x50	MCB2	MCB2 125VDC FOR	SEC DISTANCE RELAY	
20x50	MCB3	MCB3 125VDC FOR	SEC LINE DIFF. RELAY	
20x50	MCB4	MCB4 125VDC FOR	DIRECT TRANSFER TRIP	
20x50	MCB5	MCB5 125VDC FOR	BKR.80412 FAIL	
20x50	MCB6	MCB6 125VDC FOR	BKR.80432 FAIL	

TYPICAL NAMEPLATE FOR 230/115,69 KV TRANSFORMER PROTECTION

NAMEPLATE SCHEDULE PANEL 215R				
SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
35x160	215R	PANEL 215R	230/115KV TRANSFORMER KT1A	
20x140	EGAT S/N	Contract No.	EGAT serial No.	
20x50	87K1	KT1A DIFFERENTIAL	RELAY	
20x50	87K1-TB1	KT1A DIFFERENTIAL	TEST BLOCK 1	
20x50	87K1-TB2	KT1A DIFFERENTIAL	TEST BLOCK 2	
20x50	86K1	KT1A DIFFERENTIAL	LOCKOUT RELAY	
20x50	51T1-TB	HIGH SIDE OVERCURRENT	TEST BLOCK	
20x50	51-1-TB	LOW SIDE OVERCURRENT	TEST BLOCK	
20x50	51T1/51T01	HIGH SIDE OVERCURRENT	RELAY	
20x50	51-1/51G1	LOW SIDE OVERCURRENT	RELAY	
20x50	51G1-1-TB1	OVERCURRENT GROUND BU.	TEST BLOCK 1	
20x50	51G2-1-TB2	OVERCURRENT GROUND BU.	TEST BLOCK 2	
20x50	51G1-1	OVERCURRENT GROUND BU.	RELAY 1	
20x50	51G2-1	OVERCURRENT GROUND BU.	RELAY 2	
20x50	87K1-CO	KT1A DIFFERENTIAL	CUT-OFF SWITCH	
20x50	86K1-PB	KT1A DIFF. LOCKOUT	RESET PUSH BUTTON	
20x50	50BFO-833	BKR.80332 FAIL	CUT-OFF SWITCH	
20x50	86BF-833PB	BKR.80332 LOCKOUT	RESET PUSH BUTTON	
20x50	50BF-833-TB	BKR.80332 FAIL	TEST BLOCK	
20x50	50BF-833	BKR.80332 FAIL	RELAY	
20x50	86BF-833	BKR.80332 FAIL	LOCKOUT RELAY	
20x50	51-11/51G11-TB	TERTIARY OVERCURRENT	TEST BLOCK	
20x50	51-11/51G11	TERTIARY OVERCURRENT	RELAY	
20x50	59N-1-TB	RESIDUAL OVERVOLTAGE	TEST BLOCK	
20x50	59N-1	RESIDUAL OVERVOLTAGE	RELAY	
20x50	27XR1	DC UNDERVOLTAGE FOR	KT1A DIFFERENTIAL	
20x50	27XR2	DC UNDERVOLTAGE FOR	BKR.80332 FAIL	
12x28	DSW	DSW		
12x28	LAMP	LAMP		
12x28	OUTLET	OUTLET		

MCB NAMEPLATE SCHEDULE				
SIZE	LEGEND	FIRST LINE	SECOND LINE	
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET	
20x50	MCB2	MCB2 115VAC FOR	NEUTRAL (59N)	
20x50	MCB3	MCB3 125VDC FOR	TRANSFORMER DIFF.	
20x50	MCB4	MCB4 125VDC FOR	HS OVERCURRENT	
20x50	MCB5	MCB5 125VDC FOR	LS OVERCURRENT	
20x50	MCB6	MCB6 125VDC FOR	GB1 OVERCURRENT	
20x50	MCB7	MCB7 125VDC FOR	GB2 OVERCURRENT	
20x50	MCB8	MCB8 125VDC FOR	TERTIARY O/C	
20x50	MCB9	MCB9 125VDC FOR	NEUTRAL (59N)	
20x50	MCB10	MCB10 125VDC FOR	BKR.80332 FAIL	

ต้องเก็บแบบผ่านวิศวกรระบบส่ง  
รับร่างสำเนาโดย  
**ทพอ-ส. กสิศ-ส. อวส.**  
เพื่อความถูกต้อง ก่อนนำไปใช้งานให้เช็ค  
เทียบกับ Revision ล่าสุด จากฐานข้อมูลบัญชี  
แม่แบบเอกสารผลการออกแบบ

NOTES

- THE DRAWING SHOWS NAMEPLATE SCHEDULE FOR SUBSTATION IN ORDER TO BE SUBMITTED TO THE CONTRACTOR'S DESIGN IN GENERAL. THE CONTRACTOR SHALL DESIGN SPECIFIC OR ACTUAL SCHEDULE AND THEN SUBMIT TO EGAT FOR APPROVAL.
- NAMEPLATES ARE ALSO REQUIRED FOR ALL EQUIPMENT ON THE MOUNTING BRACKETS OR HINGED PANEL INSIDE THE BOARD.
- Contract No. AND EGAT Serial No. SHALL BE INFORMED LATER BY EGAT.

CABINET NO. W1  
RUN NO. 1606

145



REV. NO.	JOB NO.	JOB DESCRIPTION	DRAWN	DESIGNED	VERIFIED	VALIDATED	RECOMMENDED	CONCURRED	APPROVED	DATE
1	-	REVISE TYPICAL NAMEPLATE DESCRIPTION	P.Strawich	-	-	-	-	-	-	-
-	-	REVISE AND ADD TYPICAL NAMEPLATE DESCRIPTION	K.Nopat	-	-	-	-	-	-	-

ELECTRICITY GENERATING AUTHORITY OF THAILAND									
DRAWN		VALIDATED		DRAWING NAME					
P.Strawich		[Signature]		TYPICAL DRAWING					
DESIGNED		RECOMMENDED		DESCRIPTION OF DETAIL DRAWING					
P.Strawich		[Signature]		TYPICAL SCHEDULE FOR NAMEPLATES					
VERIFIED		CONCURRED		JOB NO.		REPLACING DWG. NO.		DWG. NO.	
[Signature]		[Signature]						TP - E - 11	
APPROVED		DATE		JOB NO.		REPLACING DWG. NO.		DWG. NO.	
[Signature]		30/11/18						4 1	



TYPICAL NAMEPLATE FOR 500 kv PRIMARY LINE PROTECTION

NAMEPLATE SCHEDULE PANEL 107R				
SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
35x160	107R	PANEL 107R	500KV LINE NO.2 TO KHON KAEN 4	PRIMARY PROTECTION
20x140	EGAT S/N	Contract No.	EGAT serial No.	
20x50	87L	PRI LINE DIFFERENTIAL	RELAY	
20x50	87L-TB1	PRI LINE DIFFERENTIAL	TEST BLOCK 1	
20x50	87L-TB2	PRI LINE DIFFERENTIAL	TEST BLOCK 2	
20x50	87L-TB3	PRI LINE DIFFERENTIAL	TEST BLOCK 3	
20x50	87L-CO	PRI LINE DIFFERENTIAL	CUT-OFF SWITCH	
20x50	94P1-A	LINE DIFFERENTIAL	AUX. TRIP PH.A	
20x50	94P1-B	LINE DIFFERENTIAL	AUX. TRIP PH.B	
20x50	94P1-C	LINE DIFFERENTIAL	AUX. TRIP PH.C	
20x50	79+25-TB1	AUTO RECLOSE & SYNC. RELAY	TEST BLOCK 1	
20x50	79+25-TB2	AUTO RECLOSE & SYNC. RELAY	TEST BLOCK 2	
20x50	79X	AUTO RECLOSE & SYNC. RELAY	AUX. TRIP	
20x50	79+25	AUTO RECLOSE & SYNC.	RELAY	
20x50	79CO	AUTO RECLOSE	CUT-OFF SWITCH	
20x50	DT1-CO	DIRECT TRANSFER TRIP	OPGW CUT-OFF SWITCH	
20x50	62DT1	CB STATUS	TIMER RELAY	
20x50	62T1	TRANSFER TRIP OPGW	SYSTEM TIMER RELAY	
20x50	94T1	TRANSFER TRIP OPGW	SYSTEM AUX. TRIP	
20x50	86T1	TRANSFER TRIP OPGW	SYSTEM LOCKOUT RELAY	
20x50	86T1-PB	TRANSFER TRIP LOCKOUT	RESET PUSH BUTTON	
20x50	PT1-CO	PERMISSIVE TRANSFER TRIP	CUT-OFF SWITCH	
20x50	51S/51SG	STUB OVERCURRENT	CUT-OFF SWITCH	
20x50	51S/51SG-TB	STUB OVERCURRENT	TEST BLOCK	
20x50	51S-CO	STUB OVERCURRENT	RELAY	
20x50	86S	STUB OVERCURRENT	LOCKOUT RELAY	
20x50	86S-PB	STUB OVERCURRENT	LOCKOUT RESET PUSH BUTTON	
20x50	52BX1	CB STATUS	AUX. TRIP	
20x50	21P1	PRI DISTANCE RELAY		
20x50	21P1-TB1	PRI DISTANCE RELAY	TEST BLOCK 1	
20x50	21P1-TB2	PRI DISTANCE RELAY	TEST BLOCK 2	
20x50	21P1-TB3	PRI DISTANCE RELAY	TEST BLOCK 3	
20x50	27XR1	DC UNDERVOLTAGE FOR	PRI LINE DIFF. RELAY	
20x50	27XR2	DC UNDERVOLTAGE FOR	AUTO RECLOSE&SYNC.RELAY	
20x50	27XR3	DC UNDERVOLTAGE FOR	STUB OVERCURRENT	
20x50	27XR4	DC UNDERVOLTAGE FOR	DIRECT TRANSFER TRIP	
20x50	R1	RESISTOR FOR 62DT1		
20x50	R2	RESISTOR FOR 62T1		
20x50	89X-8221-1	89X-8221-1	AUX. TRIP 1	
20x50	89X-8221-2	89X-8221-2	AUX. TRIP 2	
12x28	DSW	DSW		
12x28	LAMP	LAMP		
12x28	OUTLET	OUTLET		

MCB NAMEPLATE SCHEDULE				
SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET	
20x50	MCB2	MCB2 66.4VAC VL	FOR SYNC CHECK	
20x50	MCB3	MCB3 66.4VAC VB	FOR SYNC CHECK	
20x50	MCB4	MCB4 125VDC FOR	PRI DISTANCE RELAY	
20x50	MCB5	MCB4 125VDC FOR	AUTO RECLOSE	& SYNC RELAY
20x50	MCB6	MCB4 125VDC FOR	STUB O/C RELAY	
20x50	MCB7	MCB4 125VDC FOR	DIRECT TRANSFER TRIP1	

TYPICAL NAMEPLATE FOR 500 kv SECONDARY LINE PROTECTION

NAMEPLATE SCHEDULE PANEL 108R				
SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
35x160	108R	PANEL 108R	500KV LINE NO.2 TO KHON KAEN 4	SECONDARY PROTECTION
20x140	EGAT S/N	Contract No.	EGAT serial No.	
20x50	21P2	SEC DISTANCE RELAY		
20x50	21P2-TB1	SEC DISTANCE RELAY	TEST BLOCK 1	
20x50	21P2-TB2	SEC DISTANCE RELAY	TEST BLOCK 2	
20x50	21P2-TB3	SEC DISTANCE RELAY	TEST BLOCK 3	
20x50	21P2-SG	GROUP SETTING	SELECTOR SW.	
20x50	94P2-A	SEC DISTANCE RELAY	AUX. TRIP PH.A	
20x50	94P2-B	SEC DISTANCE RELAY	AUX. TRIP PH.B	
20x50	94P2-C	SEC DISTANCE RELAY	AUX. TRIP PH.C	
20x50	24L	OVERFLUXING (V/Hz)	RELAY	
20x50	24LX	OVERFLUXING (V/Hz)	AUX. TRIP	
20x50	24L-TB	OVERFLUXING (V/Hz)	TEST BLOCK	
20x50	01T2-00	DIRECT TRANSFER TRIP	OPGW CUT-OFF SWITCH	
20x50	62DTT2	CB STATUS	TIMER RELAY	
20x50	62T2	TRANSFER TRIP OPGW	SYSTEM TIMER RELAY	
20x50	94T2	TRANSFER TRIP OPGW	SYSTEM AUX. TRIP	
20x50	86T2	TRANSFER TRIP OPGW	SYSTEM LOCKOUT RELAY	
20x50	86T2-PB	TRANSFER TRIP LOCKOUT	RESET PUSH BUTTON	
20x50	PT2-CO	PERMISSIVE TRANSFER TRIP	CUT-OFF SWITCH	
20x50	50BF-921	BKR.90212 FAIL	RELAY	
20x50	50BF-921-TB1	BKR.90212 FAIL	TEST BLOCK 1	
20x50	50BF-921-TB2	BKR.90212 FAIL	TEST BLOCK 2	
20x50	50BF-921	BKR.90212 FAIL	CUT-OFF SWITCH	
20x50	50BF-922	BKR.90222 FAIL	RELAY	
20x50	50BF-922-TB1	BKR.90222 FAIL	TEST BLOCK 1	
20x50	50BF-922-TB2	BKR.90222 FAIL	TEST BLOCK 2	
20x50	50BF-922	BKR.90222 FAIL	CUT-OFF SWITCH	
20x50	86BF-921	BKR.90212 FAIL	LOCKOUT RELAY	
20x50	86BF-921PB	BKR.90212 FAIL	LOCKOUT RESET PUSH BUTTON	
20x50	86BF-922	BKR.90222 FAIL	LOCKOUT RELAY	
20x50	86BF-922PB	BKR.90222 FAIL	LOCKOUT RESET PUSH BUTTON	
20x50	52BX2	CB STATUS	AUX. TRIP	
20x50	27XR1	DC UNDERVOLTAGE FOR	SEC DISTANCE RELAY	
20x50	27XR2	DC UNDERVOLTAGE FOR	DIRECT TRANSFER TRIP	
20x50	27XR3	DC UNDERVOLTAGE FOR	BKR.90212 FAIL	
20x50	27XR4	DC UNDERVOLTAGE FOR	BKR.90222 FAIL	
20x50	R1	RESISTOR FOR 62DTT2		
20x50	R2	RESISTOR FOR 62T2		
12x28	DSW	DSW		
12x28	LAMP	LAMP		
12x28	OUTLET	OUTLET		

MCB NAMEPLATE SCHEDULE				
SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET	
20x50	MCB2	MCB2 125VDC FOR	SEC DISTANCE RELAY	
20x50	MCB3	MCB4 125VDC FOR	BKR.90212 FAIL	
20x50	MCB4	MCB5 125VDC FOR	BKR.90222 FAIL	
20x50	MCB5	MCB6 125VDC FOR	DIRECT TRANSFER TRIP2	

TYPICAL NAMEPLATE FOR 500 kv REACTOR PROTECTION

NAMEPLATE SCHEDULE PANEL 109R				
SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
35x160	109R	PANEL 109R	500KV LINE NO.2 TO KHON KAEN 4	REACTOR PROTECTION
20x140	EGAT S/N	Contract No.	EGAT serial No.	
20x50	87R	REACTOR DIFFERENTIAL	RELAY	
20x50	87R-TB	REACTOR DIFFERENTIAL	TEST BLOCK	
20x50	95R-TB	CT SUPERVISION	TEST BLOCK	
20x50	95R	CT SUPERVISION	RELAY	
20x50	86R-1	REACTOR DIFFERENTIAL	LOCKOUT RELAY 1	
20x50	86R-2	REACTOR DIFFERENTIAL	LOCKOUT RELAY 2	
20x50	87RN-TB	NEUTRAL REACTOR DIFFERENTIAL	TEST BLOCK	
20x50	95RNX	CT SUPERVISION	LOCKOUT RELAY	
20x50	96RN	NEUTRAL REACTOR DIFFERENTIAL	LOCKOUT RELAY	
20x50	87RN	NEUTRAL REACTOR DIFFERENTIAL	RELAY	
20x50	87R-CO	REACTOR DIFF.	CUT-OFF SWITCH	
20x50	86R-PB	REACTOR DIFF. LOCKOUT	RESET PUSH BUTTON	
20x50	87RN-CO	NEUTRAL REACTOR DIFF.	CUT-OFF SWITCH	
20x50	96RN-PB	NEUTRAL REACTOR LOCKOUT	RESET PUSH BUTTON	
20x50	95RN-PB	CT SUPERVISION	RESET PUSH BUTTON	
20x50	51R/51RG	REACTOR OVERCURRENT	RELAY	
20x50	51R/51RG-TB	REACTOR OVERCURRENT	TEST BLOCK	
20x50	27XR1	DC UNDERVOLTAGE FOR	REACTOR DIFF. LOCKOUT RELAY	
20x50	27XR2	DC UNDERVOLTAGE FOR	REACTOR DIFF. RELAY	
20x50	27XR3	DC UNDERVOLTAGE FOR	NEUTRAL REACTOR DIFF. RELAY	
20x50	27XR4	DC UNDERVOLTAGE FOR	REACTOR OVERCURRENT RELAY	
20x50	R1	VARISTOR UNIT		
20x50	R2	VARISTOR UNIT		
20x50	RP-1	RESISTOR	PHASE A	
20x50	RP-2	RESISTOR	PHASE B	
20x50	RP-3	RESISTOR	PHASE C	
12x28	DSW	DSW		
12x28	LAMP	LAMP		
12x28	OUTLET	OUTLET		

MCB NAMEPLATE SCHEDULE				
SIZE	LEGEND	FIRST LINE	SECOND LINE	THIRD LINE
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET	
20x50	MCB2	MCB2 125VDC FOR	REACTOR DIFFERENTIAL	
20x50	MCB3	MCB3 125VDC FOR	NEUTRAL REACTOR DIFF.	
20x50	MCB4	MCB4 125VDC FOR	REACTOR OVERCURRENT	

NOTES

- THE DRAWING SHOWS NAMEPLATE SCHEDULE FOR SUBSTATION IN ORDER TO BE GUIDELINE FOR THE CONTRACTOR'S DESIGN IN GENERAL. THE CONTRACTOR SHALL DESIGN SPECIFIC OR ACTUAL SCHEDULE AND THEN SUBMIT TO EGAT FOR APPROVAL.
- NAMEPLATES ARE ALSO REQUIRED FOR ALL EQUIPMENT ON THE MOUNTING BRACKETS OR HINGED PANEL INSIDE THE BOARD.
- Contract No. AND EGAT Serial No. SHALL BE INFORMED LATER BY EGAT.

ต้องเก็บแบบผ่านวิศวกรระบบส่ง  
รับรองสำเนาโดย  
**ทพอ-ส. กสส-ส. อวส.**  
เพื่อความถูกต้อง ก่อนนำไปใช้งานให้เช็ค  
เทียบกับ Revision ล่าสุด จากฐานข้อมูลบัญชี  
แม่บทเอกสารผลการออกแบบ

CABINET No. 1609  
RUN NO. 1609



REV. NO.	JOB NO.	JOB DESCRIPTION	DRAWN	DESIGNED	VERIFIED	VALIDATED	RECOMMENDED	CONCURRED	APPROVED	DATE
1	-	REVISE TYPICAL NAMEPLATE DESCRIPTION	P. Sravich	-	-	-	-	-	-	-
-	-	REVISE AND ADD TYPICAL NAMEPLATE DESCRIPTION	K. Nopot	-	-	-	-	-	-	-

ELECTRICITY GENERATING AUTHORITY OF THAILAND				
DRAWN	DESIGNED	VERIFIED	APPROVED	DATE
P. Sravich	P. Sravich	[Signature]	[Signature]	20/11/18
DRAWING NAME: TYPICAL DRAWING				
DESCRIPTION OF DETAIL DRAWING: TYPICAL SCHEDULE FOR NAMEPLATES				
JOB NO.	REPLACING DWG. NO.	DWG. NO.	S. REV.	
		TP - E - 11	6	1

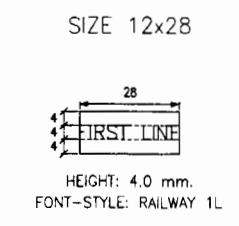
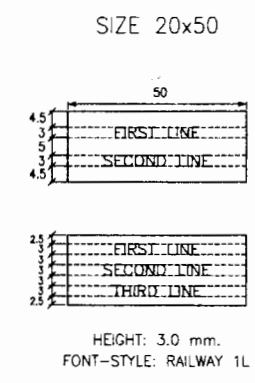
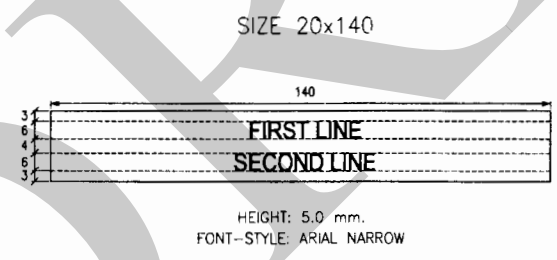
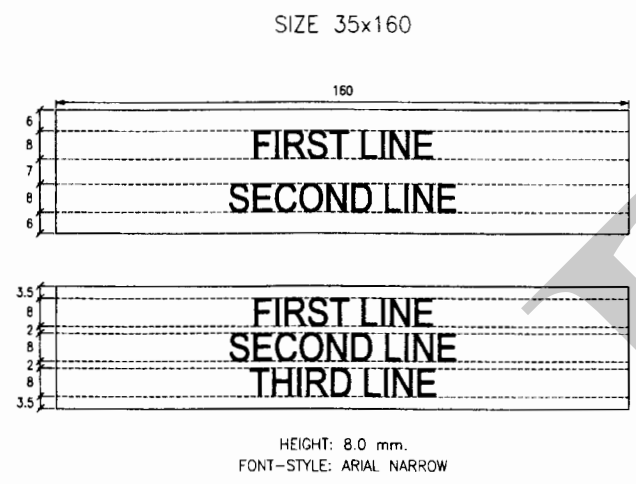
TYPICAL NAMEPLATE FOR 500/230 KV PRIMARY TRANSFORMER PROTECTION TYPICAL NAMEPLATE FOR 500/230 KV SECONDARY TRANSFORMER PROTECTION

NAMEPLATE SCHEDULE PANEL 111R			
SIZE	LEGEND	FIRST LINE	SECOND LINE
35x160	111R	PANEL 111R	500/230KV TRANSFORMER KT1A
20x140	EGAT S/N	Contract No.	EGAT serial No.
20x50	87K1P	PRI KT1A DIFFERENTIAL	RELAY
20x50	87K1P-TB1	PRI KT1A DIFFERENTIAL	TEST BLOCK 1
20x50	87K1P-TB2	PRI KT1A DIFFERENTIAL	TEST BLOCK 2
20x50	86K1P	PRI KT1A DIFFERENTIAL	LOCKOUT RELAY
20x50	87K1P-CO	PRI KT1A DIFFERENTIAL	CUT-OFF SWITCH
20x50	86K1P-PB	PRI KT1A DIFF. LOCKOUT	RESET PUSH BUTTON
20x50	50BFCO-943	BKR.90432 FAIL	CUT-OFF SWITCH
20x50	86BF-943PB	BKR.90432 LOCKOUT	RESET PUSH BUTTON
20x50	50BF-943-TB	BKR.90432 FAIL	TEST BLOCK
20x50	50BF+82BF-943	BKR.90432 FAIL	RELAY
20x50	86BF-943	BKR.90432 FAIL	LOCKOUT RELAY
20x50	27XR1	DC UNDERVOLTAGE FOR	KT1A DIFFERENTIAL
20x50	27XR2	DC UNDERVOLTAGE FOR	BKR.90432 FAIL
12x28	DSW	DSW	
12x28	LAMP	LAMP	
12x28	OUTLET	OUTLET	

MCB NAMEPLATE SCHEDULE			
SIZE	LEGEND	FIRST LINE	SECOND LINE
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET
20x50	MCB2	MCB2 125VDC FOR	BKR.90432 FAIL
20x50	MCB3	MCB3 125VDC FOR	PRI TRANSFORMER DIFF.

NAMEPLATE SCHEDULE PANEL 112R			
SIZE	LEGEND	FIRST LINE	SECOND LINE
35x160	112R	PANEL 112R	500/230KV TRANSFORMER KT1A
20x140	EGAT S/N	Contract No.	EGAT serial No.
20x50	87K1S	SEC KT1A DIFFERENTIAL	RELAY
20x50	87K1S-TB1	SEC KT1A DIFFERENTIAL	TEST BLOCK 1
20x50	87K1S-TB2	SEC KT1A DIFFERENTIAL	TEST BLOCK 2
20x50	86K1S	SEC KT1A DIFFERENTIAL	LOCKOUT RELAY
20x50	514-TB	HIGH SIDE OVERCURRENT	TEST BLOCK
20x50	51-4-TB	LOW SIDE OVERCURRENT	TEST BLOCK
20x50	514/51T04	HIGH SIDE OVERCURRENT	RELAY
20x50	51-4/51T04	LOW SIDE OVERCURRENT	RELAY
20x50	510B1-4-TB1	OVERCURRENT GROUND BU.	TEST BLOCK 1
20x50	510B2-4-TB2	OVERCURRENT GROUND BU.	TEST BLOCK 2
20x50	510B1-4	OVERCURRENT GROUND BU.	RELAY 1
20x50	510B2-4	OVERCURRENT GROUND BU.	RELAY 2
20x50	87K1S-CO	SEC KT1A DIFFERENTIAL	CUT-OFF SWITCH
20x50	86K1S-PB	SEC KT1A DIFF. LOCKOUT	RESET PUSH BUTTON
20x50	51-11/51G11-TB	TERTIARY OVERCURRENT	TEST BLOCK
20x50	51-11/51G11	TERTIARY OVERCURRENT	RELAY
20x50	59N-1-TB	RESIDUAL VOLTAGE	TEST BLOCK
20x50	59N-1	RESIDUAL VOLTAGE	RELAY
20x50	27XR1	DC UNDERVOLTAGE FOR	KT1A DIFFERENTIAL
20x50	27XR2	DC UNDERVOLTAGE FOR	KT1A OVERCURRENT
20x50	24K1	TRANSFORMER OVERFLUXING	RELAY
12x28	DSW	DSW	
12x28	LAMP	LAMP	
12x28	OUTLET	OUTLET	

MCB NAMEPLATE SCHEDULE			
SIZE	LEGEND	FIRST LINE	SECOND LINE
20x50	MCB1	MCB1 230VAC FOR	LIGHTING & OUTLET
20x50	MCB2	MCB2 115VAC FOR	NEUTRAL (59N)
20x50	MCB3	MCB3 125VDC FOR	SEC TRANSFORMER DIFF.
20x50	MCB4	MCB4 125VDC FOR	HS OVERCURRENT
20x50	MCB5	MCB5 125VDC FOR	LS OVERCURRENT
20x50	MCB6	MCB6 125VDC FOR	TRANSFORMER OVERFLUXING
20x50	MCB7	MCB7 125VDC FOR	GB1 OVERCURRENT
20x50	MCB8	MCB8 125VDC FOR	GB2 OVERCURRENT
20x50	MCB9	MCB9 125VDC FOR	TERTIARY O/C
20x50	MCB10	MCB10 125VDC FOR	NEUTRAL (59N)



ต้องเก็บแบบด้วยวิศวกรระบบส่ง  
รับรองสำเนาโดย  
**ทพอ-ส. กสส-ส. อวส.**  
เพื่อความถูกต้อง ก่อนนำไปใช้งานให้เช็ค  
เทียบกับ Revision ล่าสุด จากฐานข้อมูลบัญชี  
แม่แบบเอกสารผลการออกแบบ

- NOTES
1. THE DRAWING SHOWS NAMEPLATE SCHEDULE FOR SUBSTATION IN ORDER TO BE GUIDELINE FOR THE CONTRACTOR'S DESIGN IN GENERAL. THE CONTRACTOR SHALL DESIGN SPECIFIC OR ACTUAL SCHEDULE AND THEN SUBMIT TO EGAT FOR APPROVAL.
  2. NAMEPLATES ARE ALSO REQUIRED FOR ALL EQUIPMENT ON THE MOUNTING BRACKETS OR HINGED PANEL INSIDE THE BOARD.
  3. Contract No. AND EGAT Serial No. SHALL BE INFORMED LATER BY EGAT.

147 xx  
ISO 9001 TSEB 1099  
CAD CENTER  
DO NOT AMEND MANUALLY

REV. NO.	JOB NO.	JOB DESCRIPTION	DRAWN	DESIGNED	VERIFIED	VALIDATED	RECOMMENDED	CONCURRED	APPROVED	DATE
1	-	REVISE TYPICAL NAMEPLATE DESCRIPTION	P.Sirawich	-	-	-	-	-	-	-
-	-	REVISE AND ADD TYPICAL NAMEPLATE DESCRIPTION	K.Nopit	-	-	-	-	-	-	-

ELECTRICITY GENERATING AUTHORITY OF THAILAND			
DRAWN	DESIGNED	VERIFIED	APPROVED
P.Sirawich	P.Sirawich	C. Chulaporn	P.Sirawich
VALIDATED	RECOMMENDED	CONCURRED	APPROVED
CHEF, CONTROL AND PROTECTION ENGINEERING DEPARTMENT	ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION	DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION	ASSISTANT GOVERNOR - TRANSMISSION SYSTEM ENGINEERING
DRAWING NAME		TYPICAL DRAWING	
DESCRIPTION OF DETAIL DRAWING		TYPICAL SCHEDULE FOR NAMEPLATES	
JOB NO.	REPLACING DWG. NO.	DWG. NO.	REV.
		TP - E - 11	8 1