

**1ST DRAFT OF TERM OF REFERENCE, ANNOUNCEMENT
AND DETAILS OF MEDIUM COST
FOR INVITATION TO BID NO. TS12-MC2-04 and TIEC-MC2-02
SUPPLY OF CABLE AND CONDUCTOR
TRANSMISSION SYSTEM EXPANSION PROJECT NO. 12
TRANSMISSION SYSTEM IMPROVEMENT PROJECT IN
NORTHEASTERN, LOWER NORTHERN, CENTRAL REGIONS
AND BANGKOK AREA TO ENHANCE SYSTEM SECURITY**

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.

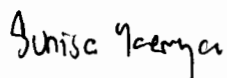
How to Comment

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: jatuphon.p@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 **June 7, 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.



Mrs. Sunisa Yaemyoo
Head, International Buy Section – Transmission System Segment
June 4, 2019



INVITATION TO BID NO. TS12-MC2-04 and TIEC-MC2-02

SUPPLY OF CABLE AND CONDUCTOR TRANSMISSION SYSTEM EXPANSION PROJECT NO. 12 TRANSMISSION SYSTEM IMPROVEMENT PROJECT IN NORTHEASTERN, LOWER NORTHERN, CENTRAL REGIONS AND BANGKOK AREA TO ENHANCE SYSTEM SECURITY

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 : Ex-works

Medium Cost (including Value Added Tax) :

Schedule A1 and B1	:	THB 51,900,000.-
Schedule A2 and B2	:	THB 26,800,000.-

Eligibility of Bidders

1. The Bidder shall be a local manufacturer or provide such locally manufactured materials and/or equipment 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 THB 1,000.- per copy, non-refundable, at the following address :

International Procurement Department – Transmission Segment
(Room No. 1202/2, 12th Floor, Building Tor. 101)
Procurement and Inventory Management Division
Electricity Generating Authority of Thailand
Bangkrui, Nonthaburi 11130, Thailand
Telephone no. 0 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/>

Delivery of Bids

Bids shall be submitted at Room No. 1202/1, 12th 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

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ประกาศการไฟฟ้าฝ่ายผลิตแห่งประเทศไทย
เรื่อง ประกวดราคาซื้อ เลขที่ TS12-MC2-04 and TIEC-MC2-02

การไฟฟ้าฝ่ายผลิตแห่งประเทศไทย (กฟผ.) มีความประสงค์จะซื้อ Cable and Conductor โครงการขยายระบบส่งไฟฟ้าระยะที่ 12 โครงการปรับปรุงระบบส่งไฟฟ้าบริเวณภาคตะวันออกเฉียงเหนือ ภาคเหนือตอนล่าง ภาคกลาง และกรุงเทพมหานคร เพื่อเสริมความมั่นคงระบบไฟฟ้า โดยใช้งบประมาณ กฟผ.

สถานที่ส่งมอบ : หน้าโรงงานผู้ผลิต

ราคากลาง(รวมภาษีมูลค่าเพิ่ม) :

Schedule A1 and B1 : 51,900,000.- บาท

Schedule A2 and B2 : 26,800,000.- บาท

คุณสมบัติของผู้เสนอราคา

1. ต้องเป็นนิติบุคคลผู้ผลิตพัสดุ หรือผู้มีอาชีพขายพัสดุที่ผลิตในประเทศไทยตามประกาศและต้องไม่เป็นผู้ทำงานซึ่งสำนักนายกรัฐมนตรีได้แจ้งเวียนชื่อไว้ หรือต้องไม่เป็นผู้ที่ กฟผ. ห้ามติดต่อหรือห้ามเข้าเสนอราคา หรือต้องไม่เป็นผู้ที่ได้รับผลของการสั่งให้นิติบุคคลหรือบุคคลอื่นเป็นผู้ทำงานตามคำสั่ง กฟผ.
2. ต้องไม่เป็นผู้มีผลประโยชน์ร่วมกันกับผู้เสนอราคารายอื่น ณ วันประกาศประกวดราคาครั้งนี้เป็นต้นไป หรือต้องไม่เป็นผู้กระทำการอันเป็นการขัดขวางการแข่งขันราคาอย่างเป็นธรรมในการดำเนินการประกวดราคาครั้งนี้
3. ต้องไม่เป็นที่ปรึกษาของ กฟผ. หรือมีส่วนร่วมในบริษัทที่ปรึกษาของ กฟผ. ในงานนี้ หรือต้องไม่มีผู้ปฏิบัติงาน กฟผ. เข้าไปมีส่วนร่วมในกิจการของผู้เสนอราคา ไม่ว่าจะในฐานะผู้ถือหุ้นที่มีสิทธิควบคุมการจัดการ กรรมการ ผู้อำนวยการ พนักงาน ลูกจ้าง ตัวแทนหรือที่ปรึกษา ยกเว้น ในกรณีที่ผู้ปฏิบัติงานได้รับคำสั่งอย่างเป็นทางการจาก กฟผ. ให้ไปปฏิบัติงานหรือเข้าร่วมในกิจการของผู้เสนอราคา
4. ต้องไม่เป็นผู้ได้รับเอกสิทธิ์หรือความคุ้มกัน ซึ่งอาจปฏิเสธไม่ยอมขึ้นศาลไทย เว้นแต่รัฐบาลของผู้เสนอราคาได้มีคำสั่งให้สละสิทธิ์และความคุ้มกันเช่นนั้น
5. ผู้ประสงค์เข้าประกวดราคาในนามของกิจการร่วมค้าหรือกิจการค้าร่วม (Joint Venture or Consortium) จะต้องดำเนินการทุกขั้นตอนของการประกวดราคาในนามของกิจการร่วมค้าหรือกิจการค้าร่วม ตั้งแต่การเสนอราคาจนถึงสิ้นสุดข้อผูกพันกับ กฟผ.

การขายเอกสารประกวดราคา

ผู้สนใจติดต่อขอทราบรายละเอียด เพื่อตรวจสอบคุณสมบัติของผู้เสนอราคา และขอซื้อเอกสารประกวดราคา ในราคาชุดละ 1,000.- บาท ได้ที่ แผนกจัดซื้อต่างประเทศสายงานระบบส่ง (ห้อง 1202/2 ชั้น 12 อาคาร ท.101) กองจัดซื้อจัดจ้างต่างประเทศ สายงานระบบส่ง 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 เซิงสะพานพระราม 7 จังหวัดนนทบุรี

ประกาศ ณ วันที่

(นางนิลเนตร โอสถภาณุชิต)

หัวหน้ากองจัดซื้อจัดจ้างต่างประเทศสายงานระบบส่ง

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**ตารางแสดงวงเงินงบประมาณที่ได้รับจัดสรรและราคากลาง(ราคาอ้างอิง)
ในการจัดซื้อจัดจ้างที่มีใช้งานก่อสร้าง**

1. **ชื่อโครงการ** ประกวดราคา เลขที่ TS12-MC2-04 and TIEC-MC2-02
งานจัดซื้อ Cable and Conductor
โครงการขยายระบบส่งไฟฟ้าระยะที่ 12
โครงการปรับปรุงระบบส่งไฟฟ้าบริเวณภาคตะวันออกเฉียงเหนือ ภาคเหนือตอนล่าง
ภาคกลางและกรุงเทพมหานคร เพื่อเสริมความมั่นคงระบบไฟฟ้า
/หน่วยงานเจ้าของโครงการ ฝ่ายแผนงานและโครงการระบบส่ง การไฟฟ้าฝ่ายผลิตแห่งประเทศไทย
2. **วงเงินงบประมาณที่ได้รับจัดสรร**
โครงการขยายระบบส่งไฟฟ้าระยะที่ 12 งบประมาณ 60,000 ล้านบาท
โครงการปรับปรุงระบบส่งไฟฟ้าบริเวณภาคตะวันออกเฉียงเหนือ ภาคเหนือตอนล่าง
ภาคกลางและกรุงเทพมหานคร เพื่อเสริมความมั่นคงระบบไฟฟ้า งบประมาณ 94,040 ล้านบาท
3. **วันที่กำหนดราคากลาง** 23 เมษายน 2562 (วันที่ อวส. อนุมัติ)
ราคารวมภาษีมูลค่าเพิ่มเป็นเงิน 78,700,000.00 บาท **ราคา/หน่วย** ตามเอกสารแนบ
4. **แหล่งที่มาของราคากลาง** หลักเกณฑ์การกำหนดราคากลางการจัดซื้อและจัดจ้างงานก่อสร้าง
ระบบส่งไฟฟ้าของสายงานระบบส่ง
5. **รายชื่อเจ้าหน้าที่ผู้กำหนดราคากลาง**
 - 5.1 นางสาวมธุรส ชมาฤกษ์ วศ.10 กวอ-ส.
 - 5.2 นางสาวจรรุวรรณ พิพัฒน์มงคล วศ.6 หวอ-ส. กวอ-ส.

MEDIUM COST OF BID NO. TS12-MC2-04 and TIEC-MC2-02

SUMMARY OF BID PRICE FOR SCHEDULE A1 AND B1

SUPPLY OF CABLE AND CONDUCTOR

TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

TRANSMISSION SYSTEM IMPROVEMENT PROJECT IN NORTHEASTERN, LOWER NORTHERN, CENTRAL REGIONS AND BANGKOK AREA TO ENHANCE SYSTEM SECURITY

No.	Description	Supply of Equipment
		Local Supply
		Ex-works Price (excluding VAT) Baht
		Amount
1	Schedule A1 : Power Cable, Control Cable and XLPE Power Cable	32,358,500.00
2	Schedule B1 : Power Cable and Control Cable	16,128,000.00
BID PRICE		Baht 48,486,500.00
VAT		Baht 3,394,055.00
TOTAL BID PRICE		Baht 51,880,555.00
TOTAL BID PRICE (ROUND)		Baht 51,900,000.00

27

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MEDIUM COST OF BID NO. TS12-MC2-04 and TIEC-MC2-02
SUMMARY OF BID PRICE FOR SCHEDULE A2 AND B2
SUPPLY OF CABLE AND CONDUCTOR
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12
TRANSMISSION SYSTEM IMPROVEMENT PROJECT IN NORTHEASTERN, LOWER NORTHERN, CENTRAL REGIONS AND BANGKOK AREA TO ENHANCE SYSTEM SECURITY

No.	Description	Supply of Equipment
		Local Supply
		Ex-works Price (excluding VAT) Baht
		Amount
1	Schedule A2 : Grounding Cable and Overhead Ground Wire	22,058,800.00
2	Schedule B2 : Grounding Cable	3,024,000.00
BID PRICE		Baht 25,082,800.00
VAT		Baht 1,755,796.00
TOTAL BID PRICE		Baht 26,838,596.00
TOTAL BID PRICE (ROUND)		Baht 26,800,000.00

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 (นางสาวพนม สุภาวกุล)

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MEDIUM COST OF BID NO. TS12-MC2-04 AND TIEC-MC2-02
Schedule A1 : Power Cable, Control Cable and XLPE Power Cable
SUPPLY OF CABLE AND CONDUCTOR
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Supply of Equipment	
				Local Supply	
				Ex-works Price (excluding VAT) Baht	
				Unit Price	Amount
	Power Cable and Control Cable Reference : Specification No. 323 (L)				
A1-1	1/C no. 240 sq.mm. power cable (500 m per reel)	2000	meter	1,087.00	2,174,000.00
A1-2	1/C no. 35 sq.mm. power cable (500 m per reel)	1000	meter	166.00	166,000.00
A1-3	1/C no. 50 sq.mm. power cable (500 m per reel)	1500	meter	180.00	270,000.00
A1-4	2/C no. 6 sq.mm. power cable (500 m per reel)	17000	meter	121.00	2,057,000.00
A1-5	4/C no. 6 sq.mm. power cable (500 m per reel)	3500	meter	172.00	602,000.00
A1-6	2/C no. 10 sq.mm. power cable (500 m per reel)	4000	meter	170.00	680,000.00
A1-7	2/C no. 35 sq.mm. power cable (500 m per reel)	3500	meter	536.00	1,876,000.00
A1-8	3/C no. 1.5 sq.mm. control cable (500 m per reel)	7000	meter	78.00	546,000.00
A1-9	5/C no. 1.5 sq.mm. control cable (500 m per reel)	4000	meter	97.00	388,000.00
A1-10	9/C no. 1.5 sq.mm. control cable (500 m per reel)	4500	meter	150.00	675,000.00
A1-11	12/C no. 1.5 sq.mm. control cable (500 m per reel)	1000	meter	193.00	193,000.00
A1-12	24/C no. 1.5 sq.mm. control cable (500 m per reel)	1000	meter	424.00	424,000.00
A1-13	3/C no. 2.5 sq.mm. control cable (500 m per reel)	15000	meter	95.00	1,425,000.00
A1-14	5/C no. 2.5 sq.mm. control cable (500 m per reel)	11500	meter	132.00	1,518,000.00
A1-15	9/C no. 2.5 sq.mm. control cable (500 m per reel)	1500	meter	205.00	307,500.00
A1-16	3/C no. 4 sq.mm. control cable (500 m per reel)	21500	meter	119.00	2,558,500.00
A1-17	5/C no. 4 sq.mm. control cable (500 m per reel)	13000	meter	174.00	2,262,000.00
A1-18	9/C no. 4 sq.mm. control cable (500 m per reel)	9500	meter	272.00	2,584,000.00
A1-19	12/C no. 4 sq.mm. control cable (500 m per reel)	500	meter	384.00	192,000.00
A1-20	2/C no. 6 sq.mm. control cable (500 m per reel)	500	meter	136.00	68,000.00

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MEDIUM COST OF BID NO. TS12-MC2-04 AND TIEC-MC2-02
Schedule A1 : Power Cable, Control Cable and XLPE Power Cable
SUPPLY OF CABLE AND CONDUCTOR
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Supply of Equipment	
				Local Supply	
				Ex-works Price (excluding VAT) Baht	
				Unit Price	Amount
A1-21	4/C no. 6 sq.mm. control cable (500 m per reel)	30000	meter	192.00	5,760,000.00
A1-22	5/C no. 6 sq.mm. control cable (500 m per reel)	1000	meter	242.00	242,000.00
A1-23	17 twisted pairs no. 0.3 sq.mm. (7/0.25 mm.) control cable (500 m per reel)	1500	meter	295.00	442,500.00
	XLPE Power Cable Reference : Specification No. 322				
A1-24	33 kV 1/C no. 500 sq.mm. XLPE power cable as per Ratings and Features RF PC3B10 (500 m per reel)	500	meter	2,783.00	1,391,500.00
A1-25	22 kV 1/C no. 35 sq.mm. XLPE power cable as per Ratings and Features RF PC2110 (1000 m per reel)	6000	meter	573.00	3,438,000.00
A1-26	22 kV 1/C no. 120 sq.mm. XLPE power cable as per Ratings and Features RF PC2510	100	meter	1,185.00	118,500.00
Total Price for Schedule A1				Baht	32,358,500.00

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MEDIUM COST OF BID NO. TS12-MC2-04 AND TIEC-MC2-02
Schedule A2 : Grounding Cable and Overhead Ground Wire
SUPPLY OF CABLE AND CONDUCTOR
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Supply of Equipment	
				Local Supply	
				Ex-works Price (excluding VAT) Baht	
				Unit Price	Amount
A2-1	Grounding Cable Reference : No. 603 4/0 AWG copper ground wire (500 m per reel)	50000	meter	432.00	21,600,000.00
A2-2	Overhead Ground Wire Reference : Specification No. 524 3/8 inch diameter galvanized steel overhead ground wire (high strength) (3,100 m per reel)	6200	meter	74.00	458,800.00
Total Price for Schedule A2				Baht	22,058,800.00

MEDIUM COST OF BID NO.TS12-MC2-04 AND TIEC-MC2-02

Schedule B1 : Power Cable and Control Cable

SUPPLY OF CABLE AND CONDUCTOR

TRANSMISSION SYSTEM IMPROVEMENT PROJECT IN NORTHEASTERN, LOWER NORTHERN, CENTRAL REGIONS AND BANGKOK AREA TO ENHANCE SYSTEM SECURITY

Item No.	Description	Qty.	Unit	Supply of Equipment	
				Local Supply	
				Ex-works Price (excluding VAT) Baht	
				Unit Price	Amount
	Power Cable and Control Cable Reference : Specification No. 323 (L)				
B1-1	1/C no. 35 sq.mm. power cable (500 m per reel)	1000	meter	166.00	166,000.00
B1-2	1/C no. 70 sq.mm. power cable (500 m per reel)	500	meter	367.00	183,500.00
B1-3	2/C no. 6 sq.mm. power cable (500 m per reel)	4000	meter	121.00	484,000.00
B1-4	2/C no. 16 sq.mm. power cable (500 m per reel)	500	meter	218.00	109,000.00
B1-5	5/C no. 1.5 sq.mm. control cable (500 m per reel)	500	meter	97.00	48,500.00
B1-6	12/C no. 1.5 sq.mm. control cable (500 m per reel)	8000	meter	193.00	1,544,000.00
B1-7	24/C no. 1.5 sq.mm. control cable (500 m per reel)	5000	meter	424.00	2,120,000.00
B1-8	3/C no. 2.5 sq.mm. control cable (500 m per reel)	9000	meter	95.00	855,000.00
B1-9	5/C no. 2.5 sq.mm. control cable (500 m per reel)	8500	meter	132.00	1,122,000.00
B1-10	9/C no. 2.5 sq.mm. control cable (500 m per reel)	2000	meter	205.00	410,000.00
B1-11	12/C no. 2.5 sq.mm. control cable (500 m per reel)	3000	meter	262.00	786,000.00
B1-12	3/C no. 4 sq.mm. control cable (500 m per reel)	9500	meter	119.00	1,130,500.00

MEDIUM COST OF BID NO.TS12-MC2-04 AND TIEC-MC2-02

Schedule B1 : Power Cable and Control Cable

SUPPLY OF CABLE AND CONDUCTOR

TRANSMISSION SYSTEM IMPROVEMENT PROJECT IN NORTHEASTERN, LOWER NORTHERN, CENTRAL REGIONS AND BANGKOK AREA TO ENHANCE SYSTEM SECURITY

Item No.	Description	Qty.	Unit	Supply of Equipment	
				Local Supply	
				Ex-works Price (excluding VAT) Baht	
				Unit Price	Amount
B1-13	4/C no. 4 sq.mm. control cable (500 m per reel)	8000	meter	141.00	1,128,000.00
B1-14	5/C no. 4 sq.mm. control cable (500 m per reel)	9000	meter	174.00	1,566,000.00
B1-15	9/C no. 4 sq.mm. control cable (500 m per reel)	14500	meter	272.00	3,944,000.00
B1-16	12/C no. 4 sq.mm. control cable (500 m per reel)	500	meter	384.00	192,000.00
B1-17	4/C no. 6 sq.mm. control cable (500 m per reel)	1000	meter	192.00	192,000.00
B1-18	17 twisted pairs no. 0.3 sq.mm. (7/0.25 mm.) control cable (500 m per reel)	500	meter	295.00	147,500.00
Total Price for Schedule B1				Baht	16,128,000.00

MEDIUM COST OF BID NO.TS12-MC2-04 AND TIEC-MC2-02

Schedule B2 : Grounding Cable

SUPPLY OF CABLE AND CONDUCTOR

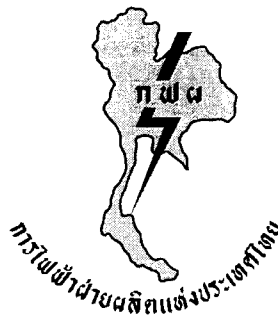
TRANSMISSION SYSTEM IMPROVEMENT PROJECT IN NORTHEASTERN, LOWER NORTHERN, CENTRAL REGIONS AND BANGKOK AREA TO ENHANCE SYSTEM SECURITY

Item No.	Description	Qty.	Unit	Supply of Equipment	
				Local Supply	
				Ex-works Price (excluding VAT) Baht	
				Unit Price	Amount
B2-1	Grounding Cable Reference : No. 603 4/0 AWG copper ground wire (500 m per reel)	7000	meter	432.00	3,024,000.00
Total Price for Schedule B2				Baht	3,024,000.00

Contract No.

**Invitation to Bid No. TS12-MC2-04
and TIEC-MC2-02**

ELECTRICITY GENERATING AUTHORITY OF THAILAND



BIDDING DOCUMENTS

SUPPLY OF CABLE AND CONDUCTOR

TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

**TRANSMISSION SYSTEM IMPROVEMENT PROJECT IN
NORTHEASTERN, LOWER NORTHERN, CENTRAL REGIONS
AND BANGKOK AREA TO ENHANCE SYSTEM SECURITY**

EGAT'S FUND

BIDDER : _____

(2019)

TC-SUPPLY-01 (Rev.1)
(Jul.18)

INVITATION TO BID NO. TS12-MC2-04 and TIEC-MC2-02
SUPPLY OF CABLE AND CONDUCTOR
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12
TRANSMISSION SYSTEM IMPROVEMENT PROJECT IN
NORTHEASTERN, LOWER NORTHERN, CENTRAL REGIONS
AND BANGKOK AREA TO ENHANCE SYSTEM SECURITY
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

SECTION H. BILL OF MATERIALS (None)

SECTION I. SPECIFICATIONS

SECTION J. DRAWINGS (None)

CONTENTS

<u>Article No.</u>	<u>Description</u>	<u>Page</u>
	Confirmation Form	-
	Discount Form	-
	Additional Regulation	1-11
	Important Information	i
	Data Sheet	i
SECTION A : <u>INVITATION TO BID</u>		
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	A5
A-6	Availability of Bidding Documents	A6
SECTION B : <u>INSTRUCTIONS TO BIDDERS</u>		
	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	B6
B-6	Withdrawal of Bids	B6
B-7	Interpretation of Bidding Documents before Bid Opening	B6
B-8	Information to be Submitted with Bid	B6
B-9	Deviations from Specifications	B8

<u>Article No.</u>	<u>Description</u>	<u>Page</u>
B-10	Rejection of Bids	B9
B-11	Delivery Time	B9
B-12	Evaluation and Comparison of Bids	B9
B-13	Acceptance of Bids	B10
<i>B-14</i>	<i>Appeal</i>	B11
B-15	Award of Contract	B11
B-16	Bidder's Responsibility	B12
B-17	Supplemental Notices	B12
B-18	Cost of Bidding	B12
B-19	Cancellation of Bid	B12
	Specimen of Bid Security	B14
SECTION C : <u>PROPOSAL</u>		
C-1	Price Schedule	C1
C-2	Penalty for Equipment Not Meeting Guaranteed Characteristics	C2
C-3	Guaranteed Delivery Time	C2
C-4	Drawing and Document Submission Schedule	C2
C-5	Estimate of Deliveries	C2
C-6	Bid Security	C3
C-7	Supplemental Notices	C3
	Part 1 : Price Proposal	Part 1-C1
	Part 2 : Proposal Data	Part 2-C1
	Part 3 : Delivery Schedule and Distribution List	Part 3-C1
SECTION D : <u>CONTRACT</u>		
D-1	Contract Documents	D1
D-2	Acceptance of Proposal	D2
D-3	Agreement	D2

<u>Article No.</u>	<u>Description</u>	<u>Page</u>
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	E4
E-7	Export Charges	E4
E-8	Import Duty and Taxes	E4
E-9	Value Added Tax	E5
E-10	Income and Other Taxes	E6
E-11	Fees and Duties	E7
E-12	Performance Security	E8
E-13	Inspection and Tests	E9
E-14	Preparation for Shipment and/or Delivery	E10
E-15	Clearance and Weight Limitations	E12
E-16	Shipment	E13

<u>Article No.</u>	<u>Description</u>	<u>Page</u>
E-17	Documents Required for Each Shipment	E14
E-18	Force Majeure	E18
E-19	Transportation Insurance	E18
E-20	Transfer of Title	E18
E-21	Changes and Extra or Omitted Work	E19
E-22	Termination and Suspension of Contract	E19
E-23	Default and Termination	E20
E-24	Indemnification by the Contractor	E21
E-25	Limitation of Liability	E21
E-26	Consequential Damages	E21
E-27	Vesting of Contract in Receiver	E22
E-28	Extension of Time	E22
E-29	Failure to Meet Requirements	E23
E-30	Operation or Use of Unsatisfactory Equipment	E25
E-31	Dispute Resolution	E25
E-32	Language and Numbers	E26
	Specimen of Guarantee	E27
	Instructions for Packaging	E28

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	F2

<u>Article No.</u>	<u>Description</u>	<u>Page</u>
F-5	Acceptance Tests	F3
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	F8
F-10	Maintenance Guarantee	F9
F-11	Drawings and Documents to be Furnished by Contractor	F11
F-12	Maintenance Security	F14
	Specimen of Maintenance Guarantee	F16
	Drawings and Documents to be Furnished by the Contractor (For Control and Protection Equipment)	F17
	Drawings and Documents to be Furnished by the Contractor (For All Equipment except Control and Protection Equipment)	F18
<u>SECTION G : RATINGS AND FEATURES</u>		
G-1	Ratings and Features	G1
<u>SECTION H : BILL OF MATERIALS (None)</u>		
-	-	-
<u>SECTION I : SPECIFICATIONS</u>		
I-1	Specifications	I1
<u>SECTION J : DRAWINGS (None)</u>		
-	-	-

CONFIRMATION FORM

(INDIVIDUAL COMPANY / JOINT VENTURE)

INVITATION TO BID NO. TS12-MC2-04 and TIEC-MC2-02

SUPPLY OF CABLE AND CONDUCTOR

TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

**TRANSMISSION SYSTEM IMPROVEMENT PROJECT IN
NORTHEASTERN, LOWER NORTHERN, CENTRAL REGIONS
AND BANGKOK AREA TO ENHANCE SYSTEM SECURITY**

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 (ทพ.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-MC2-04 and TIEC-MC2-02

SUPPLY OF CABLE AND CONDUCTOR

TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

**TRANSMISSION SYSTEM IMPROVEMENT PROJECT IN
NORTHEASTERN, LOWER NORTHERN, CENTRAL REGIONS
AND BANGKOK AREA TO ENHANCE SYSTEM SECURITY**

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 (ทพ.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-MC2-04 and TIEC-MC2-02

SUPPLY OF CABLE AND CONDUCTOR

TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

**TRANSMISSION SYSTEM IMPROVEMENT PROJECT IN
NORTHEASTERN, LOWER NORTHERN, CENTRAL REGIONS
AND BANGKOK AREA TO ENHANCE SYSTEM SECURITY**

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	
<u>Thai National Bidder</u>			
[] 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

		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 checked="" 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)

2

**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.

2

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).

Important Information

for

Invitation to Bid No. TS12-MC2-04 and TIEC-MC2-02

The purpose of this section is to inform the Bidders to **carefully study** the details of the revised terms and conditions in the bidding documents. The following provisions have been **recently revised** as stated hereunder:

Article F-8. Payment:

If the Contractor requires the payment of foreign currency portion to be paid directly to the suppliers, he has to inform EGAT **which portion of the Contract Price, as stipulated in the term of payment of the Contract**, to be paid accordingly.

In case the local Contractor requires foreign currency or currencies to be paid directly to him, payment of such foreign currency or currencies will be made to the local Contractor in Thai Baht by using the **selling exchange rate** published by the Bank of Thailand on the **payment date** (previously stated as buying exchange rate on the bid opening date).

The number of days which payment for the first portion of foreign supply will be made after delivery, previously specified as 45 days, has been **deleted**.

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

The limit of liquidated damages, previously specified that does not exceed 10%, has been **deleted**.

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DATA SHEET

TC-SUPPLY-01 (Rev.1)
(Jul.18)

DATA SHEET

for

Invitation to Bid No. TS12-MC2-04 and TIEC-MC2-02

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

Provisions Regarding Foreign Equipment

Equipment proposed for this invitation to bid/enquiry shall be manufactured locally. Any provisions regarding foreign supply found in the bidding documents are not applicable.

Article B-3. Bid Security

Schedules A1 and B1

The amount of bid security shall be THB 2,595,000.-.

Schedule A2 and B2

The amount of bid security shall be THB 1,340,000.-.

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-8. Information to be Submitted with Bid:

Item m. is not applicable

Article B-12. Evaluation and Comparison of Bids:

The evaluation of bid prices shall be on

- combination of schedules A1 and B1
- combination of schedules A2 and B2

Article E-29. Failure to Meet Requirements and F-10. Maintenance Guarantee

Maintenance Guarantee Period

- For all Equipment except Shunt Reactor, 200 MVA 230 kV and above Power Transformer and 500 kV System Voltage Equipment

The Contractor shall guarantee the proper functioning of Equipment for a period of one (1) Year except the following Equipment the guarantee period of which shall be as follows :

<u>Equipment</u>	<u>Period of Guarantee (Year)</u>
- Fault Recording System	2
- Control and Protection System	2
- <u>For Shunt Reactor, 200 MVA 230 kV and above Power Transformer and 500 kV System Voltage Equipment</u>	

The Contractor shall guarantee the proper functioning of Equipment for a period of five (5) Years.

Defective Equipment to be replaced with the whole new set

For GIS, Power Transformer, Power Circuit Breaker, Shunt Reactor, in case EGAT, at its sole discretion, requires the Contractor to replace any defected Equipment, the Contractor shall replace the Equipment with the whole new set as specified in Failure to Meet Requirements in section E and Maintenance Guarantee in section F.

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.

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**SECTION A
INVITATION TO BID**

INVITATION TO BID NO. TS12-MC2-04 and TIEC-MC2-02
SUPPLY OF CABLE AND CONDUCTOR
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12
TRANSMISSION SYSTEM IMPROVEMENT PROJECT IN
NORTHEASTERN, LOWER NORTHERN, CENTRAL REGIONS
AND BANGKOK AREA TO ENHANCE SYSTEM SECURITY

A-1. Invitation

The Electricity Generating Authority of Thailand (EGAT) hereby invites sealed bids for furnishing and delivering of Cable and Conductor under Transmission System Expansion Project No.12 and Transmission System Improvement Project in Northeastern, Lower Northern, Central Regions and Bangkok Area to Enhance System Security 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

1. 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.

- c. The Bidder shall have no just or proper claims pending against the Bidder 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 pending claim of the Bidder.
- d. The Bidder shall have sufficient capacity to carry out the Work.
- e. The bidder shall propose the Equipment manufactured by the qualified manufacturers who shall fulfill the following requirements :

- 1. Being well-established and maintaining a permanent place of business.
- 2. The manufacturer shall have the experience records that meet the requirements set forth herein.

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

- 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, provided that each item of the equipment to be supplied under this bid shall be manufactured from the same source of supply as indicated in each of such relevant supply records as described in Item e.6 below. Otherwise, it shall not be acceptable and shall be sufficient grounds for rejection.

For the avoidance of doubt, it is not allowed to combine the experience records of the previous companies or business units in order to meet the experience requirements.

- 4. Being local manufacturer for :

115 kV and below XLPE Power Cable, 750 V Power Cable, 600 V Control Cable and Switchboard Wire, Lighting Cable, Copper Ground Wire, Aluminum Conductor and Overhead Ground Wire

- 5. Regularly manufacturing of Equipment of the type and similar ratings proposed.

- 6. ***For 115 kV and below XLPE Power Cable, Power Cable, Control Cable and Switchboard Wire, Lighting Cable, Copper Ground Wire, Overhead Ground Wire, Aluminum Conductor, Optical Fiber Cable***

Having one of the following qualifications :

- 6.1 Having supply record of Equipment of the type and similar ratings proposed with successful operation/use for at least one (1) year.

OR

6.2 Having a letter of acceptance for manufacturing and/or fabrication of the specific Equipment issued by EGAT within the scope specified therein. (For the local manufacturer)

7. ***For 230 kV XLPE Power Cable***

Having one of the following qualifications :

7.1 Having a supply record of Equipment of the type and similar ratings proposed with successful operation/use for at least three (3) consecutive years in an overseas country (not his own country).

OR

7.2 Having a letter of acceptance for manufacturing and/or fabrication of the specific Equipment issued by EGAT within the scope specified therein (For the local manufacturer).

8. Having been granted a licence for producing standard product by Thai Industrial Standard Institute (TISI), Ministry of Industry :

60 kV through 115 kV XLPE Power Cable, Lighting Cable and Aluminum Conductor

9. Having the design test record of Equipment of the type and similar ratings proposed in order to confirm that the manufacturer has an experience of design test performance on his Equipment. The design test record shall be performed according to the test specified in EGAT's specification. In case it is specified in EGAT's specification that the proposed Equipment shall have the design test record of the same type and same rating, such design test record shall be submitted as requested by EGAT.

10. Proposing the manufacturer who has no just or proper claims pending against Equipment on other similar works.

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

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-MC2-04 and TIEC-MC2-02
SUPPLY OF CABLE AND CONDUCTOR
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12
TRANSMISSION SYSTEM IMPROVEMENT PROJECT IN
NORTHEASTERN, LOWER NORTHERN, CENTRAL REGIONS
AND BANGKOK AREA TO ENHANCE SYSTEM SECURITY

and shall be addressed and delivered to :

International Procurement Department - Transmission Segment
Procurement and Inventory Management Division
Electricity Generating Authority of Thailand
Bangkruai, 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, 12th 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..... or Baht 1,000.-. 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

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SECTION B
INSTRUCTIONS TO BIDDERS

INSTRUCTIONS TO BIDDERS

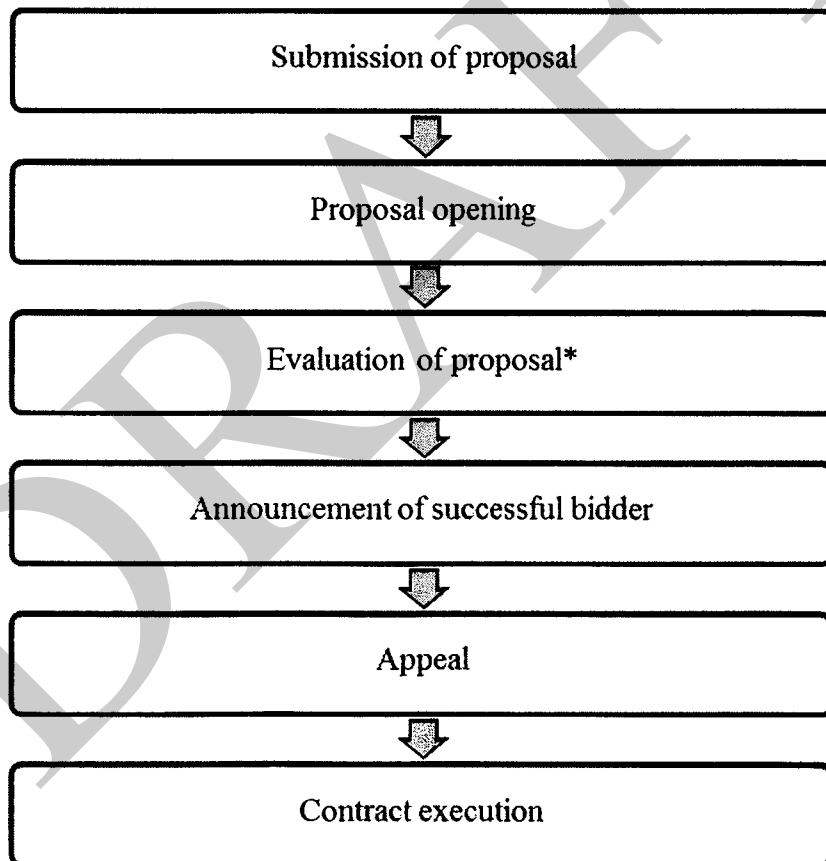
Overview of the Procurement Process

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 as shown in Article C-1. Price Schedule shall be firm, not subject to adjustment and payable in the currencies as follows :

- a. The bid price shall be quoted in Thai baht, US dollar, euro, Japanese yen, renminbi (Chinese yuan), or in the Bidder's or Manufacturer's home currency only if his currency trading is prevailed at the time of bidding in any international market other than in Bidder's or Manufacturer's home country.

If the currencies quoted by the Bidder do not conform to the requirement set forth herein, EGAT reserves the right to convert the bid price to US dollars by using the exchange rate on the Reuters screen which is announced at 10.00 a.m. (Bangkok Time) on the bid opening date. Such converted bid price in US dollars shall be treated as the Bidder's proposed bid price. In such case the Contract Price for such portion under the Contract shall be made in US dollars.

Subject to paragraph a. above, in case the Bidder expects to incur a portion of its expenditures in the performance of the Contract in more than one currency and wishes to be paid accordingly, the bid price shall be expressed in different currencies and the respective amount in each currency together making up the total price.

- b. Local expenditures shall be quoted in Thai Baht.
- c. Payments will be made in the currency or currencies in which the bid prices have been stated.

Source of Supply and Service

- a. Prices for Equipment manufactured in Thailand shall be firm ex-works prices and quoted in Thai Baht. Any import duty and taxes (value added tax included) assessed by the Government of Thailand at the port of entry on imported raw materials or components shall be paid by the Contractor and included in these ex-works prices.
- b. Prices for Equipment manufactured outside Thailand (imported Equipment) shall be firm, stated both on FOB Port of Shipment/Vessel and CFR Thai Port basis, and quoted in foreign currencies specified above. Any import duty, excise tax (if any) and value added tax to be assessed by the Government of Thailand at the port of entry shall not be included in the quoted bid prices.
- c. Prices for services including cost of installation supervisor (if any) shall be firm.
- d. All expenses incurred for the Work specified in Article F-1. Scope of Work shall be included in the quoted Bid Prices.

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.

Except for foreign supply, 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. *In case of a cash deposit, only Thai baht can be made.*

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.

- m. A statement indicating that the parent manufacturer shall certify and be responsible for the design, production process and quality control. This information is required only for the Equipment specified in Data Sheet.

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. Bid prices will be converted into Thai Baht at the selling exchange rates, published by the Bank of Thailand, www.bot.or.th between Baht and other currencies on the bid opening date.
3. The rate of import duty prevailed on the bid opening date will be used for the purpose of bid evaluation of CFR Thai Port Price.
4. The prices to be used for evaluation and comparison purpose shall be as follows :
 1. Ex-works price including VAT for the final sale direct to EGAT for locally manufactured Equipment
 2. CFR Thai Port of Equipment to be imported plus the calculated insurance premium of 0.0898% of [CFR price+10% (CFR price)], import duty, excise tax

(if any), value added tax to be assessed by the Thai Government at the port of entry for imported Equipment , and 0.6 % of CFR price for customs clearance

The rate of import duty to be used for price comparison shall be as follows:

- a) For Equipment consisting of separate components which are intended to contribute together as a functional unit and imported under partial import entry - using a normal single tariff rate published in the Customs Tariff Decree for such Equipment
- b) For other Equipment and spare parts
 - i) In case any imported Equipment and spare part is proposed from one (1) country of origin for the same item:
 - Country of Origin Under Free Trade Agreement (FTA) – using lower comparing rate between the FTA rate and the normal rate published in the Customs Tariff Decree;
 - Country of Origin Under Non FTA – using a normal rate published in the Customs Tariff Decree.
 - ii) In case any imported Equipment and spare part is proposed from different countries of origin for the same item, a normal rate published in the Customs Tariff Decree for such Equipment and spare part will be used for price comparison.
3. Cost of local transportation including VAT, if any
4. Cost of installation supervisor including VAT, if any
5. Guaranteed losses of Equipment, if any, at the rate as stipulated in the Proposal Data.

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.

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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)

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**SECTION C
PROPOSAL**

INVITATION TO BID NO. TS12-MC2-04 and TIEC-MC2-02

PROPOSAL

FOR

SUPPLY OF CABLE AND CONDUCTOR

TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

**TRANSMISSION SYSTEM IMPROVEMENT PROJECT IN
NORTHEASTERN, LOWER NORTHERN, CENTRAL REGIONS
AND BANGKOK AREA TO ENHANCE SYSTEM SECURITY**

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 FOB Port of Shipment/Vessel or CFR Thai Port as specified in the Delivery Schedule and Distribution List for foreign supply or Ex-works delivery for local supply, in accordance with all provisions and conditions as described herein, all for the prices stated in the Schedule(s) attached.

Note : 1. Article C-1. Price Schedule

For imported Equipment, EGAT reserves the right to award the Contract on either FOB Port of Shipment/Vessel or CFR Thai Port basis.

2. 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. Penalty for Equipment Not Meeting Guaranteed Characteristics

The losses of Equipment shall be evaluated with the same rate as stipulated in the Proposal Data.

If the Equipment proposed fails to meet the guaranteed characteristics or the price of the measured losses is higher than the price of the guaranteed losses, the Contract price of Equipment shall be reduced by the different amount of the comparison between the price of the measured losses and the price of the guaranteed losses.

C-3. 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-4. 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-5. Estimate of Deliveries

The estimated number of individual shipment/delivery, shipping point or points, estimated delivery date and estimated shipping weights and volumes for each individual shipping will be as follows :

<u>Number of Shipments</u>	<u>Item No.</u>	<u>Shipping Point</u>	<u>Estimated Delivery Date from Shipping Point</u>	<u>Total Weight kg.</u>	<u>Total Volume Cu.m.</u>
-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----

C-6. Bid Security

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

C-7. 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

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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

Cost of Supply of Equipment comprises Foreign Portion and Local Portion. For Foreign Portion, Bidder is allowed to quote price in only four (4) different currencies. For Local Portion, default currency is 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 - Currency and Unit Price.
2. For local portion, the default is THB.
3. For foreign portion, Bidder shall fill a currency code in a column "Currency".

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

INVITATION TO BID NO. TS12-MC2-04 and TIEC-MC2-02

SUMMARY OF BID PRICE

SUPPLY OF CABLE AND CONDUCTOR

TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

TRANSMISSION SYSTEM IMPROVEMENT PROJECT IN NORTHEASTERN, LOWER NORTHERN, CENTRAL REGIONS AND BANGKOK AREA TO ENHANCE SYSTEM SECURITY

No.	Description	Supply of Equipment
		Local Supply
		Ex-works Price (excluding VAT) Baht
		Amount
1	Schedule A1 : Power Cable, Control Cable and XLPE Power Cable	
2	Schedule B1 : Power Cable and Control Cable	
BID PRICE		Baht
VAT		Baht
SUMMARY OF BID PRICE		Baht

5

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INVITATION TO BID NO. TS12-MC2-04 and TIEC-MC2-02

SUMMARY OF BID PRICE

SUPPLY OF CABLE AND CONDUCTOR

TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

TRANSMISSION SYSTEM IMPROVEMENT PROJECT IN NORTHEASTERN, LOWER NORTHERN, CENTRAL REGIONS AND BANGKOK AREA TO ENHANCE SYSTEM SECURITY

No.	Description	Supply of Equipment
		Local Supply
		Ex-works Price (excluding VAT) Baht
		Amount
1	Schedule A2 : Grounding Cable and Overhead Ground Wire	
2	Schedule B2 : Grounding Cable	
BID PRICE		Baht
VAT		Baht
SUMMARY OF BID PRICE		Baht

INVITATION TO BID NO. TS12-MC2-04 AND TIEC-MC2-02
Schedule A1 : Power Cable, Control Cable and XLPE Power Cable
SUPPLY OF CABLE SND CONDUCTOR
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Supply of Equipment	
				Local Supply	
				Ex-works Price (excluding VAT) Baht	
				Unit Price	Amount
	Power Cable and Control Cable Reference : Specification No. 323 (L)				
A1-1	1/C no. 240 sq.mm. power cable (500 m per reel)	2000	meter		
A1-2	1/C no. 35 sq.mm. power cable (500 m per reel)	1000	meter		
A1-3	1/C no. 50 sq.mm. power cable (500 m per reel)	1500	meter		
A1-4	2/C no. 6 sq.mm. power cable (500 m per reel)	17000	meter		
A1-5	4/C no. 6 sq.mm. power cable (500 m per reel)	3500	meter		
A1-6	2/C no. 10 sq.mm. power cable (500 m per reel)	4000	meter		
A1-7	2/C no. 35 sq.mm. power cable (500 m per reel)	3500	meter		
A1-8	3/C no. 1.5 sq.mm. control cable (500 m per reel)	7000	meter		
A1-9	5/C no. 1.5 sq.mm. control cable (500 m per reel)	4000	meter		
A1-10	9/C no. 1.5 sq.mm. control cable (500 m per reel)	4500	meter		
A1-11	12/C no. 1.5 sq.mm. control cable (500 m per reel)	1000	meter		
A1-12	24/C no. 1.5 sq.mm. control cable (500 m per reel)	1000	meter		
A1-13	3/C no. 2.5 sq.mm. control cable (500 m per reel)	15000	meter		
A1-14	5/C no. 2.5 sq.mm. control cable (500 m per reel)	11500	meter		
A1-15	9/C no. 2.5 sq.mm. control cable (500 m per reel)	1500	meter		
A1-16	3/C no. 4 sq.mm. control cable (500 m per reel)	21500	meter		
A1-17	5/C no. 4 sq.mm. control cable (500 m per reel)	13000	meter		
A1-18	9/C no. 4 sq.mm. control cable (500 m per reel)	9500	meter		
A1-19	12/C no. 4 sq.mm. control cable (500 m per reel)	500	meter		
A1-20	2/C no. 6 sq.mm. control cable (500 m per reel)	500	meter		

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INVITATION TO BID NO. TS12-MC2-04 AND TIEC-MC2-02
Schedule A1 : Power Cable, Control Cable and XLPE Power Cable
SUPPLY OF CABLE AND CONDUCTOR
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Supply of Equipment	
				Local Supply	
				Ex-works Price (excluding VAT) Baht	
				Unit Price	Amount
A1-21	4/C no. 6 sq.mm. control cable (500 m per reel)	30000	meter		
A1-22	5/C no. 6 sq.mm. control cable (500 m per reel)	1000	meter		
A1-23	17 twisted pairs no. 0.3 sq.mm. (7/0.25 mm.) control cable (500 m per reel)	1500	meter		
A1-24	XLPE Power Cable Reference : Specification No. 322 33 kV 1/C no. 500 sq.mm. XLPE power cable as per Ratings and Features RF PC3B10 (500 m per reel)	500	meter		
A1-25	22 kV 1/C no. 35 sq.mm. XLPE power cable as per Ratings and Features RF PC2110 (1000 m per reel)	6000	meter		
A1-26	22 kV 1/C no. 120 sq.mm. XLPE power cable as per Ratings and Features RF PC2510	100	meter		
Total Price for Schedule A1				Baht	

58

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INVITATION TO BID NO. TS12-MC2-04 AND TIEC-MC2-02
Schedule A2 : Grounding Cable and Overhead Ground Wire
SUPPLY OF CABLE AND CONDUCTOR
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Supply of Equipment	
				Local Supply	
				Ex-works Price (excluding VAT) Baht	
				Unit Price	Amount
A2-1	Grounding Cable Reference : No. 603 4/0 AWG copper ground wire (500 m per reel)	50000	meter		
A2-2	Overhead Ground Wire Reference : Specification No. 524 3/8 inch diameter galvanized steel overhead ground wire (high strength) (3,100 m per reel)	6200	meter		
Total Price for Schedule A2				Baht	

INVITATION TO BID NO.TS12-MC2-04 AND TIEC-MC2-02

Schedule B1 : Power Cable and Control Cable

SUPPLY OF CABLE AND CONDUCTOR

TRANSMISSION SYSTEM IMPROVEMENT PROJECT IN NORTHEASTERN, LOWER NORTHERN, CENTRAL REGIONS AND BANGKOK AREA TO ENHANCE SYSTEM SECURITY

Item No.	Description	Qty.	Unit	Supply of Equipment	
				Local Supply	
				Ex-works Price (excluding VAT) Baht	
				Unit Price	Amount
B1-1	Power Cable and Control Cable Reference : Specification No. 323 (L) 1/C no. 35 sq.mm. power cable (500 m per reel)	1000	meter		
B1-2	1/C no. 70 sq.mm. power cable (500 m per reel)	500	meter		
B1-3	2/C no. 6 sq.mm. power cable (500 m per reel)	4000	meter		
B1-4	2/C no. 16 sq.mm. power cable (500 m per reel)	500	meter		
B1-5	5/C no. 1.5 sq.mm. control cable (500 m per reel)	500	meter		
B1-6	12/C no. 1.5 sq.mm. control cable (500 m per reel)	8000	meter		
B1-7	24/C no. 1.5 sq.mm. control cable (500 m per reel)	5000	meter		
B1-8	3/C no. 2.5 sq.mm. control cable (500 m per reel)	9000	meter		
B1-9	5/C no. 2.5 sq.mm. control cable (500 m per reel)	8500	meter		
B1-10	9/C no. 2.5 sq.mm. control cable (500 m per reel)	2000	meter		
B1-11	12/C no. 2.5 sq.mm. control cable (500 m per reel)	3000	meter		
B1-12	3/C no. 4 sq.mm. control cable (500 m per reel)	9500	meter		

INVITATION TO BID NO.TS12-MC2-04 AND TIEC-MC2-02

Schedule B1 : Power Cable and Control Cable

SUPPLY OF CABLE AND CONDUCTOR

TRANSMISSION SYSTEM IMPROVEMENT PROJECT IN NORTHEASTERN, LOWER NORTHERN, CENTRAL REGIONS AND BANGKOK AREA TO ENHANCE SYSTEM SECURITY

Item No.	Description	Qty.	Unit	Supply of Equipment	
				Local Supply	
				Ex-works Price (excluding VAT) Baht	
				Unit Price	Amount
B1-13	4/C no. 4 sq.mm. control cable (500 m per reel)	8000	meter		
B1-14	5/C no. 4 sq.mm. control cable (500 m per reel)	9000	meter		
B1-15	9/C no. 4 sq.mm. control cable (500 m per reel)	14500	meter		
B1-16	12/C no. 4 sq.mm. control cable (500 m per reel)	500	meter		
B1-17	4/C no. 6 sq.mm. control cable (500 m per reel)	1000	meter		
B1-18	17 twisted pairs no. 0.3 sq.mm. (7/0.25 mm.) control cable (500 m per reel)	500	meter		
Total Price for Schedule B1				Baht	

INVITATION TO BID NO.TS12-MC2-04 AND TIEC-MC2-02

Schedule B2 : Grounding Cable

SUPPLY OF CABLE AND CONDUCTOR

TRANSMISSION SYSTEM IMPROVEMENT PROJECT IN NORTHEASTERN, LOWER NORTHERN, CENTRAL REGIONS AND BANGKOK AREA TO ENHANCE SYSTEM SECURITY

Item No.	Description	Qty.	Unit	Supply of Equipment	
				Local Supply	
				Ex-works Price (excluding VAT) Baht	
				Unit Price	Amount
B2-1	Grounding Cable Reference : No. 603 4/0 AWG copper ground wire (500 m per reel)	7000	meter		
Total Price for Schedule B2				Baht	

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PART 2: PROPOSAL DATA

POWER & CONTROL CABLE

PROPOSAL DATA

PROCUREMENT REFERENCE _____

BIDDER _____

SCHEDULE NO. _____

ITEM NO. _____

- | | | |
|--|-------------|-----------------|
| a. Manufacturer / Country | _____ | |
| b. No. of Core | _____ | |
| c. Cable Size | _____ | mm ² |
| d. Applied Standards | _____ | |
| e. Voltage Class | _____ | V |
| f. Material of Conductor | _____ | |
| g. No. of Conductor | _____ | Strand |
| h. Diameter of Each Wire | _____ | mm |
| i. Calculated Cross-Sectional Area | _____ | mm ² |
| j. Outside Diameter of Stranded Conductor | _____ | mm |
| k. Material of Filler | _____ | |
| l. Insulation | - Material | _____ |
| | - Thickness | _____ |
| m. Wrapping | - Material | _____ |
| | - Thickness | _____ |
| n. Inner Jacket | - Material | _____ |
| | - Thickness | _____ |
| o. Shielding | - Material | _____ |
| | - Thickness | _____ |
| p. Outer Jacket | - Material | _____ |
| | - Thickness | _____ |
| q. Overall Diameter (Approx.) | _____ | mm |
| r. Length of Cable per Reel | _____ | m |
| s. <i>Max Resistance at 20 °C of Conductor</i> | _____ | Ω/km |

* Drawing showing cross-sectional detail of the proposed cable shall be submitted.

OVERHEAD GROUND WIRE

PROPOSAL DATA

PROCUREMENT REFERENCE _____

BIDDER _____

SCHEDULE NO. _____

ITEM NO. _____

- a. Manufacturer / Country _____
- b. Applied Standards _____
- c. No. of Steel Wire _____ Strand
- d. Diameter of Each Wire _____ mm
- e. Overall Diameter _____ mm
- f. Ultimate Strength _____ kg
- g. Elongation in 610 mm not less than _____ %
- h. Weight of Zinc Coating _____ g/m²
- i. Length of Conductor per Reel _____ m

* Drawing showing cross-sectional detail of the proposed overhead ground wire shall be submitted.

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ANNEALED COPPER GROUND WIRE

PROPOSAL DATA

PROCUREMENT REFERENCE _____

BIDDER _____

SCHEDULE NO. _____

ITEM NO. _____

- a. Manufacturer / Country _____
- b. Conductor Size _____
- c. Applied Standards _____
- d. Calculated Cross-Sectional Area _____ mm²
- e. Material of Conductor _____
- f. No. of Conductor _____ Strand
- g. Diameter of Each Wire _____ mm
- h. Overall Diameter _____ mm
- i. Length of Conductor per Reel _____ m

* Drawing showing cross-sectional detail of the proposed cable shall be submitted.

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XLPE POWER CABLE

PROPOSAL DATA

PROCUREMENT REFERENCE _____
SCHEDULE NO. _____
ITEM NO. _____

BIDDER _____

- | | | |
|--|-------------------|-----------------|
| a. Manufacturer / Country | _____ | |
| b. Type / Model / Cat. No. | _____ | |
| c. Applied Standards | _____ | |
| d. Voltage Class | _____ | kV |
| e. Material of Conductor | _____ | |
| f. No. of Conductor | _____ | Strand |
| g. Diameter of Each Wire | _____ | mm |
| h. Calculated Cross-Sectional Area | _____ | mm ² |
| i. Outside Diameter of Stranded Conductor | _____ | mm |
| j. Outside Diameter of Stranded Conductor with Extruded Semi-Conducting Shield | _____ | mm |
| k. Insulation | - Material _____ | |
| | - Thickness _____ | mm |
| l. Insulation Shield | - Material _____ | |
| | - Thickness _____ | mm |
| m. Metal Shield | - Material _____ | |
| n. Cushion | - Material _____ | |
| | - Thickness _____ | mm |
| o. Jacket | - Material _____ | |
| | - Thickness _____ | mm |
| p. Overall Diameter (Approx.) | _____ | mm |
| q. Impulse Withstand Voltage | _____ | kV |
| r. Ampacity of Free Air and Direct Burial Application with Conductor Temperature not in Excess of 90 °C at 100% Load Factor and at an Ambient Temperature of 45 °C | | |
| - Free Air, Flat Formation with Spacing 1 Time Diameter | _____ | A |
| - Direct Burial, Flat Formation with Spacing 1 Time Diameter, Depth of Laying in Ground 0.4 m, Soil Thermal Resistivity 1.2 °C-m/watt | _____ | A |
| s. Min Bending Radius as a Multiple of Cable Diameter | _____ | Times |
| t. Max Resistance at 20 °C of Conductor | _____ | Ω/km |

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PART 3: DELIVERY SCHEDULE AND DISTRIBUTION LIST

Invitation to Bid No. TS12-MC2-04 and TIEC-MC2-02

Delivery Schedule and Distribution List

Transmission System Expansion Project No.12

Schedule A1 : Power Cable, Control Cable and XLPE Power Cable

Item No.	Description	Qty	Job no.	Substation	Delivery Required by EGAT (within months after receipt of Award of Contract)
					CFR Thai Port / Ex-works / DDP EGAT's Store
A1-1	1/C no. 240 sq.mm. power cable (500 m per reel)	2000	-	-	8
A1-2	1/C no. 35 sq.mm. power cable (500 m per reel)	1000	-	-	8
A1-3	1/C no. 50 sq.mm. power cable (500 m per reel)	1500	-	-	8
A1-4	2/C no. 6 sq.mm. power cable (500 m per reel)	17000	-	-	8
A1-5	4/C no. 6 sq.mm. power cable (500 m per reel)	3500	-	-	8
A1-6	2/C no. 10 sq.mm. power cable (500 m per reel)	4000	-	-	8
A1-7	2/C no. 35 sq.mm. power cable (500 m per reel)	3500	-	-	8
A1-8	3/C no. 1.5 sq.mm. control cable (500 m per reel)	7000	-	-	8
A1-9	5/C no. 1.5 sq.mm. control cable (500 m per reel)	4000	-	-	8
A1-10	9/C no. 1.5 sq.mm. control cable (500 m per reel)	4500	-	-	8
A1-11	12/C no. 1.5 sq.mm. control cable (500 m per reel)	1000	-	-	8
A1-12	24/C no. 1.5 sq.mm. control cable (500 m per reel)	1000	-	-	8
A1-13	3/C no. 2.5 sq.mm. control cable (500 m per reel)	15000	-	-	8
A1-14	5/C no. 2.5 sq.mm. control cable (500 m per reel)	11500	-	-	8
A1-15	9/C no. 2.5 sq.mm. control cable (500 m per reel)	1500	-	-	8
A1-16	3/C no. 4 sq.mm. control cable (500 m per reel)	21500	-	-	8
A1-17	5/C no. 4 sq.mm. control cable (500 m per reel)	13000	-	-	8
A1-18	9/C no. 4 sq.mm. control cable (500 m per reel)	9500	-	-	8
A1-19	12/C no. 4 sq.mm. control cable (500 m per reel)	500	-	-	8
A1-20	2/C no. 6 sq.mm. control cable (500 m per reel)	500	-	-	8
A1-21	4/C no. 6 sq.mm. control cable (500 m per reel)	30000	-	-	8
A1-22	5/C no. 6 sq.mm. control cable (500 m per reel)	1000	-	-	8

Invitation to Bid No. TS12-MC2-04 and TIEC-MC2-02
Delivery Schedule and Distribution List
Transmission System Expansion Project No.12
Schedule A2 : Grounding Cable and Overhead Ground Wire

Item No.	Description	Qty	Job no.	Substation	Delivery Required by EGAT (within months after receipt of Award of Contract)
					CFR Thai Port / Ex-works / DDP EGAT's Store
A2-1	4/0 AWG copper ground wire (500 m per reel)	50000	-	-	8
A2-2	3/8 inch diameter galvanized steel overhead ground wire (high strength) (3,100 m per reel)	6200	-	-	8

Invitation to Bid No. TS12-MC2-04 and TIEC-MC2-02

Delivery Schedule and Distribution List

Transmission System Improvement Project in Northeastern, Lower Northern, Central Regions and Bangkok Area to Enhance System Security

Schedule B1 : Power Cable and Control Cable

Item No.	Description	Qty	Job no.	Substation	Delivery Required by EGAT (within months after receipt of Award of Contract)
					CFR Thai Port / Ex-works / DDP EGAT's Store
B1-1	1/C no. 35 sq.mm. power cable (500 m per reel)	1000	-	-	8
B1-2	1/C no. 70 sq.mm. power cable (500 m per reel)	500	-	-	8
B1-3	2/C no. 6 sq.mm. power cable (500 m per reel)	4000	-	-	8
B1-4	2/C no. 16 sq.mm. power cable (500 m per reel)	500	-	-	8
B1-5	5/C no. 1.5 sq.mm. control cable (500 m per reel)	500	-	-	8
B1-6	12/C no. 1.5 sq.mm. control cable (500 m per reel)	8000	-	-	8
B1-7	24/C no. 1.5 sq.mm. control cable (500 m per reel)	5000	-	-	8
B1-8	3/C no. 2.5 sq.mm. control cable (500 m per reel)	9000	-	-	8
B1-9	5/C no. 2.5 sq.mm. control cable (500 m per reel)	8500	-	-	8
B1-10	9/C no. 2.5 sq.mm. control cable (500 m per reel)	2000	-	-	8
B1-11	12/C no. 2.5 sq.mm. control cable (500 m per reel)	3000	-	-	8
B1-12	3/C no. 4 sq.mm. control cable (500 m per reel)	9500	-	-	8
B1-13	4/C no. 4 sq.mm. control cable (500 m per reel)	8000	-	-	8
B1-14	5/C no. 4 sq.mm. control cable (500 m per reel)	9000	-	-	8
B1-15	9/C no. 4 sq.mm. control cable (500 m per reel)	14500	-	-	8
B1-16	12/C no. 4 sq.mm. control cable (500 m per reel)	500	-	-	8
B1-17	4/C no. 6 sq.mm. control cable (500 m per reel)	1000	-	-	8
B1-18	17 twisted pairs no. 0.3 sq.mm. (7/0.25 mm.) control cable (500 m per reel)	500	-	-	8

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Invitation to Bid No. TS12-MC2-04 and TIEC-MC2-02

Delivery Schedule and Distribution List

Transmission System Improvement Project in Northeastern, Lower Northern, Central Regions and Bangkok Area to Enhance System Security

Schedule B2 : Grounding Cable

Item No.	Description	Qty	Job no.	Substation	Delivery Required by EGAT (within months after receipt of Award of Contract)
					CFR Thai Port / Ex-works / DDP EGAT's Store
B2-1	4/0 AWG copper ground wire (500 m per reel)	7000	-	-	8

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**SECTION D
CONTRACT**

CONTRACT

SUPPLY OF CABLE AND CONDUCTOR

TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

**TRANSMISSION SYSTEM IMPROVEMENT PROJECT IN
NORTHEASTERN, LOWER NORTHERN, CENTRAL REGIONS
AND BANGKOK AREA TO ENHANCE SYSTEM SECURITY**

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
 - H. Bill of Materials (None)
 - I. Specifications
 - J. Drawings (None)
 - 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
Bangkruai, 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 *two (2)* identical counterparts: *one (1)* for EGAT and one (1) for the Contractor.

ELECTRICITY GENERATING AUTHORITY
OF THAILAND

CONTRACTOR :

BY _____
()

BY _____
()

WITNESS :

WITNESS :

BY _____
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BY _____
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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 ex-works, FOB Port of Shipment/Vessel or CFR Thai Port or at EGAT's store/site as agreed, including, if required, supervision for installation at site and supervision for field tests of the Equipment under the Contract
Thai Port	:	Commercial ports in Thailand including but not limited to Bangkok Port, Laem Chabang Port, Sriracha Harbour Port, Siam Seaport, Maptaphut Port, Songkhla Port, Phuket Harbour Port or Suvarnabhumi Airport, as the case may be
Bangkok Port	:	Bangkok Wharf (Klong Toey Port) and all other commercial ports in Bangkok Metropolitan area
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-31. 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 arising 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 uncopyrighted 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. Import Duty and Taxes

EGAT will pay all costs of procuring the necessary permits and licenses for importation into Thailand, and will pay import duty and any taxes including value added tax imposed at the port of entry on the Equipment to be supplied by the Contractor and imported into Thailand for the Work under this Contract.

EGAT will not pay import duty and taxes on either the personal effects of the Contractor's employees, such as personal articles, household furnishings and appliances, and goods of any kind imported for the personal use of the Contractor's employees whether imported by an employee or by the Contractor, or in respect of food, tobacco, liquor and other commissary goods imported by the Contractor or by his employees.

EGAT will not pay import duty and taxes including value added tax on equipment, tools, instruments and machinery imported by the Contractor for purpose of carrying out the work under the Contract. All processes of importation shall be arranged by the Contractor.

Equipment, tools, instruments and machinery which are certified by the Contractor that they are required for installation, test and commissioning of the Work at the site and they are intended for re-exportation can be temporarily exempted from import duty and taxes including value added tax. All Equipment thereof shall be imported under the name of the Contractor and be in accordance with the rules and regulations of the Customs Department of the Kingdom of Thailand.

EGAT will assist the Contractor for such temporary exemption of import duty and taxes including value added tax by issuing a letter confirming such temporary import. Import duty and taxes including value added tax for the temporarily imported Equipment shall be paid by the Contractor to the Customs Department before re-exportation at the rate to be specified by the Customs Department at the time of importation for the whole period they have been imported into the Kingdom of Thailand. Temporary importation of the Equipment is subject to approval of the Customs Department and the deposit of a bond with the Customs Department in the amount to be notified by the Customs Department is required. All costs for submission of information and data if required by the Customs Department and the cost of provision of the bond shall be borne by the Contractor.

In view of numerous advantages, the ATA Carnet system or other systems may be arranged for shipment of the said temporarily imported equipment by the Contractor (if required). Any charge incurred and/or any liability shall be borne by the Contractor.

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. In case any payment being made through the letter of credit or being made directly from foreign source whereby the withholding tax cannot be deducted from payment, the Contractor is required to immediately inform EGAT once each such payment is made to the Contractor, and the withholding tax of which will be paid from EGAT's own fund to the Revenue Department in the same manner as aforesaid. Such withholding tax amount as advanced by EGAT on behalf of the Contractor shall be reimbursed by the Contractor to EGAT within the period of time fixed by EGAT.

In the case where the Contractor considers that the transaction under this Contract is exempted from income tax of Thailand (under any circumstance), the Contractor shall submit, together with his proposal(s), a statement detailing such exemption and the valid documentary evidence. Should EGAT rely on the statement so submitted, no deduction for withholding tax shall be made from payment. However, if the tax authority of Thailand determines that such exemption is not applicable, the Contractor shall then be responsible for the amount(s) equal to the withholding tax, plus the amount(s) of tax exceeding those of withholding tax, including the surcharge and/or penalties imposed on EGAT and the Contractor. The responsibility and liability of the Contractor as provided in the preceding sentence shall survive termination of the Contract.

If the Contractor fails to immediately inform EGAT of the payment as required under the second paragraph preventing EGAT from remitting the withholding tax to the Revenue Department within seven (7) Days from the end of the month in which such payment is made, or fails to pay and/or reimburse EGAT for any amount 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 money due to the Contractor under this Contract

for the outstanding amount, surcharge and/or penalty (if any) 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.

EGAT will proceed with the tax matters under the Contract by relying on the information and document submitted by the Contractor in relation to the Bidder's status and tax liability. If the Revenue Department of Thailand differently determines the status and tax liability, the Contractor shall be responsible and liable for any cost and expense, penalty and/or surcharge incurred and/or imposed on him and EGAT in relation thereto.

E-11. Fees and Duties

Any and all immigration fees, stamp duties, and other fees 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 Work under the Article E-21. 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 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 and, made payable to EGAT in the same currency as that of the Contract. In case of a cash deposit, only Thai baht portion of the Contract Price can be made. 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 Shipment and/or Delivery

The Contractor shall submit shipment and/or delivery schedule for EGAT's approval at least thirty (30) Days in advance before each shipment and/or delivery is made. No shipment and/or 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 shipment and/or 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.

For Power Transformer and Shunt Reactor, in addition, all accessories, which are packed in aforesaid manner shall be contained in a container per transformer except for transformer insulating oil, radiators and conservator including other accessories which for dimensional reason after packaging are unable to be contained in the said container. However, spare parts shall be contained in a separate container per each shipment or Contract to be awarded. The containers to be used shall become the property of EGAT. The dimensions of containers shall be as follows : -

Container Dimensions

Height 2.59 m.

Width 2.44 m.

Length 6.05 m.

Door Dimensions

Height 2.28 m.

Width 2.33 m.

In addition, details of Equipment and substation destination per container shall be identified in Bill of Lading.

Detailed breakdown prices for spare parts of Equipment 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)

In addition to this, the following instructions shall be observed :

- a. Each box, crate, case, bundle or piece of loose Equipment shipped must show the following information clearly marked on its body :

1. Gross weight in kilograms
 2. Net weight in kilograms
 3. Dimensions in centimeters
- b. All boxes, crates, cases, bundles, loose pieces, etc. must be marked consecutively from No. 1 upward throughout all shipments to completion of the order without repeating the same number.
- c. The packing list must indicate whether shipment is partial or complete, and shall incorporate the following information on each container, etc., according to its individual shipping number:
1. Export case markings
 2. Case number
 3. Container number (for Power Transformer and Shunt Reactor)
 4. Item number
 5. Gross weight and net weight in kilograms
 6. Dimensions in centimeters
 7. Complete description of Equipment
 8. EGAT's serial No. (if any)

E-15. Clearance and Weight Limitations

The largest unloading facilities at Bangkok Wharf are 35 metric ton cranes. Lifts heavier than 35 tons will have to be handled by ocean freighter on-board lifting equipment. Ocean freighters of the 10,000 tons class regularly calling at Bangkok Wharf have off-loading capacities to handle 50 tons.

The largest unloading facilities at Laem Chabang Port are 30 metric ton cranes. Lifts heavier than 30 tons will have to be handled by ocean freighter on-board lifting equipment.

Generally, unloading at Thai Port and highway transportation are subject to the following limitations:

Dimensions	Limitations		
	Unloading at Bangkok Wharf/ Highway Transportation		Unloading at Laem Chabang Port/Maptaphut Port
Weight (tons)	60.0	>60.0-135.0	120.0
Width (meters)	3.5	3.5	4.5
Length (meters)	10.0	10.0	25.0
Height from Loading Platform (meters)	3.7	4.0	4.0

The Contractor shall therefore exercise due care to pack the Equipment to meet the above transport limitations.

For Power Transformer and Shunt Reactor, the shipping weight of the largest part is indicated in Ratings and Features.

E-16. Shipment

Shipment of Equipment from port of embarkation to the final port of discharge shall be effected by using Thai vessels through the sea freight forwarder appointed by the Contractor. The Contractor is required to notify EGAT of the name of the sea freight forwarder one (1) week prior to shipment.

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.

All imported Equipment shall be shipped on Conference Line or on seaworthy oceangoing vessels which are members or associate members of the International Association of Classification Societies (IACS) and ISM Code Certified Vessels. Vessels over fifteen (15) years of age shall not be used for shipment under this Contract unless they : -

- a) have been used for the carriage of general cargo on an established and regular pattern of trading between a range of specified ports and do not exceed twenty-five (25) years of age, or
- b) were constructed as containerships, vehicle carrier or double-skin open-hatch gantry crane vessels (OHGCs) and have been continuously used as such on an established and regular pattern of trading between a range of specified ports, and do not exceed thirty (30) years of age.

Shipment shall be made under deck except for such Equipment which for dimensional reasons cannot be stowed in the vessels hold. In case Equipment cannot be stowed in the vessel hold, permission shall be obtained from EGAT prior to loading such Equipment on deck. Such approval shall not be unreasonably withheld. The Contractor shall in any case be responsible for proper packing for protection of such Equipment loaded on deck of the vessel. Shipment of all Equipment by dry cargo container will be accepted, but all the incidental expenses shall be borne by the Contractor.

For shipment of Equipment under this Contract, transshipment is allowed.

Any delicate Equipment, materials, instruments and tools including but not limited to computers, electronic parts, etc., shall be shipped by airfreight. The Contractor shall be responsible for proper packing for protection of such Equipment loaded on cargo hold of the aircraft.

Air freight shipment to airport of disembarkation in Thailand shall be effected through the air freight forwarder appointed by the Contractor. The Contractor is required to notify EGAT of the name of the air freight forwarder one (1) week prior to shipment.

E-17. Documents Required for Each Shipment

a. For Seafreight

For accounting procedure, the Contractor is required to send to EGAT the bill of lading, invoice and master packing list immediately by facsimile but not later than

three (3) Days after the Equipment are actually loaded free on board (FOB Vessel) at the port of Shipment.

One (1) original negotiable bill of lading, three (3) original signed invoices and packing lists shall be mailed directly to EGAT by express airmail within four (4) working days after the date of departure of the ocean-going vessel from the port of shipment.

Two (2) original negotiable and five (5) copies of non-negotiable bill of lading, ten (10) original signed invoices and three (3) copies of packing lists shall be submitted to EGAT through the Bank within the time as specified in the letter of credit. - This requirement is applied only in case payment is made by letter of credit.

b. For Airfreight

For accounting procedure, the Contractor is required to send to EGAT the airway bill, invoice and master packing list immediately by facsimile but not later than three (3) Days after the Equipment are actually loaded on the air carrier at the airport of departure.

Three (3) original signed invoices and packing lists shall be attached to the airway bill and dispatched together with the airfreight shipment.

One (1) copy of airway bill, two (2) original signed invoices and packing lists shall be sent directly to EGAT by courier within four (4) working days after the date of departure of the carrier from the airport.

Two (2) copies of airway bill, ten (10) signed invoices and three (3) copies of packing lists shall be submitted to EGAT through the bank within the time as specified in the letter of credit. - This requirement is applied only in case payment is made by letter of credit.

To act in accordance with the rules and regulations of the Customs Department of the Kingdom of Thailand, as well as to enable EGAT to expedite clearing the Equipment from the Customs House accordingly, the following declarations, other than regular statements, have to be made in English in the invoice for any transaction concluded with EGAT.

- a. Country from which Equipment is purchased as well as country of origin; if the Equipment is produced in the country or group of countries where there are trade agreements between such country or group of countries and the Kingdom of Thailand, preferential treatment on import duty and taxes for importation of the Equipment is required;
- b. Electricity Generating Authority of Thailand as consignee and Thailand as consigning country
- c. Date and Number of Contract;

- d. Name of Project, if any;
- e. Marking and numbers, as well as gross weight and volume;
- f. Details of Equipment, i.e. names, kinds, qualities, quantities, net weights, and other particulars as available for each type including trademarks or other symbols of such Equipment. If there are no trademarks or symbols, the invoice shall indicate "no trademarks", "no symbols", as the case may be;
- g. Selling price or value of Equipment per unit expressed in the type of currency under transaction and representing actual price or value of Equipment as stated in the price schedules or price breakdown, as the case may be;

If the Contractor fails to specify the price or value of Equipment according to the Contract in the invoice prepared for shipment, the Contractor shall be held responsible for the following:

- 1. In case of over value or price of Equipment stated in the invoice, the Contractor shall be responsible for reimbursement to EGAT for the import duty and taxes (excluding value added tax) collected by the Customs Department and the insurance premium (excluding value added tax) on the over value or price of Equipment as well as interest. Value added tax imposed in connection thereto shall be EGAT's responsibility. The Contractor shall also refund to EGAT the amount of over value payment as well as interest. The interest to be applied under this Article shall be Minimum Overdraft Rate announced by Krung Thai Bank plus two (2) (MOR+2) percent calculated from the date of EGAT's payment of the over value payment, import duty and taxes as well as insurance premium until the date of the Contractor's settlement of the same in full.
 - 2. In case of under value or price of Equipment stated in the invoice, the Contractor shall be responsible for reimbursement to EGAT the surcharges imposed on additional import duty and taxes at the rate currently established by the Customs Department as well as interest (if any) and also shall be responsible for compensation to EGAT for cost incurred in repair or replacement of the damaged Equipment which is not covered by insurance due to under value or price of Equipment stated in the invoice.
- h. Other expenses:
 - 1. Packing charges (if any)
 - 2. Insurance premiums (if insured)
 - 3. Freight
 - 4. Others (if any)

The Contractor shall, at the time of shipment, prepare and submit a certificate of origin(s) for the Equipment required as per point a. above together with the invoice and other shipping documents for EGAT to obtain the benefit from preferential treatment on import duty and taxes for importation of the Equipment from the country or group of countries where there are

trade agreements between such country or group of countries and the Kingdom of Thailand. For each shipment, all items of Equipment requiring certificate of origin shall be included in only one (1) certificate of origin except as otherwise specified in any trade agreement. The trade agreements shall include but not be limited to the following:

1. Common Effective Preferential Tariff (CEPT) Scheme for the ASEAN Free Trade Area (AFTA);
2. Agreement between the Kingdom of Thailand and Japan for an Economic Partnership; and
3. Agreement between the Government of the Kingdom of Thailand and the Government of the People's Republic of China on Accelerated Tariff Elimination under the Early Harvest Programme of the Framework Agreement on Comprehensive Economic Cooperation between ASEAN and China.

If the Contractor advises EGAT in writing before shipment that it is unable to provide a certificate of origin to EGAT, the Contractor shall be responsible for all costs incurred including but not limited to reimbursement to EGAT for the excess amount of the import duty and taxes (except value added tax) paid by EGAT to Customs Department.

Further to the above, if the Contractor delays to provide a proper certificate of origin to EGAT, the Contractor shall be responsible for all costs incurred including but not limited to reimbursement to EGAT for the storage charges and the interest on the excess amount of import duty and taxes (except value added tax) paid by EGAT to the Customs Department at the rate of Minimum Overdraft Rate announced by Krung Thai Bank plus two (2) (MOR+2) percent calculated from the date of EGAT's payment of import duty and taxes up to the date of receipt of the excess amount of import duty and taxes refund from the Customs Department.

However, if the Contractor fails to provide such proper certificate to EGAT, the Contractor shall be responsible for all costs incurred including but not limited to reimbursement to EGAT for the storage charges and the excess amount of import duty and taxes (except value added tax) paid by EGAT to the Customs Department as well as interest on the said excess amount of import duty and taxes at the rate of Minimum Overdraft Rate announced by Krung Thai Bank plus two (2) (MOR+2) percent calculated from the date of EGAT's payment of import duty and taxes up to the date of acknowledgement that the certificate cannot be issued in conformity with requirement of the Free Trade Agreement.

The Contractor is also required to study the existing trade agreements and any new trade agreement between the Kingdom of Thailand and a country or group of countries published in the website of Customs Department (www.customs.go.th) and/or Ministry of Commerce (www.moc.go.th), and ask for more information from EGAT in order that EGAT can obtain the benefit from preferential treatment on import duty and taxes for importation of the Equipment from the country or group of countries where there are trade agreements between such country or group of countries and the Kingdom of Thailand.

Fullest conformity with the requirements of the Customs Department of the Kingdom of Thailand mentioned above is essential as a condition precedent.

Unless by force majeure, failure to furnish EGAT with these shipping documents and the certificate of origin within the specified period and strictly in accordance with conditions stipulated above thereby causing impossibility of making prompt customs clearance of the Equipment from Thai Port, the Contractor shall, upon receipt of the EGAT's notice, reimburse EGAT for go down rent / storage charge and other expenses arising from or in consequence of the nonconformity with the above specified requirement.

E-18. Force Majeure

The Contractor shall not be in default under this Contract because of any delays 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-31. 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-19. Transportation Insurance

Transportation insurance from the port of shipment/from the Contractor's premise(s) to EGAT's Store and/or EGAT's site will be under the responsibility of EGAT.

E-20. 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 loaded onto the vessel at the port of shipment, or into charge of the air carrier at the port of departure, or at the time the Equipment is actually delivered ex-works and the Contractor's statement or delivery order confirming delivery of the Equipment ex-works 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 as well as any loss, theft or damage of the Equipment during the course of execution of the Contract, until final acceptance of the Work by EGAT and the fulfillment of the guarantee provision of the Contract.

E-21. 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-22. 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-23. 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-24. 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-25. 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-26. 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-27. 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-23. Default and Termination.

E-28. 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-29. 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.

In case of replacement of Equipment due to non-conformity with EGAT's specifications and/or defects found prior to acceptance of Equipment by EGAT or replenishment for short pack or returning of repaired Equipment due to such defect, the Contractor shall, upon receipt of EGAT's written notice supported with the receipt issued by the relevant parties, be responsible for reimbursement of the expenses incurred for the following :

- All re-export charges (if any)
- Import duty and taxes
- Landing charges, rents and handling charges (ocean freight)
- Storage charges (air freight)
- Truck hire
- Labour charges

These expenses shall exclude value added taxes, which will be EGAT's responsibility.

The contractor shall be also responsible for reimbursement of Service charges for customs clearance (if any) including value added tax.

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 import duty and taxes, inland transportation and installation of the replacement parts for foreign supply

Equipment, and the cost of inland transportation and the installation of the replacement parts for local supply Equipment will be borne by EGAT.

For Equipment specified in Data Sheet, in case EGAT, at its sole discretion, requires the Contractor to replace any defected Equipment, the Contractor shall replace the Equipment with the whole new set at its own costs and expenses including the cost of all re-export charges (if any), import duty and taxes, landing charges, rents and handling charges (ocean freight), storage charges (air freight), truck hire, labour charges, service charges for customs clearance, inland transportation and installation of the Equipment.

The Contractor shall extend the provisions of his liability to cover all repair and replacement parts furnished from the day immediately following the date of completion of such repair or replacement as follows:

Time of Malfunctioning and/or Defect Found	Guarantee Period Extension				
	Equipment with 1-Year guarantee period	Equipment with 2-Year guarantee period	Equipment with 3-Year guarantee period	Equipment with 4-Year guarantee period	Equipment with 5-Year guarantee period
First Year	For a new period of one (1) Year.	For a new period of two (2) Years.	For a new period of three (3) Years.	For a new period of four (4) Years.	For a new period of five (5) Years.
Second Year	n/a	For a new period of one (1) Year.	For a new period of two (2) Years.	For a new period of three (3) Years.	For a new period of four (4) Years.
Third Year	n/a	n/a	For a new period of one (1) Year.	For a new period of two (2) Years.	For a new period of three (3) Years.
Fourth Year	n/a	n/a	n/a	For a new period of one (1) Year.	For a new period of two (2) Years.
Fifth Year	n/a	n/a	n/a	n/a	For a new period of one (1) Year.

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-30 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-31. 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-32. 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.

DRAFT

SPECIMEN OF GUARANTEE

To :

Date

Electricity Generating Authority of Thailand
Bangkrui, 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 as required by these Contract Documents.

For imported Equipment, Transportation from Thai Port to sites shall be EGAT's responsibility. However, the Contractor shall, at his own expenses and responsibility, perform unloading the Equipment at the port or airport of disembarkation in Thailand.

For local supply, Transportation from the Contractor's premises to the sites shall be EGAT's responsibility. However, the Contractor shall, at his own expenses and responsibility, perform loading the Equipment on EGAT's trucks or trailers at the Contractor's premises and shall be liable for all losses and/or damages to the Equipment as well as any expenses causing therefrom.

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 installation, erection, adjustment, 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 four copies of report summarizing the work performance, from the beginning to the completion of the supervisory period, to EGAT within one month 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 maintenance security(ies) as specified in Article F-12. Maintenance Security and 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 foreign currency will be made in the currency or currencies in which the price has been stated in the price schedules. The Contractor has to inform EGAT the mode of payment he requires for payment for foreign currency portion together with detail of bank account No., beneficiary's name and address etc. *If the Contractor requires the payment of foreign currency portion to be paid directly to the suppliers, he has to inform EGAT which portion of the Contract Price, as stipulated in the term of payment of the Contract, to be paid accordingly.* In case the local Contractor requires foreign currency or currencies to be paid directly to him, payment of such foreign currency or currencies will be made to the local Contractor in Thai Baht by using the *selling* exchange rate published by the Bank of Thailand on the *payment* date.

In case the Contractor requires the payment of foreign currency portion to be made through letter of credit, EGAT will, if there is no fault or any delay caused by the Contractor, establish the letter of credit in the name of the Contractor or Suppliers not later than thirty (30) Days after signing the Contract. The Contractor shall be responsible for all bank charges inside and outside Thailand and including opening, amendment, reimbursing charges, payment commission, cable charges, discrepancy fee, acceptance commission and others (if any) arising from Letter of Credit.

Payment in local currency will be made directly by EGAT.

The Contractor or beneficiary has to inform EGAT by mailed letter or telex or facsimile immediately the date upon which he has received the original letter of credit opened in his favour.

Payment will be made in the following manner :

a. Payment for Equipment (except Spare Parts and Optional Items)

Foreign Supply

1. Eighty (80) per cent of the Contract Price will be paid after delivery FOB Port of Shipment (FOB Vessel) on the basis of pro rata value of each shipment against presentation of invoices, shipping documents, EGAT's letters of approval for shipment and 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.

*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 original signed negotiable Bill of Lading and appertaining documents giving evidence of shipment 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 Thai Port; payment of this ten (10) per cent will be made as soon as possible but not later than the ninth (9th) 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 (6th) 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.

Local Supply

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 *ex-works delivery* of Equipment duly certified by EGAT's representative*, EGAT's letters of approval for delivery and 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.

*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 ex-works delivery; payment of this ten (10) per cent will be made as soon as possible but not later than the ninth (9th) 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 (6th) 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.

b. Payment for Spare Parts

One hundred (100) per cent will be paid after complete delivery against presentation of invoices, shipping documents and EGAT's letter of approval for shipment for foreign supply or the Contractor's statement or delivery order confirming the delivery of Equipment ex-works duly certified by EGAT's representative* and EGAT's letter of approval for test report** of the relevant Equipment and the acceptance has been made by EGAT. The guarantee period shall start from the day immediately following the date of the acceptance of the Spare Parts.

*EGAT's representative means the authorized EGAT's Store personnel to verify the quality 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.

c. Payment for Optional Items

Payment for Equipment

One hundred (100) per cent will be paid after complete delivery with presentation of invoices, shipping documents and EGAT's letter of approval for shipment and the acceptance has been made by EGAT. The guarantee period shall start from the day immediately following the date of the acceptance of Equipment.

Payment for Mechanical Operation Life Test (if any)

One hundred (100) per cent of the cost of the Mechanical Operation Life Test will be paid after the test has been performed successfully and test report has been accepted by EGAT.

d. Payment for Field Test Cost

One hundred (100) per cent of Field Test Cost will be paid after the test has been performed successfully and the test report has been accepted by EGAT.

e. Payment for Installation Supervisor

Payment for the services of the installation supervisor will be made within thirty (30) Days after his release by EGAT. Payment will be made on the basis of actual working man-days at the quoted cost per man-day up to a maximum equal to the total man-days quoted. For man-days exceeding the quoted total man-days, no payment shall be made by EGAT unless the Contractor can claim for any delays in

the progress of the work caused by EGAT. Any such additional man-days approved by EGAT shall be paid on the basis of the quoted man-day rate.

The number of quoted man-days shall include Sundays and shall cover a seven (7) day workweek, if required by the construction program. The working hours shall be forty-eight (48) hours per week, eight (8) hours per day, the working hours over 8 hours per day if requested by EGAT will be counted as overtime at 1½ times the regular hourly rate.

The amount to be paid for each Day for the services of the supervisor shall include for all salary, subsistence expense, insurance, compensations and personal expense of the supervisor, and all liabilities and responsibilities thereto. EGAT will pay for round-trip economy class air transportation for the installation supervisor between the Contractor's home office and Bangkok by the most expeditious and direct route on trip basis by draft after receipt of the Contractor's invoice supported with the used air ticket of such supervisor. The remission of immigration fees and taxes collectible by the Kingdom of Thailand shall not be paid by EGAT, as described in Article E-11. Fees and Duties.

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.

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. 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-29. 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 in Data Sheet from the day immediately following the date of acceptance of Equipment by EGAT; 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 from the day immediately following the date of completion of such repair or replacement as follows:

Time of Malfunctioning and/or Defect Found	Guarantee Period Extension				
	Equipment with 1-Year guarantee period	Equipment with 2-Year guarantee period	Equipment with 3-Year guarantee period	Equipment with 4-Year guarantee period	Equipment with 5-Year guarantee period
First Year	For a new period of one (1) Year.	For a new period of two (2) Years.	For a new period of three (3) Years.	For a new period of four (4) Years.	For a new period of five (5) Years.
Second Year	n/a	For a new period of one (1) Year.	For a new period of two (2) Years.	For a new period of three (3) Years.	For a new period of four (4) Years.
Third Year	n/a	n/a	For a new period of one (1) Year.	For a new period of two (2) Years.	For a new period of three (3) Years.
Fourth Year	n/a	n/a	n/a	For a new period of one (1) Year.	For a new period of two (2) Years.
Fifth Year	n/a	n/a	n/a	n/a	For a new period of one (1) Year.

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 deposited in accordance with Article F-7. Acceptance Certificate, 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 import duty and taxes,

inland transportation and installation of the replacement parts for foreign supply Equipment, and the cost of inland transportation and the installation of the replacement parts for local supply Equipment will be borne by EGAT.

For Equipment specified in Data Sheet, in case EGAT, at its sole discretion, requires the Contractor to replace any defected Equipment, the Contractor shall replace the Equipment with the whole new set at its own costs and expenses including the cost of all re-export charges (if any), import duty and taxes, landing charges, rents and handling charges (ocean freight), storage charges (air freight), truck hire, labour charges, service charges for customs clearance, inland transportation and installation of the Equipment.

- 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 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.

- (4) Reproducibles of all final approved drawings shall be made on mylar films.
- 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, maintenance security(ies) in the amount of ten (10) per cent of the total Contract Price or ten (10) per cent of each schedule, excluding the cost of installation supervisor and cost of test(s), 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 bank guarantee or 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, and made payable to EGAT in the same currency as that of the Contract. In case of a cash deposit, only Thai baht portion of the Contract Price can be made. 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

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, excluding the cost of installation supervisor and cost of test(s), 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 _____ (...) Year(s) 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 All Equipment except 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	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.

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SECTION G
RATINGS AND FEATURES

G. RATINGS AND FEATURES

G -1. Ratings and Features

The following Ratings and Features sheets are attached hereto and made a part of the Contract Documents :

<u>RF No.</u>	<u>Description</u>	<u>Page</u>
PC3B10	XLPE Power Cable	G2
PC2110	XLPE Power Cable	G3
PC2510	XLPE Power Cable	G4

DRAFT

**XLPE Power Cable
Specification No. 322 or 1001**



**Substation Electrical
Equipment Engineering Department**

Ratings and Features	Designed : $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	Validated : $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	Revision 0	Page 1/1
RF No. PC3B10	Verified : $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	Approved : $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	Dated : 14/2/60	

a. Type	Underground Power Cable	
b. Voltage Rating	33	kV
c. Nominal Cross-Sectional Area	500	mm ²
d. Conductor		
- Material	Annealed Copper	
- Construction	Compacted Round Concentric Lay Stranded	
- Diameter (Approx.)	26.5	mm
- Min. Number of Wires	53	
- Max. Resistance at 20° C	0.0366	Ω/km
e. Thickness of Conductor Shield	0.6	mm
f. Thickness of XLPE Insulation	10.67	mm
g. Thickness of Insulation Shield	0.6	mm
h. Metal Shield		
- Material	<input checked="" type="checkbox"/> Copper Tape <input type="checkbox"/> Copper Wire	
- Thickness of Copper Tape	0.1	mm
- Min. Number of Copper Wire	-	
- Total Cross-Sectional Area of Copper Wire	-	mm ²
i. Cushion		
- Material	Polyester Non-Woven Tape	
- Thickness	≥ 0.03	mm
j. Jacket		
- Material	Black Polyvinyl Chloride (PVC)	
- Thickness	2.79	mm
k. Cable Outside Diameter (Approx.)	56	mm

**XLPE Power Cable
Specification No. 322 or 1001**



**Substation Electrical
Equipment Engineering Department**

Ratings and Features	Designed :	Validated :	Revision 2	Page 1/1
RF No. PC2110	Verified :	Approved :	Dated : 17/11/60	

a. Type	Underground Power Cable	
b. Nominal System Voltage	22	kV
c. Nominal Cross-Sectional Area	35	mm ²
d. Conductor		
- Material	Annealed Copper	
- Construction	Compacted Round Concentric Lay Stranded	
- Diameter	7	mm
- Min. Number of Wires	6	
- Max. Resistance at 20° C	0.524	Ω/km
e. Thickness of Conductor Shield	0.6	mm
f. Thickness of XLPE Insulation	8.76	mm
g. Thickness of Insulation Shield	0.6	mm
h. Metal Shield		
- Material	<input checked="" type="checkbox"/> Copper Tape <input type="checkbox"/> Copper Wire	
- Thickness of Copper Tape	0.1	mm
- Min. Number of Copper Wire	-	
- Total Cross-Sectional Area of Copper Wire	-	mm ²
i. Cushion		
- Material	Polyester Non-Woven Tape	
- Thickness	≥ 0.03	mm
j. Jacket		
- Material	Black Polyvinyl Chloride (PVC)	
- Thickness	2.03	mm
k. Cable Outside Diameter (Approx.)	34	mm

**XLPE Power Cable
Specification No. 322 or 1001**



**Substation Electrical
Equipment Engineering Department**

Ratings and Features	Designed : <i>[Signature]</i>	Validated : <i>[Signature]</i>	Revision 1	Page 1/1
RF No. PC2510	Verified : <i>[Signature]</i>	Approved : <i>[Signature]</i>	Dated : 15/09/18	

a. Type	Underground Power Cable	
b. Nominal System Voltage	22	kV
c. Nominal Cross-Sectional Area	120	mm ²
d. Conductor		
- Material	Annealed Copper	
- Construction	Compacted Round Concentric Lay Stranded	
- Diameter	13	mm
- Min. Number of Wires	18	
- Max. Resistance at 20° C	0.153	Ω/km
e. Thickness of Conductor Shield	0.6	mm
f. Thickness of XLPE Insulation	8.76	mm
g. Thickness of Insulation Shield	0.6	mm
h. Metal Shield		
- Material	<input checked="" type="checkbox"/> Copper Tape <input type="checkbox"/> Copper Wire	
- Thickness of Copper Tape	0.1	mm
- Min. Number of Copper Wire	-	
- Total Cross-Sectional Area of Copper Wire	-	mm ²
i. Cushion		
- Material	Polyester Non-Woven Tape	
- Thickness	≥ 0.03	mm
j. Jacket		
- Material	Black Polyvinyl Chloride (PVC)	
- Thickness	2.03	mm
k. Cable Outside Diameter (Approx.)	40	mm

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**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>
322 (Mar.11)	XLPE Power Cable	322.1 – 322.12
323(L) (Nov.13)	Power Cable, Control Cable and Switchboard Wire	323(L).1 – 323(L).9
524 (Apr.06)	Overhead Ground Wire	524.1 – 524.4
603 (Apr.08)	Grounding System Materials	603.1 – 603.5

Specification No 322

XLPE Power Cable

322-1 General. This Specification covers the general requirements for design, manufacture, test and supply of XLPE power cable.

The specific ratings, characteristics and the special requirements and features of the equipment not covered herein are given in the accompanying Ratings and Features sheet (if any).

322-2 Materials and Workmanship. All materials shall be new and shall be the best available for the purposes used, considering strength, ductility, durability and suitability for the intended services and best engineering practice. Workmanship shall be of the highest grade and in accordance with the best modern standard practice.

322-3 Service Conditions. All materials shall be suitable for installation and use at an altitude of 1000 m or less in a tropical climate with a maximum ambient temperature of 45°C and 100% relative humidity for outdoor equipment (or a maximum ambient temperature of 40°C and 90% relative humidity for indoor equipment) without corrosion, deterioration or degradation of performance characteristics.

322-4 Codes and Standards. All equipment, materials, devices, fabrication and testing shall conform to the codes, specifications and standards listed below and all applicable codes, specifications and standard referred therein.

ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
ICEA	Insulated Cable Engineer Association
IEC	International Electrotechnical Commission
NEMA	National Electrical Manufacturers Association
TIS	Thai Industrial Standards Institute

All threaded parts requiring external connection shall have UNC screw and pipe threads. All internal parts may have threads in accordance with the established specification in the country of manufacturer.

It is the intent that all equipment, materials, devices, fabrication and testing shall conform to the application codes, specifications and standards even though they are not specifically noted herein. Equivalent codes, specifications and standards established and approved in the country of equipment or material manufacture may be used subject to EGAT's approval. If this election is made, the Bidder shall so state and include in his bid the governing codes, specifications, and standards proposed together

with an itemized list of specific deviations from the requirements of codes, specifications and standards referred herein.

The latest issue of all codes, specifications and standards shall govern.

The most stringent requirement, in the event of code, specification or standard conflict, shall govern. This specification shall govern in the event of discrepancies between it and applicable codes, specifications and standards.

322-5 Design and Construction. The general construction of the cable shall be as shown on drawings being furnished with the characteristics described herein.

322-5.1 33 kV and below XLPE Power Cable.

a. Conductor. The conductors shall be plain annealed copper compacted round concentric lay stranded construction conformable to the applicable requirements of IEC Publication No 60228 Class 2 or compact segmental stranded.

b. Conductor Shield. The conductor shall be shielded with an extruded layer of thermosetting semi-conducting material or the combination of helically wrapped semi-conducting tape over the conductor and then an extruded layer of thermosetting semi-conducting material. In either case, the extruded layer shall be firmly bonded to the insulation.

c. Insulation. The insulation shall be cross-linked polyethylene conforming to the requirement of ICEA Pub. No S-93-639.

The insulation shall be capable of operating continuously at conductor temperatures not exceeding 90°C for normal operation, 130°C for emergency overload conditions, and 250°C for short circuit conditions.

The cable shall be provided with a 133% insulation level.

d. Insulation Shield. The insulation shall be shield with a layer of semi-conducting material applied directly over the insulation.

e. Metal Shield. The metal shield shall be annealed copper tape of suitable width and shall be helically applied over the insulation shielding with minimum 10% lap.

The annealed copper tape shall be at least 0.1 mm thickness.

f. Cushion. A polyester non-woven tape with 10% minimum lap of the tape width shall be wrapped over the metal shield as a cushion layer, the minimum thickness of tape shall not be less than 0.03 mm.

g. Jacket. The jacket shall consist of a polyvinyl chloride compound conforming to the requirement of ICEA Pub. No S-93-639.

322-5.2

115 and 69 kV XLPE Power Cable.

The XLPE power cable shall be suitable for use in wet or dry location and shall conform to the applicable requirements of TIS 2202.

a. Conductor. The conductors shall be plain annealed copper compacted round concentric lay stranded construction conformable to the applicable requirements of IEC Publication No 60228 Class 2 or compact segmental stranded.

b. Conductor Shield. The conductor shall be shielded with the combination of helically wrapped semi-conducting tape over the conductor and then an extruded layer of thermosetting semi-conducting material. The extruded layer shall be firmly bonded to the insulation.

c. Insulation. The insulation shall be cross-linked polyethylene compound (XLPE) and shall be extruded in tandem process over the extruded semi-conductive conductor shield layer by the Radiant Curing Process (RCP) or suitable completely-dried curing process, so that microvoids in the insulation are eliminated.

d. Insulation Shield. Insulation shield shall consist of extruded semi-conductive compound which shall be bonded firmly and continuously to the insulation for the requirement of removal before terminating and splicing.

e. Synthetic Water Blocking Layer. A semi-conductive non-biodegradable water blocking layer shall be provided under the metal shield to provide a continuous longitudinal watertight barrier throughout the cable length. This layer shall be compatible with other cable materials and shall not effect corroding acting on the metal shield.

f. Metal Shield. The metal shield shall be a concentric layer of copper wire which is electrically continuous and bonded together throughout the cable length with copper contact tape.

g. Synthetic Water Blocking and Cushion Tape. A non-conductive non-biodegradable water blocking tape shall be applied over the metal shield to provide a continuous longitudinal watertight barrier throughout the cable length. The tape shall have sufficient thickness to perform well as a thermal stress relief layer and to provide for cushion and bedding. The tape shall be compatible with other cable materials and shall not effect corroding acting on adjacent metal layers.

- h. Radial Water Barrier.** The radial water barrier shall be provided under the jacket. This layer shall consist of aluminum tape coated on both sides with an polyethylene or ethylene acrylic acid adhesive co-polymer.
- i. Jacket.** The jacket shall consist of extruded black polyvinyl chloride ST₂ (PVC ST₂). Semi-conductive black carbon coating shall be applied on the outer surface of the PVC outer jacket.

322-5.3

230 kV XLPE Power Cable

The XLPE power cable shall be suitable for use in wet or dry location and shall conform to the applicable requirements of IEC Publication No 62067.

- a. Conductor.** The conductors shall be plain annealed copper compacted round concentric lay stranded construction conformable to the applicable requirements of IEC Publication No 60228 Class 2 or compact segmental stranded.
- b. Conductor Shield.** The conductor shall be shielded with the combination of helically wrapped semi-conducting tape over the conductor and then an extruded layer of thermosetting semi-conducting material. The extruded layer shall be firmly bonded to the insulation.
- c. Insulation.** The insulation shall be cross-linked polyethylene compound (XLPE) which shall meet to physical and electrical requirements for power cable 230 kV (900 kV BIL) rated voltage. The insulation shall be extruded in tandem process over the extruded semi-conductive conductor shield layer by the Radiant Curing Process (RCP) or suitable completely-dried curing process, so that microvoids in the insulation are eliminated.
- d. Insulation Shield.** Insulation shield shall consist of extruded semi-conductive compound which shall be bonded firmly and continuously to the insulation for the requirement of removal before terminating and splicing.
- e. Synthetic Water Blocking Layer.** A semi-conductive non-biodegradable water blocking layer shall be provided under the metal shield to provide a continuous longitudinal watertight barrier throughout the cable length. This layer shall be compatible with other cable materials and shall not effect corroding acting on the metal shield.
- f. Metal Shield.** The metal shield shall be a concentric layer of copper wire which is electrically continuous and bonded together throughout the cable length with copper contact tape.

g. Synthetic Water Blocking and Cushion Tape. A non-conductive non-biodegradable water blocking tape shall be applied over the metal shield to provide a continuous longitudinal watertight barrier throughout the cable length. The tape shall have sufficient thickness to perform well as a thermal stress relief layer and to provide for cushion and bedding. The tape shall be compatible with other cable materials and shall not effect corroding acting on adjacent metal layers.

h. Radial Water Barrier. The radial water barrier shall be provided under the jacket. This layer shall consist of aluminum tape coated on both sides with an polyethylene or ethylene acrylic acid adhesive co-polymer.

i. Jacket. The jacket shall consist of extruded black polyvinyl chloride ST₂ (PVC ST₂). Semi-conductive black carbon coating shall be applied on the outer surface of the PVC outer jacket.

322-6 Cable Marking. The following items of marking shall be printed on the surface of the outer jacket.

- (a) Voltage classification.
- (b) Type of conductor.
- (c) Type of insulation (XLPE) and jacket.
- (d) Size and number of conductor.
- (e) Year of production.
- (f) Name of manufacturer or its abbreviation and country of origin.
- (g) Continuous marking for each meter of the cable length starting from zero through the whole length of cable in each reel.

322-7 Packing. Immediately after work of factory test, both ends of power cable shall be greased by silicone paste and covered by PVC end cap, moreover the outer end of power cable above 33 kV through 230 kV shall be ready attached with a pulling eye of sufficient strength having an effective moisture sealing.

Each length of finished cable shall be wound on a suitable non-returnable reel and packed in such a manner which prevents damage during transportation and handling operation. Owing to transportation limitation, the size of reel shall match the transportation limit of not exceeding 3.5 m x 10.0 m x 4.0 m (width x length x height).

The length of the cable to be packed on each reel shall be in accordance with EGAT's requirement. The following information shall be displayed on the side of reel :

- (a) Contract and item number.
- (b) Reel number.
- (c) Manufacturer's name or its abbreviation.
- (d) Voltage classification.
- (e) Type of conductor.
- (f) Type of insulation (XLPE) and jacket.
- (g) Size of cable and number of core.
- (h) Rolling direction of reel and terminal position of cable.
- (i) Reel Size.
- (j) Length of cable.
- (k) Net weight and total weight (kg).
- (l) Year of production.

322-8 **Test.** Test of equipments shall be performed according to the requirements specified in each referred test item. The costs of all tests and reports shall be borne by the Contractor.

322-8.1 **Design Test.** The proposed equipment shall already have the design test record of the same type and same rating as EGAT called for, in accordance with the tests specified in each equipment test items, which is subject to EGAT's approval (unless otherwise specified in each equipment test item). The design test record shall be required and submitted together with the tender document during the bidding.

322-8.2 **Routine test.** Each equipment shall be completely assembled at the factory and subject to the tests specified in each equipment test item.

322-8.3 **Quality Conformance Test.** The quality conformance test shall be performed by selecting the sample from each lot of equipment. The numbers of samples for the test shall be as specified in the Standard.

322-8.4 **Test Report.** The report of all tests, curves and standard application data shall be furnished to EGAT immediately after completion of the tests.

322-8.5 Test Procedure. The Contractor shall submit the test procedure of specified tests and actual design tests to EGAT for approval. The test procedure shall consist of procedures, applied voltage, current and criteria to justify the result of the tests.

322-8.6 Test Items for 33 kV and below XLPE Power Cable. The test shall be performed in accordance with the latest ICEA Pub. No S-93-639, ASTM B3, ASTM B8.

a. Design Tests. These tests may be omitted if a design test record can be submitted.

(a) Conductor Tests. Tests shall be performed on selected samples of the conductor before the application of any covering.

1. Tensile strength test.
2. Elongation test.
3. Conductor resistivity tests.
4. Dimension measurements.
5. Surface finish inspection.

(b) Physical and Aging Tests on the Cables, Insulation and Jacket. Tests shall be performed on selected samples of the cable insulation and jackets.

1. Thickness measurement.
2. Tensile strength test.
3. Elongation test.
4. Aging test.
5. Heat distortion test.
6. Capacitance and power factor tests.
7. Accelerated water absorption.
8. Jacket heat shock test.
9. Jacket heat distortion test.
10. Resistivity test.
11. Flame resistance test.

b. Routine Tests. Electrical tests shall be performed on the entire length of completed cables.

1. AC voltage test.
2. Insulation resistance test.
3. Partial discharge extinction level test.

322-8.7

Test Items for 115 and 69 kV XLPE Power Cable. The tests shall be performed in accordance with the latest TIS 2202.

a. Design Tests. These tests may be omitted if a design test record can be submitted.

1. Bending followed by partial discharge.
2. Tan δ measurement.
3. Heating cycle voltage test.
4. Lightning impulse voltage test followed by a power frequency voltage test.
5. Resistivity of semi-conducting layers.
6. Check of cable construction.
7. Test for determining the mechanical properties of insulation before and after aging.
8. Test for determining the mechanical properties of non-metallic sheaths before and after aging.
9. Aging tests on pieces of complete cable to check compatibility of materials.
10. Pressure test at high temperature on sheaths.
11. Hot set test for XLPE insulation.
12. Shrinkage test for XLPE insulation.
13. Water penetration test.
14. Heat shock test for PVC sheaths.
15. Loss of mass test on PVC sheaths.
16. Test under fire conditions. The test under fire conditions in accordance with IEC 60332-1 shall be carried out on a sample of completed cable.

b. Routine Tests

1. Partial discharge test.
2. Voltage test.
3. Electrical test on oversheath of the cable.

c. Quality Conformance Tests

1. Conductor examination and dimension measurement of each layers.
2. Measurement of electrical resistance of conductor.
3. Hot set test for XLPE insulation.
4. Measurement of capacitance.

322-8.8

Test Items for 230 kV XLPE Power Cable. The tests shall be performed in accordance with the latest IEC Publication No 62067.

a. Design Tests. These tests may be omitted if a design test record can be submitted.

1. Bending followed by partial discharge.
2. Tan δ measurement.
3. Heating cycle voltage test.
4. Switching impulse voltage test.
5. Lightning impulse voltage test followed by a power frequency voltage test.
6. Examination.
7. Resistivity of semi-conducting layers.
8. Check of cable construction.
9. Test for determining the mechanical properties of insulation before and after aging.
10. Test for determining the mechanical properties of non-metallic sheaths before and after aging.
11. Aging tests on pieces of complete cable to check compatibility of materials.

12. Loss of mass test on PVC sheaths.
13. Pressure test at high temperature on sheaths.
14. Tests on PVC sheaths at low temperature.
15. Heat shock test for PVC sheaths.
16. Hot set test for XLPE insulation.
17. Test under fire conditions.
18. Water penetration test.

b. Routine Tests

1. Partial discharge test.
2. Voltage test.
3. Electrical test on oversheath of the cable.

c. Quality Conformance Tests

1. Conductor examination and dimension measurement of each layers.
2. Measurement of electrical resistance of conductor.
3. Hot set test for XLPE insulation.
4. Measurement of capacitance.
5. Lightning impulse voltage test followed by a power frequency voltage test.
6. Water penetration test.

322-9 Drawings and Documents for XLPE Power Cable

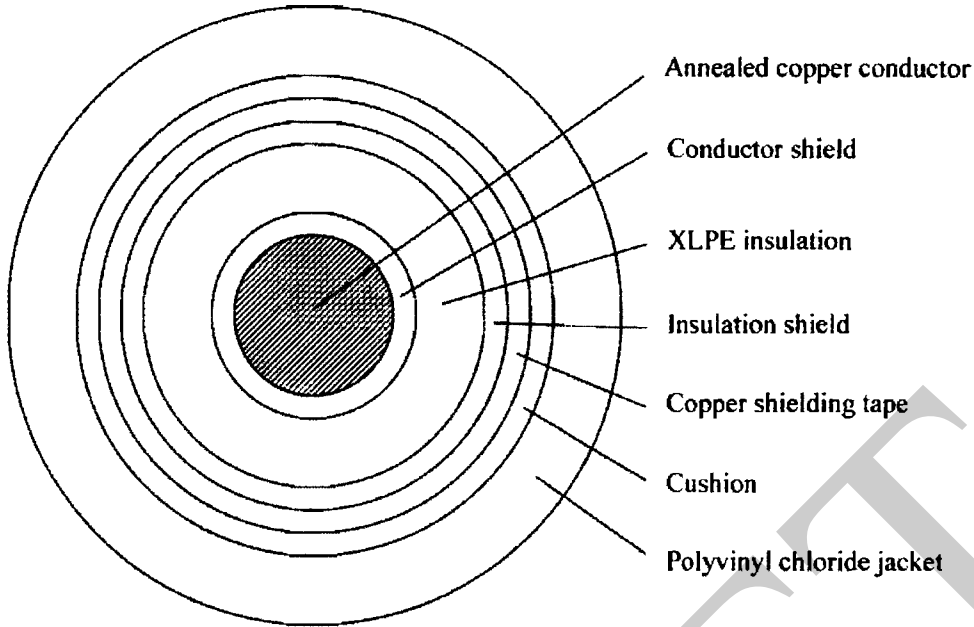
Drawings and documents shall at least comprise the followings :

A. Documents

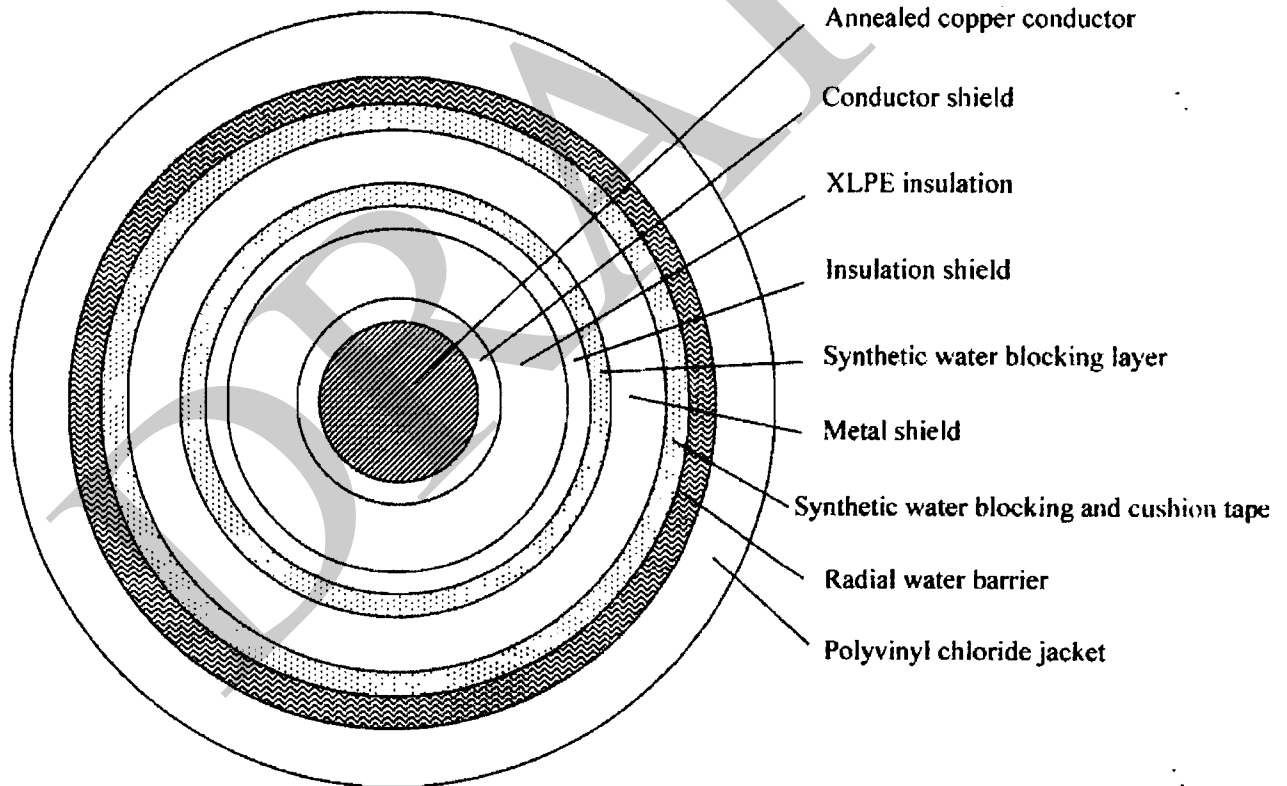
Item	Description	Printed Documents	CD-ROM
1	Manufacturing and delivery schedule	x	-
2	Test procedure (Factory test)	x	-
3	Test schedule (Factory test)	x	-
4	Test report (Factory test)	x	-

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XLPE POWER CABLE 33 kV AND BELOW



XLPE POWER CABLE ABOVE 33 kV THROUGH 230 kV



Rev.	Description	Date	SUBSTATION ELECTRICAL EQUIPMENT ENGINEERING DEPARTMENT			
1	Revised cross section of XLPE power cable 33 kV through 230 kV	24/01/11	CROSS SECTION XLPE POWER CABLE			
			Date : 24/01/11	Dwg. No. : PC-322	SII. 01/01	Rev. 1

145

Specification No 323(L)

Power Cable, Control Cable and Switchboard Wire

- 323L-1 General.** This specification covers the general requirements for design, manufacture, test and supply of the power cable, control cable and switchboard wire.
- The specific ratings, characteristics and the special requirements and features of the equipment not covered herein are given in the accompanying Ratings and Features sheet (if any).
- 323L-2 Materials and Workmanship.** All materials shall be new and shall be the best available for the purposes used, considering strength, ductility, durability and suitability for the intended services and best engineering practice. Workmanship shall be of the highest grade and in accordance with the best modern standard practice.
- 323L-3 Service Conditions.** All materials shall be suitable for installation and use at an altitude of 1000 m or less in a tropical climate with a maximum ambient temperature of 45°C and 100% relative humidity for outdoor equipment (or a maximum ambient temperature of 40°C and 90% relative humidity for indoor equipment) without corrosion, deterioration or degradation of performance characteristics.
- 323L-4 Codes and Standards.** All equipment, materials, devices, fabrication and testing shall conform to the codes, specifications and standards listed below and all applicable codes, specifications and standard referred therein.

TIS

Thai Industrial Standards Institute

It is the intent that all equipment, materials, devices, fabrication and testing shall conform to the application codes, specifications and standards even though they are not specifically noted herein. Equivalent codes, specifications and standards established and approved in the country of equipment or material manufacture may be used subject to EGAT's approval. If this election is made, the Bidder shall so state and include in his bid the governing codes, specifications, and standards proposed together with an itemized list of specific deviations from the requirements of codes, specifications and standards referred herein.

The latest issue of all codes, specifications and standards shall govern.

The most stringent requirement, in the event of code, specification or standard conflict, shall govern. This specification shall govern in the event of discrepancies between it and applicable codes, specifications and standards.

323L-5 Construction

323L-5.1 Power and Control Cable. The general construction of the power and control cable shall be suitable for installation in wet and dry locations. The power and control cable shall meet the following specific requirement.

- a. **Conductors.** The conductor shall be of soft or annealed uncoated copper wire. Concentric-stranded conductor for power and control cable shall conform to Table 1 or Table 2 of TIS 2427-2552. Number of wire for control cable shall be at least 7 strands.

In case of twisted pair type control cable, the nominal cross-sectional area of conductor, the number and nominal diameter of each wire shall be as specified in Price Schedule.

- b. **Insulation.** The insulation of power cable shall be polyvinyl chloride and conform to Table 1 of TIS 11 Part 4-2553 or Table 3 or Table 4 of TIS 11 Part 101-2553.

The insulation of control cable shall be polyvinyl chloride and conform to Table 10 of TIS 838-2531.

In case of twisted pair type control cable, the insulation thickness shall not be less than 0.76 mm (0.03 in.).

- c. **Fillers.** Fillers shall be used in the interstice of the multiconductor, cable where necessary to give the complete cable a substantially circular cross section.

- d. **Wrapping.** The cable shall be helically wrapped over the filler and copper shielding with 0.0254 mm (0.001 in) thickness non-hygroscopic mylar or polyester tape.

- e. **Inner Jacket.** The inner jacket shall be polyvinyl chloride of at least 1.14 mm (0.045 in) thickness and shall be applied over the wrapping.

- f. **Shielding.** The shielding shall be annealed copper tape of suitable width and shall be helically applied over the inner jacket with a minimum 10% lap.

The annealed copper tape shall be at least 0.1 mm (0.004 in) thickness and substantially free from burrs.

- g. **Outer Jacket.** The outer jacket shall be black polyvinyl chloride applied over the wrapping. The jacket thickness of power cable shall conform to Table 1 of TIS 11 Part 4-2553 or Table 3 or Table 4 of TIS 11 Part 101-2553

The jacket thickness of control cable shall conform to Table 10 of TIS 838-2531 respectively.

- h. **Circuit Identification.** The assembly of conductors in power and control cable composed of 30 conductors or less shall be in accordance with the combinations given in Table 323L-1.

In case of twisted pair type control cable, two insulated conductor shall be uniformly twisted together with suitable length of lay to form a pair. The assembly of conductors in cable composed of 17 pairs or less shall be in accordance with the combinations given in Table 323L-2.

323L-5.2

Switchboard Wire. The switchboard wire shall meet the following specific requirement :

- a. **Conductor stranding**

Each strand of switchboard wire shall be tin-coated copper conductor. The nominal cross-sectional area of conductor and number of wire shall be as indicated below :

Nominal Cross-Sectional Area (mm ²)	Number of Wire (strands)
1.5	30
2.5	50
4.0	56
6.0	84

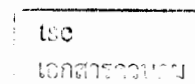
- b. **Insulation**

The insulation shall be polyvinyl chloride and suitable for use at conductor temperatures not exceeding 70°C. The thickness of insulation shall not be less than 1.14 mm. Type and color of insulation shall be as specified in Price Schedule.

323L-5.3

Cable and Wire Markings. The following information shall be printed on the surface of cable and wire :

- (a) Name of manufacturer
- (b) Size of cables and wires and number of conductors
- (c) Type of insulation
- (d) Voltage classification



148

(e) Year of manufacture

In addition to cable marking, length mark at each meter shall be printed on the surface of the cable, starting from zero through the whole length of cable in each reel.

323L-5.4 Cable Ends. An end cap shall be provided on the cable end to which special attention shall be paid to prevent penetration of moisture during transportation.

323L-6 Packing. All cables and wires shall be packed on reels. The reels shall be nonreturnable and shall be included in the prices of the cables and wires offered. The minimum length of the cable and wire to be packed on each reel shall be as indicated below :

Power and control cables : 500 or 1000 m

Switchboard wires : 100, 150 or 200 m

The following information shall be displayed :

- (a) Name of manufacturer
- (b) Size and number of conductors
- (c) Type of insulation
- (d) Voltage classification
- (e) Length of cable
- (f) Reel number and other suitable identification for reel and reel size
- (g) Year of manufacture
- (h) Total weight

323L-7 Test. Test of equipment shall be performed according to the requirements specified in each referred test item. The costs of all tests and reports shall be borne by the Contractor.

323L-7.1 Design Test. The proposed equipment shall already have the design test record of the same type and same rating as EGAT called for, in accordance with the tests specified in each equipment test items, which is subject to EGAT's approval (unless otherwise specified in each equipment test item). The design test record shall be required and submitted together with the tender document during the bidding.

- 323L-7.1** **Routine test.** Each equipment shall be completely assembled at the factory and subject to the tests specified in each equipment test item.
- 323L-7.2** **Test Report.** The report of all tests, curves and standard application data shall be furnished to EGAT immediately after completion of the tests.
- 323L-7.3** **Test Procedure.** The Contractor shall submit the test procedure of specified tests and actual design tests to EGAT for approval. The test procedure shall consist of procedures, applied voltage, current and criteria to justify the result of the tests.
- 323L-7.5** **Test Items for Power Cable, Control Cable and Switchboard Wire.** The tests shall be performed in accordance with TIS 11-2553 and TIS 838-2531.
- a. Design Tests.** These tests may be omitted if a design test record can be submitted.
- (a) Conductor tests.** Tests shall be performed on selected samples of the conductor before the application of any covering in accordance with TIS 11-2553 and TIS 838-2531.
1. Tensile strength test.
2. Elongation test.
3. Conductor resistivity test.
4. Dimension measurement.
5. Surface finish inspection.
- (b) Physical and Aging Tests on the Cable, Insulation and Jacket.** Tests shall be performed on selected samples of the cable insulation and jackets in accordance with TIS 11-2553 and TIS 838-2531.
1. Thickness measurement.
2. Tensile strength test.
3. Elongation test.
4. Aging test.
5. Heat distortion test.

b. Routines Tests. Electrical test shall be performed on the entire length of completed cables in accordance with TIS 11-2553 and TIS 838-2531.

1. Voltage test.
2. Conductor resistance test.
3. Insulation resistance test.

Insulation resistance test shall be performed under ambient the value of insulation resistance and ambient temperature shall be recorded. In addition, insulation resistance test on the sample shall be performed in accordance with TIS 11-2553 and TIS 838-2531.

323L-8 Drawings and Documents for Power Cable, Control Cable and Switchboard Wire

Drawings and documents shall at least comprise the followings :

A. Documents

Item	Description	Printed Documents	CD-ROM
1	Manufacturing and delivery schedule	x	-
2	Test procedure (Factory test)	x	-
3	Test schedule (Factory test)	x	-
4	Test report (Factory test)	x	-

Table 323L-1

Colors Sequence for Power and Control Cables

Conductor Number	Background or Base Color	Tracer Color
1	Black	-
2	White	-
3	Red	-
4	Green	-
5	Orange	-
6	Blue	-
7	White	Black
8	Red	Black
9	Green	Black
10	Orange	Black
11	Blue	Black
12	Black	White
13	Red	White
14	Green	White
15	Orange	White
16	Blue	White
17	Black	Red
18	White	Red
19	Green	Red
20	Orange	Red
21	Blue	Red
22	Black	Green
23	White	Green
24	Red	Green
25	Orange	Green
26	Blue	Green
27	Black	Orange
28	White	Orange
29	Red	Orange
30	Green	Orange

Table 323L-2

Colors Sequence for 17 Pairs Control Cable

Pair Number	Color	
	1 st core	2 rd core
1	White	Blue
2	White	Orange
3	White	Green
4	White	Brown
5	White	Grey
6	Red	Blue
7	Red	Orange
8	Red	Green
9	Red	Brown
10	Red	Grey
11	Black	Blue
12	Black	Orange
13	Black	Green
14	Black	Brown
15	Black	Grey
16	Yellow	Blue
17	Yellow	Orange

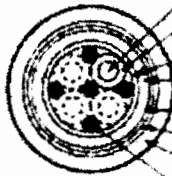
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Single Core



- Annealed copper conductor
- Insulation
- Polyester or mylar tape
- Polyvinyl chloride inner jacket (Black)
- Copper tape
- Polyester or mylar tape
- Polyvinyl chloride jacket (Black)

Multi Core



- Annealed copper conductor
- Insulation
- Polyester or mylar tape
- Polyvinyl chloride inner jacket (Black)
- Copper tape
- Polyester or mylar tape
- Polyvinyl chloride jacket (Black)
- Polyvinyl chloride rod or polypropylene filler (if necessary)

Rev	Description	Date	SUBSTATION ELECTRICAL EQUIPMENT ENGINEERING DEPARTMENT	
			CROSS SECTION	
			POWER AND CONTROL CABLE	
			Date: 04/08	Dwg No: LC 323L

154

Specification No 524

Overhead Ground Wire

524-1 General. This Specification covers the general requirements for design, manufacture, test and supply of the overhead ground wire.

The specific ratings, characteristics and the special requirements and features of the equipment not covered herein are given in the accompanying Ratings and Features sheet (if any).

524-2 Materials and Workmanship. All materials shall be new and shall be the best available for the purposes used, considering strength, ductility, durability and suitability for the intended services and best engineering practice. Workmanship shall be of the highest grade and in accordance with the best modern standard practice.

524-3 Service Conditions. All materials shall be suitable for installation and use at an altitude of 1000 m or less in a tropical climate with a maximum ambient temperature of 45°C and 100% relative humidity for outdoor equipment (or a maximum ambient temperature of 40°C and 90% relative humidity for indoor equipment) without corrosion, deterioration or degradation of performance characteristics.

524-4 Codes and Standards. All equipment, materials, devices, fabrication and testing shall conform to the codes, specifications and standards listed below and all applicable codes, specifications and standard referred therein.

ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
IEEE	The Institute of Electrical and Electronics Engineers
ICEA	Insulated Cable Engineer Association

All threaded parts requiring external connection shall have UNC screw and pipe threads. All internal parts may have threads in accordance with the established specification in the country of manufacturer.

It is the intent that all equipment, materials, devices, fabrication and testing shall conform to the application codes, specifications and standards even though they are not specifically noted herein. Equivalent codes, specifications and standards established and approved in the country of equipment or material manufacture may be used subject to EGAT's approval. If this election is made, the Bidder shall so state and include in his bid the governing codes, specifications, and standards proposed together with an itemized list of specific deviations from the requirements of codes, specifications and standards referred herein.

The latest issue of all codes, specifications and standards shall govern.

The most stringent requirement, in the event of code, specification or standard conflict, shall govern. This specification shall govern in the event of discrepancies between it and applicable codes, specifications and standards.

524-5 Design and Fabrication. This Specification covers the detailed requirements for the design, fabrication of overhead ground wire.

524-5.1 Galvanized Steel Wire Strand. Galvanized steel overhead ground wire strand shall conform to "High Strength" or "Extra High Strength" Class A coating steel strand in accordance with ASTM A363 Zinc-Coated Steel Overhead Ground Wire Strand and shall have general characteristics as shown on Table 1.

524-6 Packing. All overhead ground wire shall be packed on reels. The packing shall be carried out with caution to protect the overhead ground wire from moisture, salt or any impurities which may cause rust or harmful effect. The following information shall be displayed on the reel.

- (a) Name of manufacturer
- (b) Size and number of conductor
- (c) Length of conductor
- (d) Reel number and other suitable identification for reel and reel size
- (e) Date of manufacture
- (f) Total weight

524-7 Test. Test of equipments shall be performed according to the requirements specified in each referred test item. The costs of all tests and reports shall be borne by the Contractor.

524-7.1 Quality Conformance Test. The quality conformance test shall be performed by selecting the sample from each lot of equipment. The numbers of samples for the test shall be as specified in the Standard.

524-7.2 Test Report. The report of all tests, curves and standard application data shall be furnished to EGAT immediately after completion of the tests.

524-7.3 Test Procedure. The Contractor shall submit the test procedure of specified tests and actual design tests to EGAT for approval. The test procedure shall consist of procedures, applied voltage, current and criteria to justify the result of the tests.

524-7.4

Test Items for Overhead Ground Wire. The tests shall be performed in accordance with ASTM A363.

a. Quality Conformance Tests

- (a) Construction check.
- (b) Tensile strength test.
- (c) Weight of coating.
- (d) Elongation.
- (e) Weight of conductor.

524-8 Drawings and Documents for Overhead Ground Wire

Drawings and documents shall at least comprise the followings :

A. Documents

Item	Description	Printed Documents	CD-ROM
1	Manufacturing and delivery schedule	x	-
2	Test procedure (Factory test)	x	-
3	Test schedule (Factory test)	x	-
4	Test report (Factory test)	x	-

151

Table 1
Characteristics of Galvanized Steel Stranded Overhead Ground Wire
 (Class A coating)

Description		5/16"		3/8"		7/16"	
		High strength	Extra high strength	High strength	Extra high strength	High strength	Extra high strength
Ultimate strength	kg	3,628	5,080	4,900	6,985	6,577	9,434
Outside diameter	mm	7.925	7.925	9.144	9.144	11.049	11.049
Galvanized steel strand :							
Weight of zinc coating, not less than	g/m ²	244	244	259	259	275	275
Number of wire		7	7	7	7	7	7
Nominal diameter of coated wire	mm	2.642	2.642	3.048	3.048	3.683	3.683
Approximate weight	kg/m	0.305	0.305	0.406	0.406	0.594	0.594
Modulus of elasticity	kg/mm ²	19,300	19,300	19,300	19,300	19,300	19,300
Coefficient of linear expansion	%	11.5	11.5	11.5	11.5	11.5	11.5
Elongation in 610 mm, not less than	%	5	4	5	4	5	4
Recommended nominal length per reel	m	3,600	3,600	3,600	3,600	3,600	3,600

151
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The most stringent requirement, in the event of code, specification or standard conflict, shall govern. This specification shall govern in the event of discrepancies between it and applicable codes, specifications and standards.

603-5 Construction

603-5.1 Grounding Cables

a. Copper Conductor. Copper conductor shall be soft drawn concentric stranding bare copper conductor in accordance with the latest revision of ASTM B3, and manufactured in accordance with ASTM specification B8 (class B). The copper conductor shall be as the following requirements:

(a) Conductor

Nominal-sectional area	AWG	No 4/0	500 MCM
Construction of stranded conductor (number/dia in mm)		19/2.68	61/2.30
Calculated area	mm ²	107.2	253.5
Outside diameter	mm	13.4	20.7
Standard weight	kg/m	0.9719	2.298
Calculated resistance at 20°C for DC	Ω/km	0.1641	0.06938

(b) Component of Conductor

Number		19	61
Diameter	mm	2.68	2.30
Tolerance diameter	mm	±0.0268	±0.023
Elongation in 250 mm, not less than	%	30	25
Conductivity at 20°C, not less than	% IACS	100	100

603-5.2 Ground Rods. The ground rods shall be copper-covered steel of circular cross-section, 5/8 in (15.8 mm), 3/4 in (19.0 mm) in nominal diameter, and at least 10 ft (3.05 m) long. The steel core shall be cold-drawn steel conforming to ASTM A1080 and the copper coating shall conform to ASTM B572. Each ground rod shall have a conical swaged point at one end and shall have a continuous smooth copper covering of at least 0.010 in (0.254 mm) thickness copper-bonded (Electro-deposit) to a steel core. The copper-clad or pressed type shall not be accepted.

603-5.3 Thermite Welding Materials. The Contractor shall supply thermite welding materials for cable-to-cable, cable-to-ground rod and cable-to-steel structure connections.

The thermite welding materials shall include removable clamp type molds, handle flint gun, thermite powder cartridges, metal discs and other devices required to complete the connection.

The thermite powder cartridges shall be designed to provide an installed connection **having a current capacity** equal to the conductor being welded. The **ignition powder shall be packed** in the bottom of the cartridge to permit the ignition powder to fall on top of the welding powder when dumped into the mold. The powder cartridges shall be completed with metal discs.

The molds shall be designed to withstand the high temperature associated with the **welding operation** and shall provide a minimum of 50 acceptable connections **without maintenance or replacement.**

603-5.4 Grounding Hardware

a. Grounding Connectors, Cable Clamps and Terminal Lugs. Grounding connectors, cable clamps and terminal lugs shall be made of **high strength corrosion resistance copper alloy.** Machine screws, bolts, nuts, washers used with connectors and lugs shall be made of bronze or brass.

b. Flexible Copper Braids. All flexible copper braids shall be made of flat, extra-flexible copper braid which has been tinned before weaving. Both ends shall be **encased** in a seamless copper ferrule drilled in accordance with NEMA **Standard.** Ferrules shall be formed under high pressure insuring **dependable** contact.

603-6 Packing. All grounding cables shall be packed on reels.

The following information shall be displayed

- (a) Name of manufacturer
- (b) Size and number of conductors
- (c) Length of cables

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- (d) Reels number of other suitable identification for reel and reel size
- (e) Date of manufacture
- (f) Total weight

603-7 **Test.** Test of equipments shall be performed according to the requirements specified in each referred test item. The costs of all tests and reports shall be borne by the Contractor.

603-7.1 **Quality Conformance Test.** The quality conformance test shall be performed by selecting the sample from each lot of equipment. The numbers of samples for the test shall be as specified in the Standard.

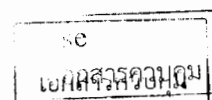
603-7.2 **Test Report.** The report of all tests, curves and standard application data shall be furnished to EGAT immediately after completion of the tests.

603-7.3 **Test Procedure.** The Contractor shall submit the test procedure of specified tests and actual design tests to EGAT for approval. The test procedure shall consist of procedures, applied voltage, current and criteria to justify the result of the tests.

603-7.4 **Test Items for Grounding Cables.** The test shall be performed in accordance with ASTM B3 and ASTM B8.

a. Quality Conformance Tests

- (a) Tensile strength test.
- (b) Elongation test.
- (c) Conductor resistivity test.
- (d) Dimension measurement.
- (e) Surface finish inspection.
- (f) Weigth of conductor.



603-8 Drawings and Documents for Grounding System Materials

Drawings and documents shall at least comprise the followings :

A. Documents

Item	Description	Printed Documents	CD-ROM
	Grounding Cables		
1	Manufacturing and delivery schedule	x	-
2	Test procedure (Factory test)	x	-
3	Test schedule (Factory test)	x	-
4	Test report (Factory test)	x	-
	Thermite Welding Materials		
1	Instruction manual	x	-

603-9 Instruction Manuals for Thermite Welding Materials

Instruction manuals shall consist of all necessary information and shall comprise at least the following parts.

Part A Installation

1. Preparation of cable
2. General welding procedure

Part B Complete set of all drawings, technical data sheets or catalogs arranged in order of each complete item.

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