資料－５　技術討議録（**Technical Memorandum**）

TECHNICAL MEMORANDUM
FOR
THE ADDITIONAL PREPARATORY SURVEY
ON
THE PROJECT FOR REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW LINES AND SUBSTATIONS IN DAR ES SALAAM IN THE UNITED REPUBLIC OF TANZANIA

AGREED BETWEEN
TANZANIA ELECTRIC SUPPLY COMPANY LIMITED (TANESCO)
AND
JICA PREPARATORY SURVEY TEAM

Dar es Salaam, May 23rd, 2013

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- Investments
Tanzania Electric Supply Company Ltd.

JICA PREPARATORY SURVEY TEAM
Yachiyo Engineering Co.,Ltd.
West Japan Engineering Consultants, Inc.

Tanzania Electric Supply Company Ltd. (hereinafter referred to as "TANESCO") and JICA Preparatory Survey Team for the Project for Rehabilitation of Substations and Construction of New Lines and Substations in Dar es Salaam in the United Republic of Tanzania (hereinafter referred to as "the Team") had series of technical discussion to form a mutual understanding of the scope and outline design of the Project at the stage of additional preparatory survey and both parties agreed to record the following points as a conclusion of the discussion.

1. Main objectives of the additional survey

The team explained that the main objectives of the additional survey are as follows:

(1)To confirm the finalized scope of the works, schedule and any updated information of the projects by other donors.

(2)To confirm the progress of necessary measures on Environmental and Social Considerations by the Tanzanian side.

(3)To discuss on the interim progress of the analysis and outline design of the Preparatory Survey.

(4)To have mutual understanding between TANESCO and the Team on the Undertakings for the Project.

2. Scope and Schedule of the Works for the projects by other donors

Through the series of discussions with other donors and coordination meeting, held on 17th May, 2013, among the stake holders of the Projects in Dar es Salaam, TANESCO and the Team confirmed the Scope of the Works and expected implementation schedule by other donors.

The team shall continue analysis and outline design for the Project in accordance with the result of the confirmation mentioned above (Refer to Attachement-2).

3. Power Demand Forecast and interim report of Power System Analysis

The team explained the point of view on the power demand forecast and power system analysis in Dar es Salaam.

TANESCO explained the way of thinking on the future plan and operation for the Grid Substations.

TANESCO understood that the Team shall finalize and explain the Power Demand Forecast and Power System Analysis on the Draft Final Report.

4. Alternatives to reinforce transmission capacity between Ubungo S/S and Ilala S/S

In view of power demand forecast, the team prepared for the alternatives and explained technical view point with recommendation (Plan C).

TANESCO understood and take Plan C even though original request was Plan A (Refer to Attachement-3).

5. Switchover (Reinforcement) Plan for Ilala Substation and 132kV Transmission Line

The team explained the plan of Switchover to reinforce Ilala Substation and 132kV Transmission Line. TANESCO agreed with the plans and understood that the Switchover plan shall be reflected to the tentative implementation schedule for cost estimation and Draft Final Report (Refer to Attachement-4).

6. Major Undertakings to be taken by the Tanzanian Side

In addition to the "Major Undertakings to be taken by Each Government" on Minutes of Dicussions of the Preparatory Survey on the Project signed by the Team and the Tanzanian Side on March 7th, 2013, the team explained detailed undertakings to be taken by the Tanzanian side which mainly focused on technical matters.

TANESCO understood major technical undertakings and agreed to secure necessary budget for the undertakings in timely manner in accordance with the tentative implementation schedule prepared by the team (Refer to Attachement-5).

7. Progress of the Outline Design

Based on the Field Report signed by the Team and the Tanzanian Side on April 4th, 2013, the Team explained progress and update of the outline design to TANESCO.

TANESCO agreed with the progress and updated outline design.

TANESCO explained that there is a plan to adapt concrete poles in the future, however TANESCO agreed to select steel poles for the project so as to have a plan to adapt steel poles in the future as well.

8. Priority of the components reqnested by the Tanzanian side

As a result of additional survey, main Components and priority order requested by the Tanzanian side have been identified shown in Table below.

Priority	Substation	Components
1	Ilala substation (132/33/11kV) (Reinforcement)	• Reinforcement of Ilala substation • Reinforcement of existing 132kV transmission line (7.5km: from Ilala substation to Ubungo substation)
4	Jangwani Beach substation (33/11kV) (New construction)	• Construction of Jangwani Beach substation • Construction of 33kV distribution line (approximately 6.5km: from Jangwani Beach substation to Tegeta substation)
3	Muhimbili substation (33/11kV) (New construction)	• Construction of Muhimbili substation • Construction of 33kV distribution line (approximately 2km: from Muhimbili substation to New City Center substation)
5	Mwananyamala substation (33/11kV) (New construction)	• Construction of Mwananyamala substation • Construction of 33kV distribution line (approximately 1.1km: from Mwananyamala substation to Makumbusho substation)
2	Msasani substation (33/11kV) (Expansion)	• Expansion of Msasani substation • Expansion of 33kV distribution line (approximately 7.6km: from Msasani substation to Makumbusho substation)

9. Utilization of the Equipment to be supplied under the Follow –up cooperation by JICA

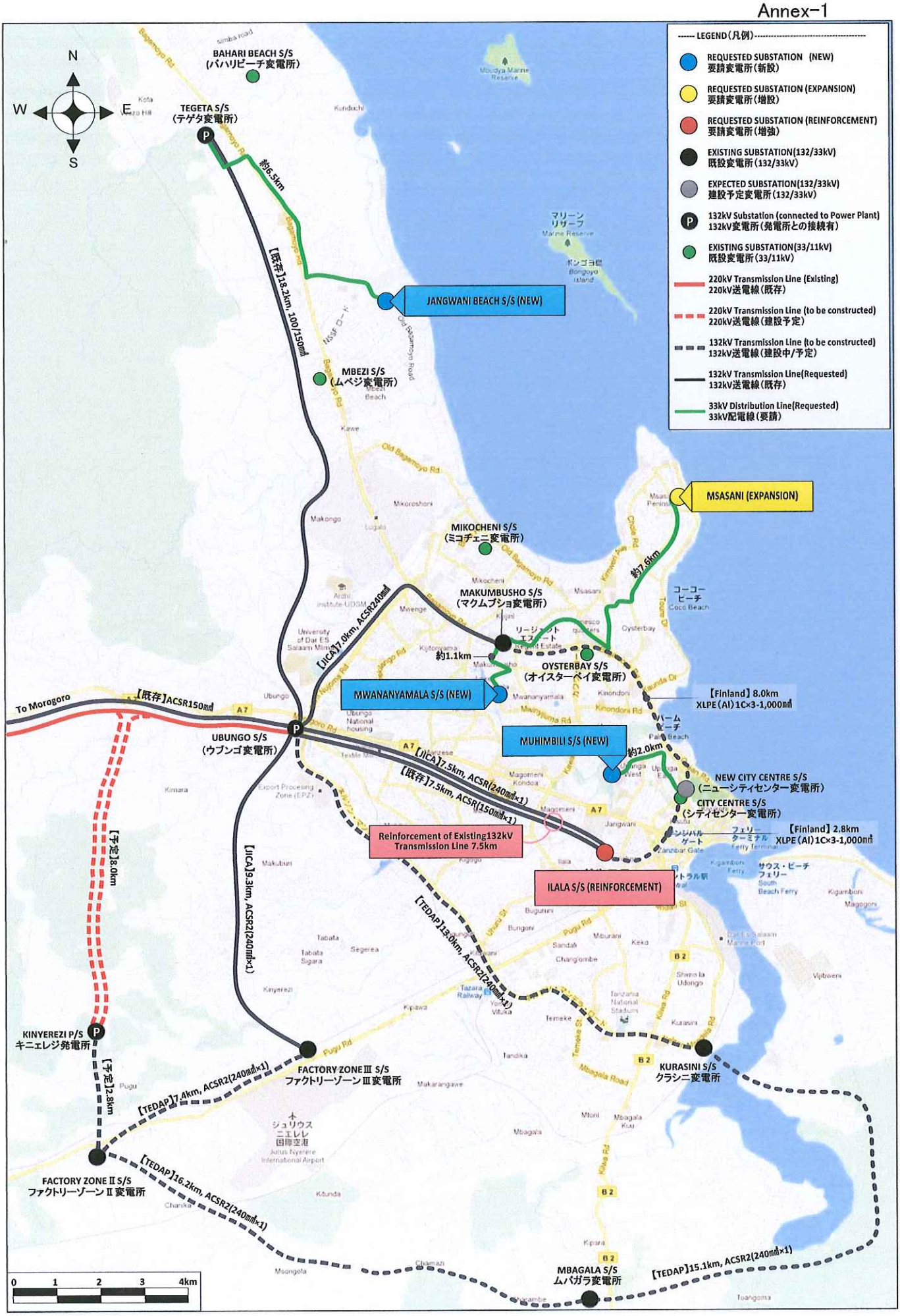
TANESCO and the Team discussed on the utilization of the Equipment to be supplied by JICA under the Follow-up cooperation on the Project for Power Supply Expansion in Dar es Salaam. TANESCO agreed to prepare for the document, which explained the way of the utilization, by the time when the Team conducts the next mission to explain Draft Final Report.

(end)

Annex

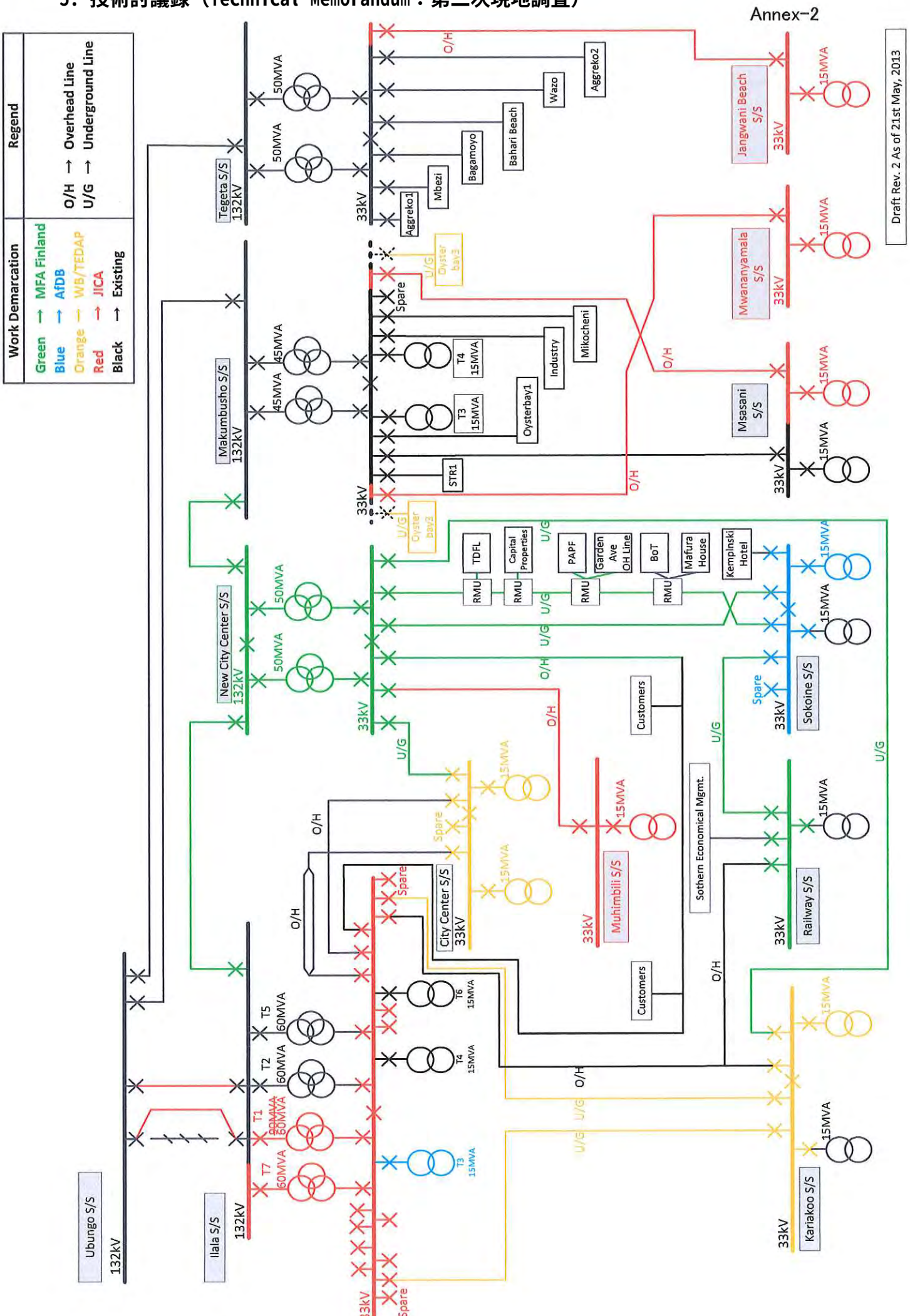
Annex-1:	Location Map
Annex-2:	Work Demarcation and tentative implementation schedule among the donors
Annex-3:	Alternatives to reinforce transmission capacity between Ubungo S/S and Ilala S/S
Annex-4:	Switchover (Reinforcement) Plan for Ilala S/S and 132kV Transmission Line
Annex-5:	Major Undertakings to be taken by the Tanzanian Side

Annex-1



Location Map

Annex-2


Work Demarcation
Regend
Green → MFA Finland
Blue → AfDB
Orange → WB/TEDAP
Red → JICA
Black → Existing
O/H → Overhead Line
U/G → Underground Line
Draft Rev. 2 As of 21st May, 2013
Tegeta S/S 132kV
50MVA
50MVA
33kV
Aggreko1
Mbezi
Bagamoyo
Bahari Beach
Wazo
Aggreko2
O/H
Jangwani Beach S/S
33kV
15MVA
Makumbusho S/S 132kV
45MVA
45MVA
Spare
U/G
Oyster bay2
T4 15MVA
T3 15MVA
Industry
Mikocheni
Oysterbay1
STR1
Mwananyamala S/S
Msasani S/S
New City Center S/S 132kV
50MVA
50MVA
TDFL
Capital Properties
PAPF
Garden Ave OH Line
BoT
Mafura House
Kempinski Hotel
RMU
Customers
Spare
Sokoine S/S
Sothern Economical Mgmt.
City Center S/S 33kV
Muhimbili S/S
Railway S/S
Kariakoo S/S
Ubungo S/S 132kV
Ilala S/S 132kV
T1 60MVA
T2 60MVA
T5 60MVA
T7 60MVA
T6 15MVA
T4 15MVA
T3 15MVA

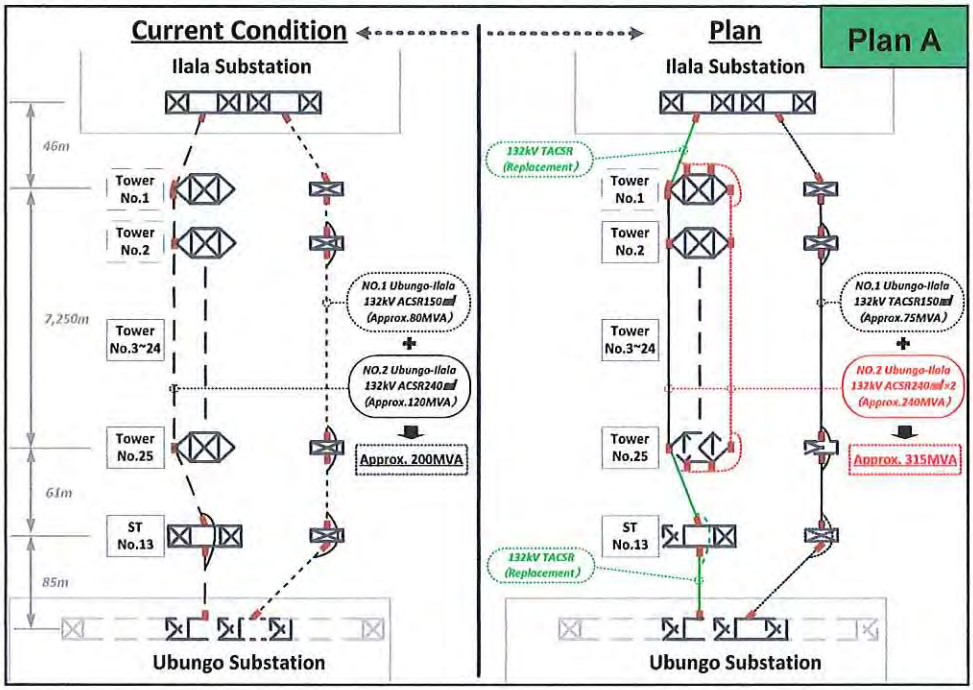
Tentative Implementation Schedule among Donors' Projects related to the Power System in Dar es Salaam

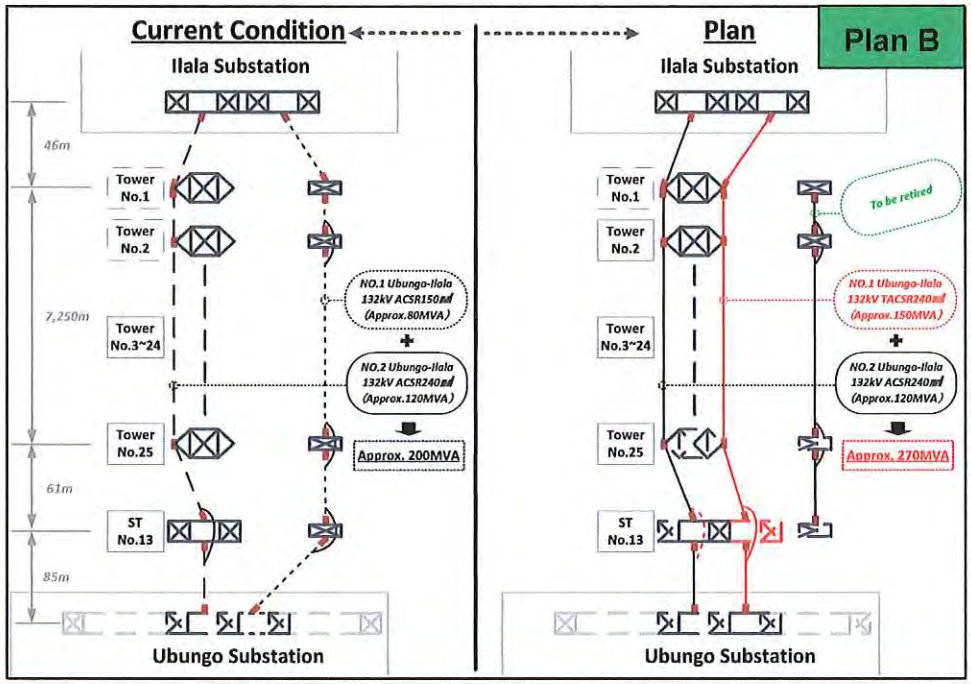
Projects included / financed by ;		Condition \ Month	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	Remarks
		Year	2012				2013												2014												2015												
MFA FinaInd	Improving the Reliability of Electric Power Supply in the city of Dar es Salaam	Contract is effective on 22/02/2013							Construction / Installation / Commissioning																																		Contract Period: 24 months from the effective date
AfDB	Construction and Rehabilitation of Substations in Arusha and Dae es Salaam Regions in Tanzania (Electricity Ⅴ Project PackageⅢ)	Contract is effective on 12/03/2013										Construction / Installation / Commissioning																													Contract Period: 18 months from the commencement of the construction
WB/TEDAP	TEDAP Transmission and Distribution Project (A: Transmission Components)	Under Construction	Construction / Installation / Commissioning																																						Contract Period: to be completed by the end of 2014
WB/TEDAP	TEDAP Transmission and Distribution Project (B: Distribution Components)	Site Assessment is completed										Construction / Installation / Commissioning																													Contract Period: 21 months from the effective date
JICA*	Project for Rehabilitation of Substations and Construction of New Lines and Substations in Dar es Salaam	Under Study							Site Survey / Analysis in Japan / Basic Design / Cost Estimation / Draft Final Report / Final																Supplier Contract / Preparation Work / Construction / Installation																Assumption in case of smooth implementation

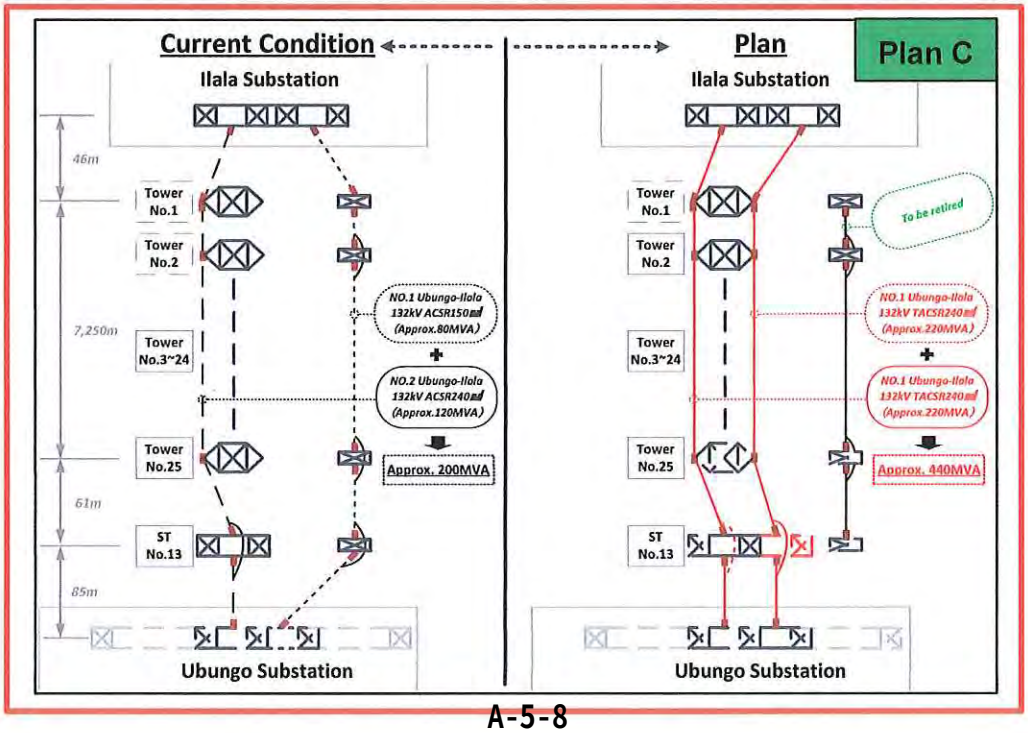
Remainder: JICA*: Scope of the Work and Schedule are subject to change

↑ We are now here

Rev.2 As of 21st May, 2013


Current Condition
Plan
Plan A
Ilala Substation
Ubungo Substation
46m
7,250m
61m
85m
Tower No.1
Tower No.2
Tower No.3~24
Tower No.25
ST No.13
NO.1 Ubungo-Ilala 132kV ACSR150㎟ (Approx.80MVA)
NO.2 Ubungo-Ilala 132kV ACSR240㎟ (Approx.120MVA)
Approx. 200MVA
132kV TACSR (Replacement)
NO.1 Ubungo-Ilala 132kV TACSR150㎟ (Approx.75MVA)
NO.2 Ubungo-Ilala 132kV ACSR240㎟×2 (Approx.240MVA)
Approx. 315MVA


Current Condition
Plan
Plan B
Ilala Substation
Ubungo Substation
46m
7,250m
61m
85m
Tower No.1
Tower No.2
Tower No.3~24
Tower No.25
ST No.13
NO.1 Ubungo-Ilala 132kV ACSR150㎟ (Approx.80MVA)
NO.2 Ubungo-Ilala 132kV ACSR240㎟ (Approx.120MVA)
Approx. 200MVA
To be retired
NO.1 Ubungo-Ilala 132kV TACSR240㎟ (Approx.150MVA)
NO.2 Ubungo-Ilala 132kV ACSR240㎟ (Approx.120MVA)
Approx. 270MVA


Current Condition
Plan
Plan C
Ilala Substation
Ubungo Substation
46m
7,250m
61m
85m
Tower No.1
Tower No.2
Tower No.3~24
Tower No.25
ST No.13
NO.1 Ubungo-Ilala 132kV ACSR150㎟ (Approx.80MVA)
NO.2 Ubungo-Ilala 132kV ACSR240㎟ (Approx.120MVA)
Approx. 200MVA
To be retired
NO.1 Ubungo-Ilala 132kV TACSR240㎟ (Approx.220MVA)
NO.1 Ubungo-Ilala 132kV TACSR240㎟ (Approx.220MVA)
Approx. 440MVA

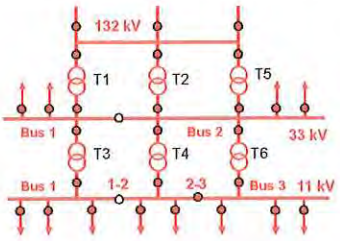
Construction Procedure for Ilala Substation

1

Normal Operation

- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA

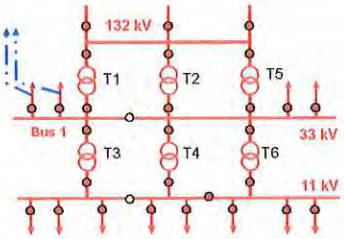
Normally open at 33 kV Bus section and 11 kV Bus 1-2 Section



2

33 kV Power Transmission by Temporary Cables (33 kV Bus 1 only)

- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA
- Installation of temporary cables for 33 kV Feeders
- De-energization of 33 kV Feeders at Bus 1

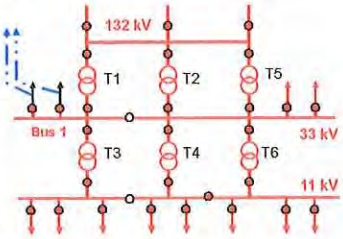


3

33 kV Power Transmission by Temporary Cables (33 kV Bus 1 only)

- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA
- Installation of temporary cables for 33 kV Feeders
- De-energization of 33 kV Feeders at Bus 1

Energization of 33 kV Feeders at Bus 1 by temporary cables (one by one)



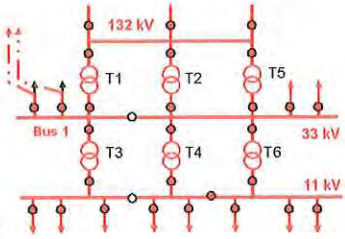
4

33 kV Power Transmission by Temporary Cables (33 kV Bus 1 only)

- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA
- Installation of temporary cables for 33 kV Feeders
- De-energization of 33 kV Feeders at Bus 1

Energization of 33 kV Feeders at Bus 1 by temporary cables (one by one)

- Removal of 33 kV Overhead conductors (inside S/S)

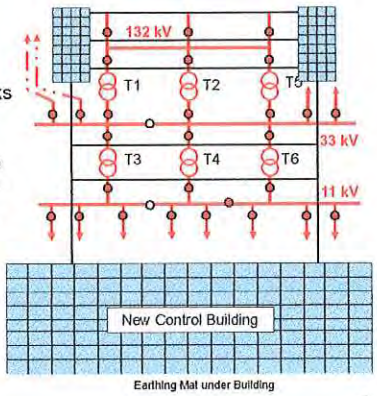


5

Start Civil and Architectural Works

- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA

Start excavation for earthing work and foundations of New Control Building, 132 kV Switchgears, 132/33 kV Transformer, etc.



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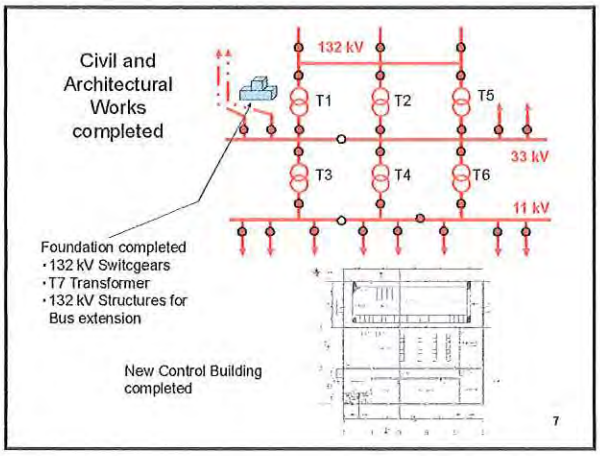
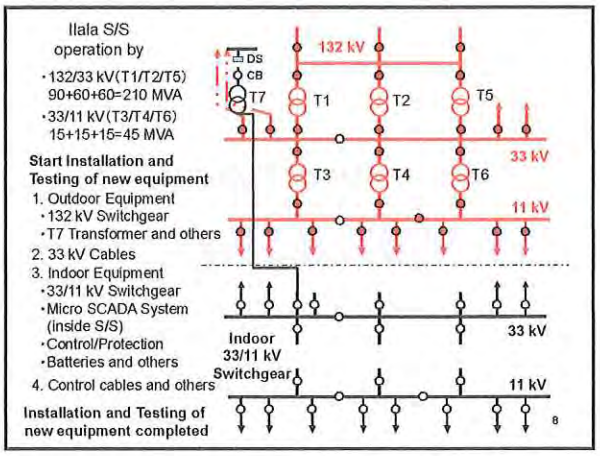
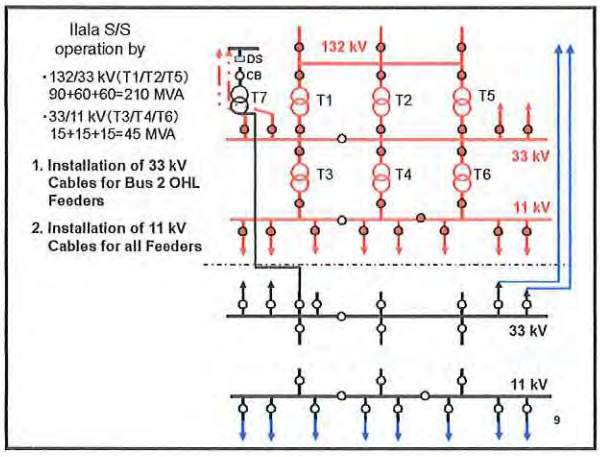
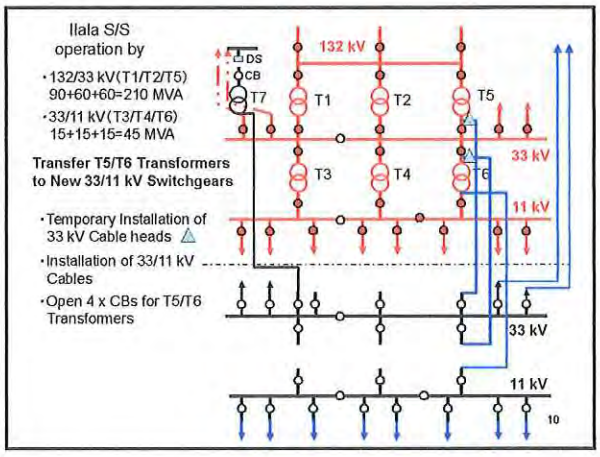
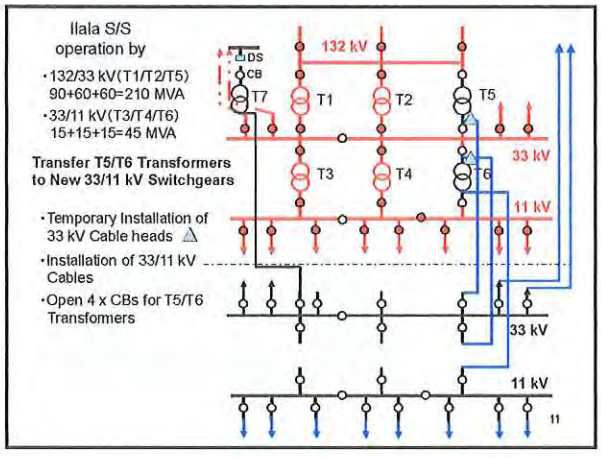
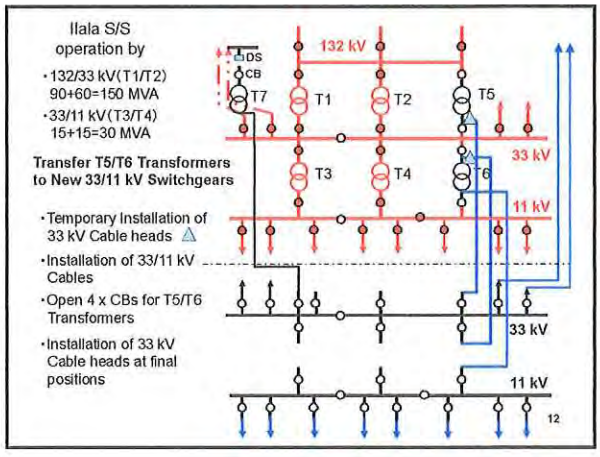

Civil and Architectural Works completed
132 kV
T1
T2
T5
33 kV
T3
T4
T6
11 kV
Foundation completed
・132 kV Switcgears
・T7 Transformer
・132 kV Structures for Bus extension
New Control Building completed
7

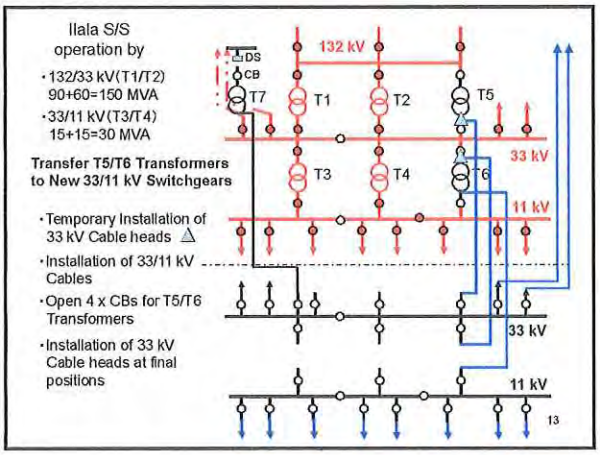

Ilala S/S operation by
・132/33 kV(T1/T2/T5) 90+60+60=210 MVA
・33/11 kV(T3/T4/T6) 15+15+15=45 MVA
Start Installation and Testing of new equipment
1. Outdoor Equipment
・132 kV Switchgear
・T7 Transformer and others
2. 33 kV Cables
3. Indoor Equipment
・33/11 kV Switchgear
・Micro SCADA System (inside S/S)
・Control/Protection
・Batteries and others
4. Control cables and others
Installation and Testing of new equipment completed
DS
CB
T7
132 kV
T1
T2
T5
33 kV
T3
T4
T6
11 kV
Indoor 33/11 kV Switchgear
8

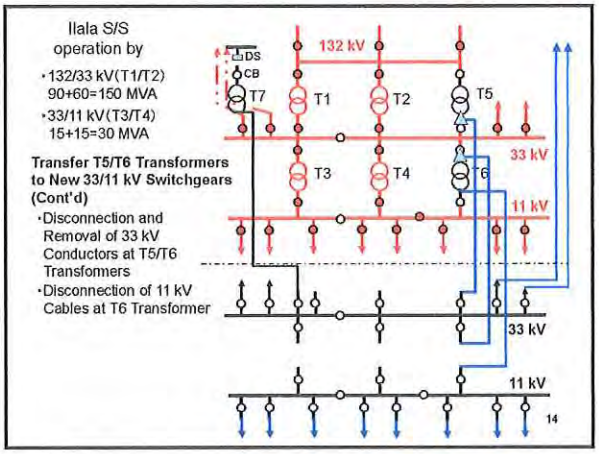

Ilala S/S operation by
・132/33 kV(T1/T2/T5) 90+60+60=210 MVA
・33/11 kV(T3/T4/T6) 15+15+15=45 MVA
1. Installation of 33 kV Cables for Bus 2 OHL Feeders
2. Installation of 11 kV Cables for all Feeders
DS
CB
T7
132 kV
T1
T2
T5
33 kV
T3
T4
T6
11 kV
9

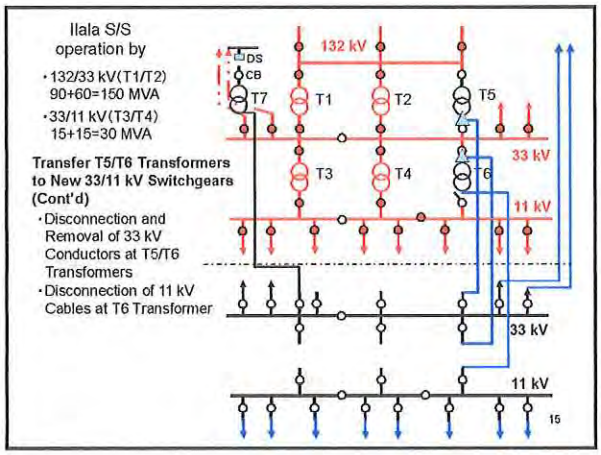

Ilala S/S operation by
・132/33 kV(T1/T2/T5) 90+60+60=210 MVA
・33/11 kV(T3/T4/T6) 15+15+15=45 MVA
Transfer T5/T6 Transformers to New 33/11 kV Switchgears
・Temporary Installation of 33 kV Cable heads △
・Installation of 33/11 kV Cables
・Open 4 x CBs for T5/T6 Transformers
DS
CB
T7
132 kV
T1
T2
T5
33 kV
T3
T4
T6
11 kV
10

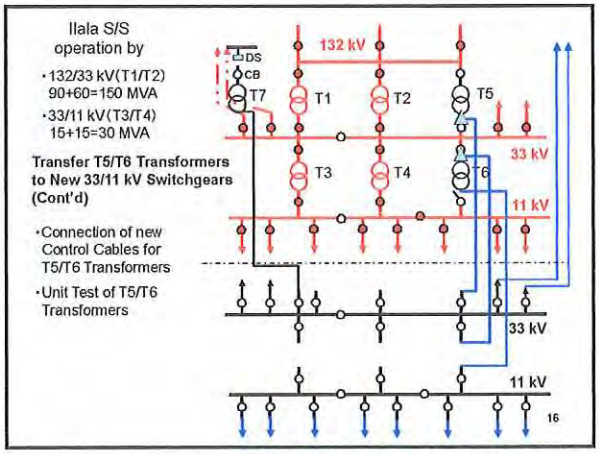

Ilala S/S operation by
・132/33 kV(T1/T2/T5) 90+60+60=210 MVA
・33/11 kV(T3/T4/T6) 15+15+15=45 MVA
Transfer T5/T6 Transformers to New 33/11 kV Switchgears
・Temporary Installation of 33 kV Cable heads △
・Installation of 33/11 kV Cables
・Open 4 x CBs for T5/T6 Transformers
DS
CB
T7
132 kV
T1
T2
T5
33 kV
T3
T4
T6
11 kV
11

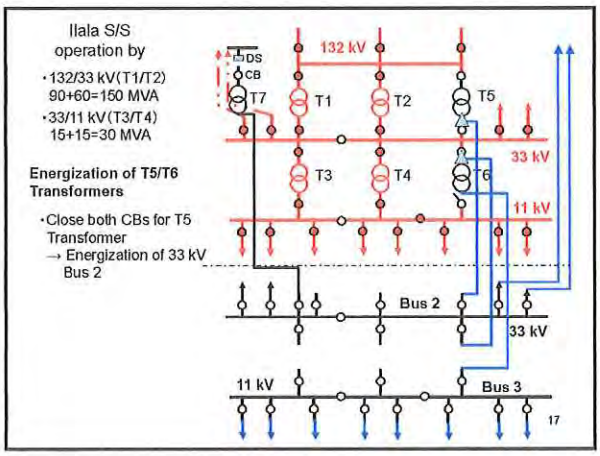

Ilala S/S operation by
・132/33 kV(T1/T2) 90+60=150 MVA
・33/11 kV(T3/T4) 15+15=30 MVA
Transfer T5/T6 Transformers to New 33/11 kV Switchgears
・Temporary Installation of 33 kV Cable heads △
・Installation of 33/11 kV Cables
・Open 4 x CBs for T5/T6 Transformers
・Installation of 33 kV Cable heads at final positions
DS
CB
T7
132 kV
T1
T2
T5
33 kV
T3
T4
T6
11 kV
12

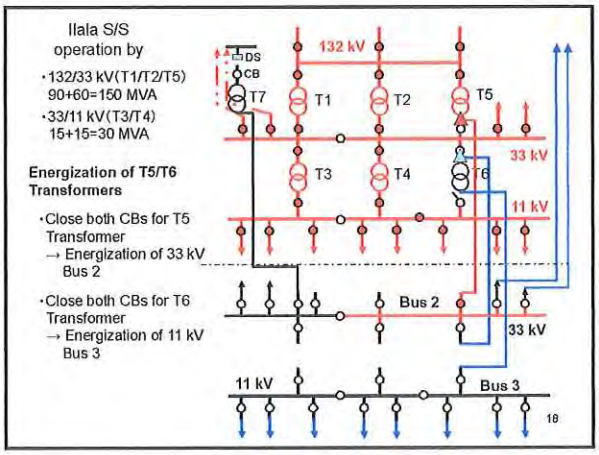

Ilala S/S
operation by
・132/33 kV(T1/T2)
90+60=150 MVA
・33/11 kV(T3/T4)
15+15=30 MVA
Transfer T5/T6 Transformers to New 33/11 kV Switchgears
・Temporary Installation of 33 kV Cable heads
・Installation of 33/11 kV Cables
・Open 4 x CBs for T5/T6 Transformers
・Installation of 33 kV Cable heads at final positions
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
13

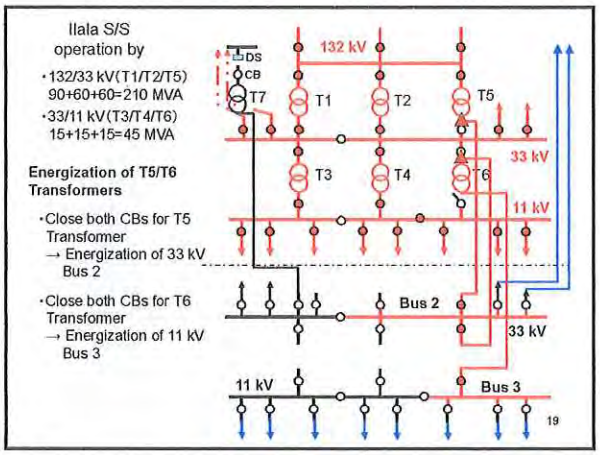

Ilala S/S
operation by
・132/33 kV(T1/T2)
90+60=150 MVA
・33/11 kV(T3/T4)
15+15=30 MVA
Transfer T5/T6 Transformers to New 33/11 kV Switchgears (Cont'd)
・Disconnection and Removal of 33 kV Conductors at T5/T6 Transformers
・Disconnection of 11 kV Cables at T6 Transformer
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
14

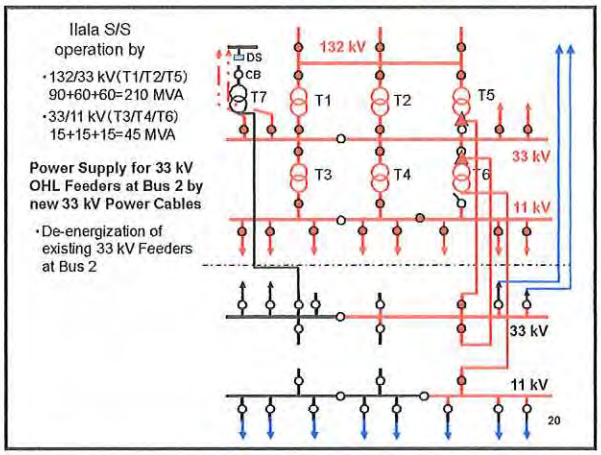

Ilala S/S
operation by
・132/33 kV(T1/T2)
90+60=150 MVA
・33/11 kV(T3/T4)
15+15=30 MVA
Transfer T5/T6 Transformers to New 33/11 kV Switchgears (Cont'd)
・Disconnection and Removal of 33 kV Conductors at T5/T6 Transformers
・Disconnection of 11 kV Cables at T6 Transformer
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
15

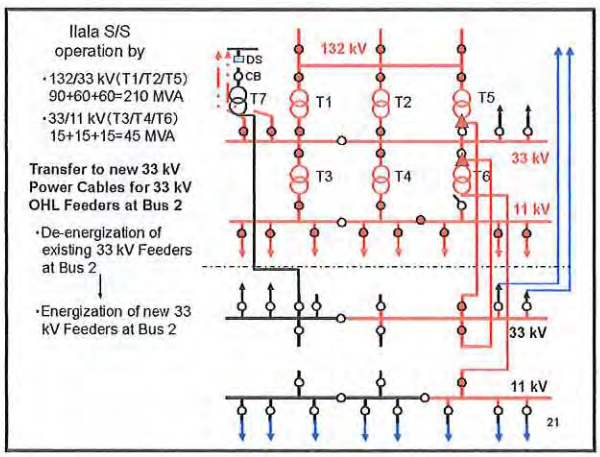

Ilala S/S
operation by
・132/33 kV(T1/T2)
90+60=150 MVA
・33/11 kV(T3/T4)
15+15=30 MVA
Transfer T5/T6 Transformers to New 33/11 kV Switchgears (Cont'd)
・Connection of new Control Cables for T5/T6 Transformers
・Unit Test of T5/T6 Transformers
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
16

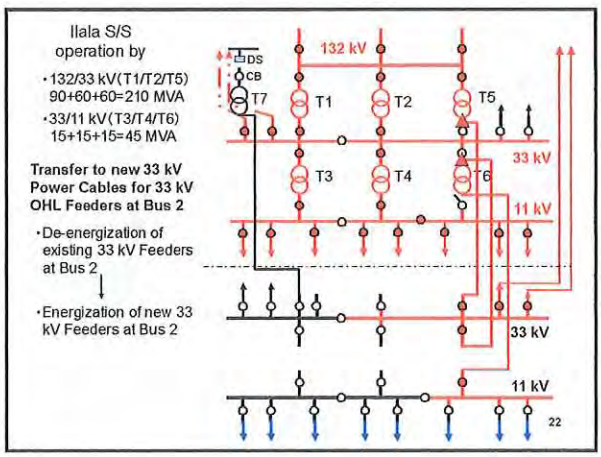

Ilala S/S
operation by
・132/33 kV(T1/T2)
90+60=150 MVA
・33/11 kV(T3/T4)
15+15=30 MVA
Energization of T5/T6 Transformers
・Close both CBs for T5 Transformer
→ Energization of 33 kV Bus 2
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
Bus 2
Bus 3
17

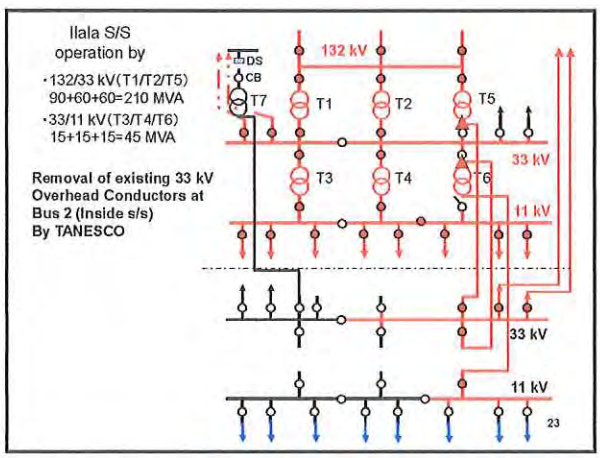

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60=150 MVA
・33/11 kV(T3/T4)
15+15=30 MVA
Energization of T5/T6 Transformers
・Close both CBs for T5 Transformer
→ Energization of 33 kV Bus 2
・Close both CBs for T6 Transformer
→ Energization of 11 kV Bus 3
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
Bus 2
Bus 3
18

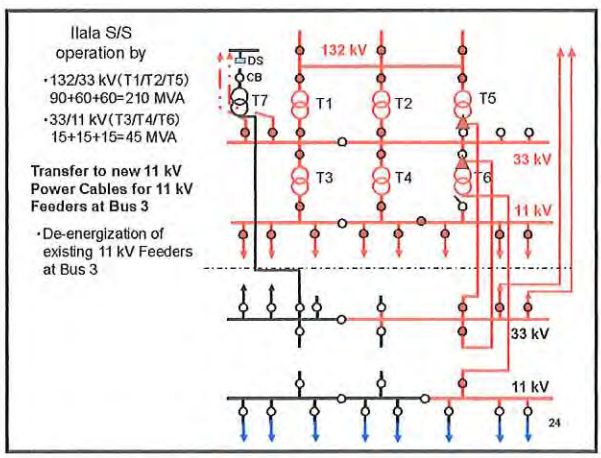

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Energization of T5/T6 Transformers
・Close both CBs for T5 Transformer
→ Energization of 33 kV Bus 2
・Close both CBs for T6 Transformer
→ Energization of 11 kV Bus 3
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
Bus 2
Bus 3
19

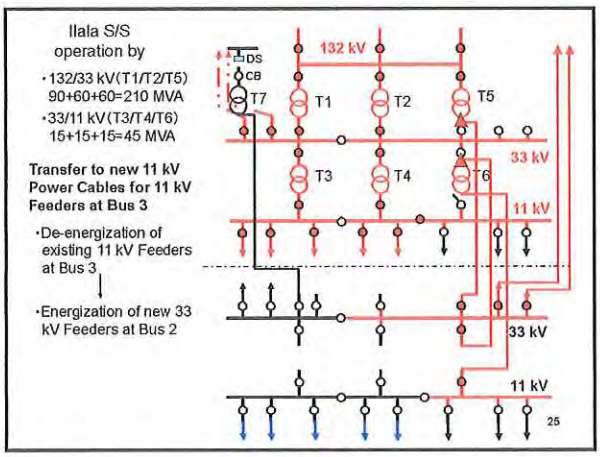

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Power Supply for 33 kV OHL Feeders at Bus 2 by new 33 kV Power Cables
・De-energization of existing 33 kV Feeders at Bus 2
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
20

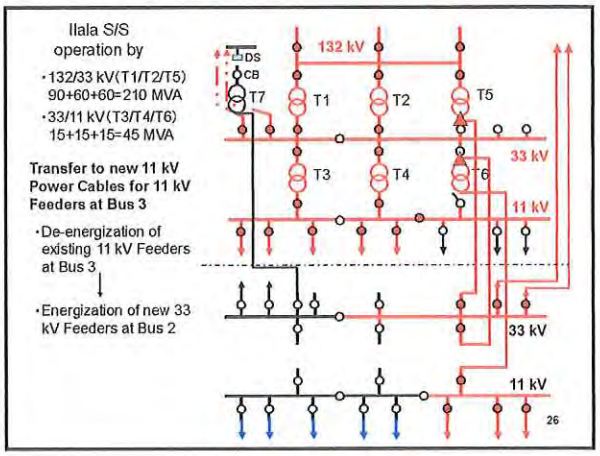

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Transfer to new 33 kV Power Cables for 33 kV OHL Feeders at Bus 2
・De-energization of existing 33 kV Feeders at Bus 2
・Energization of new 33 kV Feeders at Bus 2
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
21

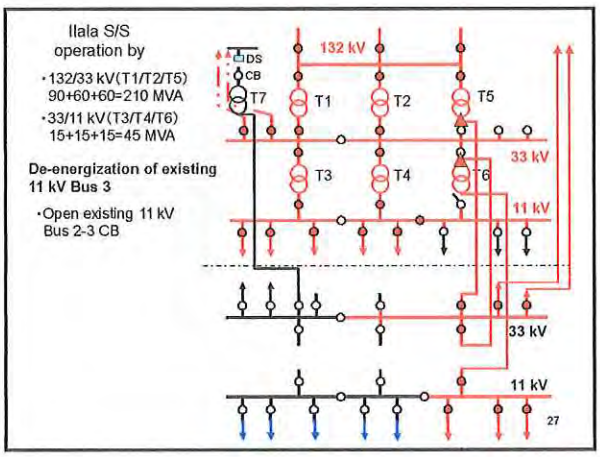

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Transfer to new 33 kV Power Cables for 33 kV OHL Feeders at Bus 2
・De-energization of existing 33 kV Feeders at Bus 2
・Energization of new 33 kV Feeders at Bus 2
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
22

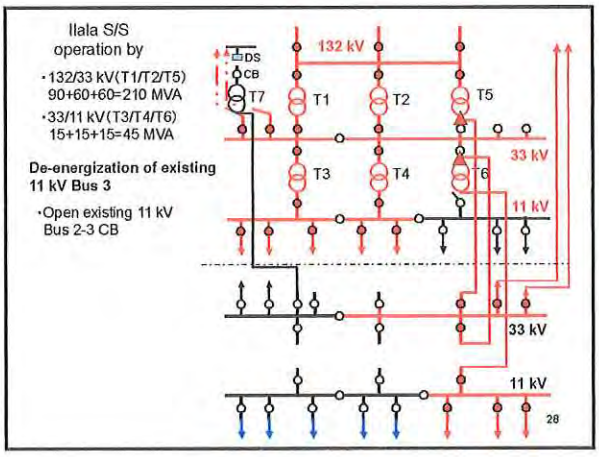

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Removal of existing 33 kV Overhead Conductors at Bus 2 (Inside s/s) By TANESCO
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
23

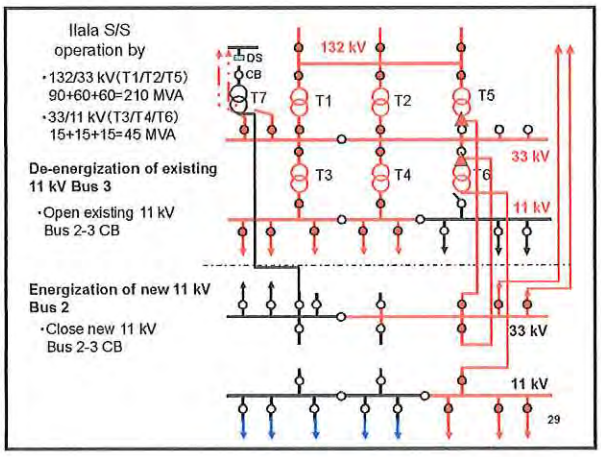

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Transfer to new 11 kV Power Cables for 11 kV Feeders at Bus 3
・De-energization of existing 11 kV Feeders at Bus 3
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
24

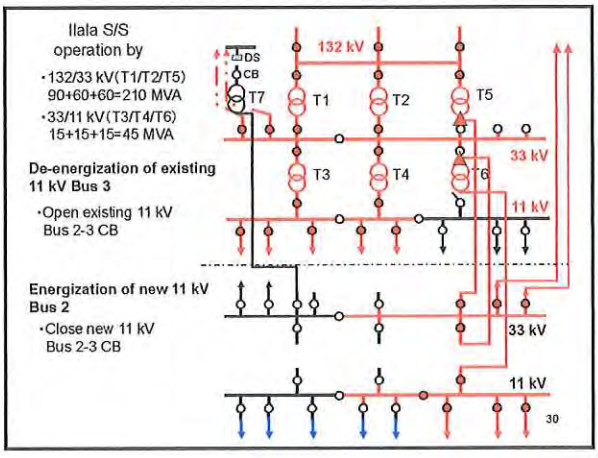

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Transfer to new 11 kV
Power Cables for 11 kV
Feeders at Bus 3
・De-energization of
existing 11 kV Feeders
at Bus 3
・Energization of new 33
kV Feeders at Bus 2
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
25

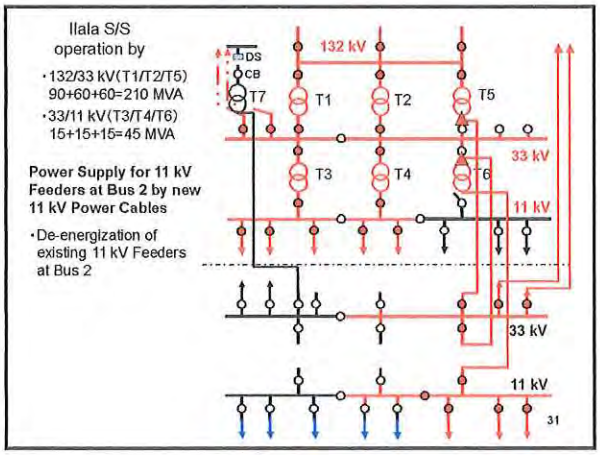

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Transfer to new 11 kV
Power Cables for 11 kV
Feeders at Bus 3
・De-energization of
existing 11 kV Feeders
at Bus 3
・Energization of new 33
kV Feeders at Bus 2
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
26

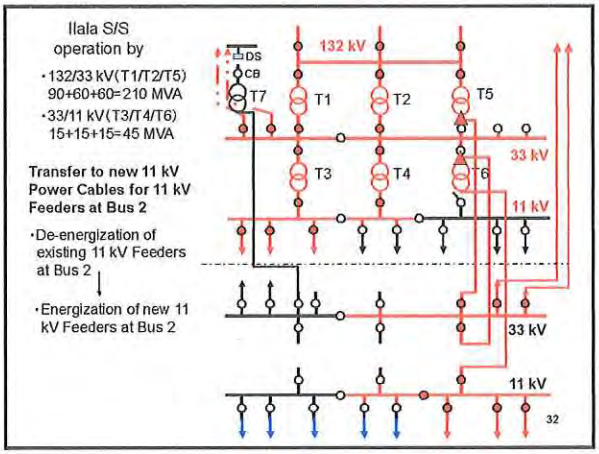

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
De-energization of existing
11 kV Bus 3
・Open existing 11 kV
Bus 2-3 CB
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
27

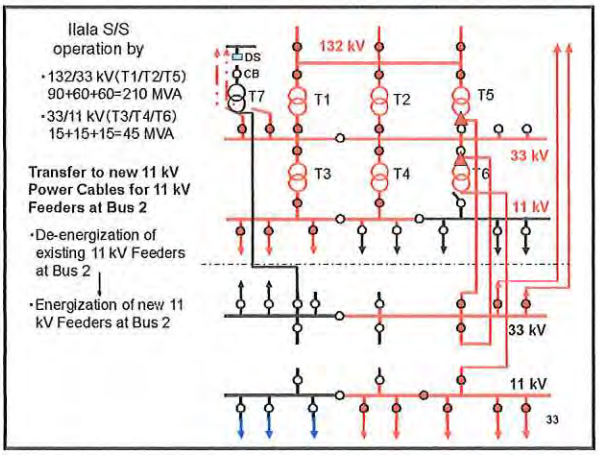

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
De-energization of existing
11 kV Bus 3
・Open existing 11 kV
Bus 2-3 CB
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
28

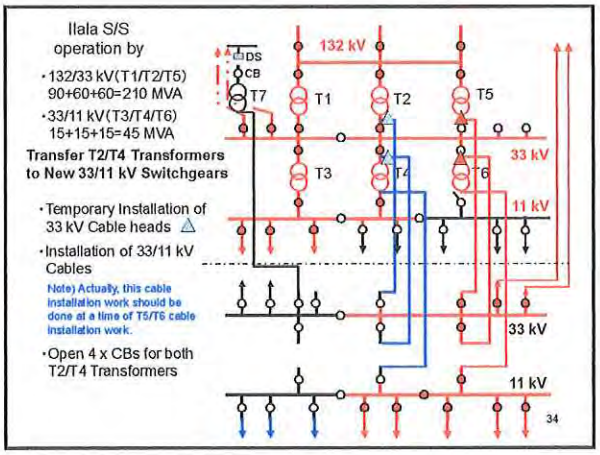

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
De-energization of existing
11 kV Bus 3
・Open existing 11 kV
Bus 2-3 CB
Energization of new 11 kV
Bus 2
・Close new 11 kV
Bus 2-3 CB
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
29

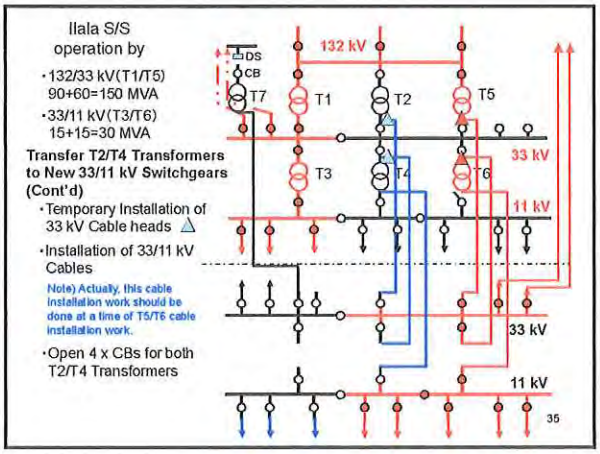

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
De-energization of existing
11 kV Bus 3
・Open existing 11 kV
Bus 2-3 CB
Energization of new 11 kV
Bus 2
・Close new 11 kV
Bus 2-3 CB
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
30

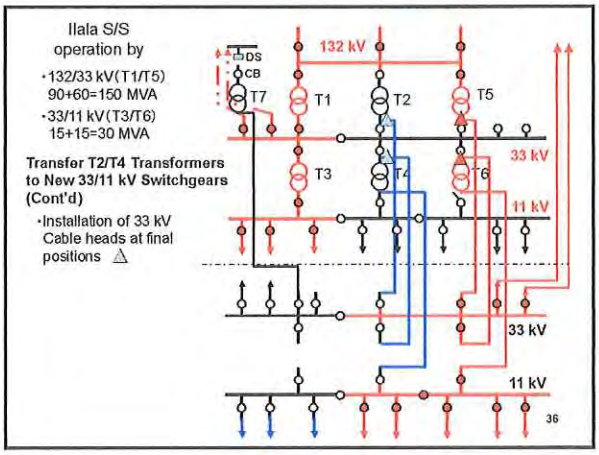

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Power Supply for 11 kV Feeders at Bus 2 by new 11 kV Power Cables
・De-energization of existing 11 kV Feeders at Bus 2
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
31

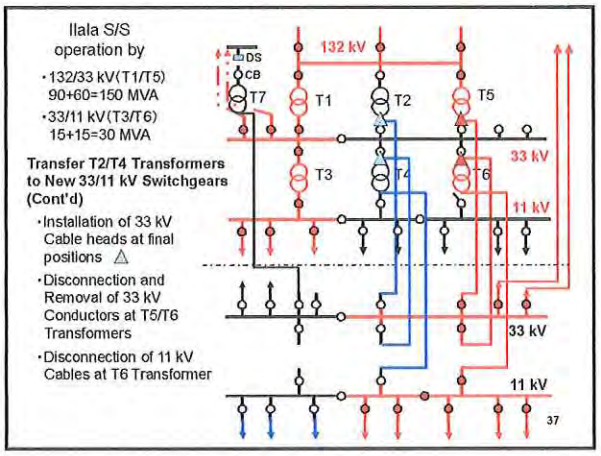

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Transfer to new 11 kV Power Cables for 11 kV Feeders at Bus 2
・De-energization of existing 11 kV Feeders at Bus 2
・Energization of new 11 kV Feeders at Bus 2
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
32

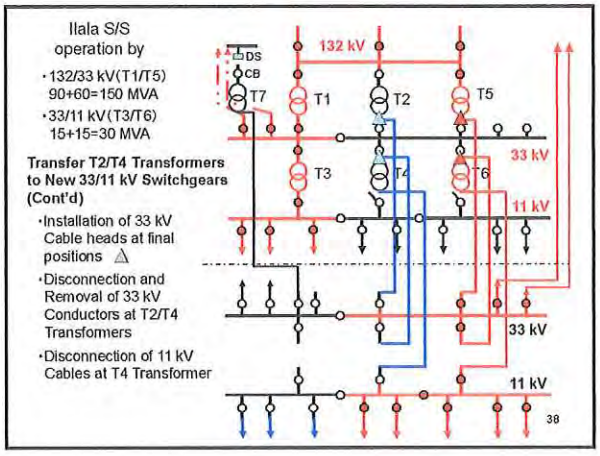

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Transfer to new 11 kV Power Cables for 11 kV Feeders at Bus 2
・De-energization of existing 11 kV Feeders at Bus 2
・Energization of new 11 kV Feeders at Bus 2
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
33

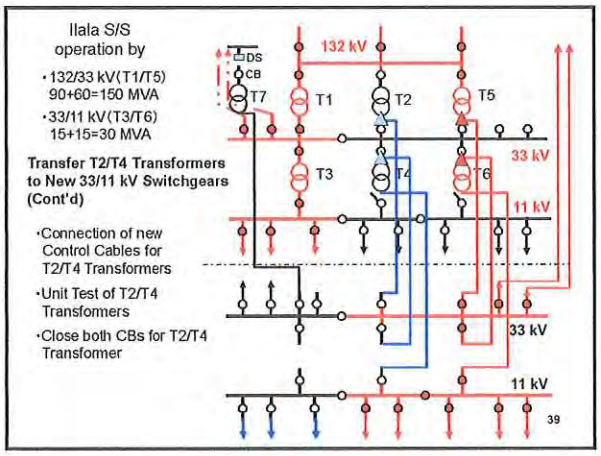

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Transfer T2/T4 Transformers to New 33/11 kV Switchgears
・Temporary Installation of 33 kV Cable heads △
・Installation of 33/11 kV Cables
Note) Actually, this cable installation work should be done at a time of T5/T6 cable installation work.
・Open 4 x CBs for both T2/T4 Transformers
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
34

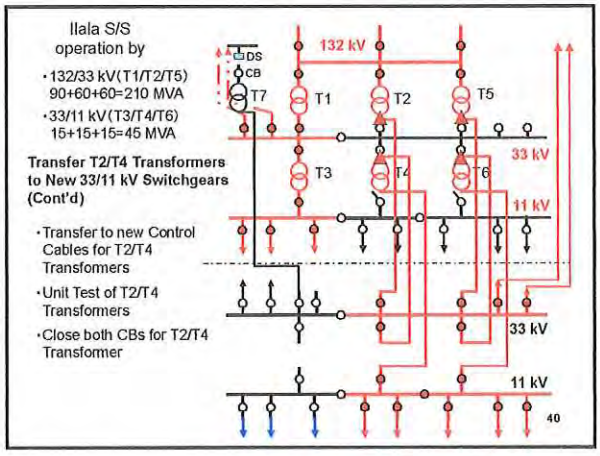

Ilala S/S
operation by
・132/33 kV(T1/T5)
90+60=150 MVA
・33/11 kV(T3/T6)
15+15=30 MVA
Transfer T2/T4 Transformers to New 33/11 kV Switchgears (Cont'd)
・Temporary Installation of 33 kV Cable heads △
・Installation of 33/11 kV Cables
Note) Actually, this cable installation work should be done at a time of T5/T6 cable installation work.
・Open 4 x CBs for both T2/T4 Transformers
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
35

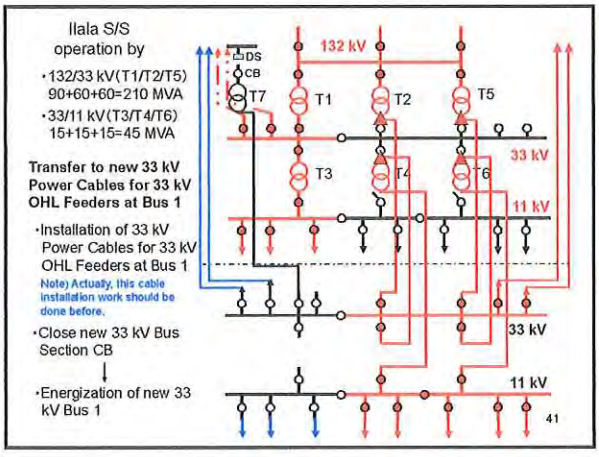

Ilala S/S
operation by
・132/33 kV(T1/T5)
90+60=150 MVA
・33/11 kV(T3/T6)
15+15=30 MVA
Transfer T2/T4 Transformers to New 33/11 kV Switchgears (Cont'd)
・Installation of 33 kV Cable heads at final positions △
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
36

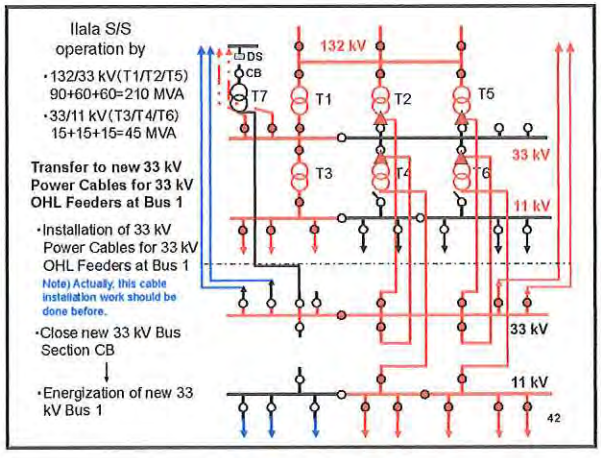

Ilala S/S
operation by
・132/33 kV(T1/T5)
90+60=150 MVA
・33/11 kV(T3/T6)
15+15=30 MVA
Transfer T2/T4 Transformers to New 33/11 kV Switchgears (Cont'd)
・Installation of 33 kV Cable heads at final positions △
・Disconnection and Removal of 33 kV Conductors at T5/T6 Transformers
・Disconnection of 11 kV Cables at T6 Transformer
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
37

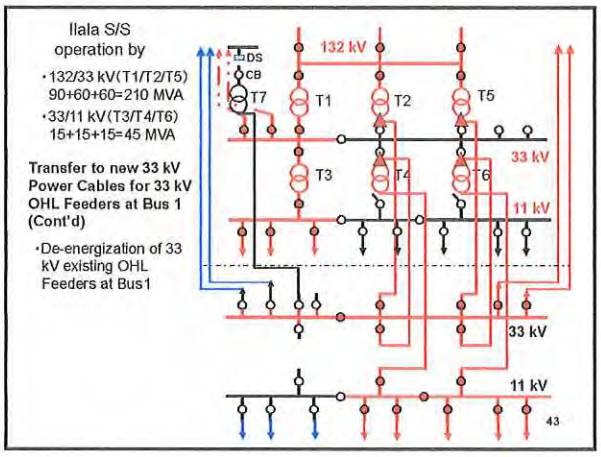

Ilala S/S
operation by
・132/33 kV(T1/T5)
90+60=150 MVA
・33/11 kV(T3/T6)
15+15=30 MVA
Transfer T2/T4 Transformers to New 33/11 kV Switchgears (Cont'd)
・Installation of 33 kV Cable heads at final positions △
・Disconnection and Removal of 33 kV Conductors at T2/T4 Transformers
・Disconnection of 11 kV Cables at T4 Transformer
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
38

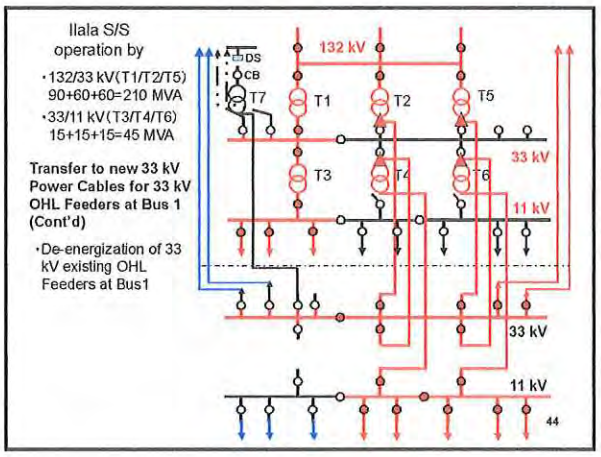

Ilala S/S
operation by
・132/33 kV(T1/T5)
90+60=150 MVA
・33/11 kV(T3/T6)
15+15=30 MVA
Transfer T2/T4 Transformers to New 33/11 kV Switchgears (Cont'd)
・Connection of new Control Cables for T2/T4 Transformers
・Unit Test of T2/T4 Transformers
・Close both CBs for T2/T4 Transformer
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
39

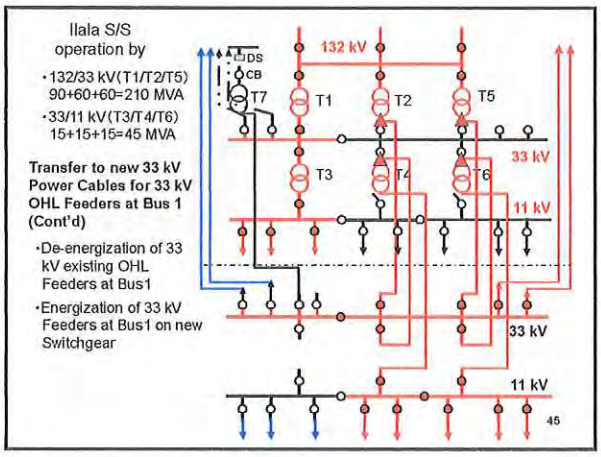

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Transfer T2/T4 Transformers to New 33/11 kV Switchgears (Cont'd)
・Transfer to new Control Cables for T2/T4 Transformers
・Unit Test of T2/T4 Transformers
・Close both CBs for T2/T4 Transformer
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
40

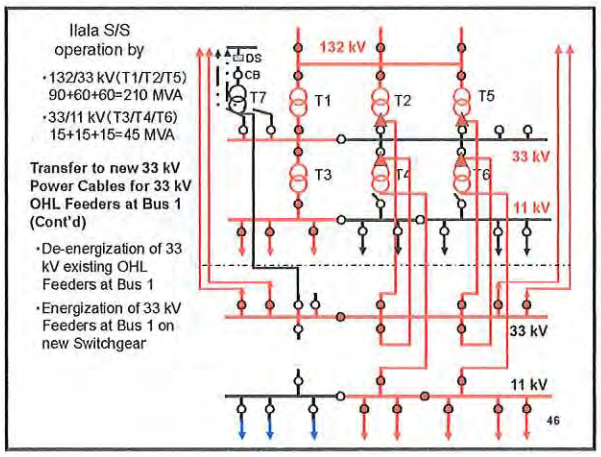

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Transfer to new 33 kV Power Cables for 33 kV OHL Feeders at Bus 1
・Installation of 33 kV Power Cables for 33 kV OHL Feeders at Bus 1
Note) Actually, this cable installation work should be done before.
・Close new 33 kV Bus Section CB
↓
・Energization of new 33 kV Bus 1
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
41

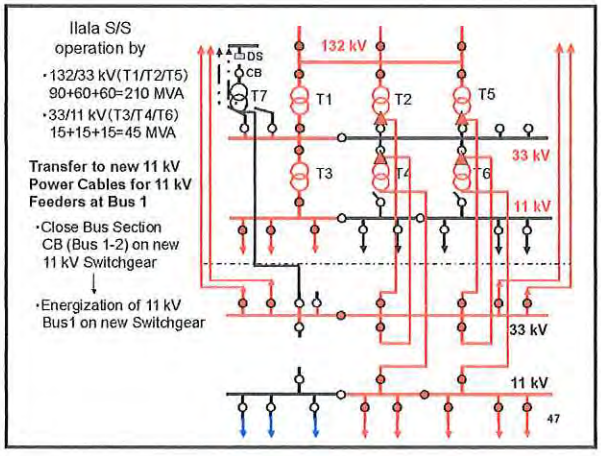

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Transfer to new 33 kV Power Cables for 33 kV OHL Feeders at Bus 1
・Installation of 33 kV Power Cables for 33 kV OHL Feeders at Bus 1
Note) Actually, this cable installation work should be done before.
・Close new 33 kV Bus Section CB
↓
・Energization of new 33 kV Bus 1
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
42

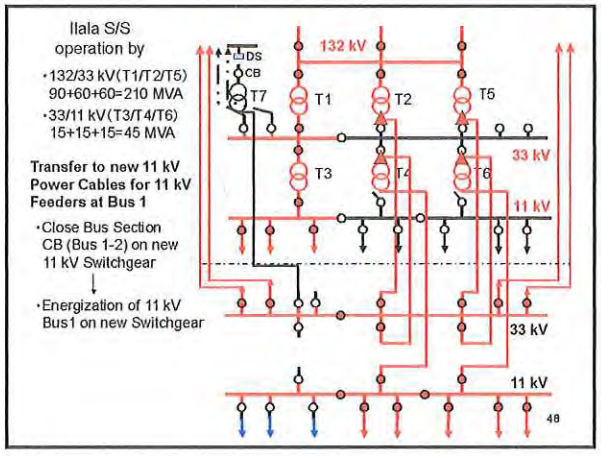

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Transfer to new 33 kV
Power Cables for 33 kV
OHL Feeders at Bus 1
(Cont'd)
・De-energization of 33
kV existing OHL
Feeders at Bus1
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
43

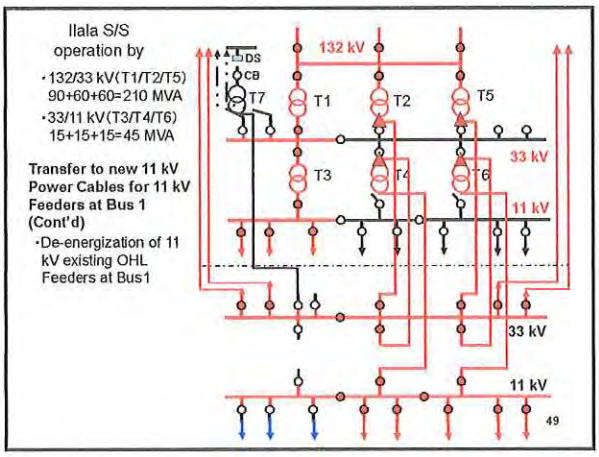

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Transfer to new 33 kV
Power Cables for 33 kV
OHL Feeders at Bus 1
(Cont'd)
・De-energization of 33
kV existing OHL
Feeders at Bus1
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
44

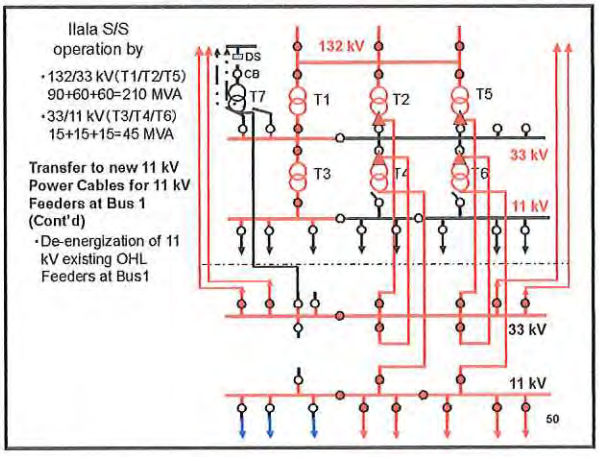

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Transfer to new 33 kV
Power Cables for 33 kV
OHL Feeders at Bus 1
(Cont'd)
・De-energization of 33
kV existing OHL
Feeders at Bus1
・Energization of 33 kV
Feeders at Bus1 on new
Switchgear
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
45

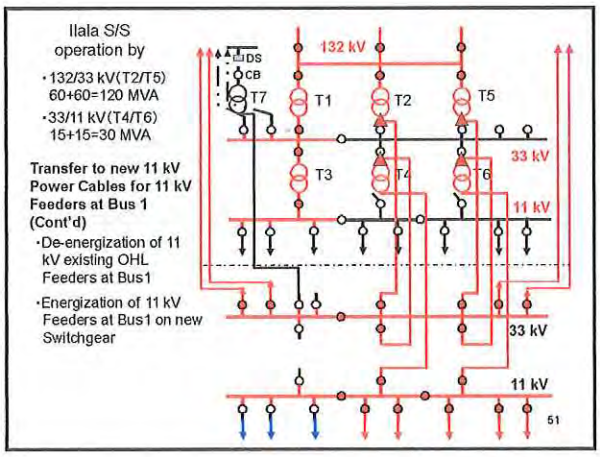

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Transfer to new 33 kV
Power Cables for 33 kV
OHL Feeders at Bus 1
(Cont'd)
・De-energization of 33
kV existing OHL
Feeders at Bus 1
・Energization of 33 kV
Feeders at Bus 1 on
new Switchgear
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
46

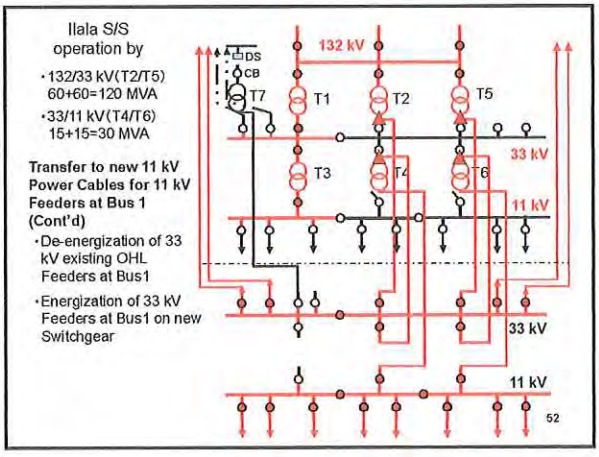

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Transfer to new 11 kV
Power Cables for 11 kV
Feeders at Bus 1
・Close Bus Section
CB (Bus 1-2) on new
11 kV Switchgear
↓
・Energization of 11 kV
Bus1 on new Switchgear
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
47

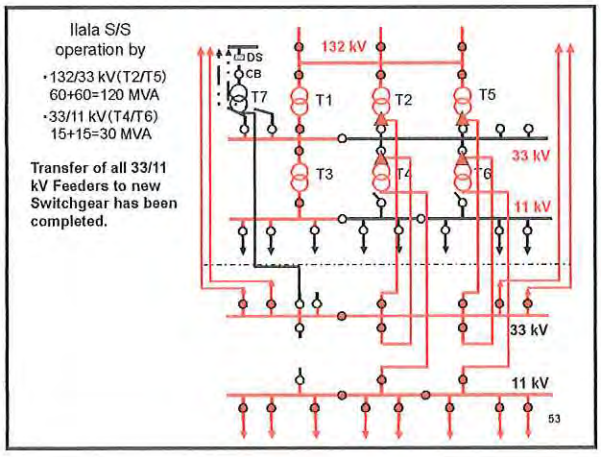

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Transfer to new 11 kV
Power Cables for 11 kV
Feeders at Bus 1
・Close Bus Section
CB (Bus 1-2) on new
11 kV Switchgear
↓
・Energization of 11 kV
Bus1 on new Switchgear
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
48

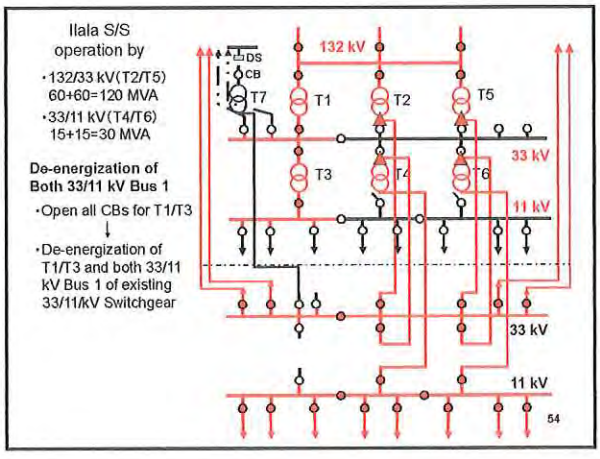

Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Transfer to new 11 kV Power Cables for 11 kV Feeders at Bus 1 (Cont'd)
・De-energization of 11 kV existing OHL Feeders at Bus1
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
49


Ilala S/S
operation by
・132/33 kV(T1/T2/T5)
90+60+60=210 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Transfer to new 11 kV Power Cables for 11 kV Feeders at Bus 1 (Cont'd)
・De-energization of 11 kV existing OHL Feeders at Bus1
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
50


Ilala S/S
operation by
・132/33 kV(T2/T5)
60+60=120 MVA
・33/11 kV(T4/T6)
15+15=30 MVA
Transfer to new 11 kV Power Cables for 11 kV Feeders at Bus 1 (Cont'd)
・De-energization of 11 kV existing OHL Feeders at Bus1
・Energization of 11 kV Feeders at Bus1 on new Switchgear
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
51


Ilala S/S
operation by
・132/33 kV(T2/T5)
60+60=120 MVA
・33/11 kV(T4/T6)
15+15=30 MVA
Transfer to new 11 kV Power Cables for 11 kV Feeders at Bus 1 (Cont'd)
・De-energization of 33 kV existing OHL Feeders at Bus1
・Energization of 33 kV Feeders at Bus1 on new Switchgear
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
52


Ilala S/S
operation by
・132/33 kV(T2/T5)
60+60=120 MVA
・33/11 kV(T4/T6)
15+15=30 MVA
Transfer of all 33/11 kV Feeders to new Switchgear has been completed.
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
53


Ilala S/S
operation by
・132/33 kV(T2/T5)
60+60=120 MVA
・33/11 kV(T4/T6)
15+15=30 MVA
De-energization of Both 33/11 kV Bus 1
・Open all CBs for T1/T3
↓
・De-energization of T1/T3 and both 33/11 kV Bus 1 of existing 33/11/kV Switchgear
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
54

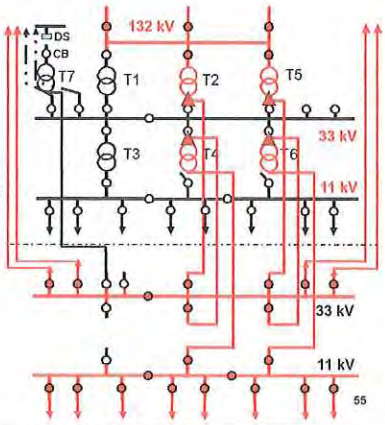
Ilala S/S
operation by

- 132/33 kV(T2/T5)
  60+60=120 MVA
- 33/11 kV(T4/T6)
  15+15=30 MVA

De-energization of Both 33/11 kV Bus 1

- Open all CBs for T1/T3
  ↓
- De-energization of T1/T3 and both 33/11 kV Bus 1 of existing 33/11kV Switchgear

Removal of 33 kV Temporary Cables

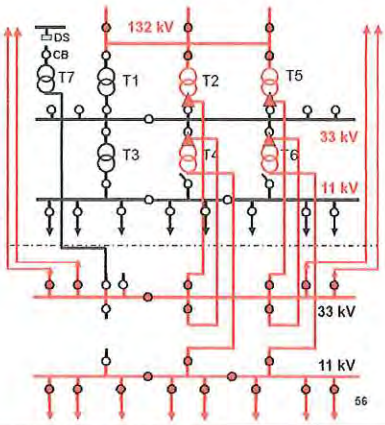


Ilala S/S
operation by

- 132/33 kV(T2/T5)
  60+60=120 MVA
- 33/11 kV(T3/T4/T6)
  15+15+15=45 MVA

Removal of T1 Transformer

- Disconnection and removal of both 132/33 kV Conductors for T1 Transformer
- Removal of T1 Transformer

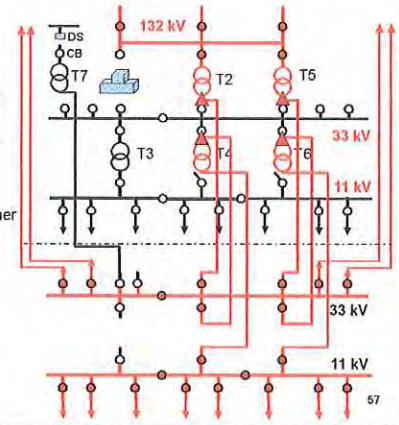


Ilala S/S
operation by

- 132/33 kV(T2/T5)
  60+60=120 MVA
- 33/11 kV(T3/T4/T6)
  15+15+15=45 MVA

Installation of new T1 Transformer

- Reinforcement of existing Foundation for new T1 Transformer

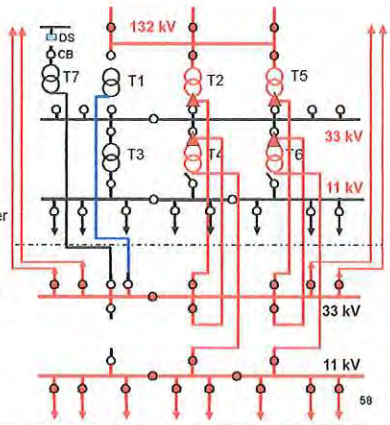


Ilala S/S
operation by

- 132/33 kV(T2/T5)
  60+60=120 MVA
- 33/11 kV(T3/T4/T6)
  15+15+15=45 MVA

Installation of new T1 Transformer

- Reinforcement of existing Foundation for new T1 Transformer
- Installation of new T1 Transformer
- Installation of 33 kV Power Cables for new T1 Transformer
- Connection of Control Cables for new T1 Transformer
- Unit test of new T1 Transformer

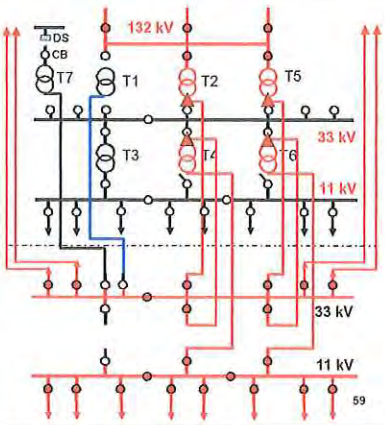


Ilala S/S
operation by

- 132/33 kV(T2/T5)
  60+60=120 MVA
- 33/11 kV(T4/T6)
  15+15=30 MVA

Transfer to new Power Cables for T3 Transformer

- Disconnection and Removal of 33 kV Conductors for T3
- Disconnection of 11 kV Power Cables at T3

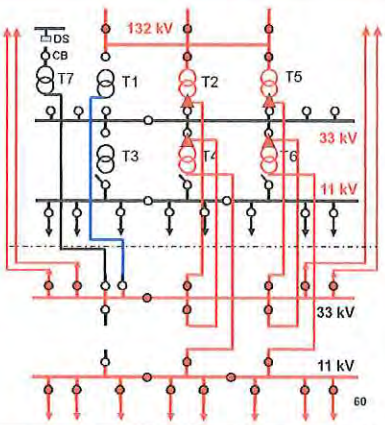


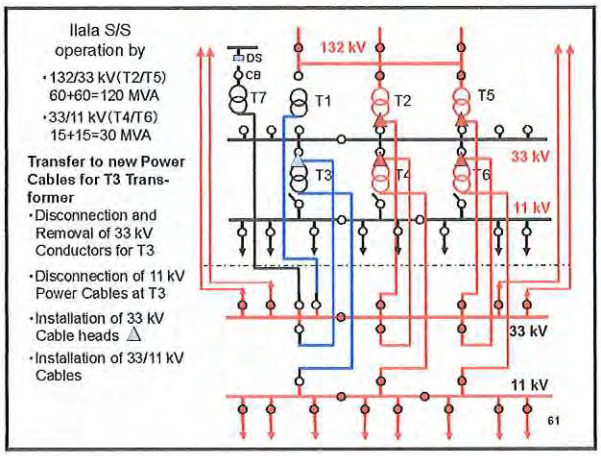
Ilala S/S
operation by

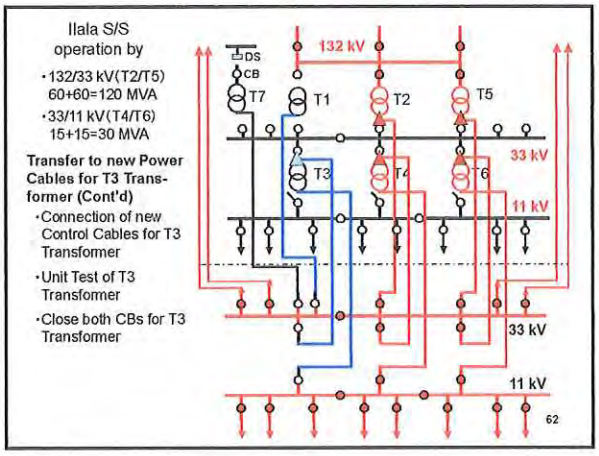
- 132/33 kV(T2/T5)
  60+60=120 MVA
- 33/11 kV(T4/T6)
  15+15=30 MVA

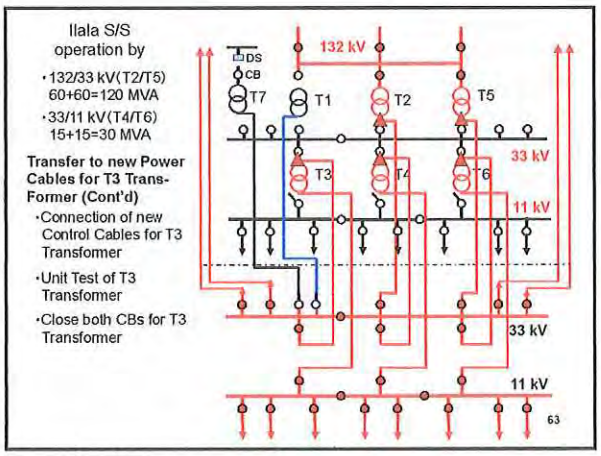
Transfer to new Power Cables for T3 Transformer

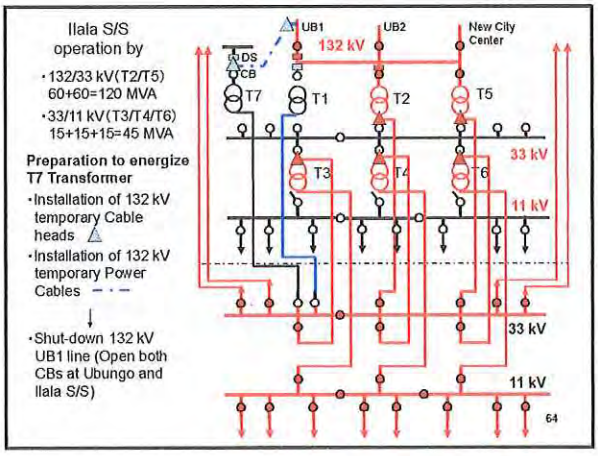
- Disconnection and Removal of 33 kV Conductors for T3
- Disconnection of 11 kV Power Cables at T3

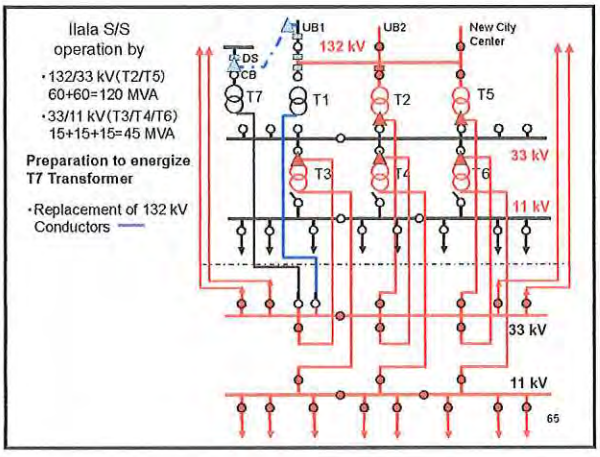


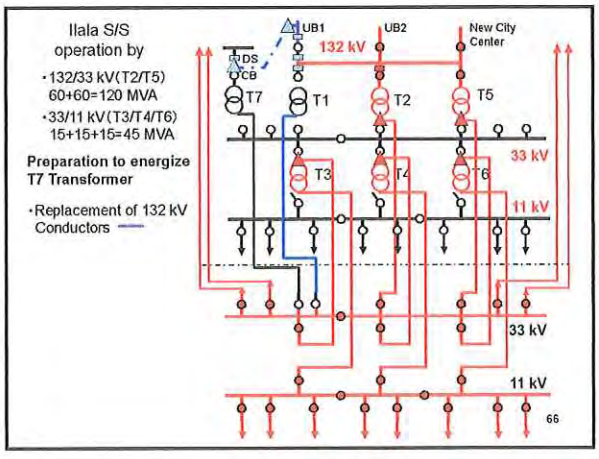

Ilala S/S
operation by
・132/33 kV(T2/T5)
60+60=120 MVA
・33/11 kV(T4/T6)
15+15=30 MVA
Transfer to new Power Cables for T3 Trans-former
・Disconnection and Removal of 33 kV Conductors for T3
・Disconnection of 11 kV Power Cables at T3
・Installation of 33 kV Cable heads
・Installation of 33/11 kV Cables
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
61

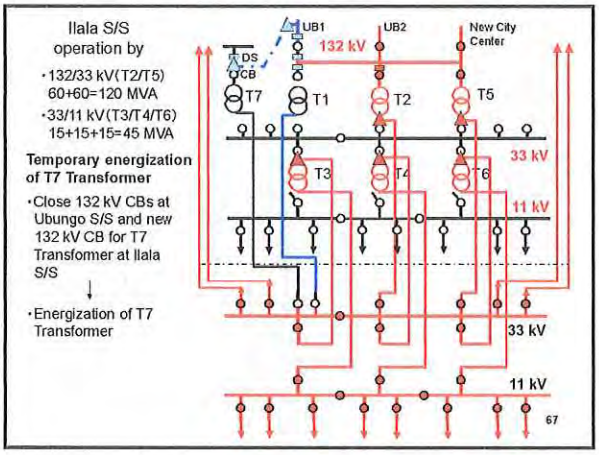

Ilala S/S
operation by
・132/33 kV(T2/T5)
60+60=120 MVA
・33/11 kV(T4/T6)
15+15=30 MVA
Transfer to new Power Cables for T3 Trans-former (Cont'd)
・Connection of new Control Cables for T3 Transformer
・Unit Test of T3 Transformer
・Close both CBs for T3 Transformer
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
62

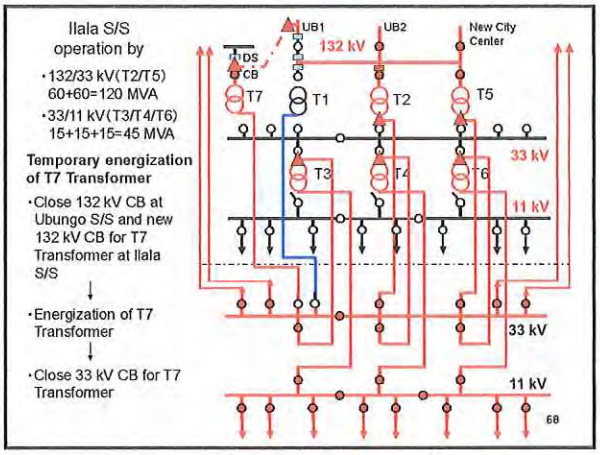

Ilala S/S
operation by
・132/33 kV(T2/T5)
60+60=120 MVA
・33/11 kV(T4/T6)
15+15=30 MVA
Transfer to new Power Cables for T3 Trans-Former (Cont'd)
・Connection of new Control Cables for T3 Transformer
・Unit Test of T3 Transformer
・Close both CBs for T3 Transformer
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
63

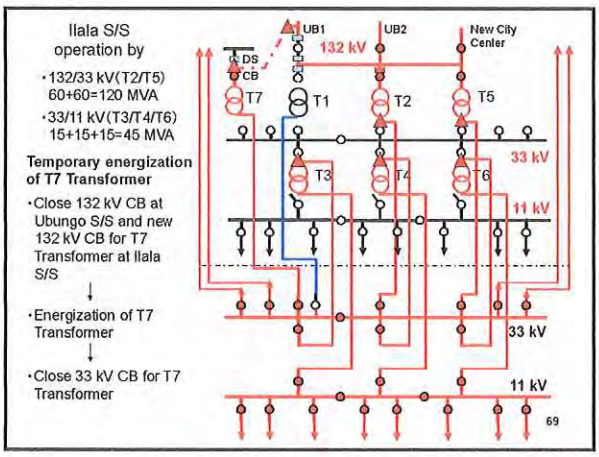

Ilala S/S
operation by
・132/33 kV(T2/T5)
60+60=120 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Preparation to energize T7 Transformer
・Installation of 132 kV temporary Cable heads
・Installation of 132 kV temporary Power Cables
・Shut-down 132 kV UB1 line (Open both CBs at Ubungo and Ilala S/S)
UB1
UB2
New City Center
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
64

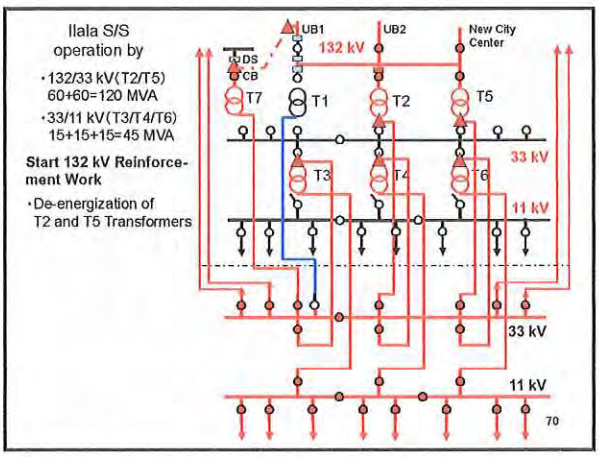

Ilala S/S
operation by
・132/33 kV(T2/T5)
60+60=120 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Preparation to energize T7 Transformer
・Replacement of 132 kV Conductors
UB1
UB2
New City Center
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
65

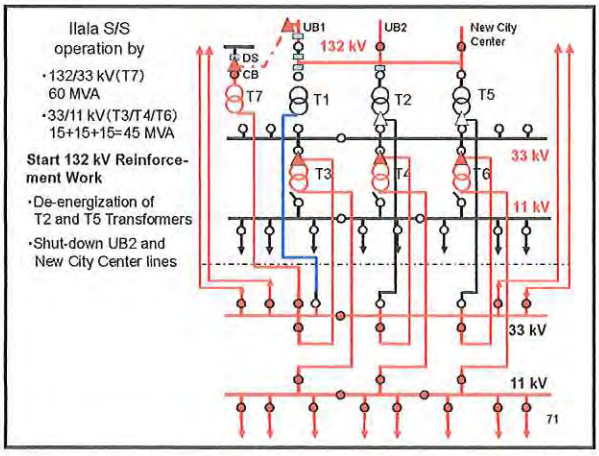

Ilala S/S
operation by
・132/33 kV(T2/T5)
60+60=120 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Preparation to energize T7 Transformer
・Replacement of 132 kV Conductors
UB1
UB2
New City Center
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV
66

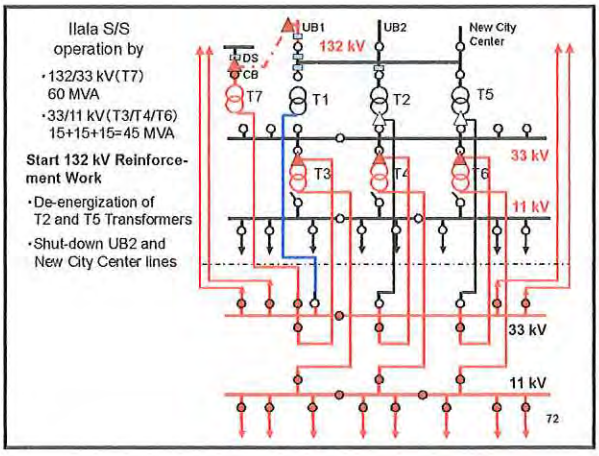

Ilala S/S
operation by
・132/33 kV(T2/T5)
60+60=120 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Temporary energization
of T7 Transformer
・Close 132 kV CBs at
Ubungo S/S and new
132 kV CB for T7
Transformer at Ilala
S/S
・Energization of T7
Transformer
UB1
UB2
New City
Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
67

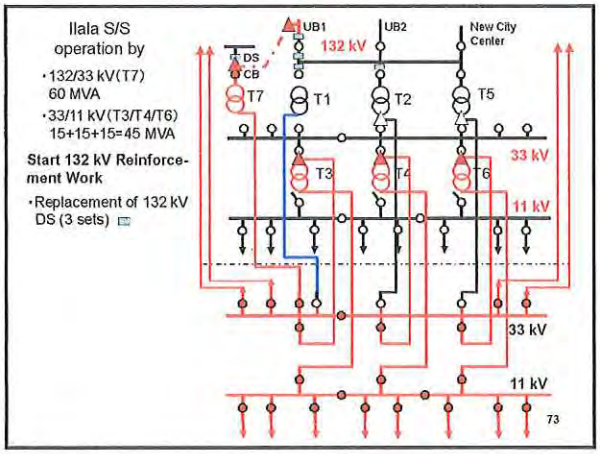

Ilala S/S
operation by
・132/33 kV(T2/T5)
60+60=120 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Temporary energization
of T7 Transformer
・Close 132 kV CB at
Ubungo S/S and new
132 kV CB for T7
Transformer at Ilala
S/S
・Energization of T7
Transformer
・Close 33 kV CB for T7
Transformer
UB1
UB2
New City
Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
68

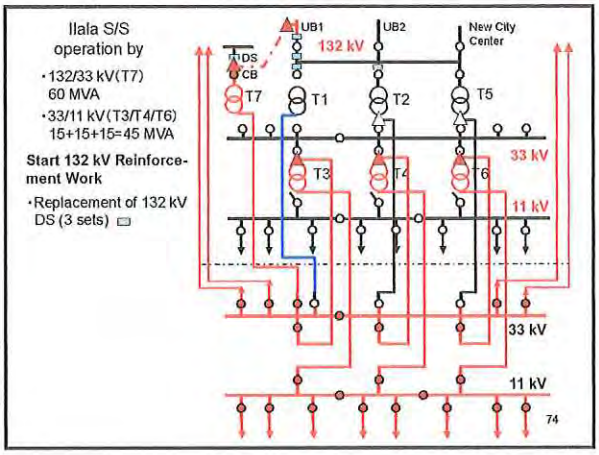

Ilala S/S
operation by
・132/33 kV(T2/T5)
60+60=120 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Temporary energization
of T7 Transformer
・Close 132 kV CB at
Ubungo S/S and new
132 kV CB for T7
Transformer at Ilala
S/S
・Energization of T7
Transformer
・Close 33 kV CB for T7
Transformer
UB1
UB2
New City
Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
69

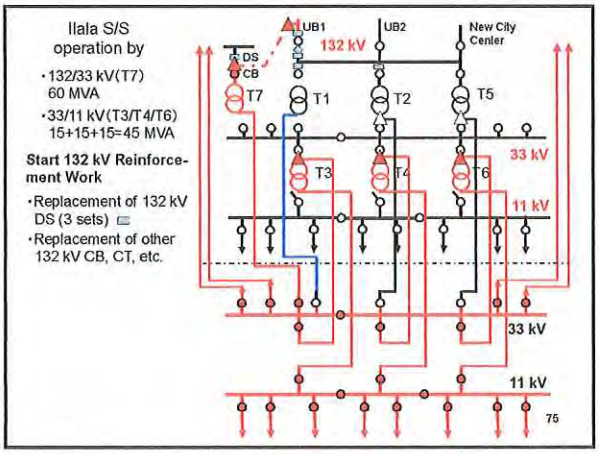

Ilala S/S
operation by
・132/33 kV(T2/T5)
60+60=120 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Start 132 kV Reinforce-
ment Work
・De-energization of
T2 and T5 Transformers
UB1
UB2
New City
Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
70

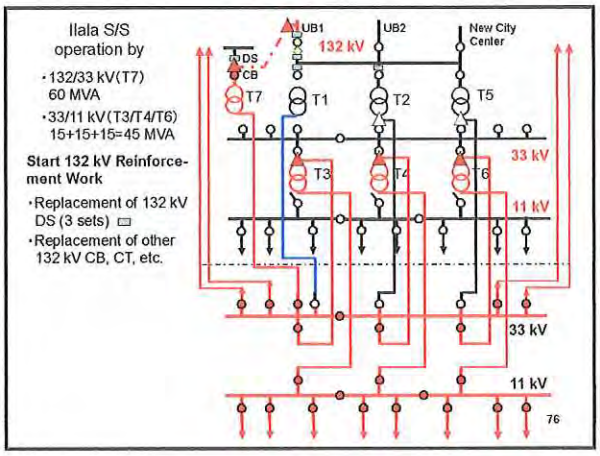

Ilala S/S
operation by
・132/33 kV(T7)
60 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Start 132 kV Reinforce-
ment Work
・De-energization of
T2 and T5 Transformers
・Shut-down UB2 and
New City Center lines
UB1
UB2
New City
Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
71

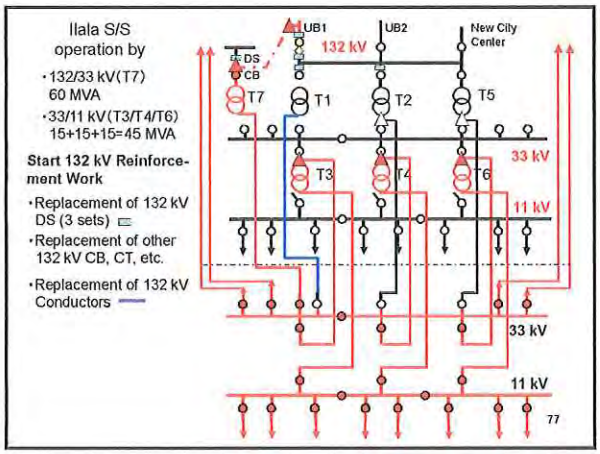

Ilala S/S
operation by
・132/33 kV(T7)
60 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Start 132 kV Reinforce-
ment Work
・De-energization of
T2 and T5 Transformers
・Shut-down UB2 and
New City Center lines
UB1
UB2
New City
Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
72

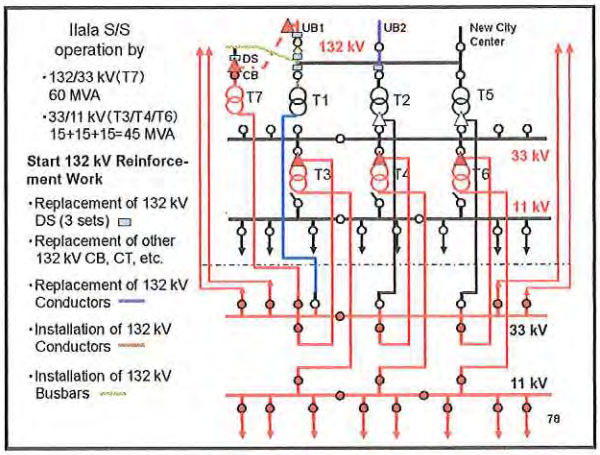

Ilala S/S
operation by
・132/33 kV(T7)
60 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Start 132 kV Reinforcement Work
・Replacement of 132 kV DS (3 sets)
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
33 kV
11 kV
73

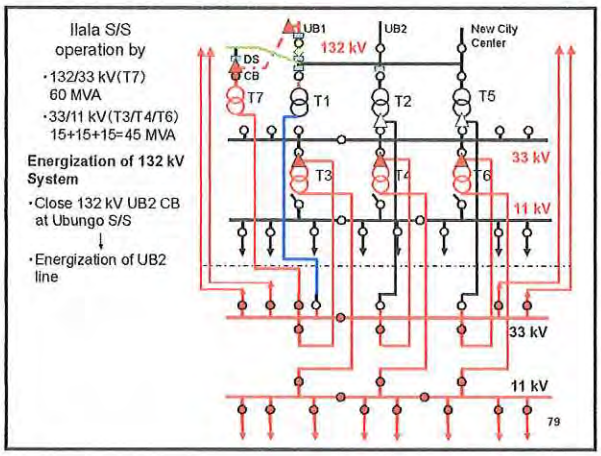

Ilala S/S
operation by
・132/33 kV(T7)
60 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Start 132 kV Reinforcement Work
・Replacement of 132 kV DS (3 sets)
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
33 kV
11 kV
74

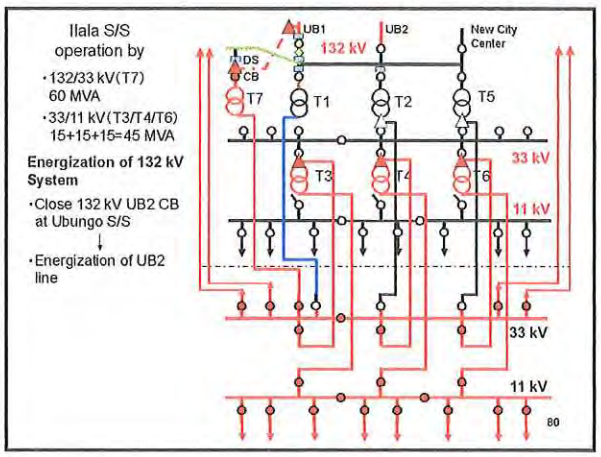

Ilala S/S
operation by
・132/33 kV(T7)
60 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Start 132 kV Reinforcement Work
・Replacement of 132 kV DS (3 sets)
・Replacement of other 132 kV CB, CT, etc.
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
33 kV
11 kV
75

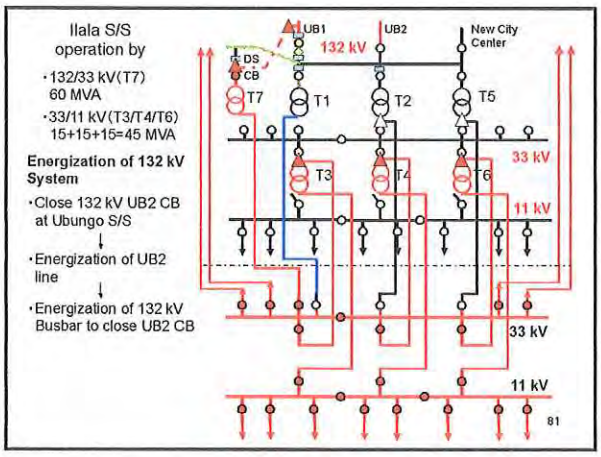

Ilala S/S
operation by
・132/33 kV(T7)
60 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Start 132 kV Reinforcement Work
・Replacement of 132 kV DS (3 sets)
・Replacement of other 132 kV CB, CT, etc.
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
33 kV
11 kV
76

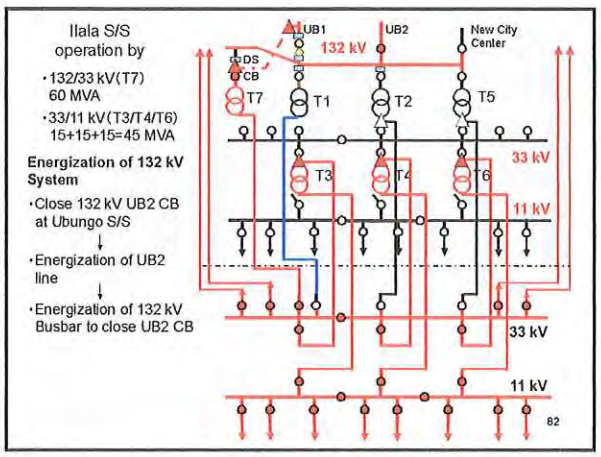

Ilala S/S
operation by
・132/33 kV(T7)
60 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Start 132 kV Reinforcement Work
・Replacement of 132 kV DS (3 sets)
・Replacement of other 132 kV CB, CT, etc.
・Replacement of 132 kV Conductors
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
33 kV
11 kV
77

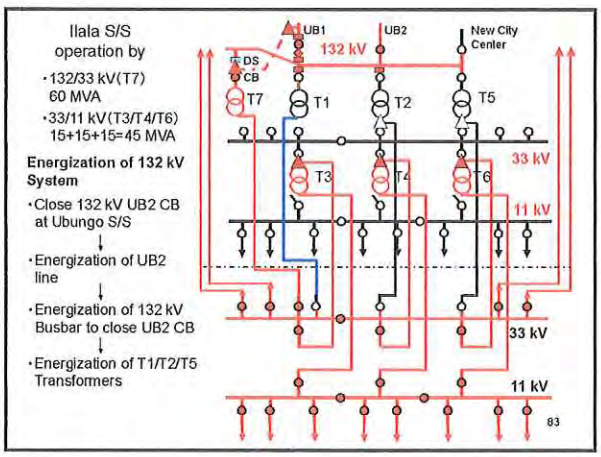

Ilala S/S
operation by
・132/33 kV(T7)
60 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Start 132 kV Reinforcement Work
・Replacement of 132 kV DS (3 sets)
・Replacement of other 132 kV CB, CT, etc.
・Replacement of 132 kV Conductors
・Installation of 132 kV Conductors
・Installation of 132 kV Busbars
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
33 kV
11 kV
78

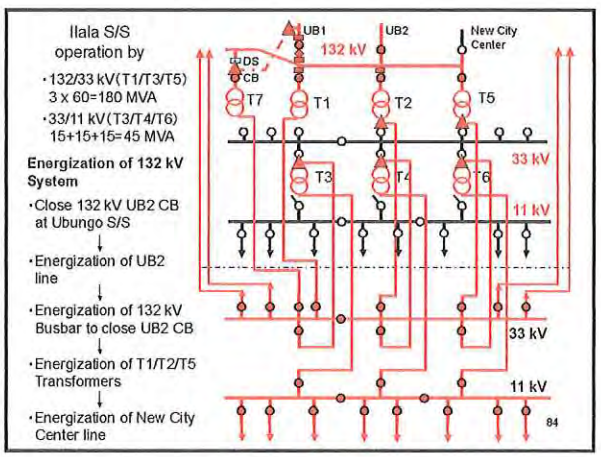

Ilala S/S
operation by
・132/33 kV(T7)
60 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Energization of 132 kV System
・Close 132 kV UB2 CB at Ubungo S/S
・Energization of UB2 line
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
79

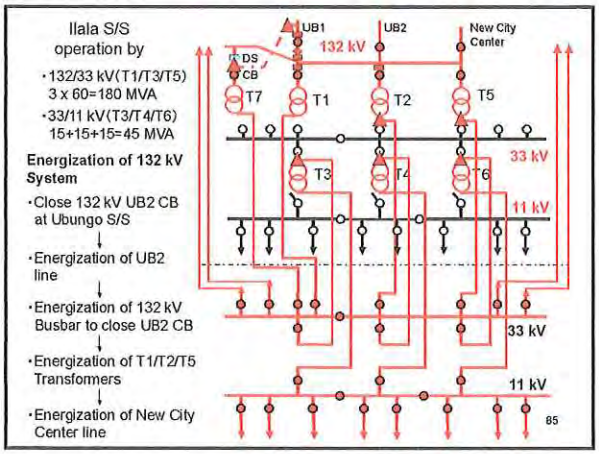

Ilala S/S
operation by
・132/33 kV(T7)
60 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Energization of 132 kV System
・Close 132 kV UB2 CB at Ubungo S/S
・Energization of UB2 line
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
80

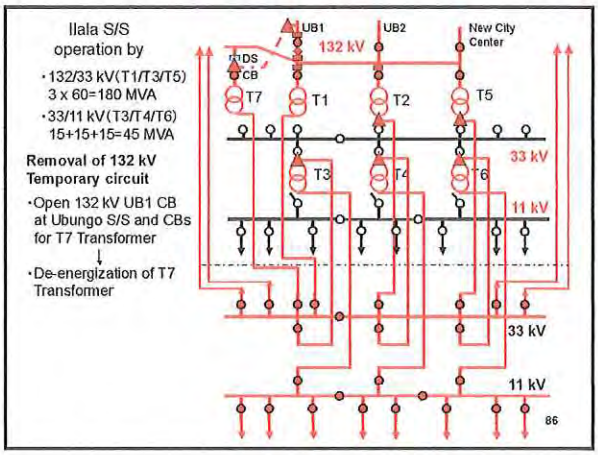

Ilala S/S
operation by
・132/33 kV(T7)
60 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Energization of 132 kV System
・Close 132 kV UB2 CB at Ubungo S/S
・Energization of UB2 line
・Energization of 132 kV Busbar to close UB2 CB
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
81

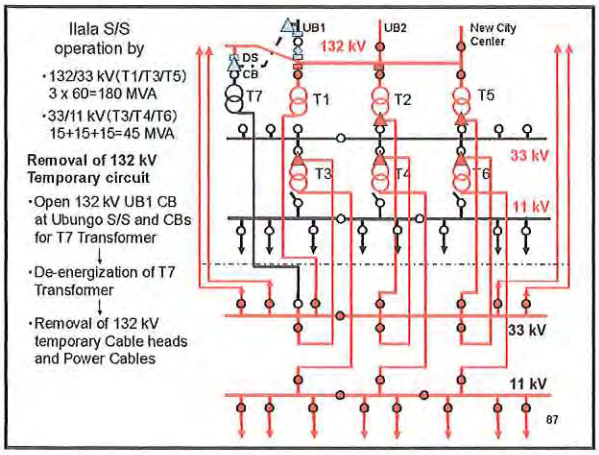

Ilala S/S
operation by
・132/33 kV(T7)
60 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Energization of 132 kV System
・Close 132 kV UB2 CB at Ubungo S/S
・Energization of UB2 line
・Energization of 132 kV Busbar to close UB2 CB
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
82

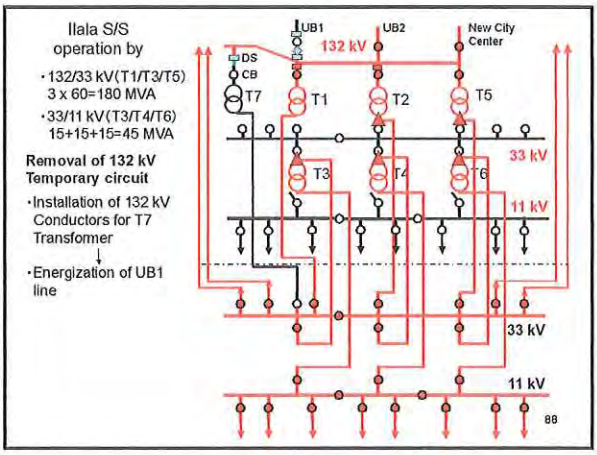

Ilala S/S
operation by
・132/33 kV(T7)
60 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Energization of 132 kV System
・Close 132 kV UB2 CB at Ubungo S/S
・Energization of UB2 line
・Energization of 132 kV Busbar to close UB2 CB
・Energization of T1/T2/T5 Transformers
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
83

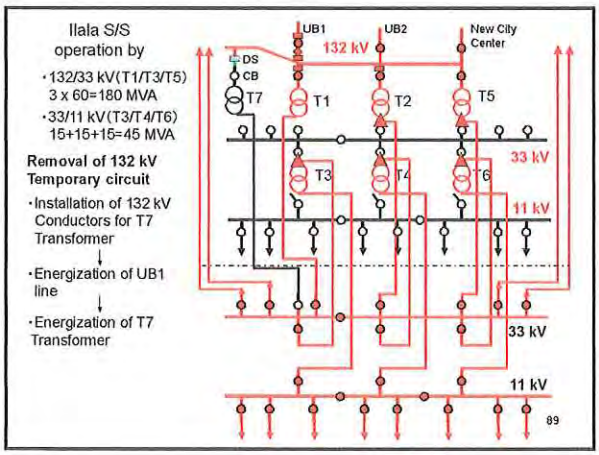

Ilala S/S
operation by
・132/33 kV(T1/T3/T5)
3 x 60=180 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Energization of 132 kV System
・Close 132 kV UB2 CB at Ubungo S/S
・Energization of UB2 line
・Energization of 132 kV Busbar to close UB2 CB
・Energization of T1/T2/T5 Transformers
・Energization of New City Center line
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
84

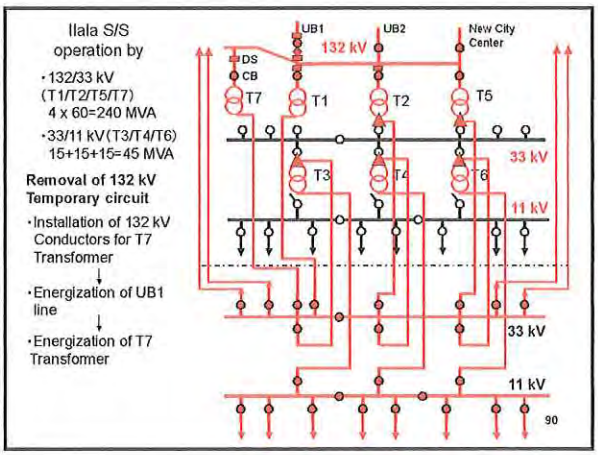

Ilala S/S
operation by
・132/33 kV(T1/T3/T5)
3 x 60=180 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Energization of 132 kV System
・Close 132 kV UB2 CB at Ubungo S/S
・Energization of UB2 line
・Energization of 132 kV Busbar to close UB2 CB
・Energization of T1/T2/T5 Transformers
・Energization of New City Center line
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
33 kV
11 kV
85

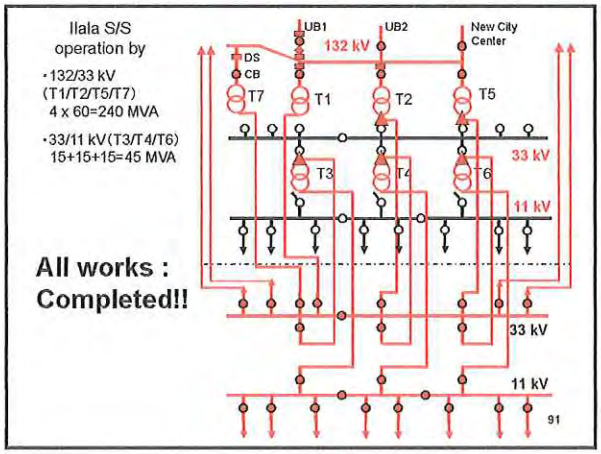

Ilala S/S
operation by
・132/33 kV(T1/T3/T5)
3 x 60=180 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Removal of 132 kV Temporary circuit
・Open 132 kV UB1 CB at Ubungo S/S and CBs for T7 Transformer
・De-energization of T7 Transformer
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
33 kV
11 kV
86


Ilala S/S
operation by
・132/33 kV(T1/T3/T5)
3 x 60=180 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Removal of 132 kV Temporary circuit
・Open 132 kV UB1 CB at Ubungo S/S and CBs for T7 Transformer
・De-energization of T7 Transformer
・Removal of 132 kV temporary Cable heads and Power Cables
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
33 kV
11 kV
87


Ilala S/S
operation by
・132/33 kV(T1/T3/T5)
3 x 60=180 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Removal of 132 kV Temporary circuit
・Installation of 132 kV Conductors for T7 Transformer
・Energization of UB1 line
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
33 kV
11 kV
88

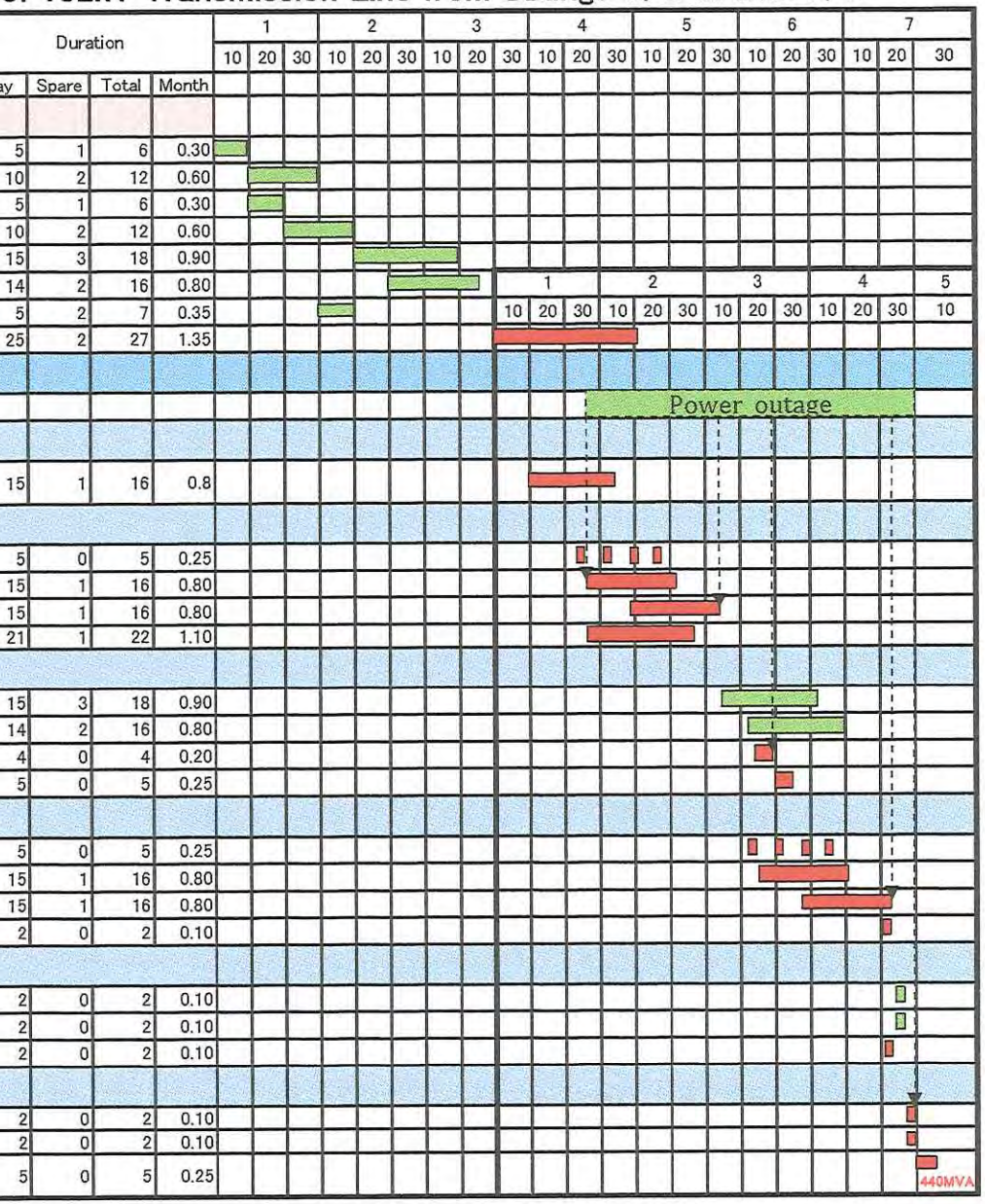

Ilala S/S
operation by
・132/33 kV(T1/T3/T5)
3 x 60=180 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Removal of 132 kV Temporary circuit
・Installation of 132 kV Conductors for T7 Transformer
・Energization of UB1 line
・Energization of T7 Transformer
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
33 kV
11 kV
89


Ilala S/S
operation by
・132/33 kV
(T1/T2/T5/T7)
4 x 60=240 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
Removal of 132 kV Temporary circuit
・Installation of 132 kV Conductors for T7 Transformer
・Energization of UB1 line
・Energization of T7 Transformer
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
33 kV
11 kV
90


Ilala S/S
operation by
・132/33 kV
(T1/T2/T5/T7)
4 x 60=240 MVA
・33/11 kV(T3/T4/T6)
15+15+15=45 MVA
All works :
Completed!!
UB1
UB2
New City
Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
33 kV
11 kV
91

Tentative Switchover (Reinforcement) plan of 132kV Transmission Line from Ubungo S/S to Ilala S/S

Gant Chart / Work Item			Duration			
			Day	Spare	Total	Month
Preparation Work						
STEP-1	TZ	Land clearing for Working Space (case1)	5	1	6	0.30
	TZ	Land clearing for Working Space (case2)	10	2	12	0.60
	TZ	Land readjustment (case1)	5	1	6	0.30
	TZ	Land readjustment (case2)	10	2	12	0.60
	TZ	Removal of the existing and un-utilized conductor	15	3	18	0.90
	TZ	Removal of the existing and un-utilized insulators and accessories	14	2	16	0.80
	TZ	Clearing of objects around ST No.13 in the Songas Compound	5	2	7	0.35
	JP	Construction of Access Road (if necessary)	25	2	27	1.35
Switchover (Reinforcement) Work						
STEP-2	TZ	To take necessary measures for power outage work				
	Temorary stay wire Work					
	JP	Installation of Temporary Stay Wire for new circuit No.1, stringing equipment and scaffolding to protect conductors for stringing work	15	1	16	0.8
STEP-3	Stringing Work for New Circuit No.1					
	JP	Drum and Equipment settings	5	0	5	0.25
	JP	Stringing	15	1	16	0.80
	JP	Installation of insulators, damper, and armor rod, connection work	15	1	16	0.80
	JP	Extension of ST No.13 Gantry	21	1	22	1.10
STEP-4	Removing Work for the existing Circuit No.2					
	TZ	Removal of the existing conductor	15	3	18	0.90
	TZ	Removal of the existing insulators and accessories	14	2	16	0.80
	JP	Installation of Temporary Conductor for new circuit No.1	4	0	4	0.20
	JP	Installation of Temporary Stay Wire for new circuit No.2	5	0	5	0.25
STEP-5	Stringing Work for New Circuit No.2					
	JP	Drum and Equipment settings	5	0	5	0.25
	JP	Stringing	15	1	16	0.80
	JP	Installation of insulators, damper, and armor rod, connection work	15	1	16	0.80
	JP	Removing work of Temporary Stay Wire for new circuit No.2	2	0	2	0.10
STEP-6	Decommisioning Work for Circuit No.1					
	TZ	Removal of the existing conductor	2	0	2	0.10
	TZ	Removal of the existing insulators and accessories	2	0	2	0.10
	JP	Replacement of the temporary new circuit No.1 into new circuit No.2	2	0	2	0.10
STEP-7	Completion of Switchover (Reinforcement)					
	JP	Stringing	2	0	2	0.10
	JP	Installation of insulators, damper, and armor rod, connection work	2	0	2	0.10
	JP	Removing work of Temporary Stay Wire for new circuit No.1 and scaffolding to protect conductors for stringing work	5	0	5	0.25



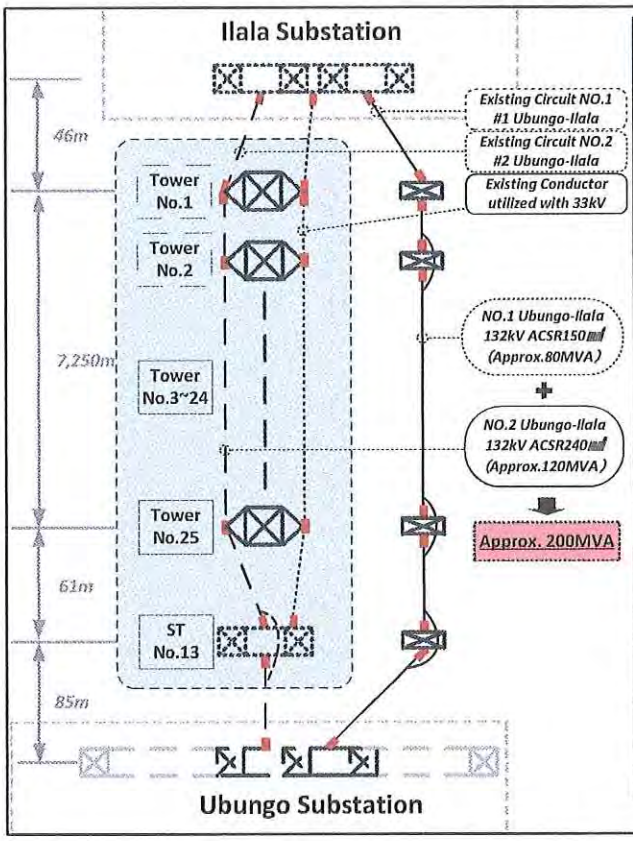
TZ : Tanzanian Side

JP : Japanese Side

Note: 20days/1month in consideration of holidays

1spare day/every five days for Tanzanian Side, 1spare day/every ten days for Japanese Side

STEP-1



Preparation Work

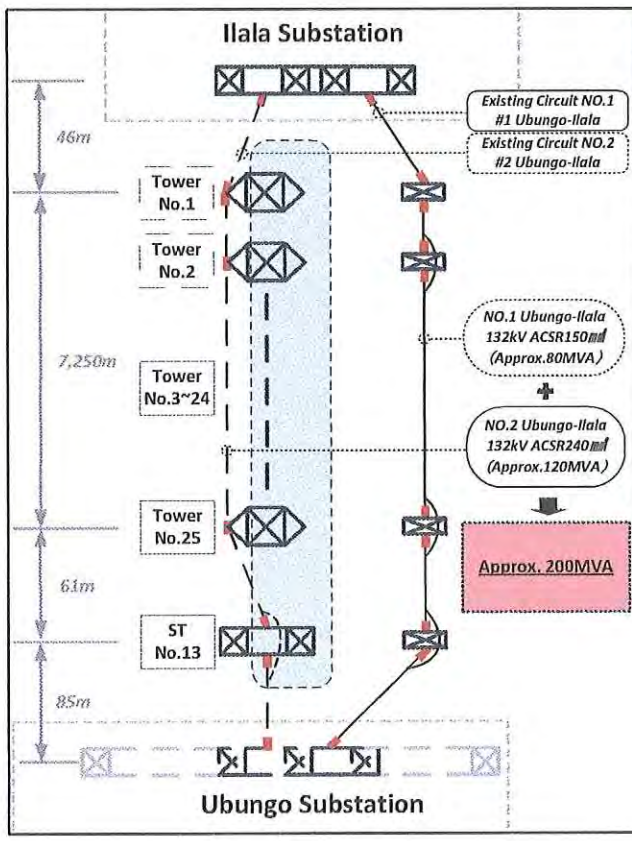
Precondition
-To complete required environmental works and to obtain environmental clearance.
-To allocate budget for the Work by TANESCO.
-To have available Working Time from 09:00 to 17:00 (8hrs)/day.
-To have necessary permission from Songas to enter his compound.

Work Item (Refer to Required minimum work space and Road Access) by TANESCO
-Land clearing for Working Space (case1)
: 5locations×1loc./day = 5days
-Land clearing for Working Space (case2)
: 20locations×2loc./day = 10days
-Land readjustment (case1)
: 5locations×1loc./day = 5days
-Land readjustment (case2)
: 20locations×2loc./day = 10days
-Removal of the existing and un-utilized conductor
: 0.5km/day ×7.5km = 15days
-Removal of the existing and un-utilized insulators and accessories
: 28locations×2loc./day = 14days
-Clearing of objects around ST No.13 in the Songas Compound
: 1location×5day = 5days

Work Item (Refer to Required minimum work space and Road Access) by Japanese Side
-Construction of Access Road (if necessary)
: 5locations (200㎡/1loc.)×5day = 25days

1/7

STEP-2



Temporary stay wire Work

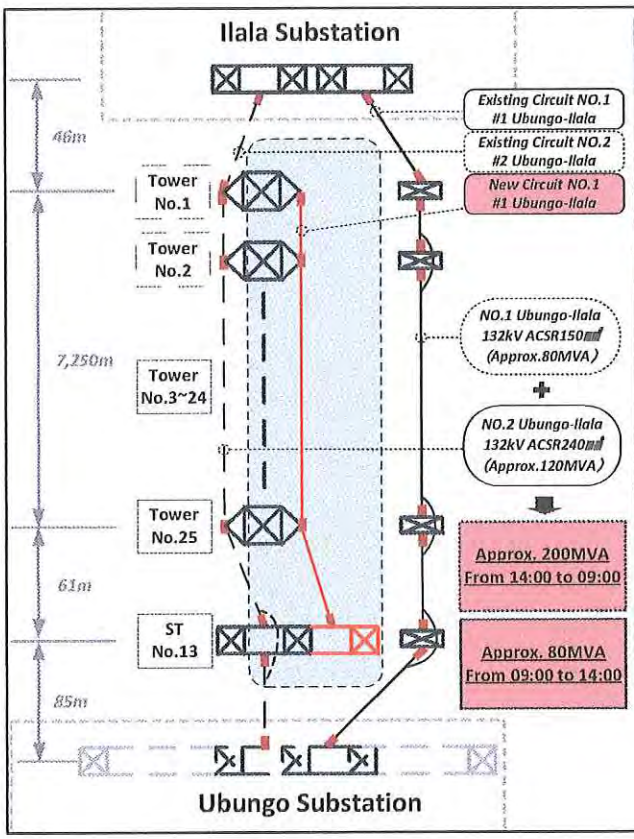
Precondition
-To complete required environmental works and to obtain environmental clearance.
-To allocate budget for the Work by TANESCO.
-To have available Working Time from 09:00 to 17:00 (8hrs)/day.
-To have necessary permission from Songas to enter his compound.

Work Item by TANESCO
-No power outage is necessary

Work Item by Japanese Side
-Installation of Temporary Stay Wire for new circuit No.1, stringing equipment and scaffolding to protect conductors for stringing work
: 5locations ×3day = 15days

2/7

STEP-3



Stringing Work for New Circuit No.1

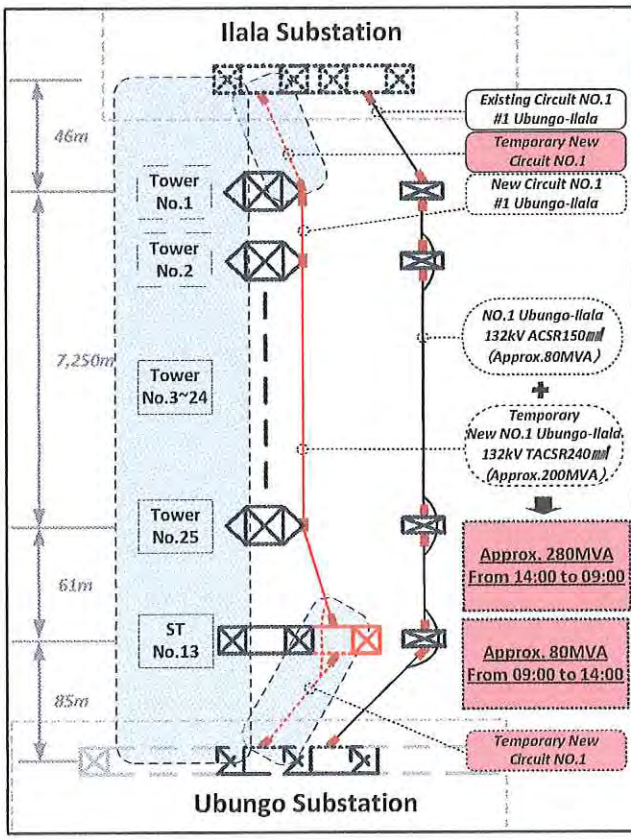
Precondition
-To complete required environmental works and to obtain environmental clearance.
-To allocate budget for the Work by TANESCO.
-To have available Working Time from 09:00 to 14:00 (5hrs)/day.
-During the Working Time, the existing transmission line with ACSR 240㎟ shall not be utilized but ACSR150㎟ shall be utilized.
-To have necessary permission from Songas to enter his compound.

Work Item by TANESCO
-To take necessary measure for power outage work
: 09:00～14:00 (5hrs)/day

Work Item by Japanese Side
-Drum and Equipment settings
: 5locations ×1day = 5days
-Stringing
: 0.5km/day ×7.5km = 15days
-Installation of insulators, damper, and armor rod, connection work
: 0.5km/day ×7.5km = 15days
-Extension of ST No.13 Gantry
: = 21days

3/7

STEP-4



Removing Work for the existing Circuit No.2

Precondition
-To complete required environmental works and to obtain environmental clearance.
-To allocate budget for the Work by TANESCO.
-To have available Working Time from 09:00 to 14:00 (5hrs)/day.
-To have necessary permission from Songas to enter his compound.
-After disconnection at Ilala and Ubungo S/S, new transmission line with TACSR 240㎟ shall be connected as a temporary new circuit No.1 by the Japanese side and utilized with the existing ACSR150㎟.

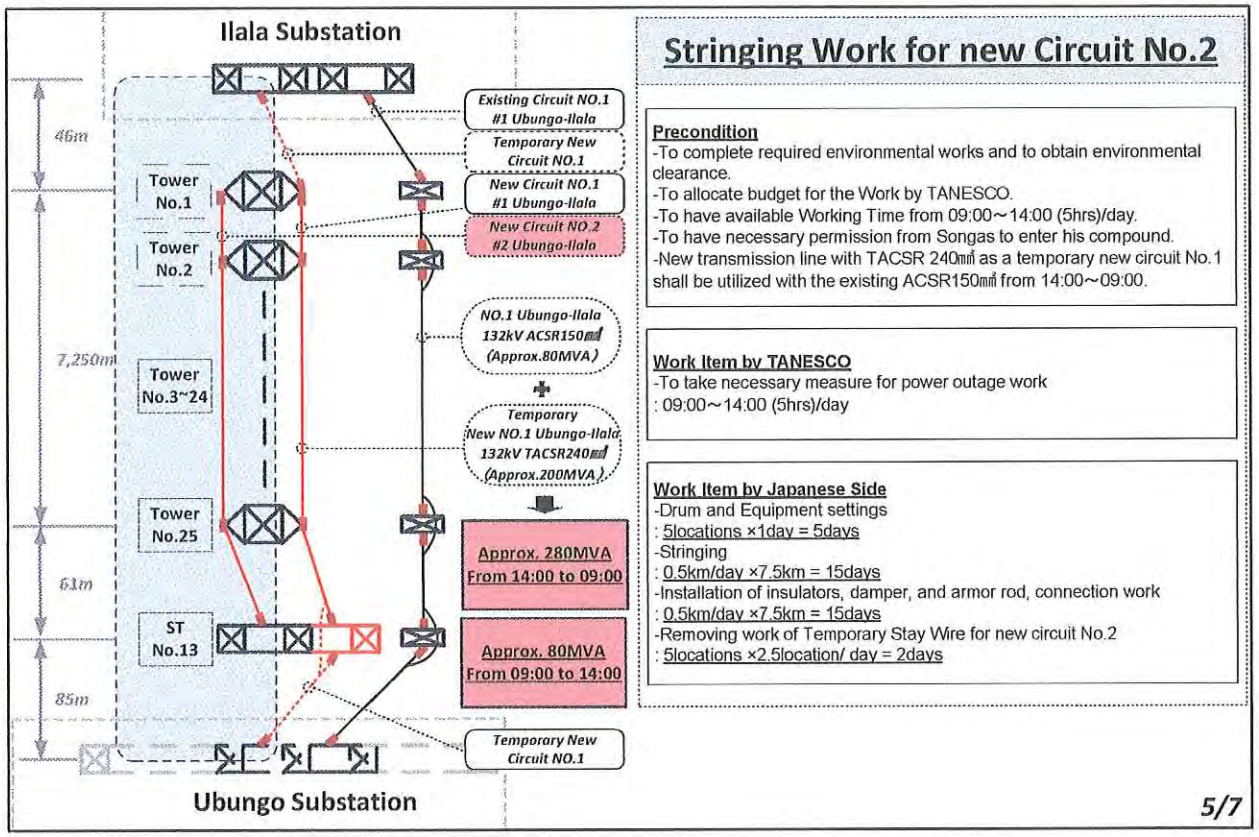
Work Item by TANESCO
-To take necessary measure for power outage work
: 09:00～14:00 (5hrs)/day
-Removal of the existing conductor
: 0.5km/day ×7.5km = 15days
-Removal of the existing insulators and accessories
: 28locations×2loc./day = 14days

Work Item by Japanese Side
-Installation of Temporary Conductor for new circuit No.1
: 2locations ×2day/1loc. = 4days
-Installation of Temporary Stay Wire for new circuit No.2
: 5locations ×1day = 5days

4/7

Annex-4

STEP-5



Stringing Work for new Circuit No.2

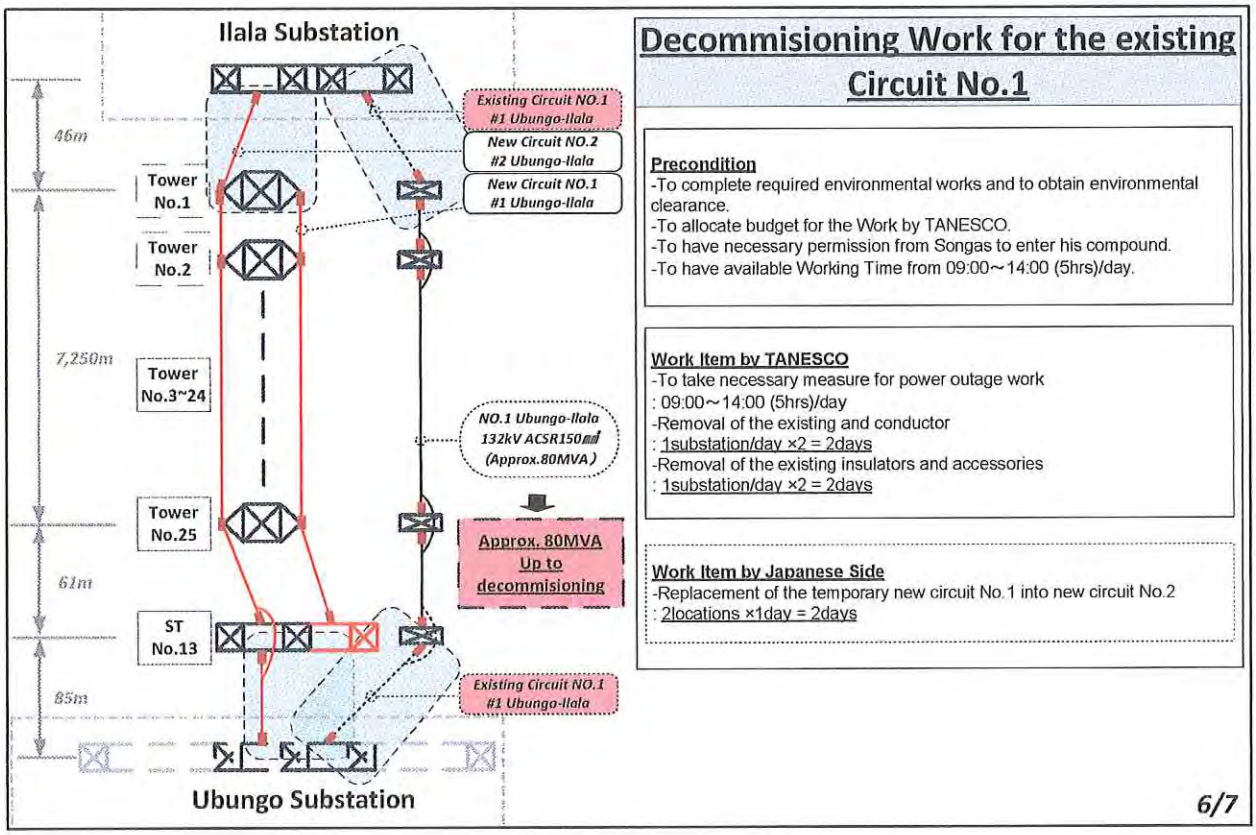
Precondition
-To complete required environmental works and to obtain environmental clearance.
-To allocate budget for the Work by TANESCO.
-To have available Working Time from 09:00~14:00 (5hrs)/day.
-To have necessary permission from Songas to enter his compound.
-New transmission line with TACSR 240㎟ as a temporary new circuit No.1 shall be utilized with the existing ACSR150㎟ from 14:00~09:00.

Work Item by TANESCO
-To take necessary measure for power outage work
: 09:00~14:00 (5hrs)/day

Work Item by Japanese Side
-Drum and Equipment settings
: 5locations ×1day = 5days
-Stringing
: 0.5km/day ×7.5km = 15days
-Installation of insulators, damper, and armor rod, connection work
: 0.5km/day ×7.5km = 15days
-Removing work of Temporary Stay Wire for new circuit No.2
: 5locations ×2.5location/ day = 2days

5/7

STEP-6



Decommisioning Work for the existing Circuit No.1

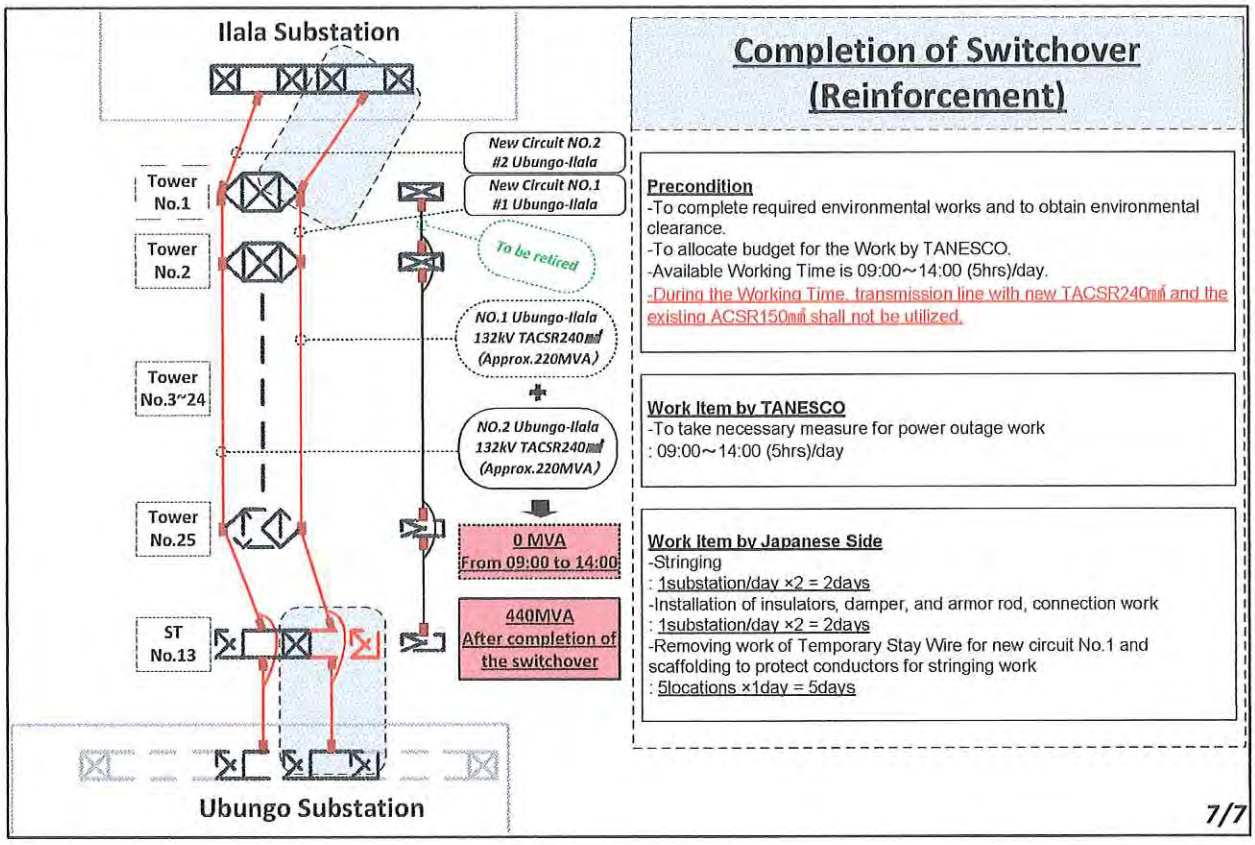
Precondition
-To complete required environmental works and to obtain environmental clearance.
-To allocate budget for the Work by TANESCO.
-To have necessary permission from Songas to enter his compound.
-To have available Working Time from 09:00~14:00 (5hrs)/day.

Work Item by TANESCO
-To take necessary measure for power outage work
: 09:00~14:00 (5hrs)/day
-Removal of the existing and conductor
: 1substation/day ×2 = 2days
-Removal of the existing insulators and accessories
: 1substation/day ×2 = 2days

Work Item by Japanese Side
-Replacement of the temporary new circuit No.1 into new circuit No.2
: 2locations ×1day = 2days

6/7

STEP-7


Ilala Substation
Tower No.1
Tower No.2
Tower No.3~24
Tower No.25
ST No.13
New Circuit NO.2 #2 Ubungo-Ilala
New Circuit NO.1 #1 Ubungo-Ilala
To be retired
NO.1 Ubungo-Ilala 132kV TACSR240㎟ (Approx.220MVA)
NO.2 Ubungo-Ilala 132kV TACSR240㎟ (Approx.220MVA)
0 MVA From 09:00 to 14:00
440MVA After completion of the switchover
Ubungo Substation
Completion of Switchover (Reinforcement)
Precondition
-To complete required environmental works and to obtain environmental clearance.
-To allocate budget for the Work by TANESCO.
-Available Working Time is 09:00～14:00 (5hrs)/day.
-During the Working Time, transmission line with new TACSR240㎟ and the existing ACSR150㎟ shall not be utilized.
Work Item by TANESCO
-To take necessary measure for power outage work
: 09:00～14:00 (5hrs)/day
Work Item by Japanese Side
-Stringing
: 1substation/day ×2 = 2days
-Installation of insulators, damper, and armor rod, connection work
: 1substation/day ×2 = 2days
-Removing work of Temporary Stay Wire for new circuit No.1 and scaffolding to protect conductors for stringing work
: 5locations ×1day = 5days
7/7

List of the Major Undertakings to be taken by the Tanzanian Side

Work Item		Work Contents
A	**Common (including Environmental Social Considerations)**	
	A-1	Secure land for stockyards
	A-2	Bank commissions (Advising and Payment Commission of Authorization to Pay
	A-3	Registration fee for the Contractor and the Consultant
	A-4	Necessary arrangement for Power outage
	A-5	RAP compensation (Mwananyamala site)
	A-6	RAP compensation (other sites)
	A-7	RAP compensation (Grave removal cost)
	A-8	Notification to PAP (project affected people) on grave relocation
	A-9	Issue letter to Municipalities on grave removal cost
	A-10	Conclude the negotiation with TANROADS on the distribution lines
	A-11	Conducting EIA study and obtaining EIA certificate from NEMC
	A-12	Having stakeholder consultations
	A-12	Overload fee for Transporation from the seaport to the sites
B	**Regarding Substations**	
IL	B-1	Clearing and leveling the land (for new Control Building and stockyard)
IL	B-2	Removing the un-used equipment (in the substation)
IL	B-3	Removal of entrance (gate), fence, etc.
IL	B-4	Construction of entrance (gate), fence, etc.
IL	B-5	Leveling for the access road
IL	B-6	Preparation for temporary oil storage and the disposal
IL	B-7	Relocation of the control facilities
IL	B-8	Relocation of Batteries and charger for communication
IL	B-9	Relocation of existing protection panels (including disconnection and reconnection)
IL	B-10	Removal of the existing O/H line and U/G cable
IL	B-11	Relocation of existing 33/11kV End poles with accessories, if any
IL	B-12	Installation of 11 kV U/G cables on the existing Distribution lines for new indoor switchgears
IL	B-13	Supply of Wh meters
UB	B-14	Necessary upgrade of communication system in GCC/DCC
UB	B-15	Necessary re-setting for protection
UB	B-16	Connection of disconnected earthing wires
JB	B-17	Procurement and installation of communication facilities (including batteries, charger, etc.)
JB	B-18	Clearing and leveling the land
JB	B-19	Construction of new fence and gate
JB	B-20	Construction of access road
JB	B-21	Installation of new 11 kV U/G cable and 11 kV end poles
JB	B-22	Supply of Wh meters
TG	B-23	Supply of Wh meters
MH	B-24	Procurement and installation of communication facilities
MH	B-25	Clearing and leveling the land
MH	B-26	Construction of new fence and gate
MH	B-27	Procurement and installation of new 11 kV U/G cable and 11kV end poles
MH	B-28	Construction of access road and safety fence with gate
MH	B-29	Supply of Wh meters
MW	B-30	Procurement and installation of communication facilities
MW	B-31	Clearing and leveling the land
MW	B-32	Construction of new fence and gate
MW	B-33	Installation of new 11 kV U/G cable and 11kV end poles
MW	B-34	Construction of access road and safety fence with gate
MW	B-35	Supply of Wh meters
MS	B-36	Clearing and leveling the land
MS	B-37	Removal of the existing net fence, gate and generator
MS	B-38	Removal of the existing 11kV O/H line and 11kV U/G cable to install new transformer
MS	B-39	Installation of new 11kV U/G cable
MS	B-40	Supply of Wh meters

Work Item		Work Contents
C	**Regarding 132kV Transmission Line**	
T/L	C-1	Removal of existing and un-utilized conductor, insulators and other related accessories
T/L	C-2	Clearing and leveling the land for the Work Space
T/L	C-3	Obtaining necessary permission to enter Songas compound for Tower No. 25 and ST No.13
D	**Regarding 33kV Distribution Line**	
D/L	D-1	Replacement of the existing 11kV D/L interfered with the new 33kV D/L
D/L	D-2	Construction of 11kV D/L from new 33/11kV substations
E	**Regarding Grid Control Center (GCC) and District Control Center (DCC)**	
	E-1	Connection and software modification of GCC SCADA system for T7 transformer at Ilala S/S
	E-2	Ditto of DCC SCADA system for 33/11 kV feeders, if any
	E-3	Modification of Ilala line metering circuit(s) by 132 kV CT replacement of at Ubungo S/S for GCC
	E-4	Connection and software modification of DCC SCADA system at following substations;- - New 33 kV Substations (Jangwani Beach S/S, Muhimbili S/S and Mwananyamala S/S) - 33 kV Substation extension (Msasani S/S) - 33 kV feeder bay extension on 132 kV Substations (Tegeta S/S, Makumbusho S/S and New City Center S/S)
	E-5	Modification of RTU on existing Substations for DCC SCADA system
	E-6	Installation and connection of Optical cables between Substations for SCADA system

IL: Ilala Substation, UB: Ubungo Substation, TG: Tegeta Substation, MH: Muhimbili Substation, MW: Mwananyamala Substation, MS: Msasani Substation
T/L: Transmission Line, D/L: Distribution Line

TECHNICAL MEMORANDUM
FOR
THE THIRD PREPARATORY SURVEY
ON
THE PROJECT FOR REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW LINES AND SUBSTATIONS IN DAR ES SALAAM
IN THE UNITED REPUBLIC OF TANZANIA

BETWEEN

TANZANIA ELECTRIC SUPPLY COMPANY LIMITED (TANESCO)

AND

JICA PREPARATORY SURVEY TEAM

Dar es Salaam, October 19th, 2013

Mr. Mitsuhisa Nishikawa
Chief Consultant
JICA Preparatory Survey Team
Yachiyo Engineering Co., Ltd.

Eng. Mosha T. Izahaki
Manager Transmission Substations
Tanzania Electric Supply Company Ltd.

JICA PREPARATORY SURVEY TEAM
Yachiyo Engineering Co., Ltd.
West Japan Engineering Consultants, Inc.

List of Attendance

Ministry of Energy and Minerals (MEM)	
Eng. Edson W. Ngabo	Energy Engineer
Eng. Joram Kengete	Energy Engineer
Tanzania Electric Supply Company Ltd. (TANESCO)	
Eng. Mosha T. Izahaki	Manager Transmission Substations
Eng. Clara N. Simbila	Principal Engineer. Distribution Planning
Mr. David Mwakambonja	Land Surveyor
Eng. Richard Mhongole	Senior Engineer (HC)
Mr. Hamisi Boby	Ag. Manager Environment
Eng. Benedict V. Lyaruu	Ag. Senior Zonal Manager DSM & Coast
Eng. Mary Kabakuzi	Planning Engineer Ilala
Eng. A. H. Mmingwa	Ag. Regional Manager Ilala
Eng. Bakari Sekuninga	Planning Engineer Kinondoni North
Eng. Ramond Seya	Regional Manager Kinondoni North
JICA Preparatory Survey Team	
Mr. Gaku Saito	Planning Management (Japan International Corporation Agency)
Mr. Mitsuhisa Nishikawa	Chief Consultant Power Development Planning (Yachiyo Engineering Co., Ltd.)
Mr. Makoto Abe	Deputy Chief Consultant/ Transmission and Distribution Facilities (Yachiyo Engineering Co., Ltd.)
Mr. Kenji Sakemura	Substation Facilities 1 (Ilala Substation) (West Japan Engineering Consultants, Inc.)
Mr. Shinya Kondo	Substation Facilities 2 (Other Substations) (West Japan Engineering Consultants, Inc.)
Mr. Mitsuharu Nakagawa	Construction and Procurement Planning / Cost Estimation (Yachiyo Engineering Co., Ltd.)
Mr. Kyohei Kurohane	Coordinator / Assistance for Distribution Facilities (Yachiyo Engineering Co., Ltd.)

Tanzania Electric Supply Company Ltd. (hereinafter referred to as "TANESCO") and JICA Preparatory Survey Team for the Project for Rehabilitation of Substations and Construction of New Lines and Substations in Dar es Salaam (hereinafter referred to as "the Team") had series of technical discussion to form a mutual understanding of Draft Final Report and Equipment Specifications of the Project at the stage of third preparatory survey. The following points are mainly discussed and agreed each other.

1. **Fire Walls in Ilala substation**

   The Team submitted Engineering Sheet Ref. 500-3617-02-004 dated October 02, 2013, and explained that the fire wall between 60 MVA Transformers is not required in accordance with *JEAG-5002 (2001). The distance between the transformers will be more than 7m.
   (*JEAG-5002 (2001): Japan Electric Association Guideline-5002 in 2001)

2. **Construction procedure for Ilala Substation**

   The Team submitted revised "Construction Procedure for Ilala Substation", and explained the differences from previous procedure (May 2013). The main differences are that 132 kV temporary cables and cable heads are not be utilized at the time of construction.

   The reasons are;-

   - To minimize the Project cost as much as possible, and
   - The 132 kV temporary cables and cable heads are no more use after the Project

   The Team also explained that *shut down of all the feeders at the substation shall be required for several days at later stage of the construction period for extension of 132 kV bus bar and other 132 kV equipment installation. (*shut down; several hours in a day time)

3. **Oil Spillage Facilities for Transformers**

   TANESCO explained the method of oil spillage facilities for main transformers (no gravels on steel mesh gratings) and the Team understood it. The details of the design will be considered at the implementation stage of the Project.

4. **Re-setting Works of 132 kV Transmission Line Protection Relays in Ubungo substation**

   Due to the replacement of 132 kV CTs for Ilala feeders at Ubungo substation, existing 132 kV Transmission line protection relays at Ubungo substation should be re-set. In this connection, the Team confirmed that the re-setting work of the relays should be done by TANESCO, and TANESCO confirmed it.

5. **Transportation route for Ilala Substation**

   TANESCO shall secure the leveled access road for Ilala substation to transport heavy and huge equipment.

6. **Entry Permission for the construction of 132 kV Transmission Line**
Necessary permission to enter the work space at Songas and Aggreko shall be obtained by TANESCO prior to commencement of Japanese Works.

7. **Securing the land for storage yard**
Storage yard for equipment and materials shall be secured by TANESCO. Proposed storage yards should be suggested by TANESCO to the Team. Both sides agreed to visit the proposed storage yards.

8. **Location of 11kV end poles**
TANESCO proposed the location of 11kV end poles at each substation. In all the substations related to the Project, equipment and materials between substation to end poles, such as 11kV cables, line switch, arresters, Poles except Ilala Substation etc. shall be procured by Japanese side. Installation works should be undertaken by TANESCO. However, connection works of 11kV end poles and substation facilities, test and inspection shall be undertaken by Japanese side.

9. **Leveling the land for substation**
The team explained that the land leveling works including rising and compaction works of the land at substations shall be undertaken by TANESCO.
TANESCO shall obtain soil, sand and gravels etc., if necessary, to secure the proper ground level for substation in order to avoid soaking with heavy rainfall. The consultant shall inform the necessary information of leveling the land to TANESCO.

10. **RAP compensation for Mwananyamala Substation**
TANESCO has already made compensation to people who are affected by the construction of Mwananyamala substation and the demolishing is completed.

11. **Distribution line**
TANESCO shall complete the necessary requirements with Municipality and payment for obtaining permission to use road reserve as soon as possible.

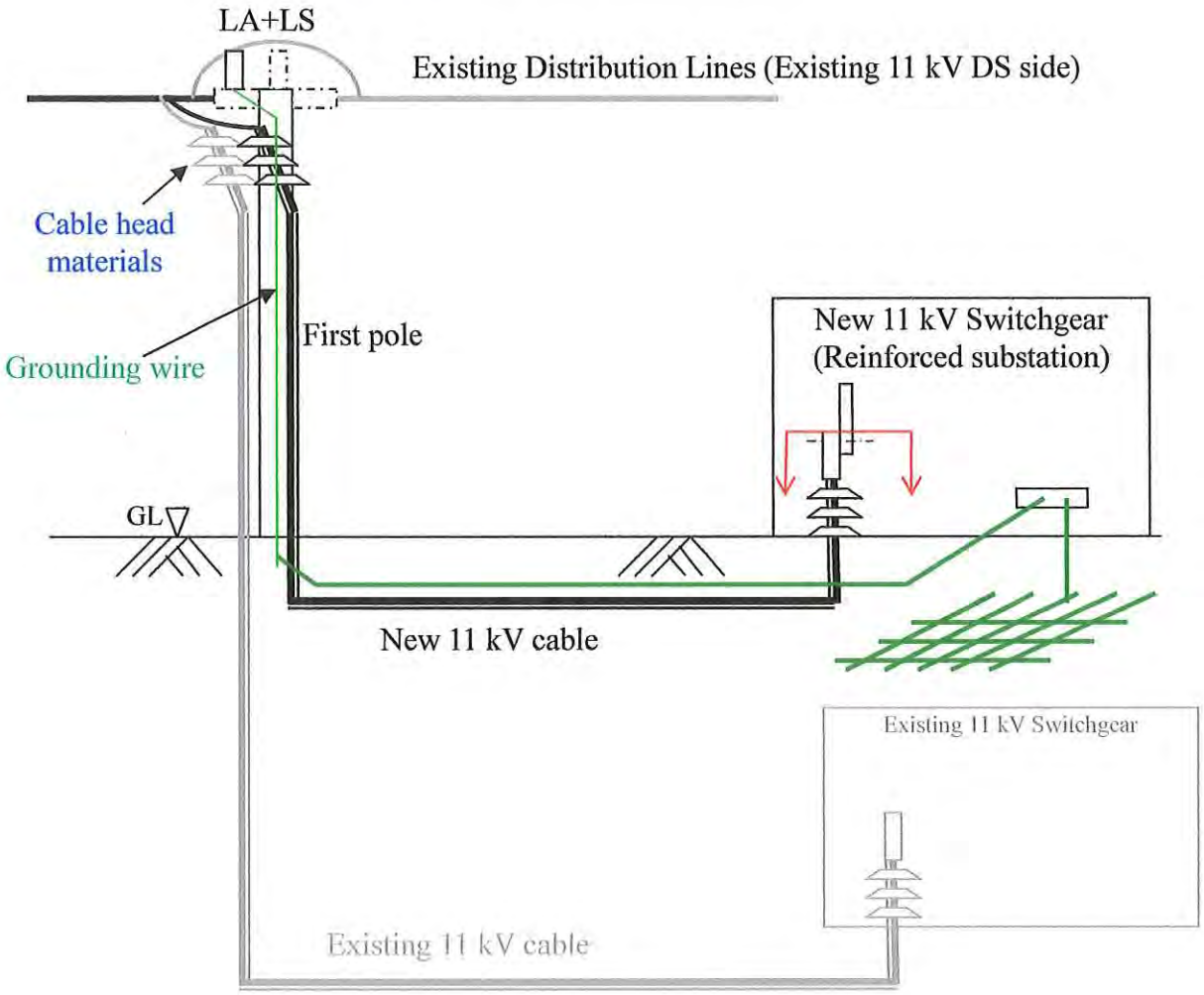
12. **Attendance of factory test and inspection**
The factory test and inspection of equipment and materials procured under the Project shall be carried out by the Contractor at manufacturer's factories and attended by the Consultant on behalf of TANESCO. If TANESCO attends the factory test and inspection, TANESCO should bear all the costs for attending the factory test and inspection.

End

Attachment: Detailed Work Demarcation regarding 11kV cables

Attachment

Detailed Work Demarcation for Installation of 11 kV Cables (Ilala and Msasani Substation)

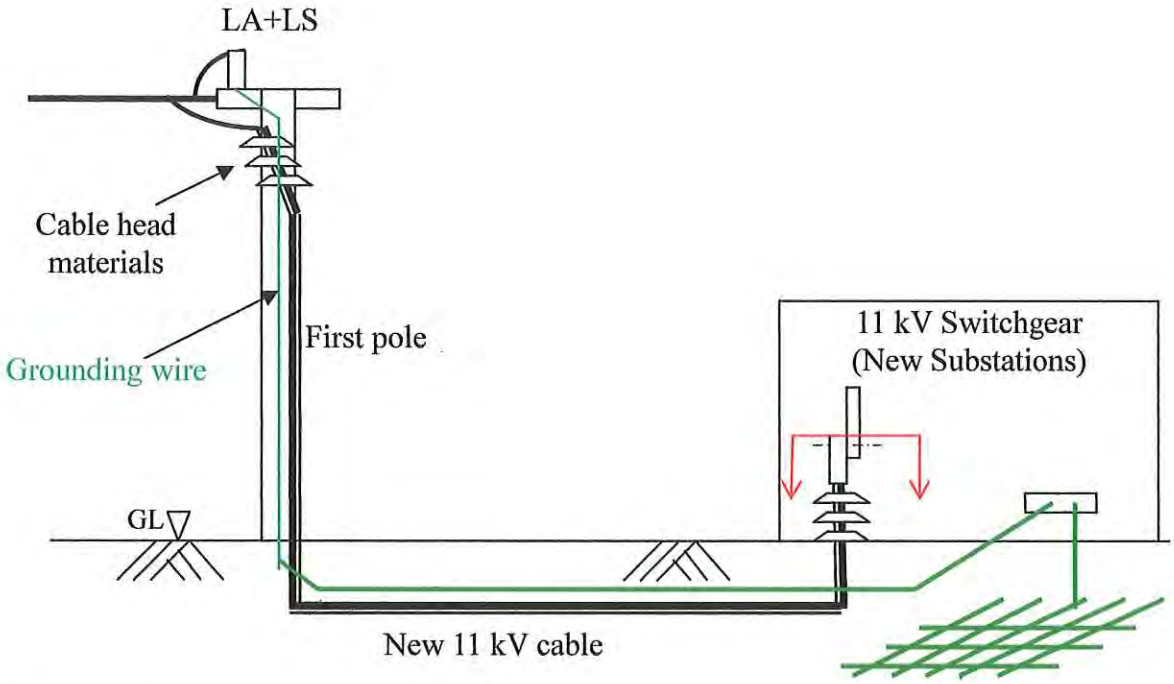


Work Demarcation

	Work	Demarcation		Remarks
		Japan	Tanzania	
1	Disconnection and removal of the existing distribution lines		O	
2	Procurement of new cables ,Poles (except Ilala Substation) and Cable head materials	O		
3	Installation of new cables (underground)		O	
4	Connection of new cables with new cable head materials	O		
5	Unit testing of new cable (Insulation resistance test, dielectric strength test, phase rotation test, etc.)	O		

Attachment

Detailed Work Demarcation for Installation of 11 kV Cables (Muhimbili, Mwananyamala and Jangwani Beach Substation)



Work Demarcation

	Work	Demarcation		Remarks
		Japan	Tanzania	
1	Procurement of new cables, Poles and new cable head materials	O		
2	Installation of new cables(underground)		O	
3	Connection of new cables with new cable head materials	O		
4	Unit testing of new cable (Insulation resistance test, dielectric strength test, phase rotation test, etc.)	O		

資料－６　参考資料／入手資料リスト

6. 参考資料/入手資料リスト

調査名：タンザニア国ダルエスサラーム送配電網強化計画準備調査（その２）

番号	名　称	形態 文書・ビデオ・ 地図・写真等	オリジナル・コピー	発　行　機　関	発　行　元
1	POWER SYSTEM MASTER PLAN 2012 UPDATE	文書	コピー	Ministry of Energy and Minerals	Oct. 2012
2	THE PROJECT ON IMPROVING THE RELIABILITY OF ELECTRIC POWER SUPPLY IN THE CITY OF DAR ES SALAAM	文書	コピー	Ministry for Foreign Affairs of Finland	Mar. 2012
3	The breakdown of Finland Project Cost	文書	コピー	Ministry for Foreign Affairs of Finland	Mar. 2012
4	Meteorological Data	文書	コピー	Tanzania Meteorological Agency	
5	CONTRACTORS' OCCUPATIONAL HEALTH AND SAFETY GUIDELINES	Word file	オリジナル	TANESCO	Mar. 2011
6	HEALTH AND SAFETY POLICY	PDF	オリジナル	TANESCO	Jul. 2008
7	Financial Statement 2006	文書	コピー	TANESCO	Dec. 2006
8	Financial Statement 2007	文書	コピー	TANESCO	Dec. 2007
9	Financial Statement 2008	文書	コピー	TANESCO	Dec. 2008
10	Financial Statement 2009	文書	コピー	TANESCO	Dec. 2009
11	Financial Statement 2010	文書	コピー	TANESCO	Dec. 2010
12	Annual Report 2007	文書	コピー	TANESCO	2007
13	Annual Report 2008	文書	コピー	TANESCO	2008
14	Annual Report 2009	文書	コピー	TANESCO	2009

6. 参考資料/入手資料リスト

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番号	名称	形態 文書・ビデオ・ 地図・写真等	オリジナル・コピー	発行機関	発行元
15	Annual Report 2010	文書	コピー	TANESCO	2010
16	Annual Report 2011	文書	コピー	TANESCO	2011
17	Monthly Report 2008	文書	コピー	TANESCO	2008
18	Monthly Report 2009	文書	コピー	TANESCO	2009
19	Monthly Report 2010	文書	コピー	TANESCO	2010
20	Monthly Report 2011	文書	コピー	TANESCO	2011
21	Monthly Report 2012	文書	コピー	TANESCO	2012
22	Monthly Report 2013	文書	コピー	TANESCO	2013
23	Mothly Demand From Tegeta SS 2012	文書	コピー	TANESCO	2012
24	TZS 932:2007 Acoustics – General tolerance limits for environmental noise (Tanzania Standard)	文書	オリジナル	Tanzania Bureau of Standards	2007
25	Purchase of two developed plots for Construction of 33/11kV, 15MVA substation at Muwananyamala funded by the Government of Japan through JICA (official letter by TANESCO)	文書	コピー	Regional Manager, Kinondoni North, TANESCO	August 2012
26	Kuondoa barua ya tayehe 09/07/2012 Kama Ilivyosomeka Ikubalike Barua ya 18/06/2012 Inayohusu Kiwanja No.77 Kitalu “2” Mwananyamala (letter on land selling cost by the land owner of Mwananyamala Plot Not.77)	文書	コピー	Fikirini Bashiri Shanani Farihallah	August 2012

番号	名 称	形態 文書・ビデオ・ 地図・写真等	ｵﾘｼﾞﾅﾙ・ｺﾋﾟｰ	発 行 機 関	発 行 元
27	Majibu ya Ombi la kiwanja No.77 Kitau No.2 Mwananyamala (Agreement letter on land selling by the land owner of Mwananyamala Plot Not.77)	文書	コピー	Fikirini Bashiri Shanani Farihallah	June 2012
28	Ombi la Kuuziwa kiwanja No,77 Kitau No.2 Mwananyamala kwa ajili ya kujenga kituo cha kupoozea Umeme wa Msongo wa 33/11kV (Request letter from TANESCO to the land owner of Mwananyamala Plot Not.77)	文書	コピー	Regional Manager, Kinondoni North, TANESCO	June 2012
29	Offer of a Right of Occupancy (Mwananyamala Plot No.77)	文書	コピー	Office of the Regional Land Office Agent, Dar es Salaam	April 1965
30	Conditions of the Right of Occupancy (Mwananyamala Plot No.77)	文書	コピー	Office of the Regional Land Office Agent, Dar es Salaam	April 1965
31	Kuondoa barua ya tayehe 06/7/2012 Kama Ilivyosomeka Ikubalike Barua ya 15/6/2012 Inayohusu Kiwanja No.76 Kitalu “2” Mwananyamala (letter on land selling cost by the land owner of Mwananyamala Plot Not.76)	文書	コピー	Safia Thomas	August2012
32	Kiwanja No.76 Kitau 2 Mwananyamala (Agreement letter on land selling by the land owner of Mwananyamala Plot Not.76)	文書	コピー	Safia Thomas	June 2012
33	Majibu ya Ombi la kiwanja No.76 Kitau Na.2 Mwananyamala kwa ajili ya kujenga kituo cha kupoozea Umeme wa Msongo wa 33/11kV (Request letter from TANESCO to the land owner of Mwananyamala Plot Not.76)	文書	コピー	Regional Manager, Kinondoni North, TANESCO	June 2012
34	Jamhuri ya Muungano Wa Tanzania Usimamizi wa Mirathi (Court letter on care taker of Mwananyamala Plot No.76)	文書	コピー	Primary Court, Kinondoni, Dar es Salaam	July 2012

6. 参考資料/入手資料リスト

調査名：タンザニア国ダルエスサラーム送配電網強化計画準備調査（その２）

番号	名　称	形態 文書・ビデオ・ 地図・写真等	ｵﾘｼﾞﾅﾙ・ｺﾋﾟｰ	発　行　機　関	発　行　元
35	Offer of a Right of Occupancy (Mwananyamala Plot No.76)	文書	コピー	Office of the Regional Land Office Agent, Dar es Salaam	April 1965
36	Conditions of the Right of Occupancy (Mwananyamala Plot No.76)	文書	コピー	Office of the Regional Land Office Agent, Dar es Salaam	April 1965
37	Hati Ya Fidia (Certification of Compensation/Valuation report)	文書	コピー	Government Chief Valuer, Kinondoni Municipality	January 2013
38	New TANESCO ORGANISATION STRUCYURE	文書	コピー	TANESCO	
39	TANESCO ZONES DEMACATIONS	文書	コピー	TANESCO	
40	Tariffs of TANESCO 2013	文書	コピー	TANESCO	2013
41	THE TRAFFIC ACT 1973 (NO.30 OF 1973) REGULATIONS	図書	コピー	TANROAD	February 2001

資料－７　ドナー間の合同調整会議に係る資料

7. ドナー間の合同調整会議に係る資料

TANSECO-33/11 kV DISTRIBUTION NETWORK REINFORCEMENT PROJECTS

Coordination Meeting among the stake holders of Distribution Projects

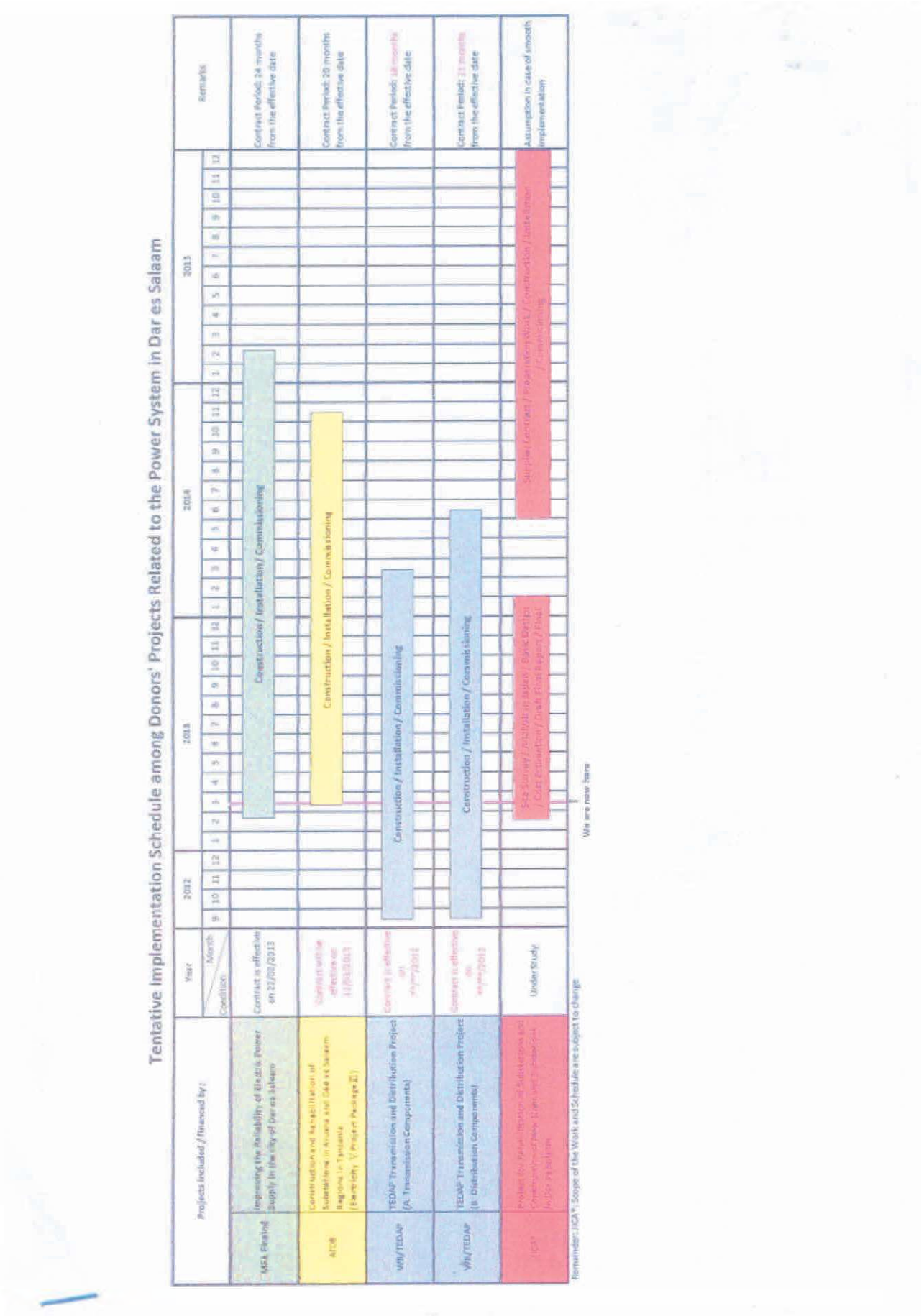
Venue: Twiga Meeting Room

Date & Time : 12.03.2013 / 10:00 hrs

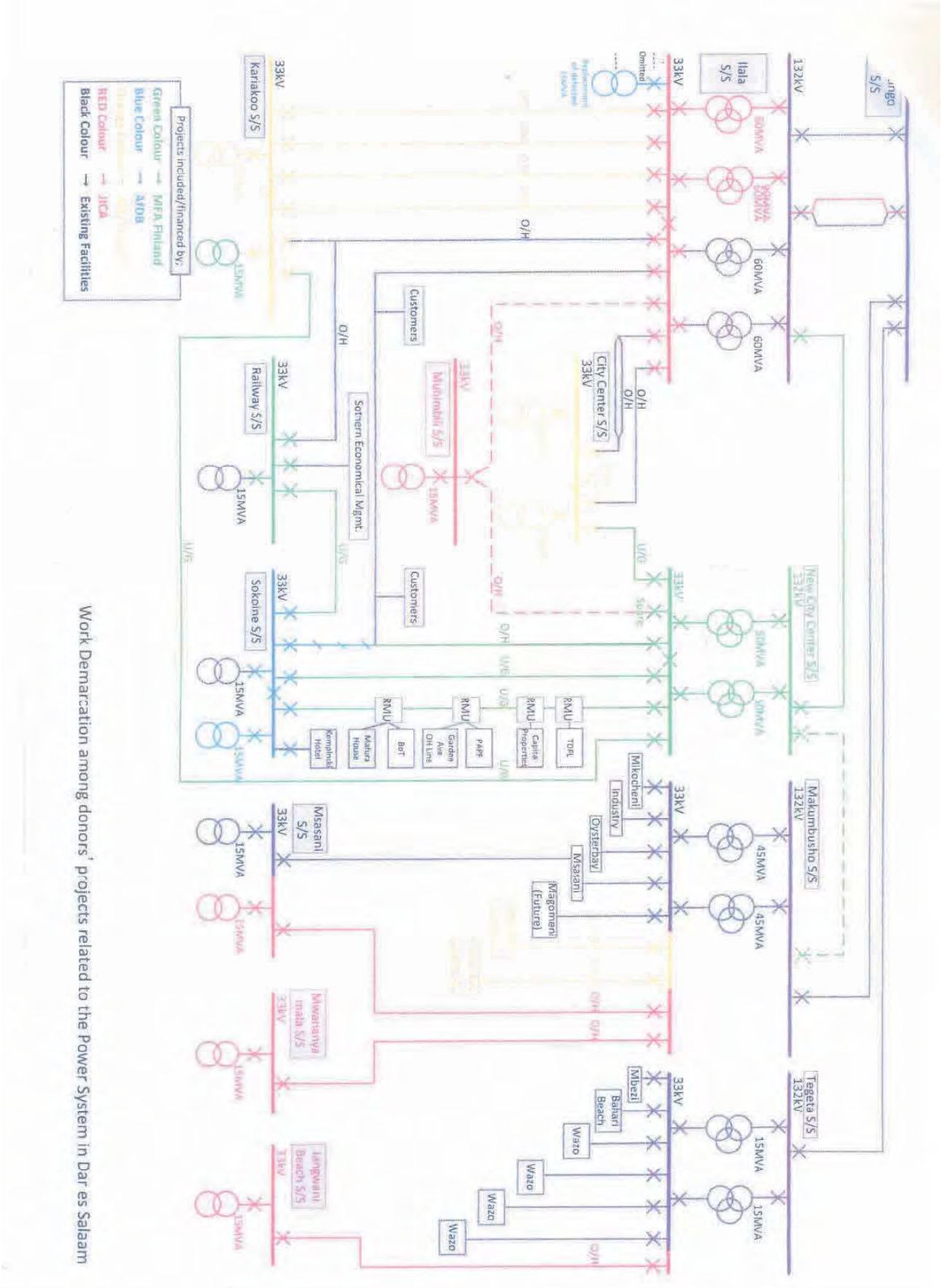
AGENDA

1. Welcome
2. Introduction of participants
3. Reasons to call the meeting and the expected output
4. Briefing (by each project owner) about the
   - stake holders,
   - capital investment,
   - estimated project completion time, and
   - scope of each project
5. Identification of interface points for the projects on hand
6. Support /coordination required from the relevant parties for interface points
7. Action plan(s) for the interface points, as and where required
8. Other issues
9. Next coordination meeting
10. meeting closing statements

7. ドナー間の合同調整会議に係る資料



7. ドナー間の合同調整会議に係る資料



7. ドナー間の合同調整会議に係る資料

DCC - RTU

No.	Name	Voltage	Region	DCC RTU	
1	Bahari Beach	33/11 kV	Kinondoni North	New 33/11 kV RTU	TEDAP Lot 2
2	Changombe	33/11 kV	Temeke	New 33/11 kV RTU	TEDAP Lot 1
3	City Centre	33/11 kV	Ilala	New 33/11 kV RTU	TEDAP Lot 1
4	Factory Zone I	33/11 kV	Temeke	New 33/11 kV RTU	TEDAP Lot 1
5	Factory Zone II	33/11 kV	Ilala	New 33/11 kV RTU	
6	Factory Zone III	132/33 kV	Ilala	New 33/11 kV RTU	
7	Ilala	132/33 kV	Ilala	New 33/11 kV RTU	TEDAP Lot 2
8	Kariakoo	33/11 kV	Ilala	New 33/11 kV RTU	
9	Kigamboni	33/11 kV	Temeke	New 33/11 kV RTU	TEDAP Lot 2
10	Kurasini	33/11 kV	Temeke	New 33/11 kV RTU	
11	Makumbusho	132/33 kV	Kinondoni North	New 33/11 kV RTU	
12	Magomeni	33/11 kV	Kinondoni South	New 33/11 kV RTU	TEDAP Lot 2
13	Msasani	33/11 kV	Temeke	New 33/11 kV RTU	
14	Mbezi	33/11 kV	Kinondoni North	New 33/11 kV RTU	TEDAP Lot 1
15	Mikocheni	33/11 kV	Kinondoni North	New 33/11 kV RTU	
16	Msasani	33/11 kV	Kinondoni North	New 33/11 kV RTU	
17	New City Centre	132/33/11 kV	Ilala	New SCS	TEDAP Lot 1
18	Oysterbay	33/11 kV	Kinondoni North	New 33/11 kV RTU	
19	Railway	33/11 kV	Ilala	New 33/11 kV RTU	Electricity V
20	Sokoine	33/11 kV	Ilala	New 33/11 kV RTU	
21	Tandale	33/11 kV	Kinondoni South	New 33/11 kV RTU	
22	Tandika	33/11 kV	Temeke	New 33/11 kV RTU	
23	Tegeta	132/33 kV	Kinondoni North	New 33/11 kV RTU	
24	TOL	33/11 kV	Temeke	New 33/11 kV RTU	
25	Ubungo[1]	220/132/33 kV	Kinondoni South	New 33 kV RTU	TEDAP Lot 2
26	Ubungo[2]	132/33 kV	Kinondoni South	New 33/11 kV RTU	
27	University	33/11 kV	Kinondoni South	New 33/11 kV RTU	
28	DCC Building		Kinondoni North	New Local Terminal Unit	

Co-ordinati

7. ドナー間の合同調整会議に係る資料

Meeting Notes

Dar Es Salaam, 12.03.2013

Projects:	Transmission & Distribution Network Reinforcement Projects in Dar Es Salaam, financed by various Donors
Place, Date:	TANESCO Head Office - Twiga Meeting Room , 12th March 2013
Participants:	See List of Participants
Topic(s):	Coordination Meeting among the Stake Holders of the Projects
Copies to:	TANESCO (Projects Dept. and Regions), HIFAB, YEC, SWECO and FICHTNER.

Item	Topics	Action by	Date
	Introduction The meeting was called by TANESCO to discuss about the attached "Agenda" items and was chaired by Mr. E. Manirabona – Manager Projects (T&D), while the moderation was carried out by Mr. A. Zafer Ozgur of FICHTNER. After an opening speech and welcoming, the chairman outlined the purpose of the meeting. And the discussions were summarized as per below headlines.	Info	
1.	**Purpose of the Meeting and the Expected Output** There have been a number of 'planning/site' activities by donors, Consultants and Contractors for various Projects in order to improve the power transmission and distribution capacity/ reliability/availability/quality in Dar Es Salaam, as shown in the attached "Tentative Implementation Schedule among Donors' Projects". Although these projects are independent of each other, there exist interfaces -as shown in the attached Single Line Diagram titled "Work Demarcation among Donors'	Info Info	

7. ドナー間の合同調整会議に係る資料

	Projects"- for which information exchange and coordination are required among the afore mentioned Stake holders. As to enable the required coordination for the forthcoming planning, engineering and construction activities of each Project with the other ones, utilization of a communication platform was thought to be highly beneficial for all the stake holders. Therefore, the current coordination meeting was called by the Projects (T&D) Dept. of TANESCO. As also expressed by the participants, the outcome of the this meeting have already initiated the first step to coordinate a number of issues among the stake holders, thus confirming the achievement of the expected output.	Info Info	
2.	**Project Information by the Stake Holders** The relevant Consultants provided the following information highlights; **a) TEDAP Transmission Project, financed by World Bank** a.1) Consultant is Fichtner GmbH & Co. KG, Germany a.2) Contractor is JV SAE Power Lines srl of Italy and Associated Transrail Structures Ltd of India a.3) Current project completion rate is about 60% a.2) Project has three lots for which, - Lot 1 covers 132 kV Ubungo, FZ III, FZ II, Mbagala and Kurasini substations in Dar Es Salaam - Lot 2 covers 132 kV Transmission Lines in four sections forming the Southern ring in Dar Es Salaam - Lot 3b covers 132 kV KIA substation in Kilimanjaro a.3) Overall project completion is expected as end of 2014 with earlier completion of some substations and T/L sections starting in June 2013.	Info	

7. ドナー間の合同調整会議に係る資料

	a.4) The overall capital investment (which includes the cost for the supply part of the project + installation costs + consultancy costs + the cost of the purchased land or right of way for use of land + other cost by the Employer for the project development & implementation) is estimated 80 M USD. **b) TEDAP Distribution Project, financed by World Bank** b.1) Consultant is Fichtner GmbH & Co. KG, Germany b.2) Contractors and Project scopes are; - Lot 1, Dar Es Salaam: SINOTEC, China 33/11 kV New Substations: City Center, Oyster bay, FZ I, FZ II, Mburahati & Mikocheni - Lot 2, Dar Es Salaam: NCC, Saudi Arabia 33/11 kV Rehab. Substations: Kariako, Kurasini, Mbagala, Changombe & Ubungo - Lot 3, Arusha & Kilimanjaro: CONCO, South Africa 33/11 kV New Substations: Sakina, Njiro B, Mount Meru, Unga, Kiltex, Theme, Trade School & Bomambuzi - Lot 4, Dar Es Salaam, Arusha and Kilimanjaro: NCC, Saudi Arabia Single/double/triple circuit 33/11 kV OHLs & cables b.3) Projects have not yet kicked off. Consultant is in the process of site assessment which is expected to be finished by the end of April 2013. b.4) Overall project completion is 21 months for each lot b.5) The overall capital investment (which includes the cost for the supply part of the project + installation costs + consultancy costs + the cost of the purchased land or right of way for use of land + other cost by the Employer for the project development & implementation) is estimated 70 M USD.	Info	

7. ドナー間の合同調整会議に係る資料

	c) Project for Rehabilitation of Substations and Construction of New Lines and Substations in Dar Es Salaam, financed by JICA - Japan c.1) Consultant is Yachiyo Engineering Co. Ltd., Japan c.2) Project is currently under study phase which covers the following sequential steps, till early 2014: - Site Survey - Analysis in Japan - Basic Design - Cost Estimation - Draft Final Report - Final Report Upon approval of the study and release of the grant, the next phase of the Project will kick off for the implementation in mid-2014 and will be completed by the end of 2015. c.3) Project scope covers engineering, supply, installation, testing and commissioning for the following: c.3.1) second circuit on the existing 132 kV Ubungo-Ilala transmission line c.3.2) 132/33 kV Ilala Substation - upgrading/extension for, - 2 x 132 kV transformer bays - 2 x 132/33 kV 60 MVA power transformers - 33 kV metal clad switchgear as shown in the attached Single Line Diagram c.3.3) 33/11 kV new substations with 1x15 MVA power transformer in each for, - Muhimbili S/S - Mwananyamala S/S - Jangwani Beach S/S c.3.4) 33/11 kV Msasani substation extension - 33 kV switchgear extension - 1 x 33/11 kV 15 MVA power transformer c.3.5) 132/33 kV Makambusho substation - 33 kV switchgear extension	Info	

7. ドナー間の合同調整会議に係る資料

	c.3.6) 33 kV OHL's and/or 33 kV underground cables for, - Ilala S/S – Muhimbili S/S line - Muhimbili S/S - New City Center S/S line - Makambusho S/S – Msasani S/S line - Makambusho S/S – Mwananyamala S/S line - Tegeta S/S – Jangwani Beach S/S line c.4) Capital Investment is not known due to the current status of the Project, however the initial grant request of TANESCO was about 10 M USD which would definitely be insufficient for the aforementioned scope. **d) Improving the Reliability of Electric Power Supply in the City of Dar Es Salaam, financed by MFA Finland** d.1) Consultant is HIFAB, Finland d.2) Contractor is ELTEL Networks TE AB, Sweden d.3) Project scope covers engineering, supply, installation, testing and commissioning for the following; d.3.1) SCADA System for 28 no's of 33/11 kV Distribution Substations, as shown in the attached List. Area Control Center (ACC) for the SCADA System of Distribution Network shall be constructed in Kinondoni North. d.3.2) Network Development (132/33 kV GIS Substation, 132 kV bay, 33/11 kV Substations, 132 kV underground cables, 33 kV OHL's/cables, etc. by Contractor) d.3.2.1) 132/33 kV New City Center GIS Substation - 2 x 132 kV transformer bays - 2 x 132/33 kV 50 MVA power transformers - 33 kV metal clad switchgear d.3.2.2) 132 kV feeder at Ilala S/S and 132 kV underground cable on Ilala S/S - New City Center S/S route. d.3.2.3) 132 kV feeder at Makambusho S/S and 132 kV	Info	

7. ドナー間の合同調整会議に係る資料

	underground cable on Makambusho S/S - New City Center S/S route. d.3.2.4) upgrading/extension of 33/11 kV substations - 33/11 kV 15 MVA power trafo at Kariakoo S/S - 33 kV Metal clad switchgear at Railway S/S d.3.2.5) 33 kV OHL's and/or 33 kV underground cables for, - New City Center S/S – Kariakoo S/S line - Railway S/S – Sokoine S/S line - New City Center S/S – City Center S/S line - New City Center S/S – Sokoine S/S 3x lines with one line having four RMU's d.4) Project effective date is 22.02.2013 d.5) Overall project completion is 24 months and currently route and site surveys are in progress. d.6) The Contract value for ELTEL is 21.8 M Euro under finance by MFA- Finland. TANESCO financed portion in the investment is 1.5 M USD (it is higher as per TANESCO representatives). **e) Construction and Rehabilitation of Substations in Arusha and Dar Es Salaam Regions in Tanzania (Electricity V Project Package III), financed by African Development Bank** e.1) Consultant is SWECO, Sweden Note: As the consultant was not present in the meeting, the following information is copied from the available documentation; e.2) Project effective date is 12.03.2013 and implementation period is 20 months from the effective date. e.3) Project scope covers engineering, supply, installation, testing and commissioning for the following; Upgrading/extension of 33/11 kV substations	Info	

7. ドナー間の合同調整会議に係る資料

	- 33/11 kV 15 MVA power transformer at Ilala S/S - 33 kV Metal clad switchgear at Sokoine S/S - 33/11 kV 15 MVA power transformer at Sokoine S/S		
3.	**TANESCO Regional Representation to assist the Transmission & Distribution Projects in Dar Es Salaam** TANESCO regional managers have expressed their interest and support for the aforementioned Projects. And consequently, they have provided the following names & contact details of their Planning Engineers whom they have assigned as TANESCO regional representatives to assist/to support the Consultants and the Contractors, as and where required; - Ilala region: Ms. Mary Kabakuzi, 0715 73 09 03 - Temeke region: Ms. Cecilia Msangi, 0713 43 22 67 - Kinondoni South region: Ms. Anita Marco, 0715 39 10 48 - Kinondoni North region: As regional manager was not present in the meeting, the representative shall be named later on	TANESCO TANESCO	
4.	**Currently Identified Interface Points between the Projects** **a) WB/TEDAP and MFA Finland** There are 11 no's of MV substations under WB/TEDAP to be connected to the SCADA system which consists of 28 no's substations in total. The scope under MFA Finland covers the supply of RTU's and their connection/communication to the Area Control Center. Therefore, the a.m. 11 no's of substations should have the required set up for SCADA connections. Parties shall have a separate meeting for coordination. **b) MFA Finland and JICA Japan**	HIFAB/ FICHTNER /TANESCO	

7. ドナー間の合同調整会議に係る資料

	b.1) 15 MVA Transformer shall be supplied as spare to TANESCO, if budget limits are not exceeded.	HIFAB	
	b.2) SCADA preparation for Substations to be financed by JICA – Japan, shall be upto and including the RTU.	YEC	
	c) WB/TEDAP and MFA Finland and JICA Japan		
	Use of common cable routes/trenches for "Ilala – Kariakoo" + "Ilala - New City Center" and "Makambusho-Oyster Bay" + Makambusho – Msasani" + "New City Center – Makambusho", etc. shall be checked at sites for optimization and shall be considered as much as the time schedules of each Project and the cable de-ratings permit.	All Parties	
5.	**Requirements and Actions by the Stake Holders**		
	a) Status for 132 kV line bays in Ubungo S/S & Ilala S/S		
	Although TANESCO has previously stated otherwise, the availability of fully furnished 132 kV line bays with the required protection, metering and controls shall be checked at project sites. And accordingly, the missing items, if any shall be included in the scope of the relevant Project as part of the installation of the second 132 circuit between these two substations.	YEC	
	b) 33 kV Lines to new Muhimbili S/S from Ilala S/S and from New City Center Substations		
	The attached Single Line Diagram shows that Muhimbili S/S shall be supplied by 33 kV OHL's from Ilala S/S or New City Center S/S. As the area is a highly densed commercial & residential location, the use of 33 kV underground cables was recommended.	YEC	
	c) 33 kV Busbar Load at Ilala S/S and Selection of supply source to Muhimbili S/S		
	It is assumed that the 33 kV busbar at Ilala S/S shall be heavily loaded. Therefore, prior to checking the possibility of supplying Muhimbili S/S from the New City Center Substation, load calculations and forecast shall be made for	YEC	

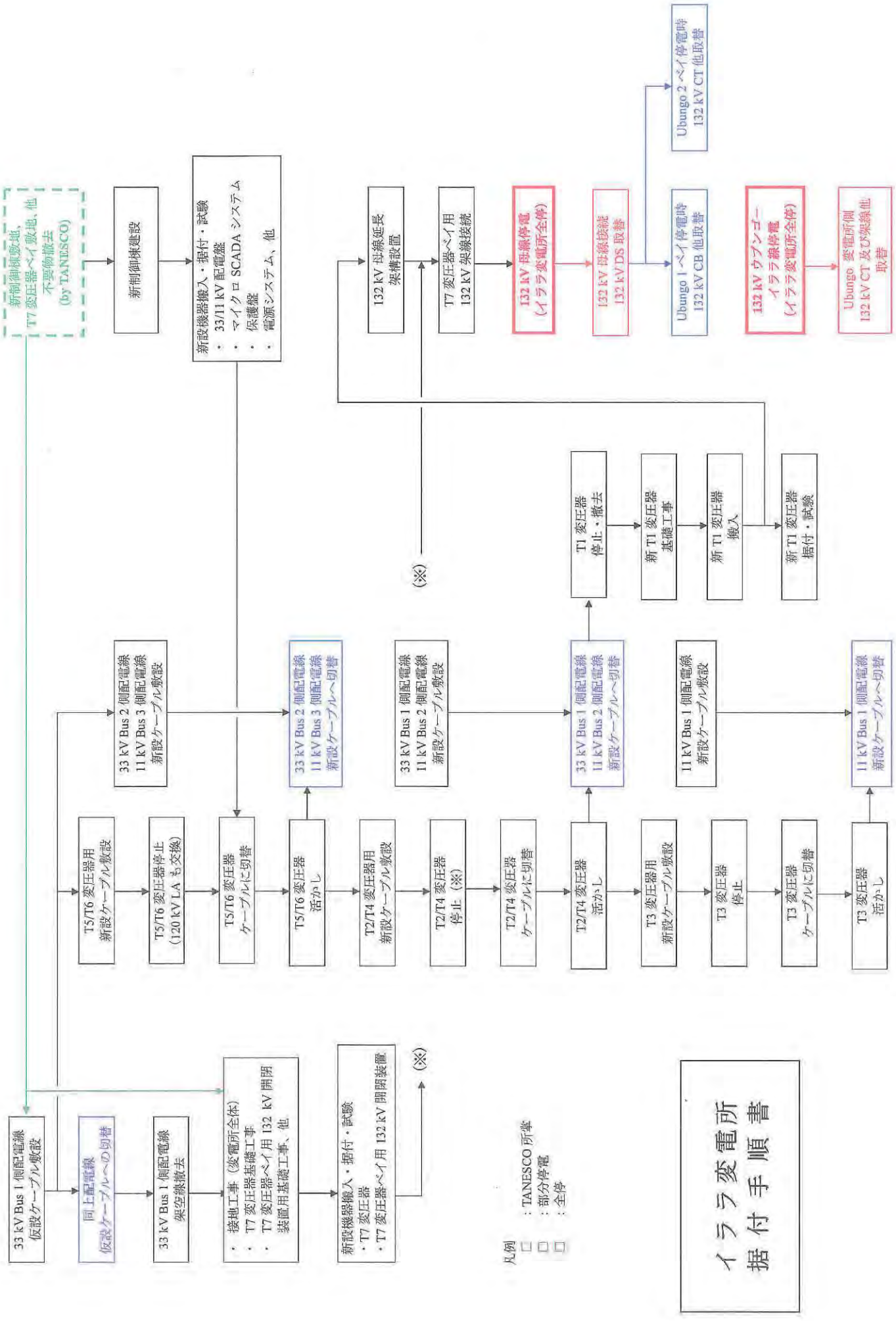
7. ドナー間の合同調整会議に係る資料

	the 33 kV busbar at Ilala Substation. In this regards, the current load data for the area around the Ilala S/S and the expected load increase during the next ten years shall be made available to Yachiyo Engineering Co. YEC shall make the load calculations/forecast at 33 kV busbar of Ilala S/S to see if spare load capacity is available. **d) Communication Interfaces/Protocols for SCADA System** The required preparations under each Project for SCADA System and the Communication Interfaces /Protocols shall be discussed separately during which the representatives from the relevant business unit of TANESCO will be present. **e) Site Survey Meeting** In order to familiarize with the site conditions at locations where common cable routes/trenches are expected, a site meeting is planned to start in Ilala substation at 10:00 AM.	TANESCO Ilala Region YEC All Parties All Parties	March end, 2013 April end, 2013 19.03.2013
6.	**Next Meeting** Next meeting is planned tentatively for 13.05.2013 at 10:00 hrs. The Venue shall be separately informed.	All Parties	

Attachments: - List of Participants
- Agenda
- Tentative Implementation Schedule among Donors' Projects
- Work Demarcation among Donors'
- List of SCADA System for 28 no's of 33/11 kV Distribution Substations

資料－８　イララ変電所増強に係る切換え手順検討

8. イララ変電所増強に係る切換え手順検討

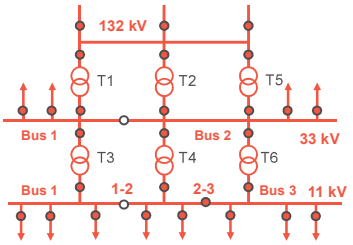


Construction Procedure for Ilala Substation

Normal Operation

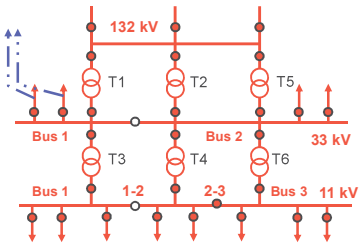
- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA

Normally open at 33 kV Bus section and 11 kV Bus 1-2 Section



33 kV Power Transmission by Temporary Cables (33 kV Bus 1 only)

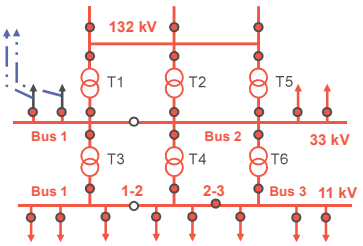
- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA
- Installation of temporary cables for 33 kV Feeders
- De-energization of 33 kV Feeders at Bus 1



33 kV Power Transmission by Temporary Cables (33 kV Bus 1 only)

- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA
- Installation of temporary cables for 33 kV Feeders
- De-energization of 33 kV Feeders at Bus 1

Energization of 33 kV Feeders at Bus 1 by temporary cables (one by one)

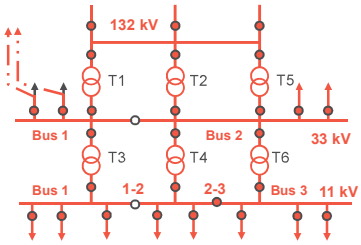


33 kV Power Transmission by Temporary Cables (33 kV Bus 1 only)

- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA
- Installation of temporary cables for 33 kV Feeders
- De-energization of 33 kV Feeders at Bus 1

Energization of 33 kV Feeders at Bus 1 by temporary cables (one by one)

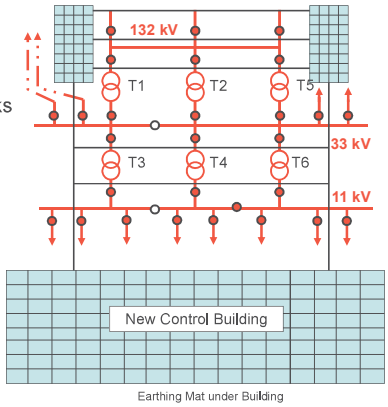
- Removal of 33 kV Overhead conductors (inside S/S)



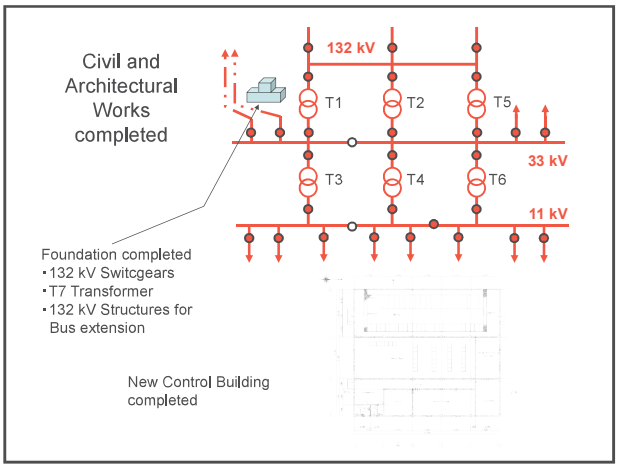
Start Earthing, Civil and Architectural Works

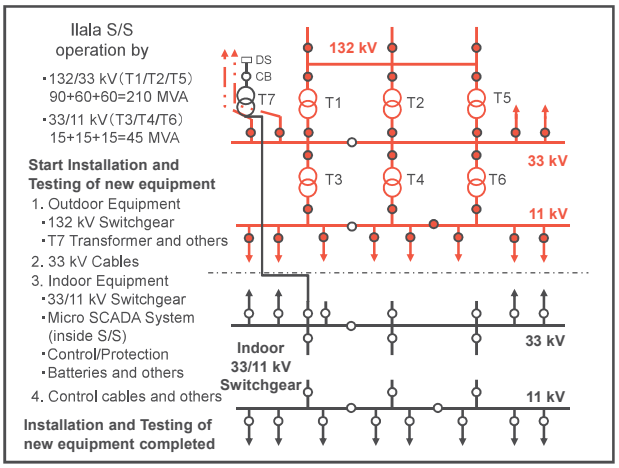
- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA

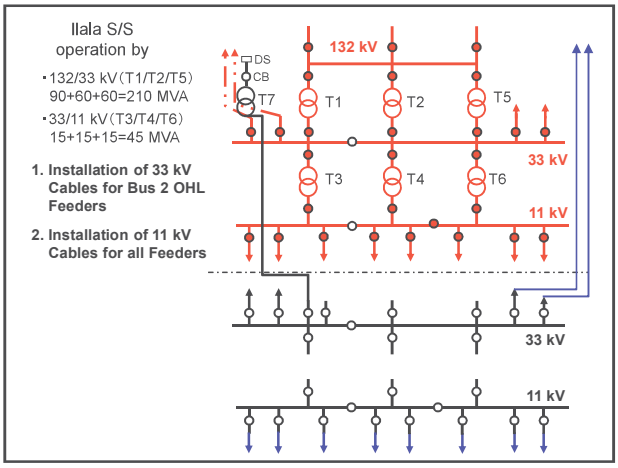
Start excavation for earthing work and foundations of New Control Building, 132 kV Switchgears, 132/33 kV Transformer, etc.

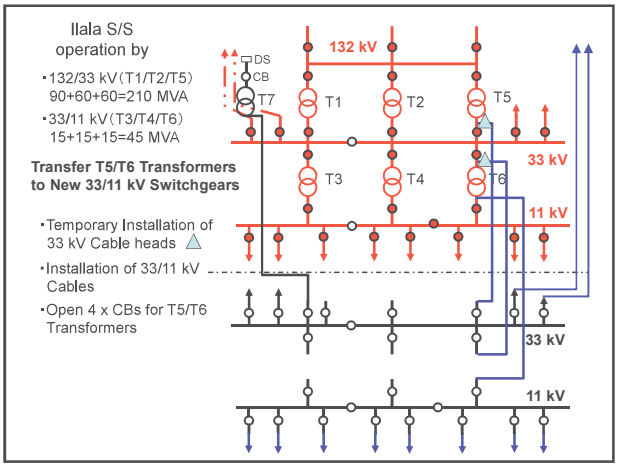


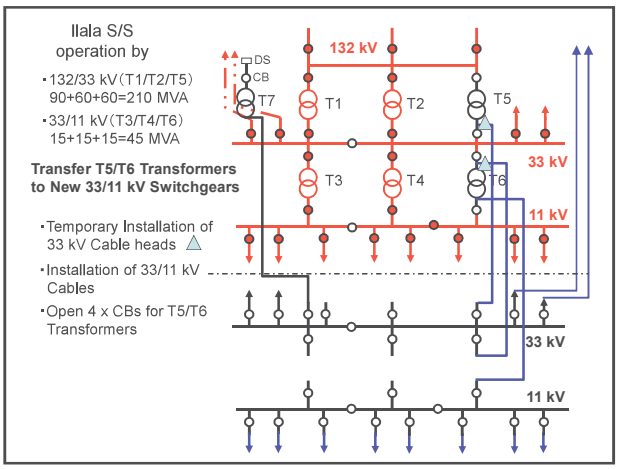
8. イララ変電所増強に係る切換え手順検討

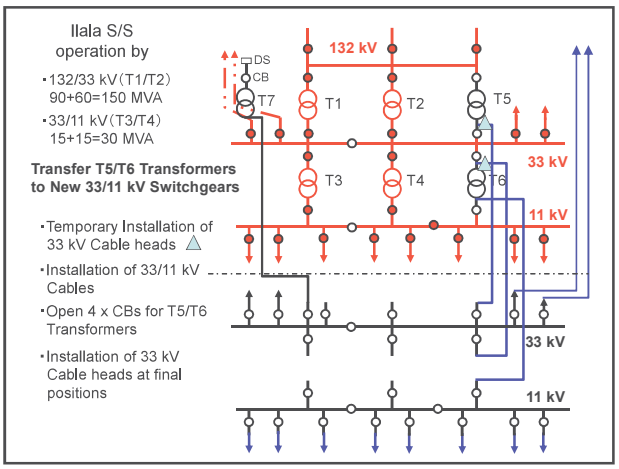




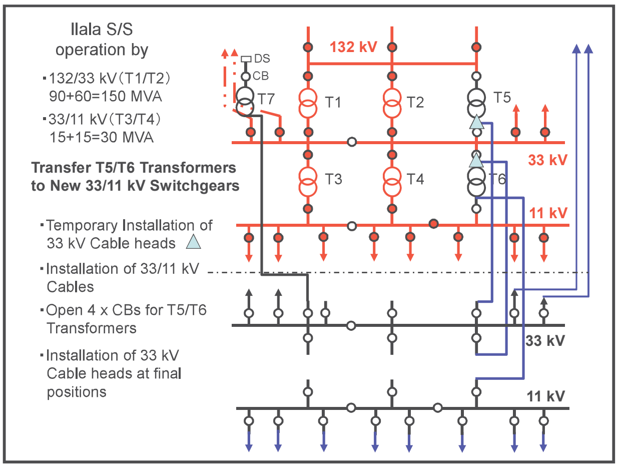


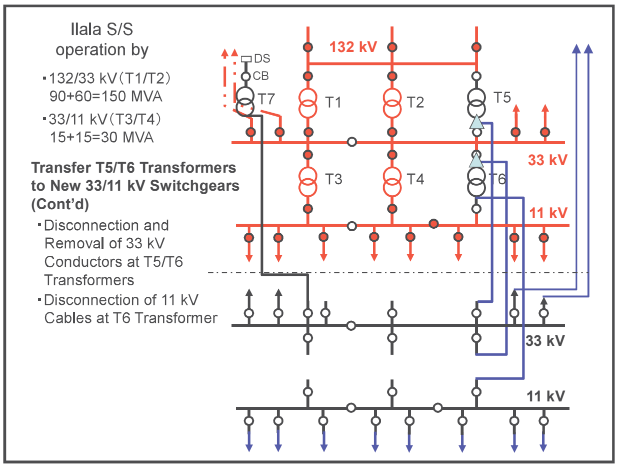


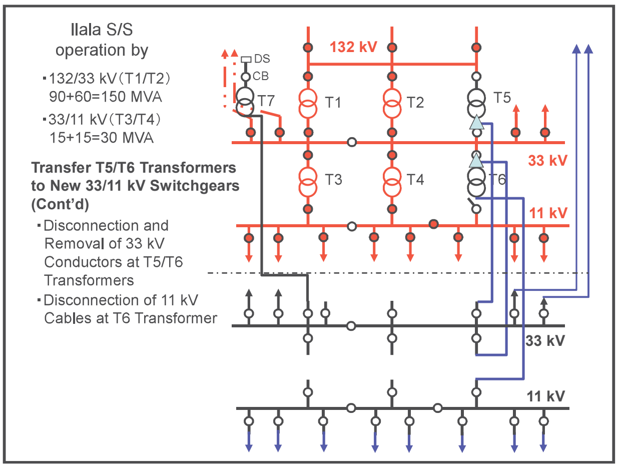


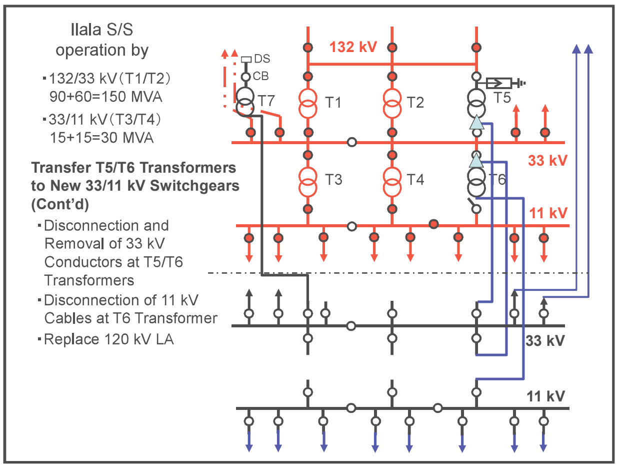


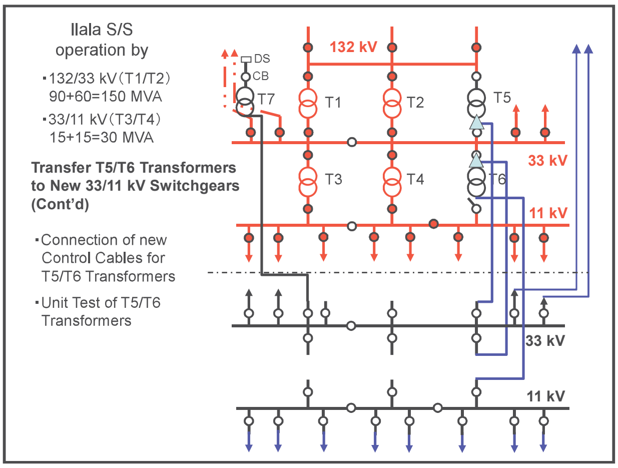
8. イララ変電所増強に係る切換え手順検討

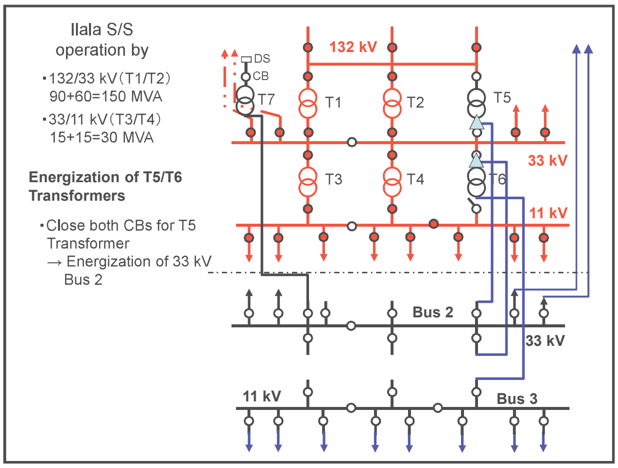


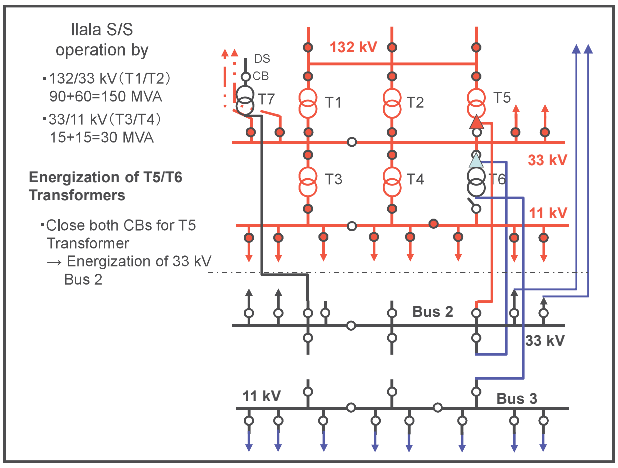


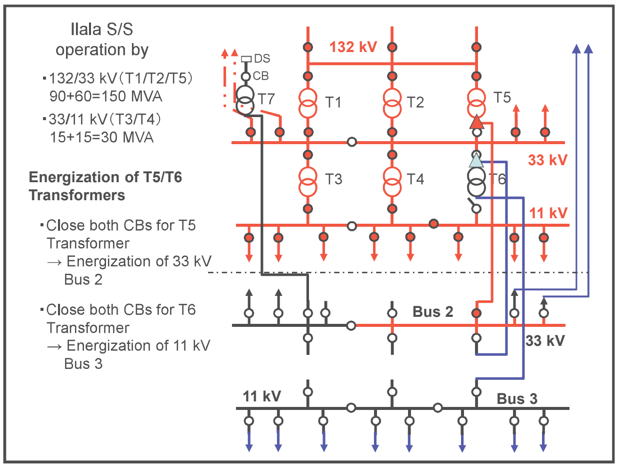


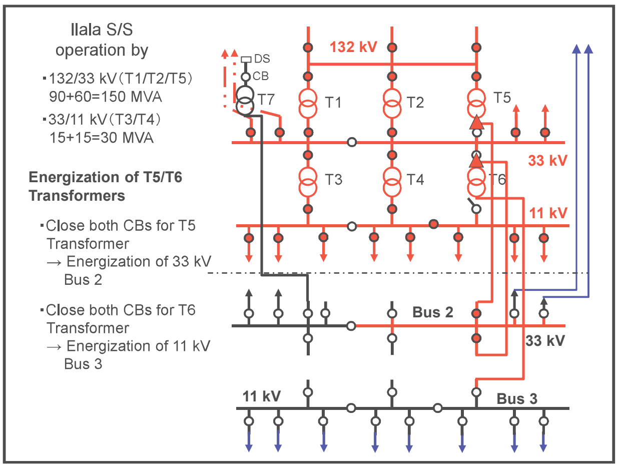


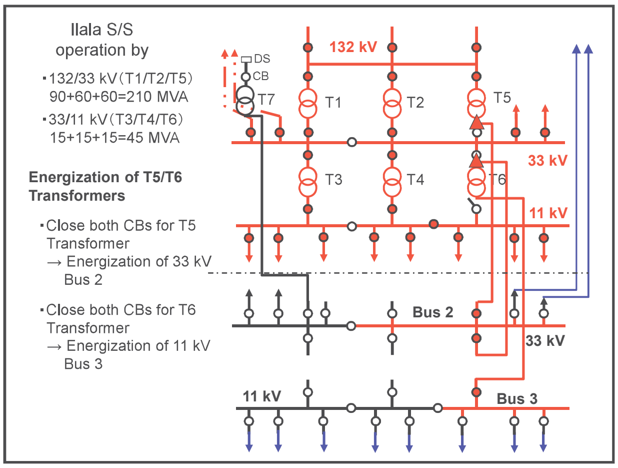


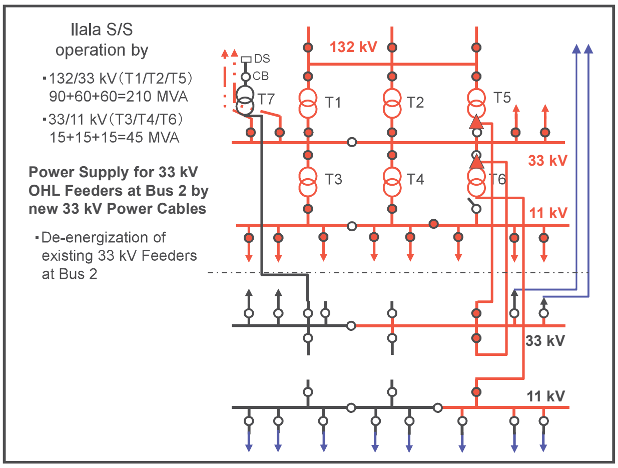


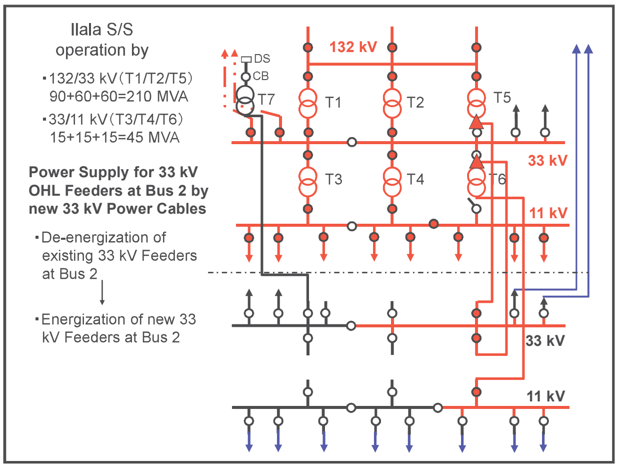

Ilala S/S
operation by
•132/33 kV (T1/T2)
90+60=150 MVA
•33/11 kV (T3/T4)
15+15=30 MVA
Energization of T5/T6 Transformers
•Close both CBs for T5 Transformer
→ Energization of 33 kV Bus 2
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
Bus 2
33 kV
11 kV
Bus 3


Ilala S/S
operation by
•132/33 kV (T1/T2/T5)
90+60=150 MVA
•33/11 kV (T3/T4)
15+15=30 MVA
Energization of T5/T6 Transformers
•Close both CBs for T5 Transformer
→ Energization of 33 kV Bus 2
•Close both CBs for T6 Transformer
→ Energization of 11 kV Bus 3
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
Bus 2
33 kV
11 kV
Bus 3

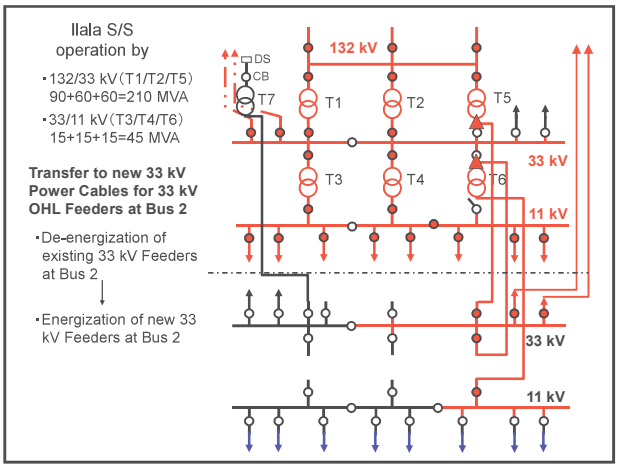

Ilala S/S
operation by
•132/33 kV (T1/T2/T5)
90+60=150 MVA
•33/11 kV (T3/T4)
15+15=30 MVA
Energization of T5/T6 Transformers
•Close both CBs for T5 Transformer
→ Energization of 33 kV Bus 2
•Close both CBs for T6 Transformer
→ Energization of 11 kV Bus 3
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
Bus 2
33 kV
11 kV
Bus 3

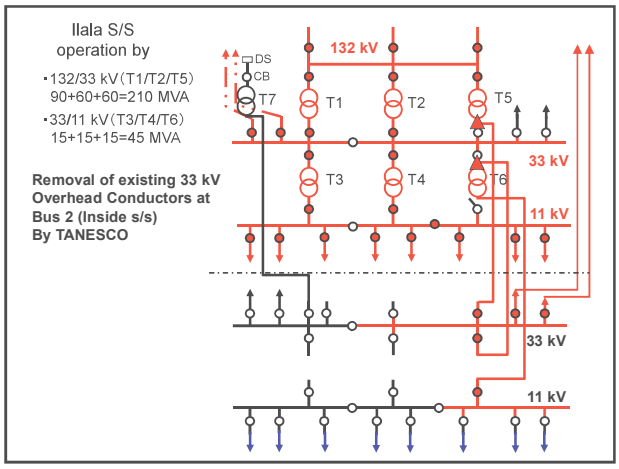

Ilala S/S
operation by
•132/33 kV (T1/T2/T5)
90+60+60=210 MVA
•33/11 kV (T3/T4/T6)
15+15+15=45 MVA
Energization of T5/T6 Transformers
•Close both CBs for T5 Transformer
→ Energization of 33 kV Bus 2
•Close both CBs for T6 Transformer
→ Energization of 11 kV Bus 3
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
Bus 2
33 kV
11 kV
Bus 3

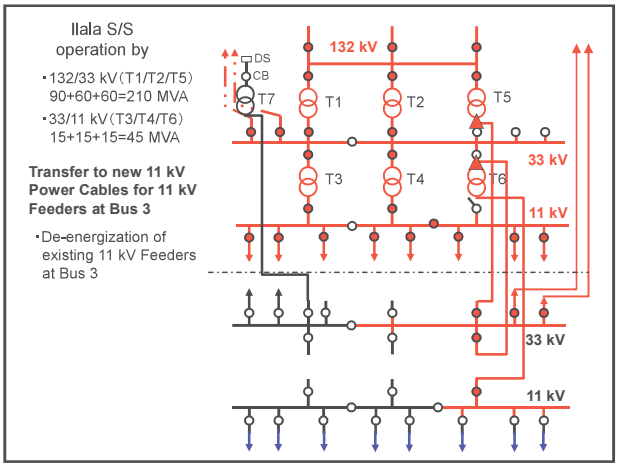

Ilala S/S
operation by
•132/33 kV (T1/T2/T5)
90+60+60=210 MVA
•33/11 kV (T3/T4/T6)
15+15+15=45 MVA
Power Supply for 33 kV OHL Feeders at Bus 2 by new 33 kV Power Cables
•De-energization of existing 33 kV Feeders at Bus 2
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV

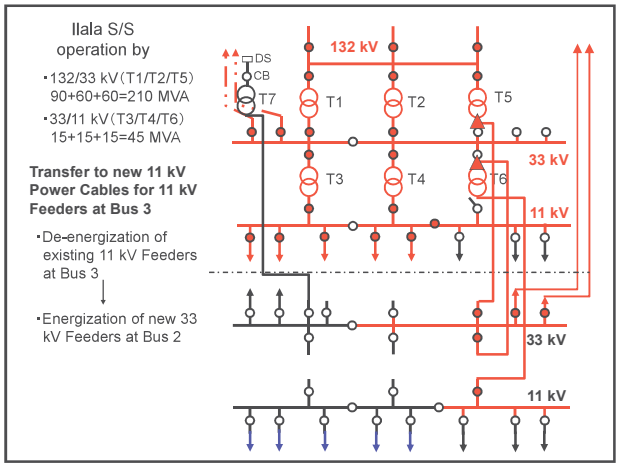

Ilala S/S
operation by
•132/33 kV (T1/T2/T5)
90+60+60=210 MVA
•33/11 kV (T3/T4/T6)
15+15+15=45 MVA
Power Supply for 33 kV OHL Feeders at Bus 2 by new 33 kV Power Cables
•De-energization of existing 33 kV Feeders at Bus 2
•Energization of new 33 kV Feeders at Bus 2
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV

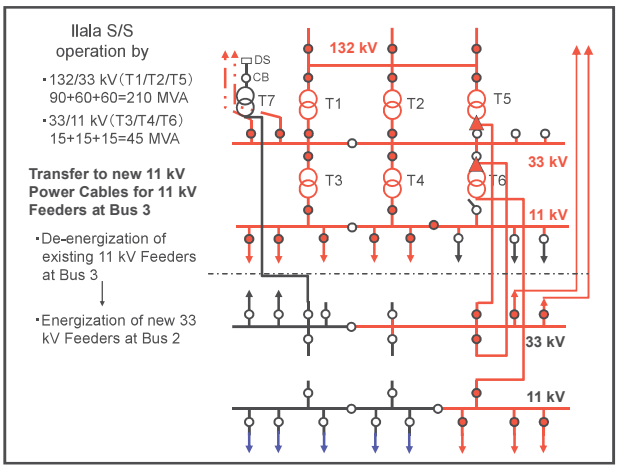
8. イララ変電所増強に係る切換え手順検討

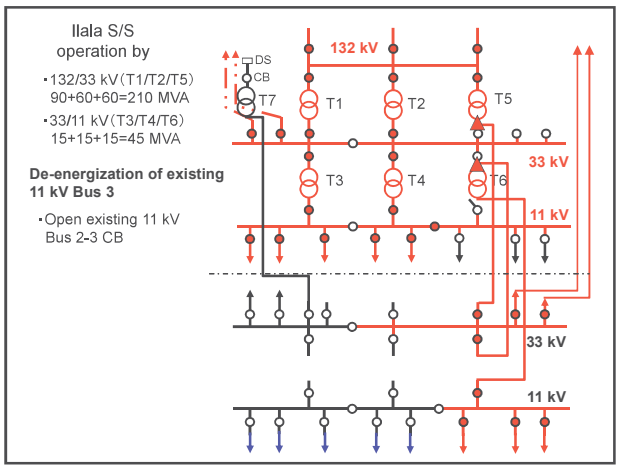




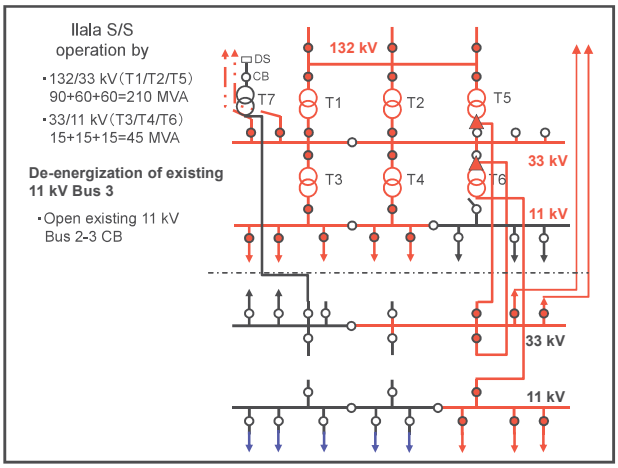


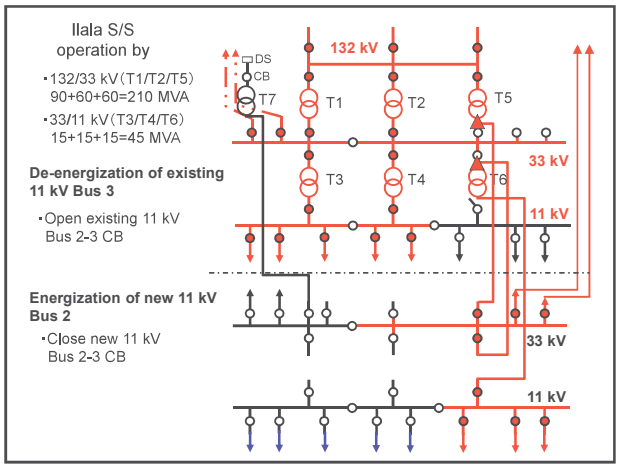


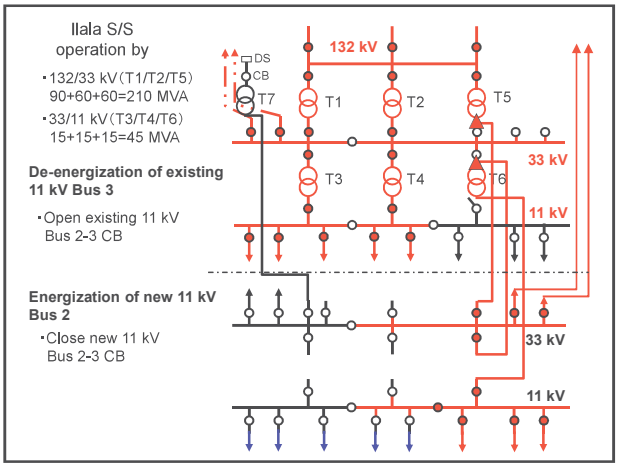


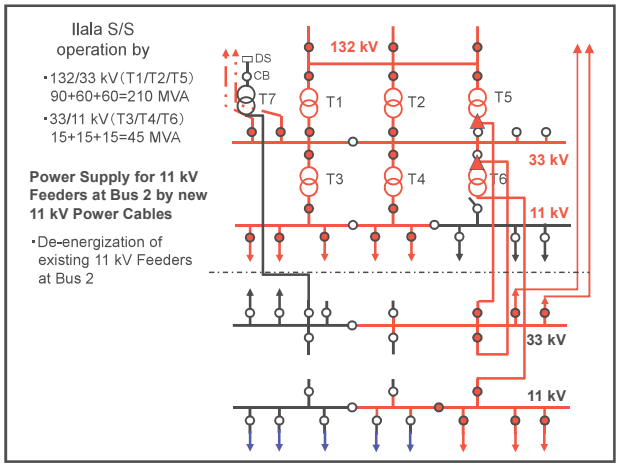


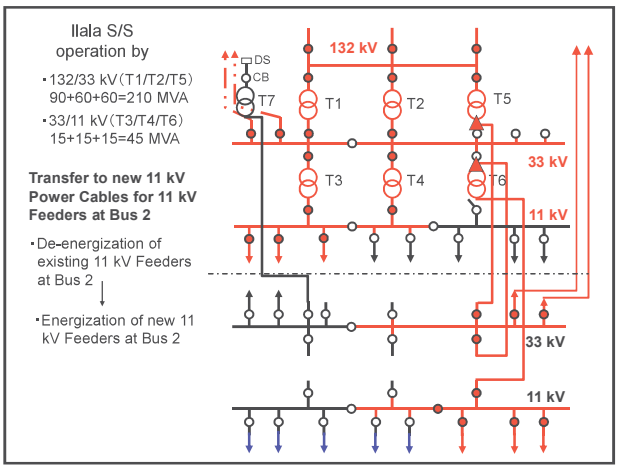
8. イララ変電所増強に係る切換え手順検討

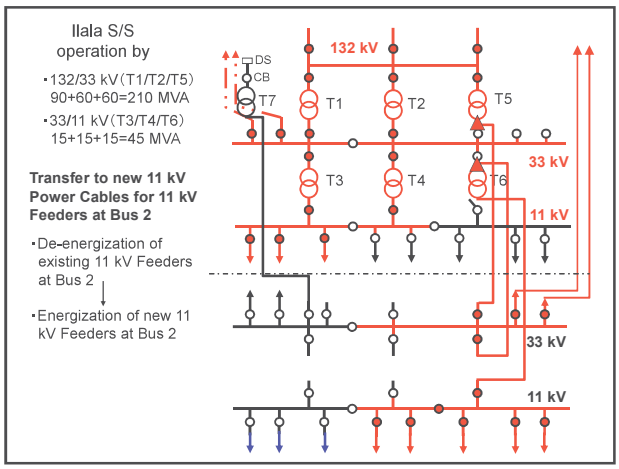












8. イララ変電所増強に係る切換え手順検討

Ilala S/S
operation by

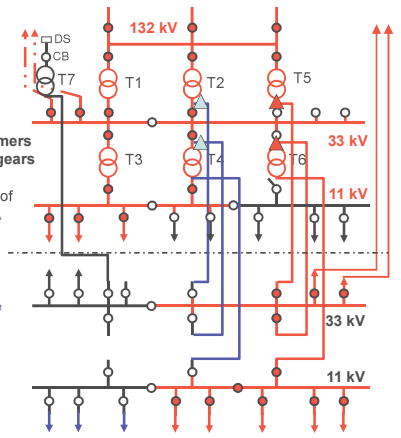
- 132/33 kV(T1/T2/T5)
  90+60+60=210 MVA
- 33/11 kV(T3/T4/T6)
  15+15+15=45 MVA

Transfer T2/T4 Transformers to New 33/11 kV Switchgears

- Temporary Installation of 33 kV Cable heads △
- Installation of 33/11 kV Cables

Note) Actually, this cable installation work should be done at a time of T5/T6 cable installation work.

- Open 4 x CBs for both T2/T4 Transformers



Ilala S/S
operation by

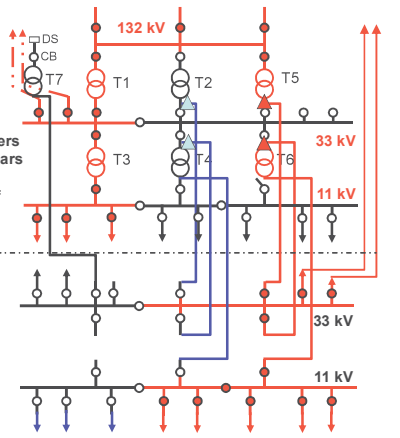
- 132/33 kV(T1/T5)
  90+60=150 MVA
- 33/11 kV(T3/T6)
  15+15=30 MVA

Transfer T2/T4 Transformers to New 33/11 kV Switchgears (Cont'd)

- Temporary Installation of 33 kV Cable heads △
- Installation of 33/11 kV Cables

Note) Actually, this cable installation work should be done at a time of T5/T6 cable installation work.

- Open 4 x CBs for both T2/T4 Transformers

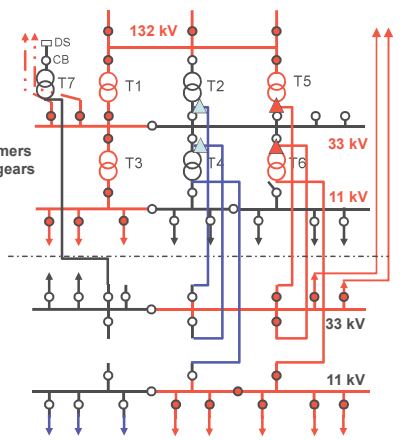


Ilala S/S
operation by

- 132/33 kV(T1/T5)
  90+60=150 MVA
- 33/11 kV(T3/T6)
  15+15=30 MVA

Transfer T2/T4 Transformers to New 33/11 kV Switchgears (Cont'd)

- Installation of 33 kV Cable heads at final positions △

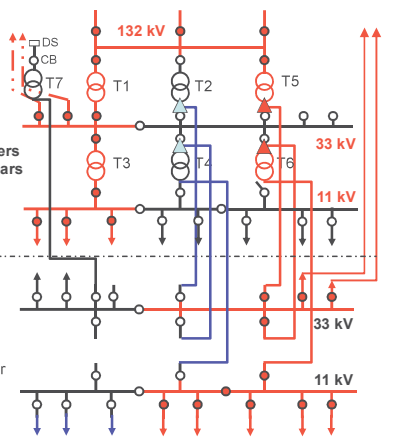


Ilala S/S
operation by

- 132/33 kV(T1/T5)
  90+60=150 MVA
- 33/11 kV(T3/T6)
  15+15=30 MVA

Transfer T2/T4 Transformers to New 33/11 kV Switchgears (Cont'd)

- Installation of 33 kV Cable heads at final positions △
- Disconnection and Removal of 33 kV Conductors at T5/T6 Transformers
- Disconnection of 11 kV Cables at T6 Transformer

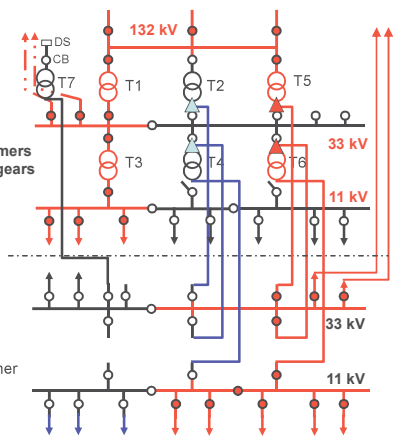


Ilala S/S
operation by

- 132/33 kV(T1/T5)
  90+60=150 MVA
- 33/11 kV(T3/T6)
  15+15=30 MVA

Transfer T2/T4 Transformers to New 33/11 kV Switchgears (Cont'd)

- Installation of 33 kV Cable heads at final positions △
- Disconnection and Removal of 33 kV Conductors at T2/T4 Transformers
- Disconnection of 11 kV Cables at T4 Transformer

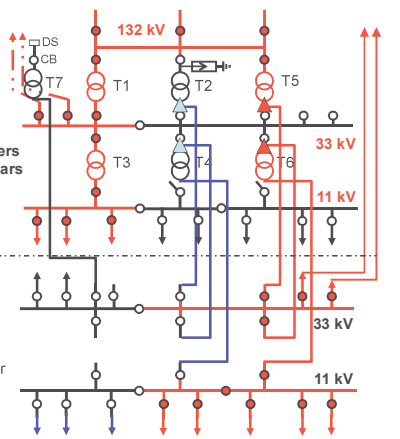


Ilala S/S
operation by

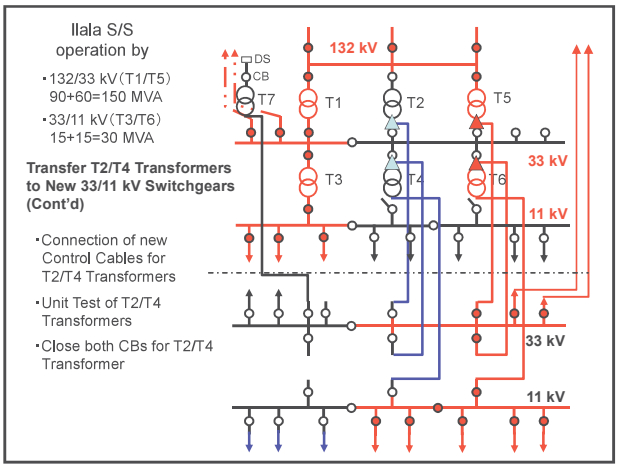
- 132/33 kV(T1/T5)
  90+60=150 MVA
- 33/11 kV(T3/T6)
  15+15=30 MVA

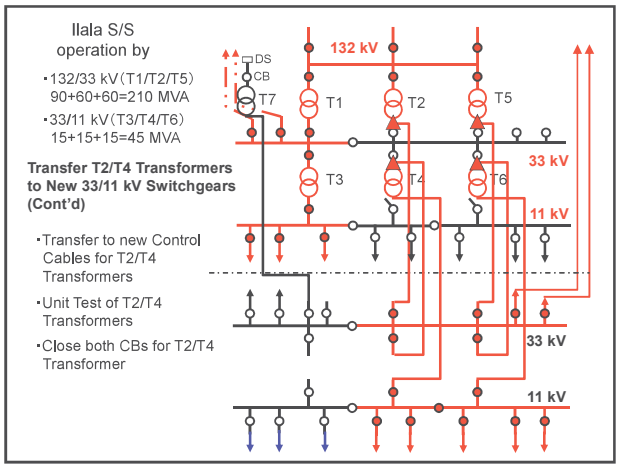
Transfer T2/T4 Transformers to New 33/11 kV Switchgears (Cont'd)

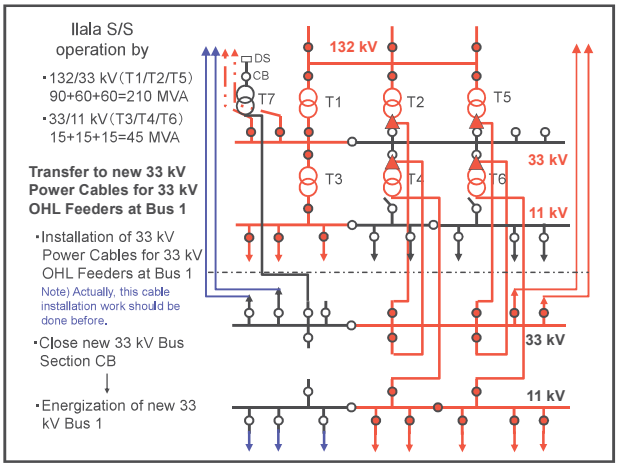
- Installation of 33 kV Cable heads at final positions △
- Disconnection and Removal of 33 kV Conductors at T2/T4 Transformers
- Disconnection of 11 kV Cables at T4 Transformer
- Replace 120 kV LA

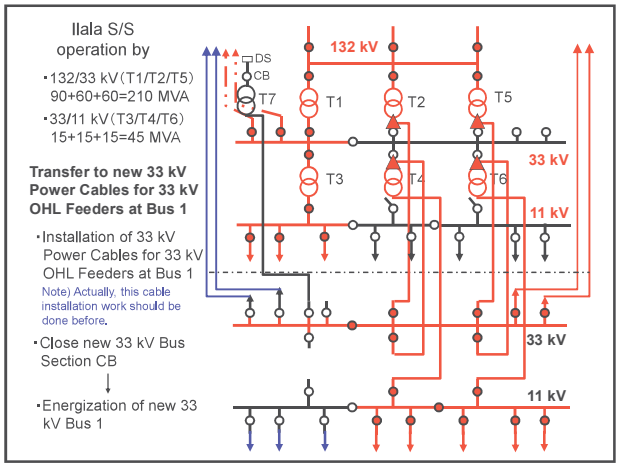


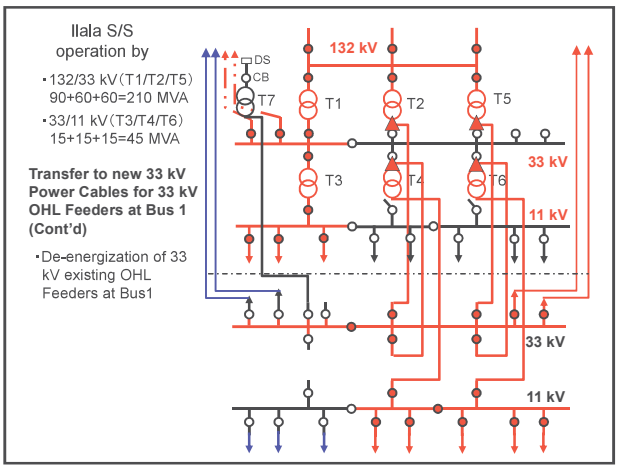
8. イララ変電所増強に係る切換え手順検討

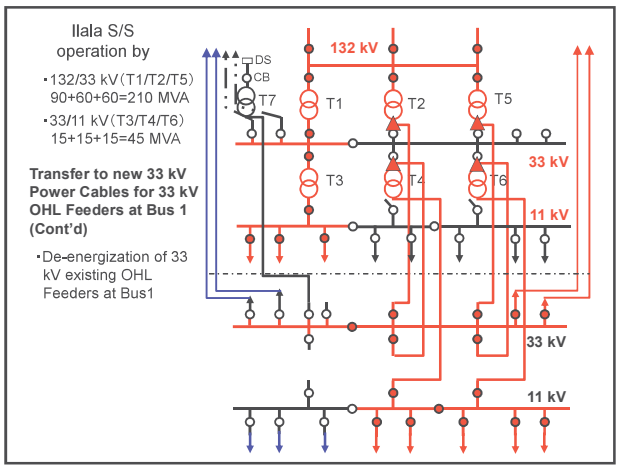












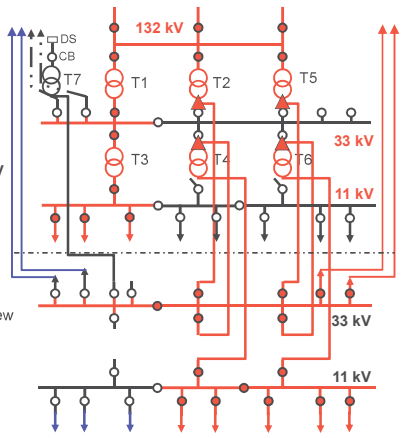
8. イララ変電所増強に係る切換え手順検討

Ilala S/S operation by

- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA

Transfer to new 33 kV Power Cables for 33 kV OHL Feeders at Bus 1 (Cont'd)

- De-energization of 33 kV existing OHL Feeders at Bus1
- Energization of 33 kV Feeders at Bus1 on new Switchgear

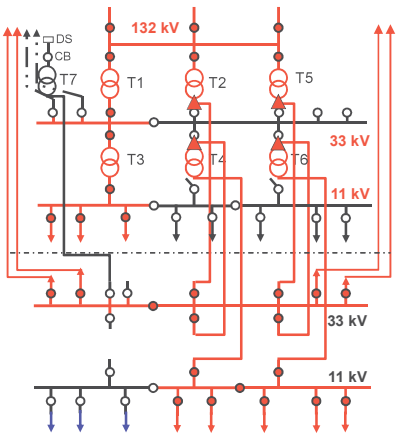


Ilala S/S operation by

- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA

Transfer to new 33 kV Power Cables for 33 kV OHL Feeders at Bus 1 (Cont'd)

- De-energization of 33 kV existing OHL Feeders at Bus 1
- Energization of 33 kV Feeders at Bus 1 on new Switchgear

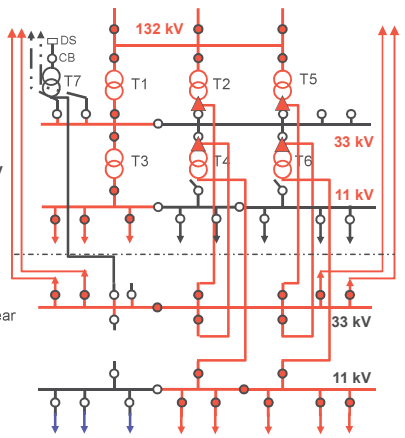


Ilala S/S operation by

- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA

Transfer to new 11 kV Power Cables for 11 kV Feeders at Bus 1

- Close Bus Section CB (Bus 1-2) on new 11 kV Switchgear
- Energization of 11 kV Bus1 on new Switchgear

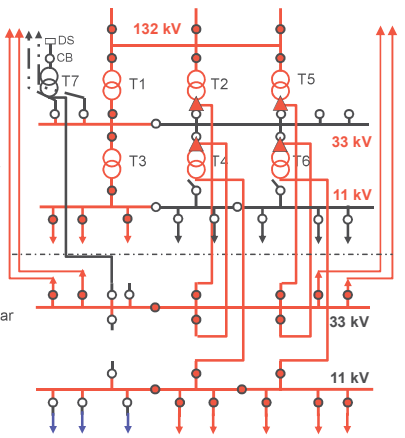


Ilala S/S operation by

- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA

Transfer to new 11 kV Power Cables for 11 kV Feeders at Bus 1

- Close Bus Section CB (Bus 1-2) on new 11 kV Switchgear
- Energization of 11 kV Bus1 on new Switchgear

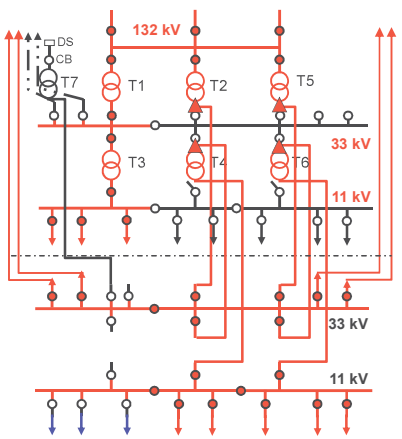


Ilala S/S operation by

- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA

Transfer to new 11 kV Power Cables for 11 kV Feeders at Bus 1 (Cont'd)

- De-energization of 11 kV existing OHL Feeders at Bus1

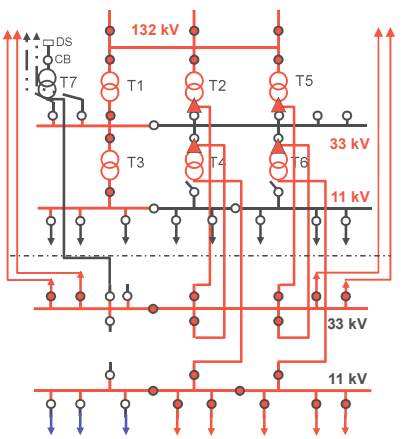


Ilala S/S operation by

- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA

Transfer to new 11 kV Power Cables for 11 kV Feeders at Bus 1 (Cont'd)

- De-energization of 11 kV existing OHL Feeders at Bus1



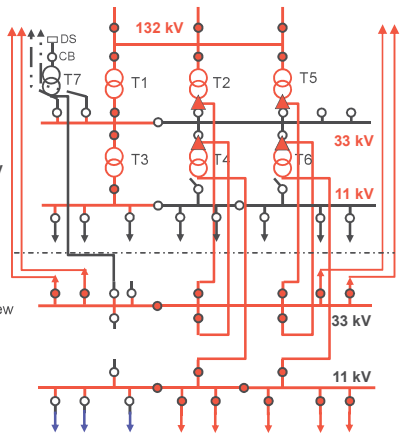
8. イララ変電所増強に係る切換え手順検討

Ilala S/S
operation by

- 132/33 kV(T2/T5) 60+60=120 MVA
- 33/11 kV(T4/T6) 15+15=30 MVA

Transfer to new 11 kV Power Cables for 11 kV Feeders at Bus 1 (Cont'd)

- De-energization of 11 kV existing OHL Feeders at Bus1
- Energization of 11 kV Feeders at Bus1 on new Switchgear

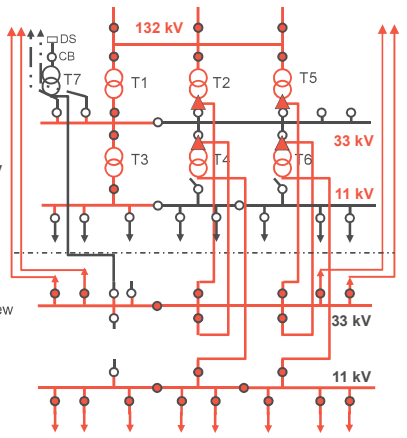


Ilala S/S
operation by

- 132/33 kV(T2/T5) 60+60=120 MVA
- 33/11 kV(T4/T6) 15+15=30 MVA

Transfer to new 11 kV Power Cables for 11 kV Feeders at Bus 1 (Cont'd)

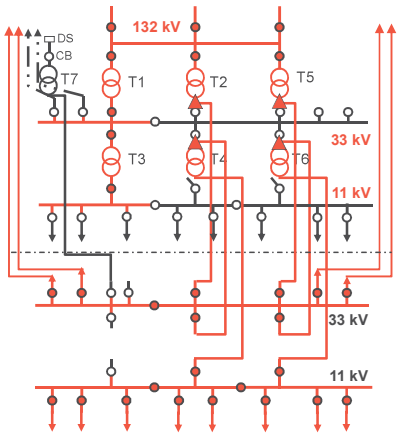
- De-energization of 11 kV existing OHL Feeders at Bus1
- Energization of 11 kV Feeders at Bus1 on new Switchgear



Ilala S/S
operation by

- 132/33 kV(T2/T5) 60+60=120 MVA
- 33/11 kV(T4/T6) 15+15=30 MVA

Transfer of all 33/11 kV Feeders to new Switchgear has been completed.

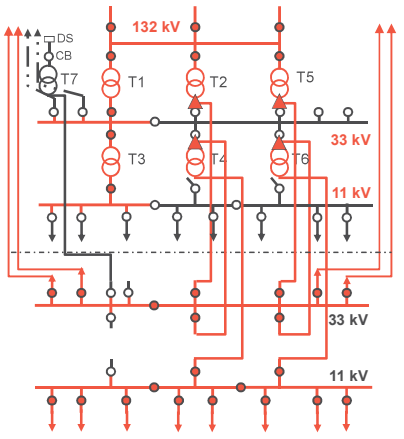


Ilala S/S
operation by

- 132/33 kV(T2/T5) 60+60=120 MVA
- 33/11 kV(T4/T6) 15+15=30 MVA

De-energization of Both 33/11 kV Bus 1

- Open all CBs for T1/T3
  ↓
- De-energization of T1/T3 and both 33/11 kV Bus 1 of existing 33/11/kV Switchgear



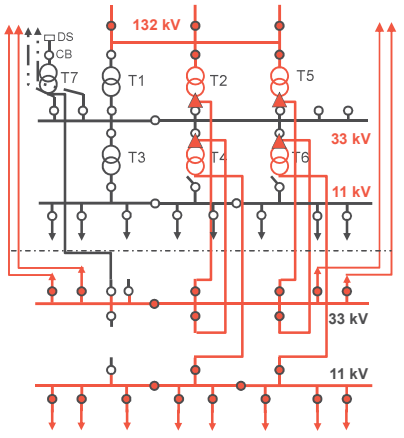
Ilala S/S
operation by

- 132/33 kV(T2/T5) 60+60=120 MVA
- 33/11 kV(T4/T6) 15+15=30 MVA

De-energization of Both 33/11 kV Bus 1

- Open all CBs for T1/T3
  ↓
- De-energization of T1/T3 and both 33/11 kV Bus 1 of existing 33/11/kV Switchgear

Removal of 33 kV Temporary Cables

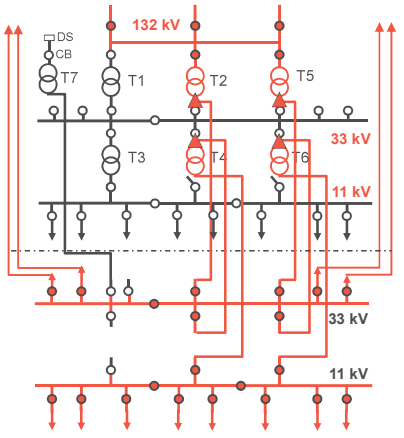


Ilala S/S
operation by

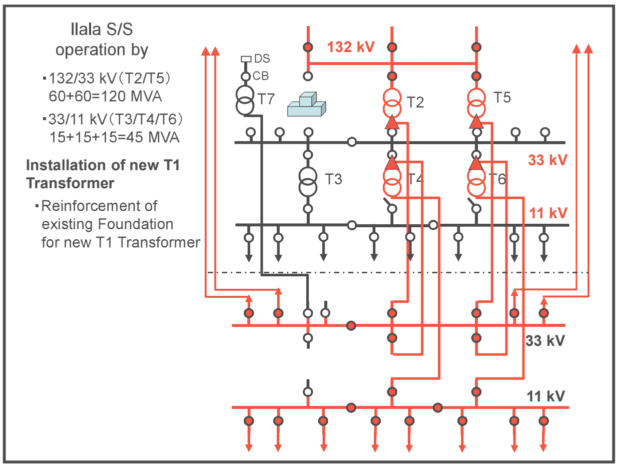
- 132/33 kV(T2/T5) 60+60=120 MVA
- 33/11 kV(T3/T4/T6) 15+15+15=45 MVA

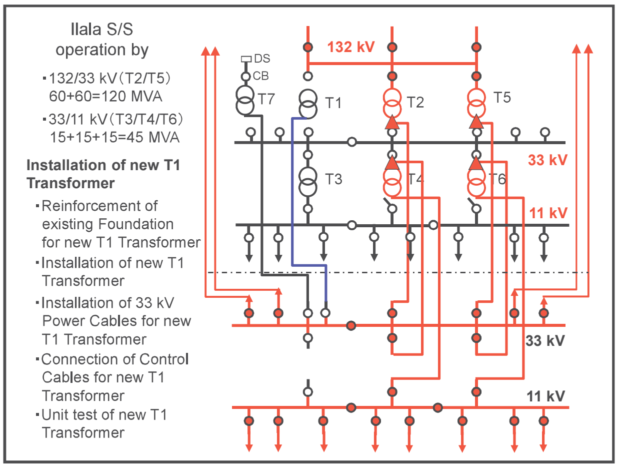
Removal of T1 Transformer

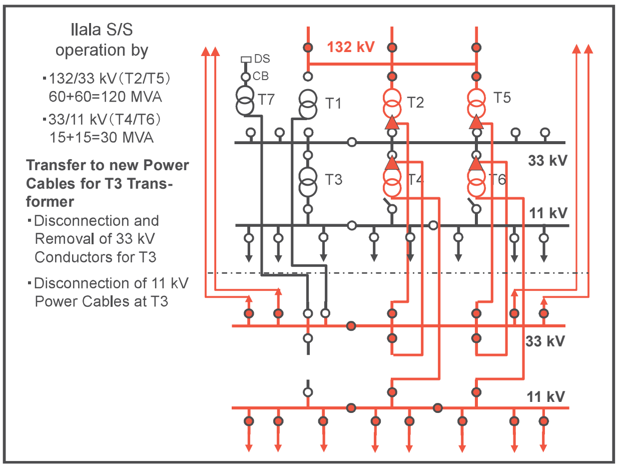
- Disconnection and removal of both 132/33 kV Conductors for T1 Transformer
- Removal of T1 Transformer

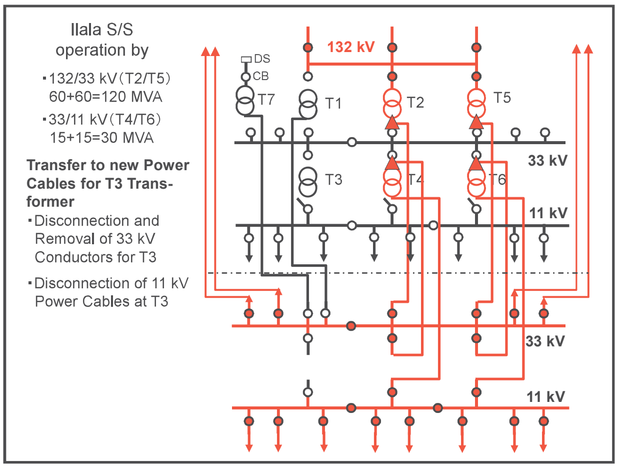


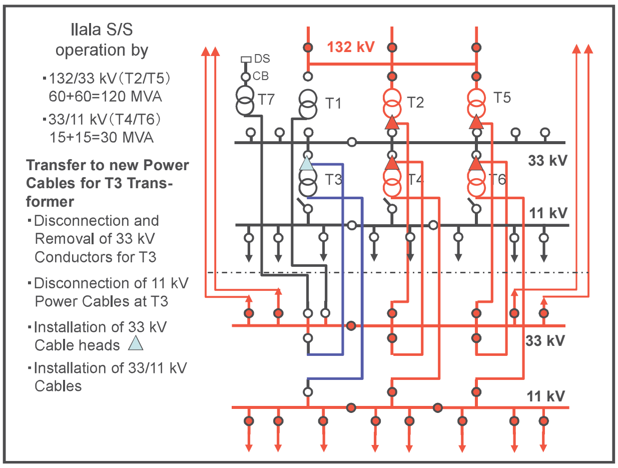
8. イララ変電所増強に係る切換え手順検討

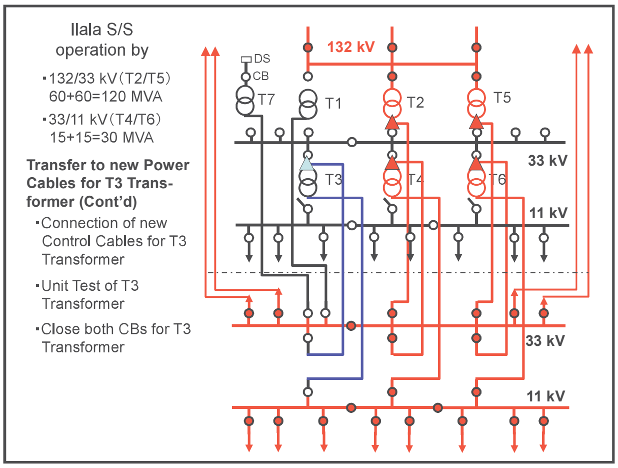




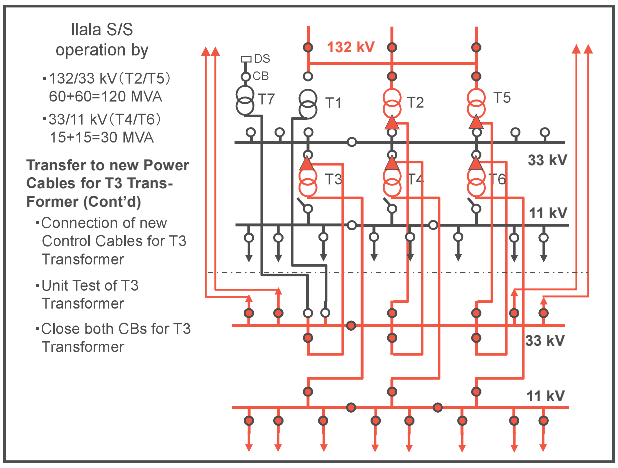


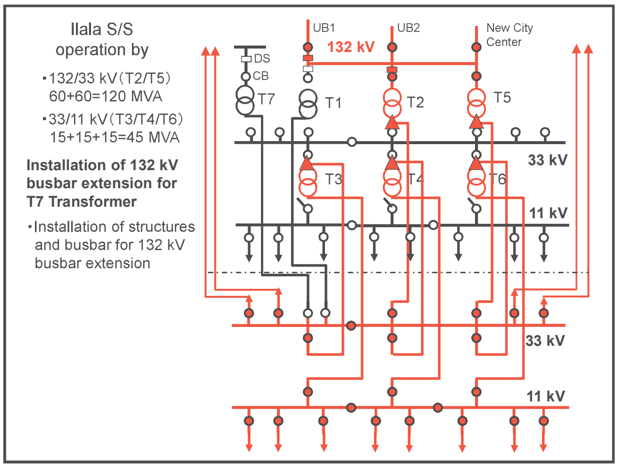


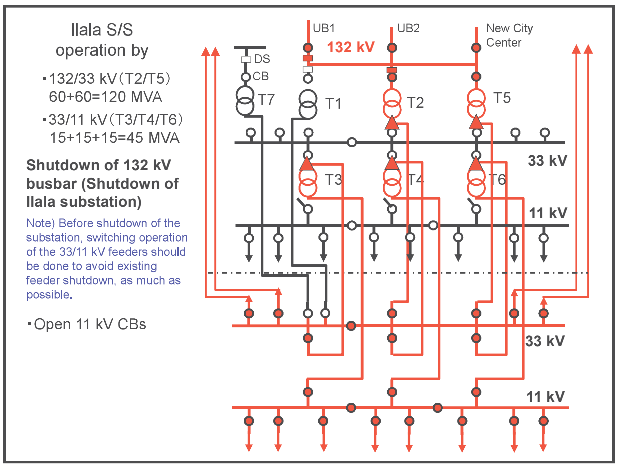


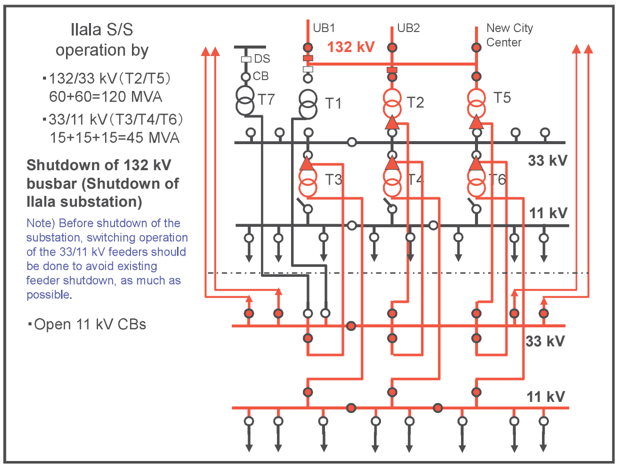


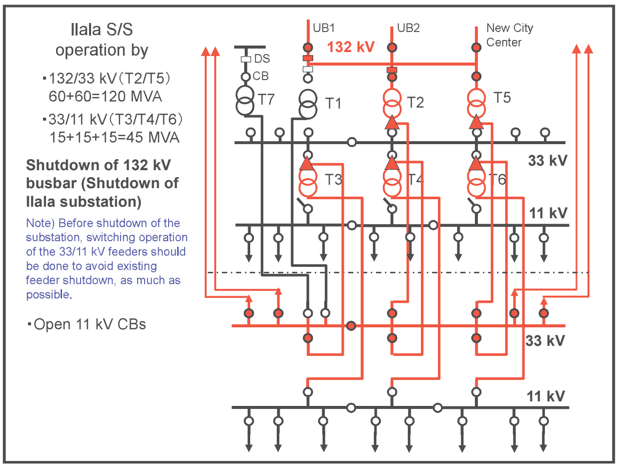
8. イララ変電所増強に係る切換え手順検討

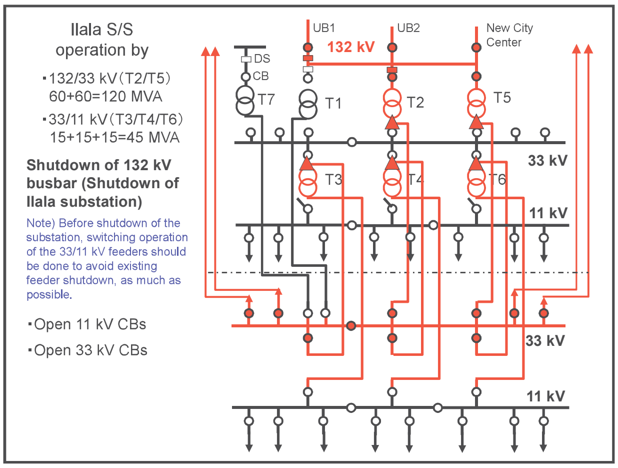




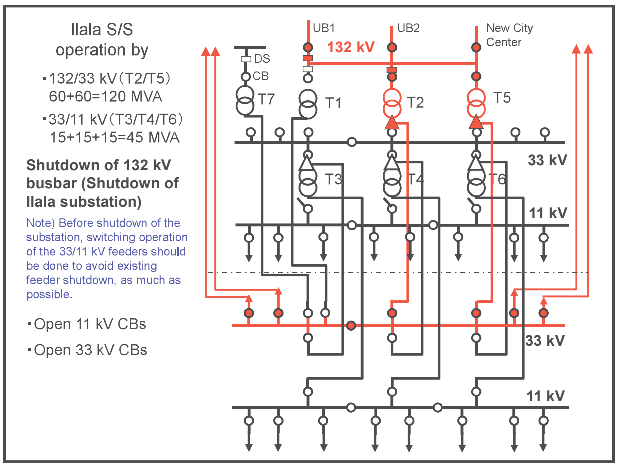


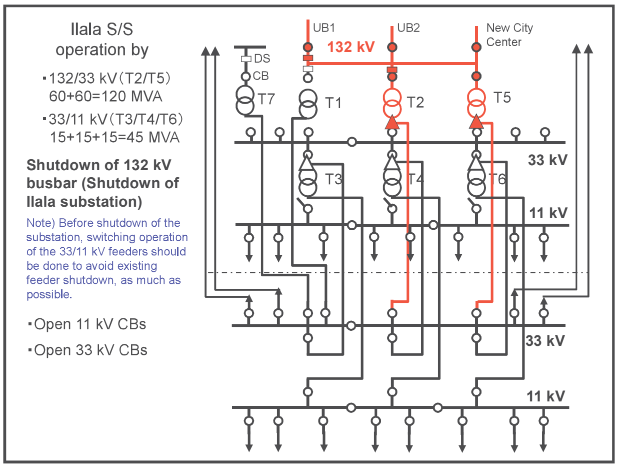


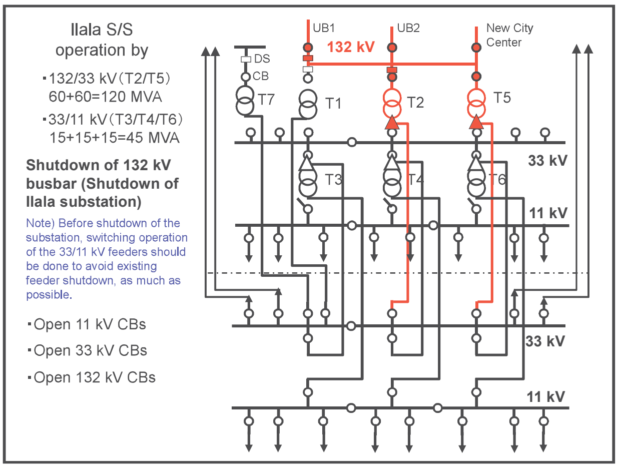


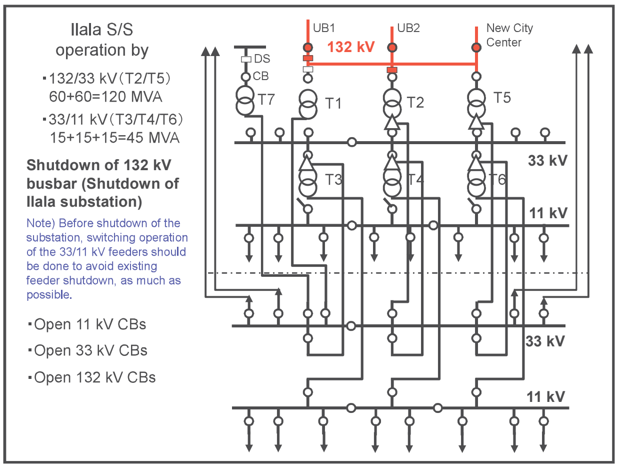


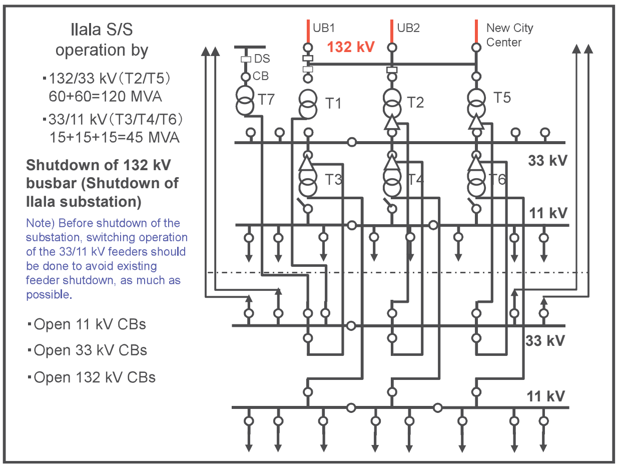
8. イララ変電所増強に係る切換え手順検討

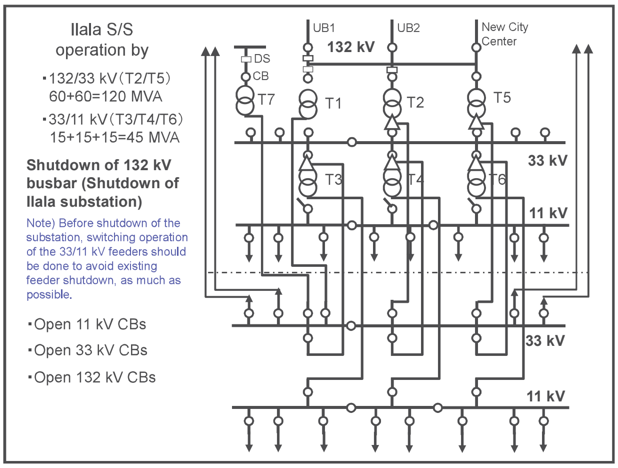












8. イララ変電所増強に係る切換え手順検討

Ilala S/S operation by

- 132/33 kV（T2/T5） 60+60=120 MVA
- 33/11 kV（T3/T4/T6） 15+15+15=45 MVA

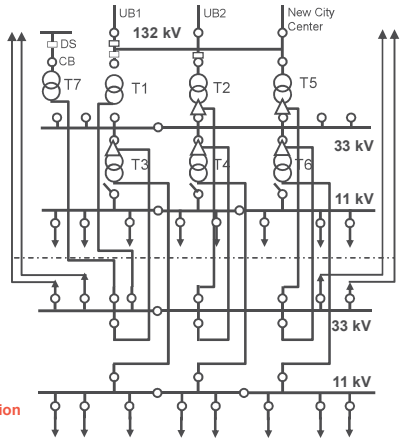
Shutdown of 132 kV busbar (Shutdown of Ilala substation)

Note) Before shutdown of the substation, switching operation of the 33/11 kV feeders should be done to avoid existing feeder shutdown, as much as possible.

- Open 11 kV CBs
- Open 33 kV CBs
- Open 132 kV CBs

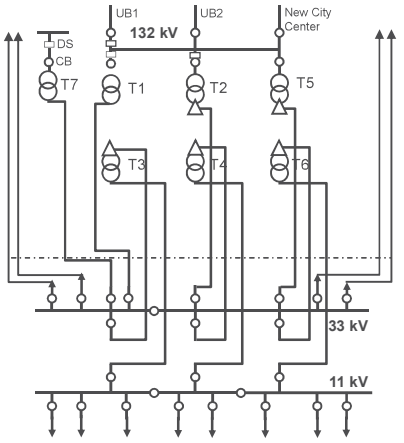
↓

Shutdown Ilala substation



Ilala S/S operation by

- 132/33 kV 0 MVA
- 33/11 kV 0 MVA

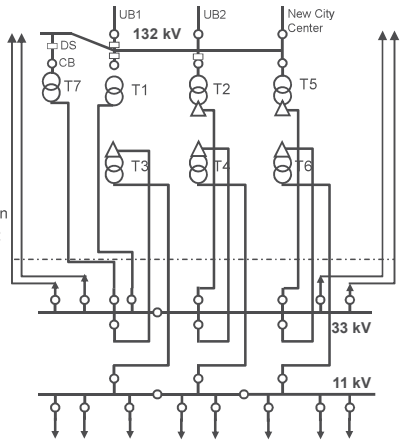


Ilala S/S operation by

- 132/33 kV 0 MVA
- 33/11 kV 0 MVA

Start Installation and replacement work of 132 kV equipment

- 132 kV busbar extension
- Replacement of 3 x 132 kV DS

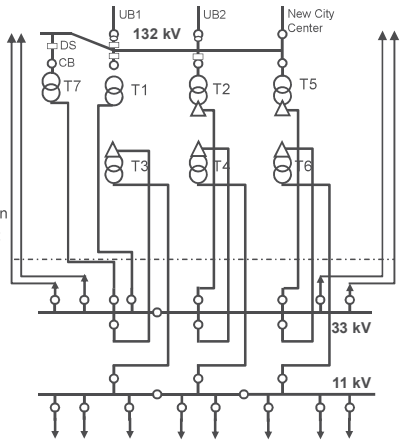


Ilala S/S operation by

- 132/33 kV 0 MVA
- 33/11 kV 0 MVA

Start Installation and replacement work of 132 kV equipment

- 132 kV busbar extension
- Replacement of 3 x 132 kV DS
- Replacement of 132 kV CB (UB1 bay) & CT (UB1 & UB2)

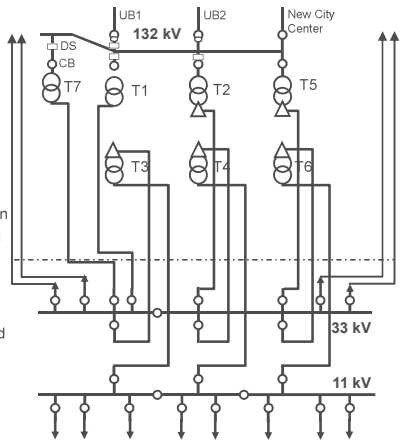


Ilala S/S operation by

- 132/33 kV 0 MVA
- 33/11 kV 0 MVA

Start Installation and replacement work of 132 kV equipment

- 132 kV busbar extension
- Replacement of 3 x 132 kV DS
- Replacement of 132 kV CB (UB1 bay) & CT (UB1 & UB2)
- Connection of Overhead conductors for T1

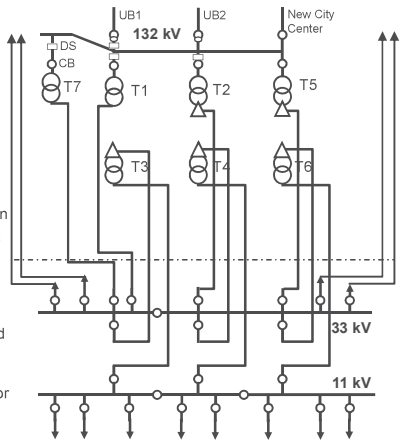


Ilala S/S operation by

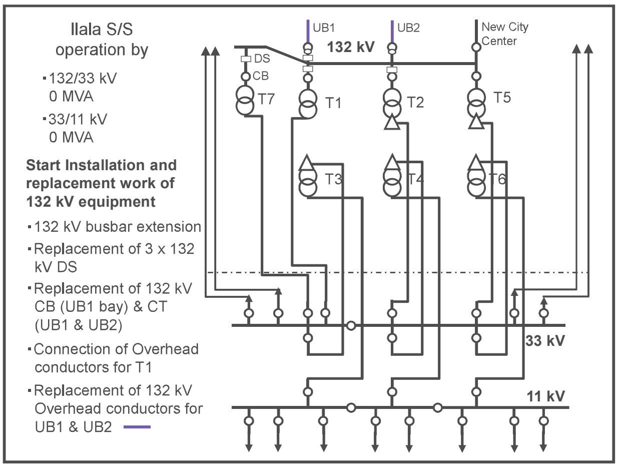
- 132/33 kV 0 MVA
- 33/11 kV 0 MVA

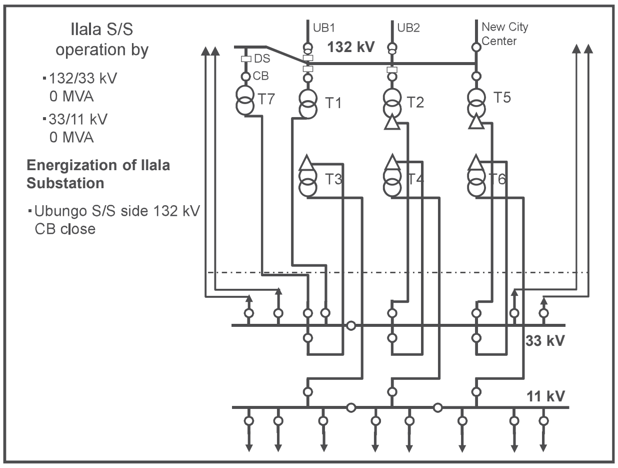
Start Installation and replacement work of 132 kV equipment

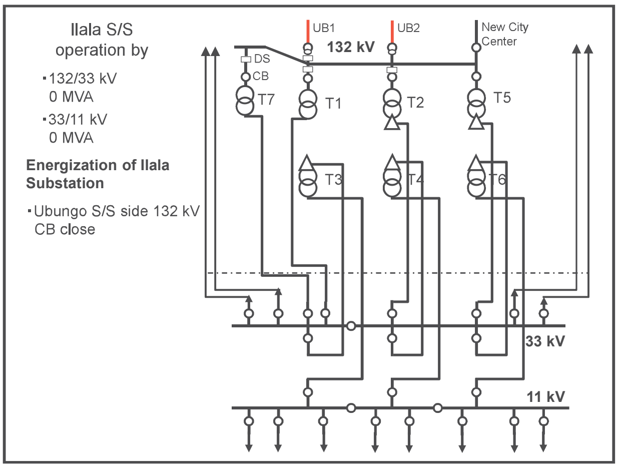
- 132 kV busbar extension
- Replacement of 3 x 132 kV DS
- Replacement of 132 kV CB (UB1 bay) & CT (UB1 & UB2)
- Connection of Overhead conductors for T1
- Replacement of 132 kV Overhead conductors for UB1 & UB2

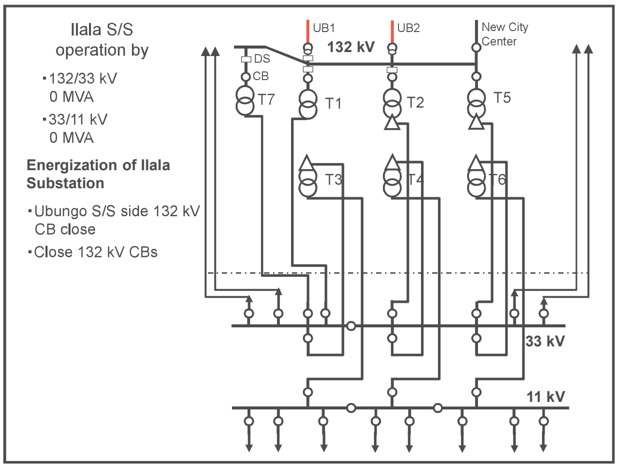


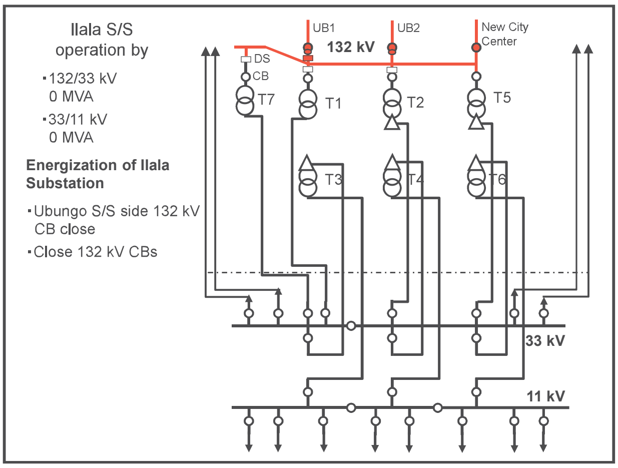
8. イララ変電所増強に係る切換え手順検討

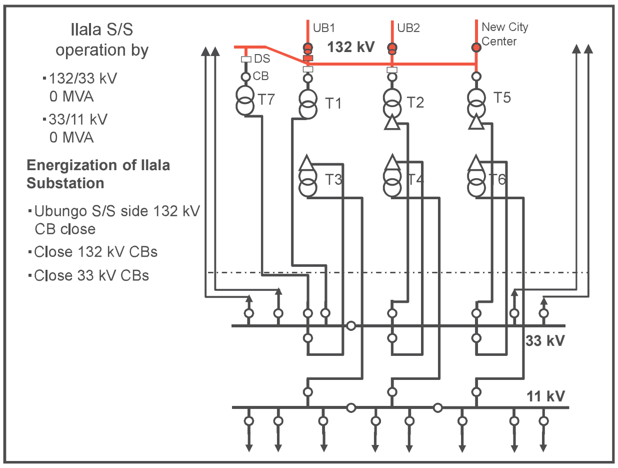




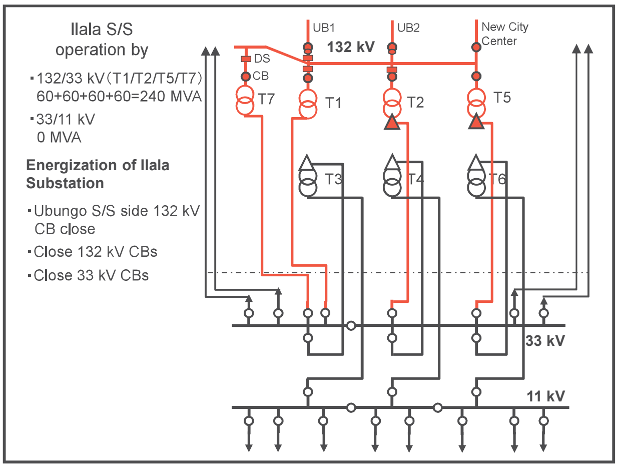


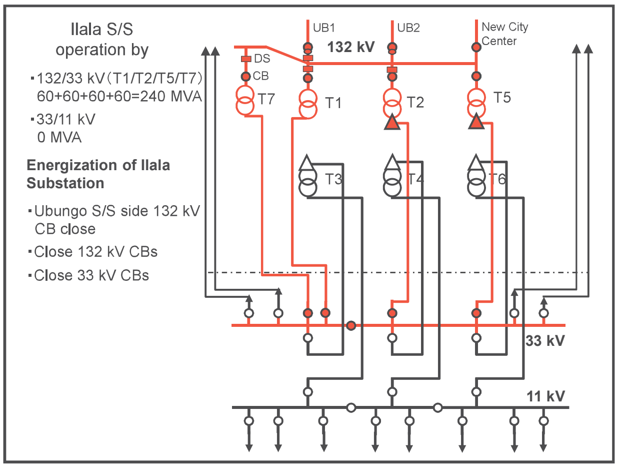


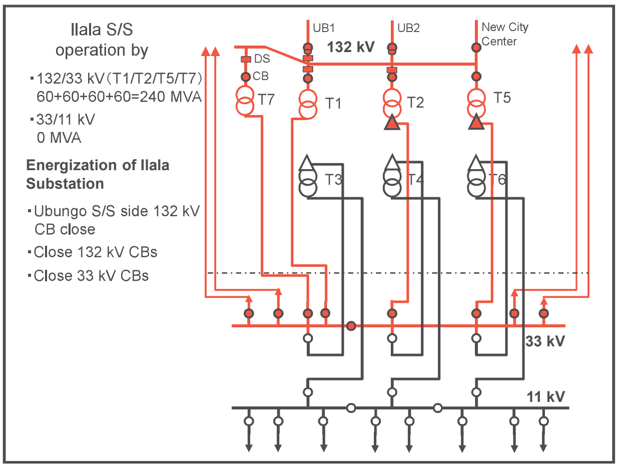


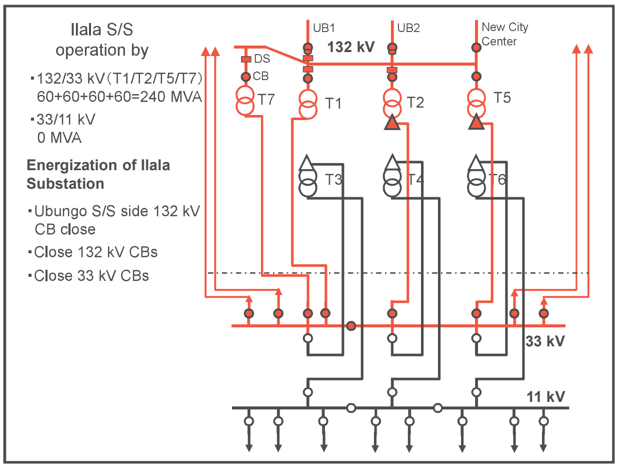


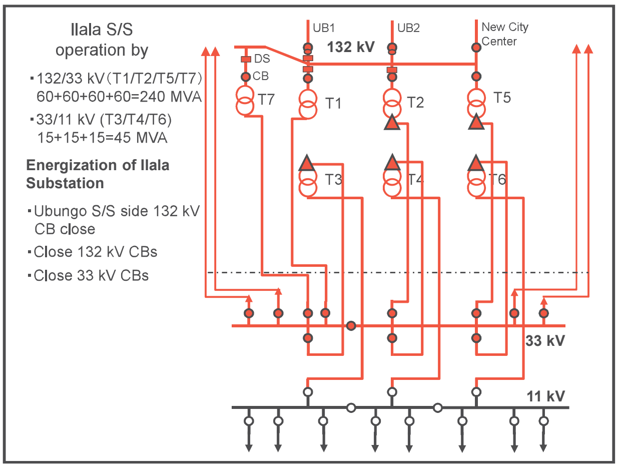
8. イララ変電所増強に係る切換え手順検討

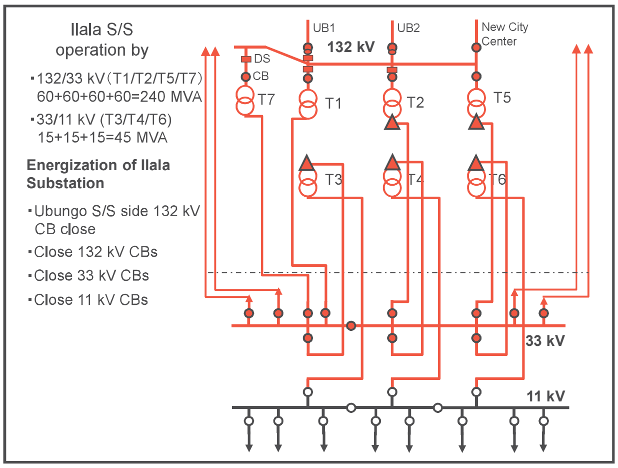




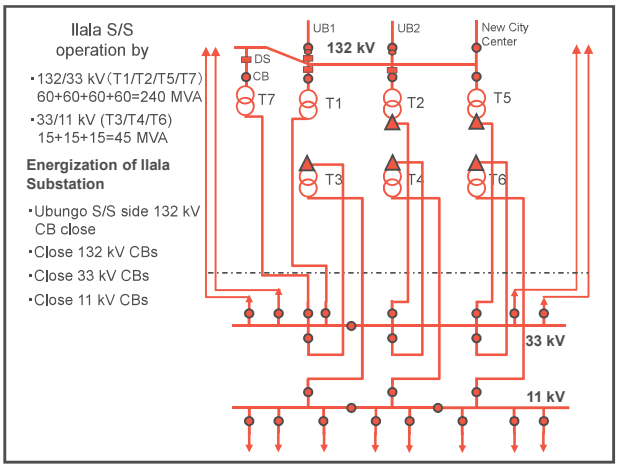


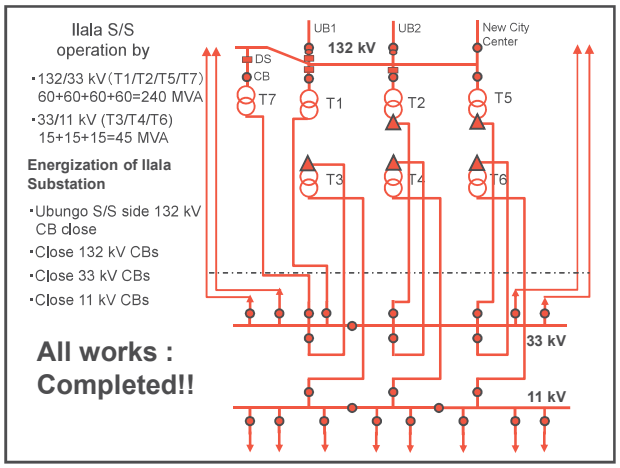






8. イララ変電所増強に係る切換え手順検討

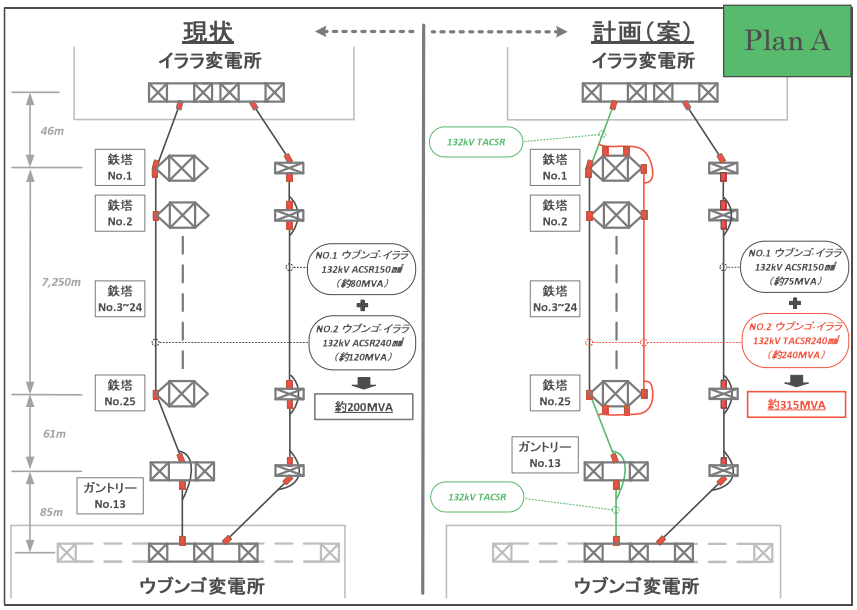


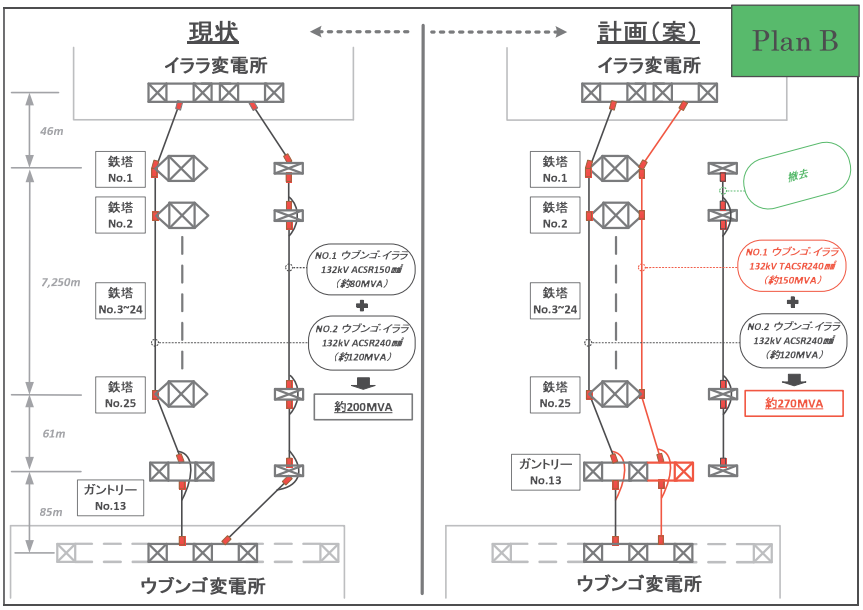


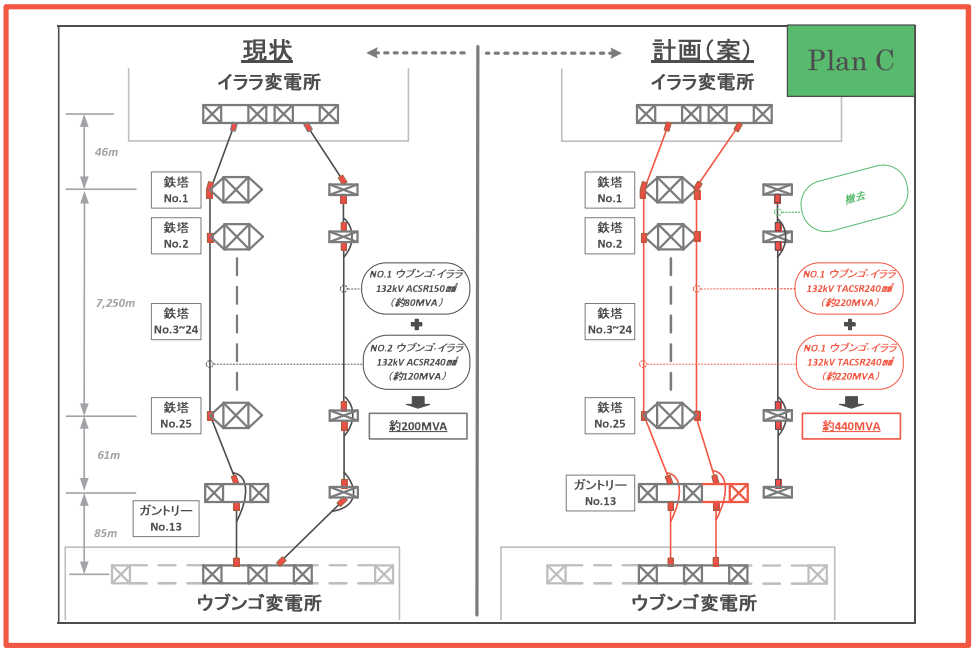
資料－９　**132kV** 送電線増強に係る切換え手順検討

9. 132kV 送電線増強に係る切換え手順検討

1. 132kV 送電線増強計画（Plan C を採用）



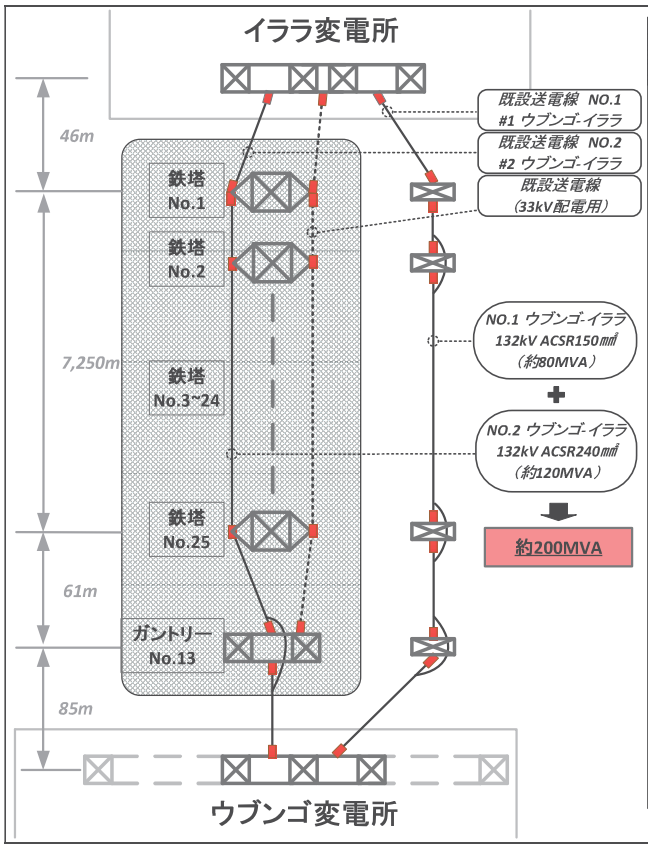




9. 132kV 送電線増強に係る切換え手順検討

2. 切換え手順

STEP-1



準備作業

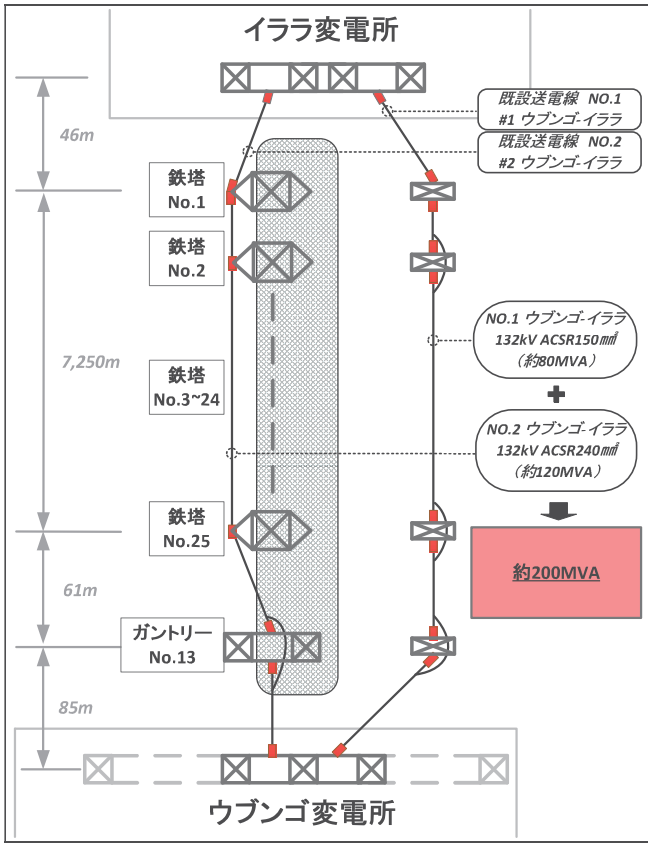
前提条件
-作業用地のクリアリング及び不法建築物などの撤去
-TANESCOによる必要な予算の確保
-09:00から17:00 (8h)/日の作業時間の確保
-作業用地使用許可の取得(Songas社敷地内作業のため)

TANESCO側の負担工事(作業スペース及びアクセス道路の確保)
-作業用地のクリアリング (case1)
: 5箇所×1箇所/日 = 5日
-作業用地のクリアリング (case2)
: 20箇所×2箇所/日 = 10日
-作業スペースの整地 (case1)
: 5箇所×1箇所/日 = 5日
-作業スペースの整地 (case2)
: 20箇所×2箇所/日 = 10日
-使用していない既設送電線の撤去
: 0.5km/日 ×7.5km = 15日
-使用していない既設送電線付属品(碍子など)の撤去
: 28箇所×2箇所/日 = 14日
-Songas社敷地内にあるガントリーNo.13付近のクリアリング
: 1箇所×5日 = 5日

日本側の負担工事(作業スペース及びアクセス道路の確保)
-アクセス道路の整備(必要な場合)
: 5箇所 (200㎡/1箇所)×5日= 25日

1/7

STEP-2



仮支線取付作業

前提条件
-作業用地のクリアリング及び不法建築物などの撤去
-TANESCOによる必要な予算の確保
-09:00から17:00 (8h)/日の作業時間の確保
-作業用地使用許可の取得(Songas社敷地内作業のため)

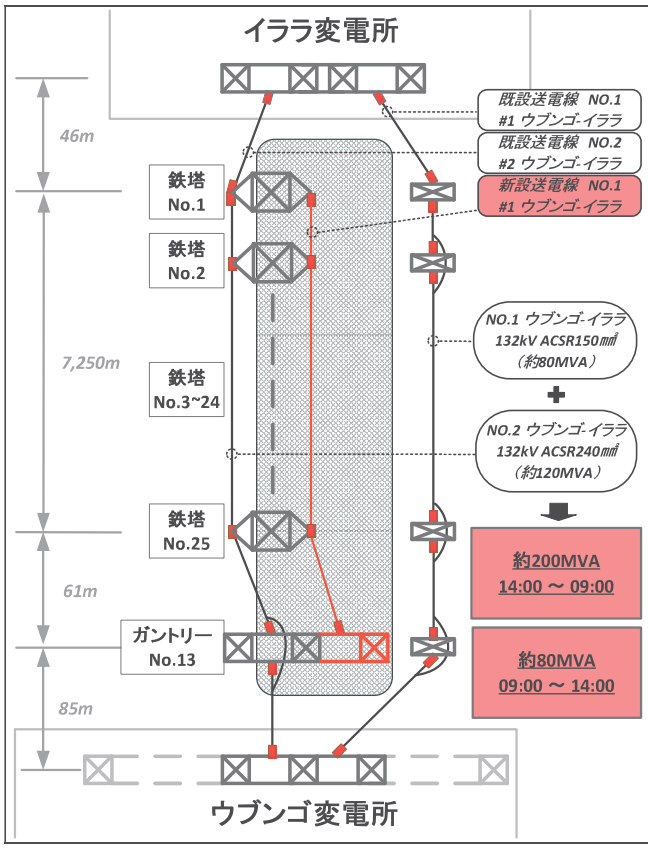
TANESCO側の負担工事
-停電の必要なし

日本側の負担工事
-新設送電線の仮支線取付及び防護足場設置
: 5箇所 ×3日 = 15日

2/7

9. 132kV 送電線増強に係る切換え手順検討

STEP-3



新設送電線（No.1）の延線作業

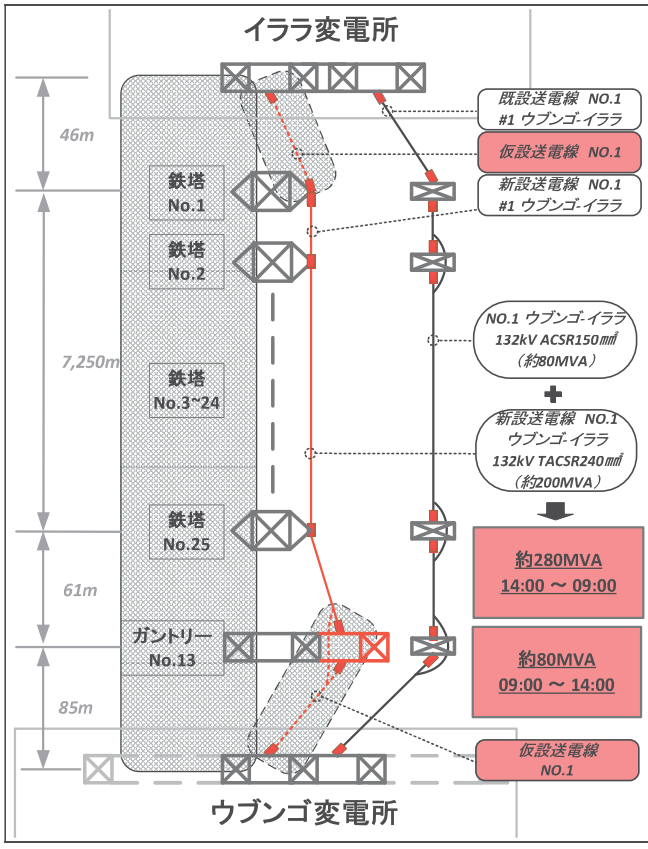
前提条件
-作業用地のクリアリング及び不法建築物などの撤去
-TANESCOによる必要な予算の確保
-09:00から14:00 (5h)/日の作業時間の確保
-作業時間中、既設送電線ACSR240mm²は送電停止。既設送電線ACSR150mm²は送電する。
-作業用地使用許可の取得（Songas社敷地内作業のため）

TANESCO側の負担工事
-必要な停電の実施
: 09:00～14:00 (5h)/日

日本側の負担工事
-ドラム場の準備
: 5箇所 ×1日 = 5日
-延線作業
: 0.5km/日 ×7.5km = 15日
-碍子、ダンパなどの付属品取付
: 0.5km/日 ×7.5km = 15日
-ガントリーNo.13の鉄構組立
: = 21日

3/7

STEP-4



既設送電線（No.2）の撤去

前提条件
-作業用地のクリアリング及び不法建築物などの撤去
-TANESCOによる必要な予算の確保
-09:00から17:00 (8h)/日の作業時間の確保
-作業用地使用許可の取得（Songas社敷地内作業のため）
-Ilala変電所とUbungo変電所間の送電停止後、新設送電線（No.1）TACSR240mm²を仮接続し、送電する。既設送電線（No.1）ACSR150mm²も使用して送電する。

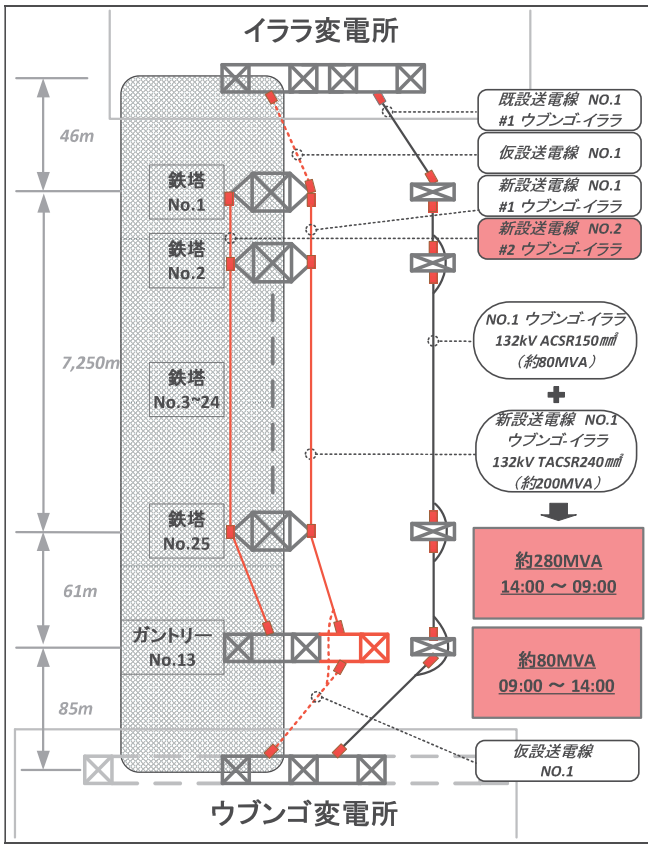
TANESCO側の負担工事
-必要な停電の実施
: 09:00～14:00 (5hrs)/日
-既設送電線（No.2）を撤去
: 0.5km/日 ×7.5km = 15日
-既設送電線（No.2）付属品の撤去
: 28箇所×2箇所/日 = 14日

日本側の負担工事
-新設送電線（No.1）の仮接続
: 2箇所 ×2日/1箇所 = 4日
-新設送電線（No.2）の仮支線取付
: 5箇所 ×1日 = 5日

4/7

9. 132kV 送電線増強に係る切換え手順検討

STEP-5



新設送電線（No.2）の延線作業

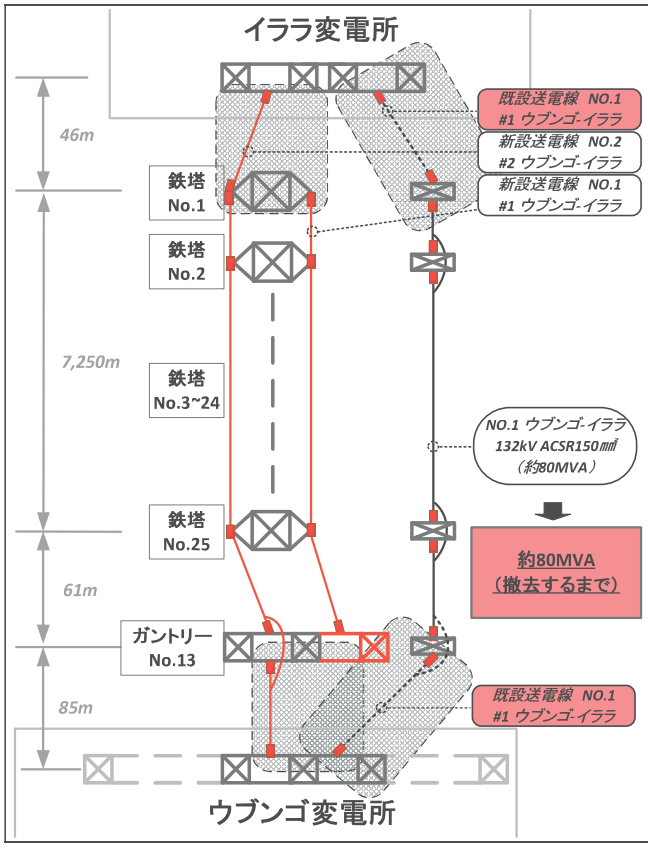
前提条件
-作業用地のクリアリング及び不法建築物などの撤去
-TANESCOによる必要な予算の確保
-09:00から14:00 (5h)/日の作業時間の確保
-作業用地使用許可の取得（Songas社敷地内作業のため）
-新設送電線（No.1）TACSR240mm²及び既設送電線（No.1）ACSR150mm²を使用して14:00～09:00まで送電する。

TANESCO側の負担事項
-必要な停電の実施
: 09:00～14:00 (5h)/日

日本側の負担事項
-ドラム場の準備
: 5箇所 ×1日 = 5日
-延線作業
: 0.5km/日 ×7.5km = 15日
-碍子、ダンパなどの付属品取付
: 0.5km/日 ×7.5km = 15日
-新設送電線（No.2）の仮支線を撤去
: 5箇所 ×2.5箇所/日 = 2日

5/7

STEP-6



既設送電線（No.1）の撤去

前提条件
-作業用地のクリアリング及び不法建築物などの撤去
-TANESCOによる必要な予算の確保
-09:00から14:00 (5h)/日の作業時間の確保
-作業用地使用許可の取得（Songas社敷地内作業のため）

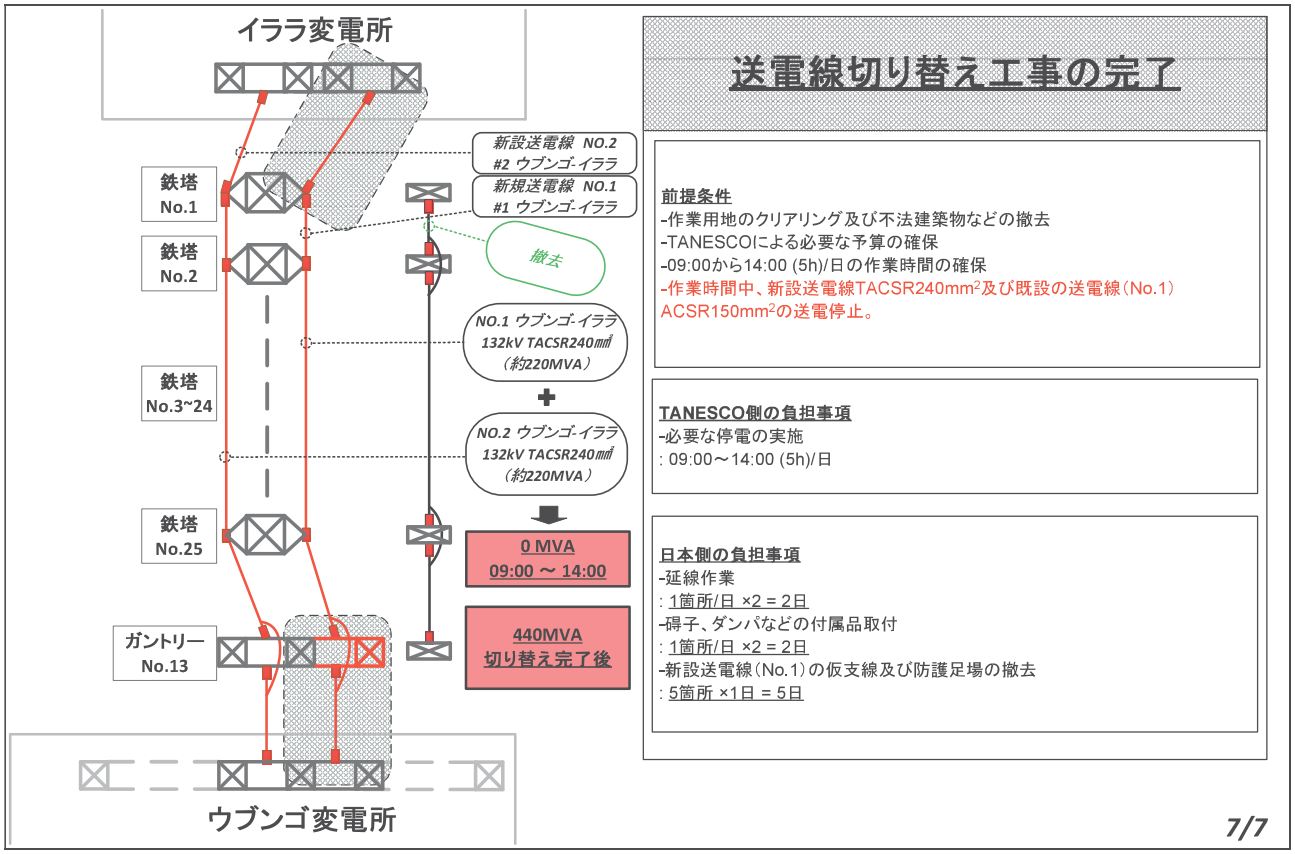
TANESCO側の負担事項
-必要な停電の実施
: 09:00～14:00 (5h)/日
-既設送電線（No.1）の撤去
: 1箇所/日 ×2 = 2日
-既設送電線（No.1）付属品の撤去
: 1箇所/日 ×2 = 2日

日本側の負担事項
-新設送電線（No.2）の仮接続（新設送電線（No.1）から移設）
: 2箇所 ×1日 = 2日

6/7

9. 132kV 送電線増強に係る切換え手順検討

STEP-7



資料－１０　EIA 登録申請時のプロジェクトブリーフ

10. EIA 登録申請時のプロジェクトブリーフ

REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW LINES AND SUBSTATIONS IN DAR ES SALAAM

Environmental and Social Impact Assessment Project Brief

Developer

Tanzania Electricity Supply Company Limited (TANESCO)
Umeme Park, Ubungo, P.O. Box 9024
Dar es Salaam
Phone: +255 22 2451 206, Fax +255 22 2451 206
Email: Aaron.Nanyaro@tanesco.co.tz

Consultant

Hamdun Mansur
P.O.Box 9024, Dar es Salaam
Tel: +255 22 245 1210
Email: Hamdun.Mansur@tanesco.co.tz

Submitted to:

National Environmental Management Council (NEMC)
P.O. Box 63154, Dar es Salaam
Tel: +255 22 277 4889
Email: nemc@nemctan.org

Submission Date: **12th April 2013**

10. EIA 登録申請時のプロジェクトブリーフ

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10. EIA 登録申請時のプロジェクトブリーフ

0.0 PREAMBLE

The following project brief is presented to the regulatory authority and various stakeholders to provide a brief overview of the undertaking and highlight the environmental and socio-economic issues of the project. The information provided is drawn from secondary information and a review of literature from the area, supported with stakeholder opinions and field observations.

1.0 THE PROPOSED UNDERTAKING/ DEVELOPMENT

The Government of Tanzania through Tanzania Electric Supply Company (TANESCO) is planning to undertake rehabilitation of substations and construction of new lines and substations in Dar es Salaam City. Under the Japanese International Corporation Agency (JICA) funding, TANESCO has completed carrying out a conceptual detailed design study of the proposed transmission and distribution line routes and substations, and preparation of the abbreviated resettlement action plan is in progress. Therefore this study intends to undertake Environmental and Social Impact Assessment (ESIA) study for the proposed project.

The overall objective of the project is to provide increased access to electricity with sustainable effects on poverty reduction by facilitating income generation and improved social services. The technical objective of the project is to stabilize the grid system, increase power supply, improve reliability of the power supplied in Dar es salaam city, as well as to increase the extent of TANESCO's distribution network in the city in order to be able to provide electricity to commercial business activities, water pumping, secondary schools, medical services, streetlights, residential houses, agro-processing activities etc. in the project area.

The proposed project has five (5) components which are:

1) Reinforcement of Ilala substation and existing 132 kV transmission line from Ilala substation to Ubungo substation (7.5 km)
2) Construction of new Jangwani Beach substation (33/11kV) and construction of distribution line (33kV) from Jangwani beach substation to Tegeta substation (6.6km)
3) Construction of Muhimbili substation (33/11kV) and construction of distribution line (33kV) from Muhimbili to City Center substation (1.3km)
4) Construction of Mwananyamala substation (33/11kV) and construction of distribution line (33kV) from Mwananyamala substation to Makumbusho substation (1.3km)
5) Expansion of Msasani substation (33/11kV) and expansion of distribution line (33kV) from Msasani substation to Makumbusho substation (7.9km)

In order to implement the above projects, a comprehensive Environmental and Social Impact Assessment (ESIA) has to be conducted and Resettlement Action Plan (RAP) established for the transmission and distribution lines of the project. For this project it has been established to prepare an Abbreviated Resettlement Action Plan (ARAP) due to the extent of the impacts caused by the project.

1.1 Design

1.1.1 Transmission line sub-project

The proposed transmission line will use the existing transmission line (II) from Ilala to Ubungo which currently has double circuits of 33kV and 132kV. This will involve upgrading/reinforcing of the 33kV line to 132kV. The major activity will be stringing of the 132kV aluminum conductor in the existing towers and therefore the project will involve no new construction of towers. The ex-

isting transmission line uses steel lattice towers with concrete or grillage foundations. The existing transmission line route have a Right of Way (RoW) of 40 meters (20 meters each side of the center line) of land to be cleared however the new line will not acquire new way leave instead the same right of way (RoW) will be used. In the line route corridor neither settlements nor crops higher than 4 meters will be allowed for production.

Figure1 proposed transmission towers

1.1.2 Distribution

The planned design of the distribution lines is to use steel poles (slip joint type). The current design proposes the distribution line routes be located along existing roads reserves, that is TANROADS' and Municipal Councils' so as to minimize the environmental and social impacts i.e. resettlement of people along the proposed routes. The line route corridor will be 10 meters wide. The line route will be located so that no resettlement is required, however few of them found to be in the way leave will have to be relocated. On the other hand the construction of these new distribution lines will be associated with construction of new substations as well as reinforcing the old ones for selected sites, therefore mounting of transformers will also be involved.

Figure 0 15MVA transformer for 33/11kVsubstation

2.0 PROPOSED SITE

2.1 Location

The transmission line will be constructed from Ilala substation to Ubungo substation along the existing 132kV line II in Dar es salaam City crossing the two municipalities of Kinondoni and Ilala. Three new substations with respective distribution lines will be constructed in Kinondoni Minicipal Council while the remaining two substations with their respective lines are located in Ilala Municipal Council. The new ssubstations will be fenced off and public will not be allowed to enter.

3.0 INFRASTRUCTURE AND UTILITIES

Requirements during the construction phase include:

- Storage areas for equipment and material (approximately varying from 700 m^2 to 2100 m^2)
- Offices and housing for staff
- Skilled, semi and unskilled labour
- Access roads
- Water for domestic purposes
- Sewage and waste disposal
- Contractor camps

4.0 ENVIRONMENTAL AND SOCIAL IMPACTS

As per the Environmental Impact Assessment and Audit Regulations 2005 the project is under **Schedule A** development. Schedule A projects normally require a full ESIA as the developments are anticipated to have diverse significant impacts (projects in this category include forestry, large industrial plants, irrigation and drainage, mineral development (including oil and gas), pipelines (oil, gas, water) resettlement, rural roads, tourism, urban development, Energy-**production and distribution of electricity**, etc.). Input from the environmental impact assess-

ment team complemented by stakeholder input at the design stage can help to reduce adverse environmental impacts and to enhance the positive impacts.

4.1 Transmission Power Line Environmental and Social impacts

Positive:

- Improved and stabilized grid system.
- Improved quality of electricity supply and increased duration of supply in the city
- Temporary employment opportunities for unskilled labour during the construction phase
- Business opportunities in the vicinity of construction camps
- Potential for future industries electrification, that will increase employment opportunities and boost economic development.

Negative:

- Moderate risk of pollution to soils and water during construction from organic waste, discarded construction materials, oil and lubricants, and litter.
- Noise and vibration levels are expected to rise during construction from the use of heavy vehicles, machinery and equipment necessary for construction.
- Potential hazards related to worker health and safety associated with the electric power industry include electrocution, accidents i.e. falls, sprains, strains and fractures, confined spaces, fires and explosions, environmental stress, vehicular safety, and exposure to hazardous chemicals. Appropriate fencing and security is needed at substation locations to protect the public from electrical hazards.

- Air pollution (noise and dust) and pollution from accidental oil spills.

Note:

- Construction of transmission line will generally not entail land-take as it will use the current way leave.

4.2 Distribution power lines and substations Environmental impacts

Positive:

- Increased access to electricity will reduce the use of kerosene and candles for lighting, and the use of batteries for operating radios etc as a result of extending the distribution network in the city.
- Temporary employment opportunities for unskilled labour during the construction phase
- Increased business opportunities as a result of increased electrification
- Improved power supply and voltage level in the system network

Negative:

- Moderate risk of pollution to soils and water during construction from organic waste, discarded construction materials, oil and lubricants, and litter.
- Noise and vibration levels are expected to rise during construction from the use of heavy vehicles, machinery and equipment necessary for construction.
- Potential hazards related to worker health and safety is similar to those from transmission line construction.

- Noise pollution from transformers in the substations during operation.

OTHER ENVIRONMENTAL ISSUES

It is expected that Environmental and Social Impact Assessment (ESIA) to be conducted as part of this project will assess other potential environmental and social impacts to be associated with implementing this project as deemed necessary according to NEMC's approved Terms of Reference (TOR).

5.0 MITIGATION OF IMPACT AND ENVIRONMENTAL ENHANCEMENT MEASURES

Control of Gas Emissions

- Regular inspection and maintenance of all construction machines and vehicles
- Reduce machines and vehicles idling time
- Avoid burning of solid waste at the site

Controlling Soil Pollution

- Proper storage of waste materials remaining from construction and other activities
- Proper storage of oil, and lubricants in second containments to avoid spills

Controlling Vegetation Clearance

- Limit construction footprint to a minimum and focus only where required along the RoW.

Control of Noise Emission

- Restrict construction activities to normal working hours (8am - 5pm).
- Inform local residents beforehand, via notices and advisories, of pending noisy periods and solicit their tolerance well before the commencement of piling works.
- Operators of equipments that generate noise should be equipped with ear muffs/ear plugs to protect them from noisy.
- All transformers placed at substations near residential areas should be wall fenced to minimize noise generation effects to human beings.

Control of Dust Emissions

- Covering of all haulage vehicles carrying sand, aggregate and cement
- Stockpiles of fine materials (e.g. sand and ballast) should be wetted or covered with tarpaulin during windy conditions.

- Access roads and exposed ground must be watered frequently to keep the area dust free.
- Workers in dusty area site should be provided with dust masks for protection.

Control of Workers Accidents and Hazards

- Engage workers that are trained to operate specific machines and equipment.
- Proper signs on site to warn workers of safety requirements as regards machines with moving parts and other equipment at site.
- Provide a First Aid box and have a trained person to handle site emergencies and incidences.
- Train workers on health and safety issues
- Monitor and control illegal connection of electricity
- Educate local populations to safe behavior in the presence of high voltage power lines

Access roads

- Design drainage to reduce impact on nearby land and water resources (use ample culverts etc.)
- Use discontinuous maintenance roads
- Demolish temporary roads and storage areas
- Restore land to pre-construction conditions

DECLARATION

I, FILBERT MTONGA hereby declare that the information provided on this form is true to the best of our knowledge and shall provide any additional information that shall come to my notice in the course of processing this application

Signature

10/04/2013

Date

資料－１１　NEMC によるスクリーニング結果

11. NEMCによるスクリーニング結果

NATIONAL ENVIRONMENT MANAGEMENT COUNCIL (NEMC)

BARAZA LA TAIFA LA HIFADHI NA USHAURIMIZI WA MAZINGIRA

Tel Dir.: +255 22 277 4852
Tel +255 22 277 4889
Mobile: +255 713 - 608930
Fax: +255 22 277 4901
E-mail: dg@nemc.or.tz
Website: www.nemc.or.tz

Regent Estate / Migombani
Plot No 29 / 30
P.O.Box 63154
Dar es Salaam
Tanzania

In reply please quote:

Ref: NEMC/513/1/Vol.I/175 Date: 07/05/2013

Managing Director,
Tanzania Electric Supply Company Limited (TANESCO),
P.O. BOX 9024,
DAR ES SALAAM

RE: SCREENING DECISION ON THE PROPOSED REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW LINES AND SUBSTATIONS IN DAR ES SALAAM

Reference is made to the subject matter above.

We acknowledge receipt of your letter referenced SMR/MEnv/eia/19 of 10th April, 2013 submitted with an EIA Certificate application form, terms of reference and the Project brief in respect of the above mentioned project. The project has been registered and allotted Application Reference Number 2499.

Following the review of the submitted documents, the Council has noted that the submission of the documents has not followed the standard procedure stipulated in the EIA and Audit Regulations, 2005 regarding project registration and screening, also on the conduct of the EIA specifically Regulation 13 and 15.

However, the Council reached a decision that, this project requires a full Environmental Impact Assessment (EIA) study. Thus, you will be required to carry out the scoping exercise and submit a Scoping Report and comprehensive draft Terms of References (ToR) to the Council for review and approval before the beginning of the EIA study. Also, be reminded that the scoping report should conform to the EIA and Audit Regulations 2005 particularly Regulation 13 (3) and the Fourth Schedule made under Regulation 15 for the contents of the scoping report and the essence of the scoping exercise respectively.

Yours Sincerely,

K. P. Luteganya
For: Director General.

All correspondence should be addressed to the Director - General

資料－１２　スコーピング・レポート

SCOPING REPORT FOR REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW LINES AND SUBSTATIONS IN DAR ES SALAAM

Submitted to: National Environment Management Council (NEMC)
Plot No. 30, Migombani Street
P. O. Box 63154
Dar es salaam, Tanzania
Tel: +255 22 2134 603 / + 255 22 2127817
Fax: +255 22 2111579

Developer: TANZANIA ELECTRIC SUPPLY COMPANY LIMITED (TANESCO)
P.O. Box 9024
Dar es salaam, Tanzania
Tel: +255 22 2451131-9
Fax: +255 22 2451206

Consultant: Hamdun Mansur
P.O. Box 9024, Dar es Salaam
Tel: +255 22 245 1210
Email: Hamdun.Mansur@tanesco.co.tz

October, 2013

Table of Contents

Scoping Report for rehabilitation of substations and construction of new lines and substations in Dar es Salaam

SIGNED DECLARATION OF EXPERTS

We hereby certify that the particulars given to this scoping report are correct and true to the best of our knowledge and we shall provide any additional information that shall come to our notice in the course of the processing of this scoping report

S/N	NAME		SIGNATURE
1	Eng. Hamdun Mansur	Team Leader (Registered EIA Expert)	
2	Mr. Fikirini M. Mtandika	Environmental Engineer (Registered EIA Expert)	
3	Ms. Brigita Sylvester	Environmental Officer (Registered EIA Expert)	

CHAPTER ONE

1.0 INTRODUCTION

1.1 Purpose of the Scoping Report

Scoping is a consultative procedure that culminates in the determination of the extent and approach to an Environmental and Social Impact Assessment (ESIA). This report is thus intended to cover the scoping aspect which is an integral part in undertaking an Environmental and Social Impact Assessment (ESIA).

Scoping phase involves the following tasks:

- Identification and involvement of relevant authorities and interested and likely to be affected parties
- Identification and selection of project alternatives
- Description of ESIA study boundaries
- Developing effective methods and approach for undertaking the ESIA study
- Identification of significant issues to be examined in the ESIA
- Determination of the Terms of Reference (TOR) for undertaking the ESIA study

This report has been prepared to satisfy the requirements of Part III of the Environmental Impact Assessment and Audit Regulations G.N. No.349 of 2005 as a one step toward application of Environmental Impact Assessment Certificate to the National Environmental Management Council. The approval of this report will enable TANESCO to proceed with ESIA study for undertake rehabilitation of substations and construction of new lines and substations in Dar es Salaam City.

1.2 Objectives of the Scoping Report

The main objectives of scoping exercise were therefore:

- To provide an opportunity for the consultant, relevant authorities, interested and affected parties to exchange information and express their views and concern regarding the project before an ESIA is undertaken,
- To focus ESIA on reasonable alternatives and relevant issues so as to ensure that the ESIA is useful to decision makers and addresses the concern of the stakeholders.
- To facilitate an efficient assessment process that saves time and resources as well as reducing undue delays of this power project.

1.3 Scoping Methodology

Methodology used in carrying out this scoping activity were included a review of relevant documents such as Guidelines and Procedures for undertaking EIA in Tanzania as provided by NEMC and VPO (DoE), subsidiary regulations, and other technical literature relevant to the area. The review helped to identify areas where further information would be needed in order to focus the scoping exercise and the ESIA study in general.

Additionally, scoping methodology included field trip to the proposed area, consultation with authorities, interested and affected parties, reconnaissance survey and collection of views and opinions from various stakeholders. The information bulletin briefings about the project were distributed to the stakeholders and household questionnaires during consultation meeting to aid collecting their view regarding the project.

The scoping exercise was intended to determine the scope of the study by identifying stakeholders, defining the boundaries and the issues involved. The main objectives of this stage were:-

- Identification of main problems, constraints and issues associated with the projects;
- Identification of stakeholders;
- Identification and discussion of project alternatives.
- Identification of the likely positive and negative impacts of the project.
- Identification of data requirements.
- Determination of spatial, temporal and institutional boundaries of the project; and
- Development of appropriate study methods.

.

1.3.1 Stakeholders Identification

Stakeholders were identified based on their role and their relevance in the project. Most of the stakeholders such as local leaders, house owners, nearby communities and government authorities that might be impacted by the project were pre-determined while others were identified by different stakeholders.

1.3.2 Scoping Data Collection

Public meeting, Focus Group Discussion and household questionnaires as a qualitative data gathering method were used in collecting data about the project. It based on the interviews and discussions with various groups, the community and other stakeholders. The study area was visited; interviews were conducted with stakeholders and made spot verification of the status of environmental and social issues in the study area.

CHAPTER TWO

2.0 PROJECT DESCRIPTION

2.1 Background of the Project and Rationale

The Government of Tanzania through Tanzania Electric Supply Company (TANESCO) is planning to undertake rehabilitation of substations and construction of new lines and substations in Dar es Salaam City. Under the Japanese International Corporation Agency (JICA) funding, TANESCO has completed carrying out a detailed design study of the proposed transmission and distribution line routes and substations, and preparation of the abbreviated resettlement action plan is in progress. Therefore, this study intends to undertake Environmental and Social Impact Assessment study for the proposed project.

The overall objective of the project is to provide increased access to electricity with sustainable effects on poverty reduction by facilitating income generation and improved social services. The technical objective of the project is to stabilize the grid system, increase power supply, improve reliability of the power supply in Dar es Salaam city, as well as to increase the extent of TANESCO's distribution network in the city in order to be able to provide electricity to commercial business activities, water pumping, secondary schools, medical services, streetlights, residential houses, agro-processing activities etc. in the project area.

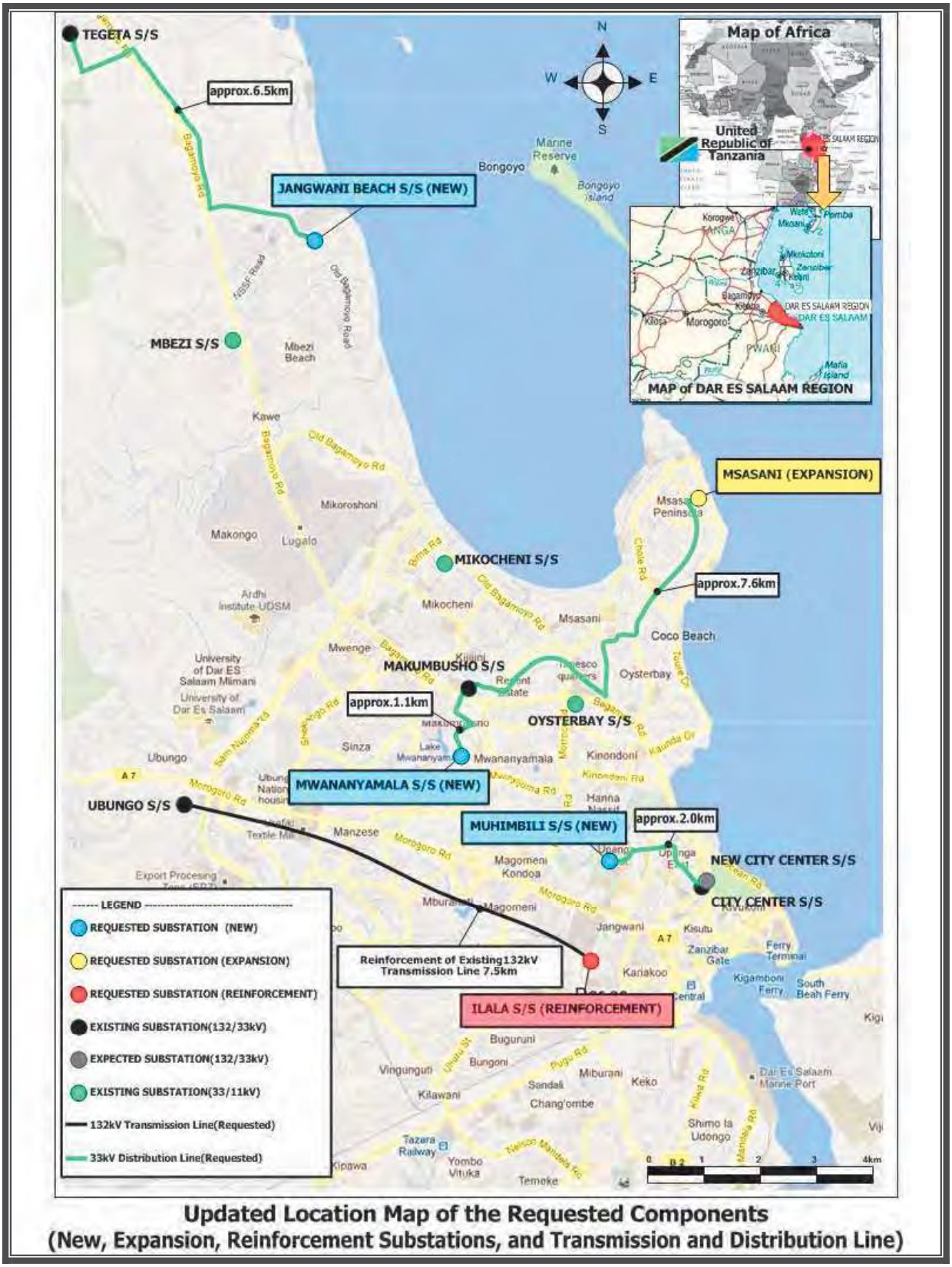
The proposed project has five (5) components which are:

- Reinforcement of Ilala substation and existing 132 kV transmission line from Ilala substation to Ubungo substation (7.5 km)
- Construction of new Jangwani Beach substation (33/11kV) and construction of distribution line (33kV) from Jangwani beach substation to Tegeta substation (6.5km)
- Construction of Muhimbili substation (33/11kV) and construction of distribution line (33kV) from Muhimbili to City Center substation (2km)
- Construction of Mwananyamala substation (33/11kV) and construction of distribution line (33kV) from Mwananyamala substation to Makumbusho substation (1.1km)
- Expansion of Msasani substation (33/11kV) and expansion of distribution line (33kV) from Msasani substation to Makumbusho substation (7.6km)

2.2 Site description:

The project area as a whole has mixed land use activities, the areas covered by the project are highly developed as settlements, or institutions such as hospitals, schools, churches etc. There are few planted trees alongside the road where by the project will pass and most of vegetation covers have been cleared for urban development activities. However, the detailed ESIA survey will confirm the specific land uses of the respective area.

Figure 2.1 Map Showing the project area and transmission line sections and substations



Updated Location Map of the Requested Components
(New, Expansion, Reinforcement Substations, and Transmission and Distribution Line)

2.3 Design

2.3.1 Transmission line sub-project

The proposed transmission line will use the existing transmission line (TL) from Ilala to Ubungo which currently has double circuits of 33kV and 132kV. This will involve upgrading/reinforcing of the 33kV line to 132kV. The major activity will be stringing of the 132kV aluminum conductor in the existing towers and therefore the project will involve no new construction of towers. The existing transmission line uses steel lattice towers with concrete or grillage foundations. Therefore the existing wayleave will be used for this project.

2.3.2 Distribution

The planned design of the distribution lines is to use wooden poles. The current design proposes the distribution line routes be located along existing road reserves, that is TANROADS' and Municipal Councils' so as to minimize the environmental and social impacts i.e. resettlement of people along the proposed routes. The line route corridor will be about 2.5 up to 10 meters wide depend on nature of the site. The line route will be located so that no resettlement is required, however few of them found to be in the way leave will have to be relocated. On the other hand the construction of these new distribution lines will be associated with construction of new substations as well as reinforcing the old ones for selected sites, therefore mounting of transformers will also be involved.

2.3.3 Ilala substation

Reinforcement of Ilala substation and 132kV transmission line from Ilala substation to Ubungo substation of about 7.5km, the transmission line will be constructed from Ilala substation to Ubungo substation along the existing 132kV line II in Dar es salaam City crossing the two municipalities of Kinondoni and Ilala

2.3.3 Jangwani Beach substation (33/11 kV)

New Construction of Jangwani beach substation and construction of 132 kV distribution line of approximately 6.5 km from Jangwani beach substation to Tegeta substation.

2.3.4 Muhimbili substation (33/11 kV)

Construction of Muhimbili substation and construction of a distribution line of 33 kV from Muhimbili substation to City centre S/S of approximately 2km.

2.3.5 Mwananyamala substation (33/11 kV)

Construction of Mwananyamala substation and construction 33 kV of distribution line of 1.1km from Mwananyamala substation to Makumbusho substation.

2.3.6 Msasani substation (33/11 kV)

Expansion of Msasani substation and expansion of 33 kV distribution line of approximately 7.6km from Msasani substation to Makumbusho substation.

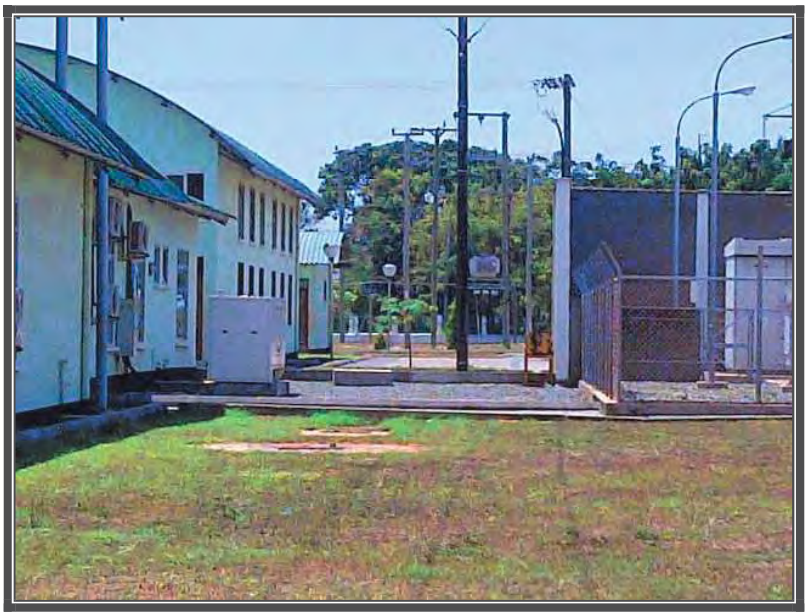


Figure 2.2: Site for the proposed expansion of Msasani S/S

2.4 Clearing of Right of Way (ROW)

The existing transmission line route have a Right of Way (RoW) of 40 meters (20 meters each side of the center line) of land to be cleared however the new line will not acquire new way leave instead the same right of way (RoW) will be used. In the line route corridor neither settlements nor crops higher than 4 meters will be allowed for production.

2.5 Project Activities

The implementation of this project involves various phases such as planning phase construction, demobilization and operation phase. Decommissioning of the project is expected after 10-15 years of operation and will be in the form of major rehabilitation that will involve changing poles and conductors. The following are activities expected in each phase:

2.5.1 Pre- construction Phase

Prior to commencement of any construction activity, topographical survey shall be carried out to identify the distribution line centreline, define the right-of-way (ROW) boundaries, identify areas of road and other infrastructure crossings, and identification of properties to be affected and their owners (PAPs). Important also is to generate the distribution line route profiles. During this phase no major impact to the environment is expected.

2.5.2 Construction Phase

The following are activities that are going to be conducted during construction phase:

Excavation of holes

Depending on the nature of the terrain and materials, different methods of excavation holes for pole erection may be used. For this distribution network manual excavation is expected though in hard rock areas machine drills may be used.

Poles erection

The wooden poles will be erected using available manpower and by hoisting equipment mounted on special vehicles.

Conductors stringing

The process of attaching conductor wire to the insulators attached to the poles or cross bar is called conductor stringing. It involves pulling the conductor off a truck mounted spool. For the proposed distribution line the materials to be used in executing this work include:

- Aluminium Conductors
- Galvanised Steel Sections
- Anchor Bolts
- Line Insulators

The arrangement of the conductors on the poles will vary according to the design.

Transformer installation and service line construction

Upon completion of 33kV line construction, transformers of different sizes depending on the size and expected loads will be installed following by construction of service line to all service line applicants.

2.5.3 Demobilization phase

Following the completion of construction activities, there will be a demobilization phase to remove the equipment from the worksites and removal of all unwanted temporary structures in order to leave the site clean. This will also be accompanied by removal of all materials left and all kinds of waste (used timber, wooden poles, cross bars, broken conductors, and insulators) from the working sites.

2.5.4 Operational Phase

The activities expected to be executed during operational phase include:

- Maintenance of 33 kV distribution line and 132kV transmission line to the project areas
- Safety management of the distribution and service lines
- Maintenance and safeguard of the RoW

2.6 Construction Materials

Construction materials will include but not limited to the following:

- Wooden poles in standard height
- Aluminium conductors with cross section of 25mm2, 50mm2 and 100mm2 ACSR, and AAC
- Insulators
- Cross arms
- Transformers

Building materials such as sand, aggregates, and cement, shall be sourced locally via certified suppliers. However, the quantity and quality required shall dictate the material sources. The poles shall be sourced from Mufindi Iringa Region or imported from abroad. Power conductors, transformers and insulators shall be imported from abroad when not available locally. Water shall be fetched to the nearest water source.

2.7 Distance to nearest residential and/or other facilities:

The Transmission and Distribution lines traverse settled and non-settled areas, with the latter being closer to settlements to facilitate delivery of electricity, also three substations (Mwananyamala, Muhimbili and Jangwani S/S) are near residential/institutions.

2.8 Project Boundaries

Scoping is the most critical step in an EIA and in order to provide an accurate project appraisal appropriate project boundaries i.e. spatial, temporal and institutional boundaries are to be established for the rehabilitation of substations and construction of new lines and substations in Dar es Salaam as some of impacts might be confined or spread beyond the geographic boundaries of the project site. All potentially serious environmental and social impacts are to be identified and documented according to its boundaries.

Generally in EIA and scoping study three types of boundaries will be considered i.e. institutional, temporal and spatial boundaries of the project.

2.8.1 Institutional boundaries

These are institutions sectoral boundaries in which the project lies or interacts. These can be determined from political boundaries, acts, regulations and institutional mandates.

The proposed development is about rehabilitation of substations and construction of new lines and substations in Dar es Salaam regions at Ilala and Kinondoni Municipals and will be implemented in urban areas. The development is expected to touch the interest of several institutions and organizations and is in relation to several policies, laws and regulations in Tanzania.

Examples of the key stakeholders are:

- Vice President Office – Division of Environment
- NEMC
- Ministry of Energy and Minerals
- Tanzania Electric Supply Company-TANESCO,
- Energy and Water Utilities Authority (EWURA)
- Dar es Salaam Regional Secretariat,
- Ilala and Kinondoni Municipals including Ward and Street Governments.
- local NGOS and CBOs, as well as international organizations operating in the area,

Some of the institutions have been consulted and the remaining will have to be consulted during the EIA processes as they are key stakeholders in this project.

2.8.2 Temporal boundaries

Temporal boundaries refer to the lifespan and reversibility of impacts. The temporal impacts can be either short term or long term. The short-term impacts are considered to be those which will be apparent only for a short period and as such will include mainly construction activities related impacts. The long-term impacts are considered to be those which will be apparent after construction has been completed (but may include also impacts which may become apparent during the construction phase). Consideration will also be given to what happens when the project ends, where there is need for site restoration and decommissioning.

Short-term impacts include noise, dust and vehicle movements, spillage of hazardous materials and pollution of water bodies that will disappear as soon as construction is finished but existence of the power line and substations will last for many years to come. Long-term impacts include reduced biotic viability and existence of sensitive plants and impact on public health and spread of HIV, AIDS and other STDs, impact on vegetation**,** boost to the local economy through employment and other benefits to the local communities in relation to accessibility to the electricity.

2.8.3 Spatial boundary

The spatial dimension encompasses the geographical spread of the impacts i.e. local, regional, national or international regardless of whether they are short term or long term. The spatial scale considers the receptor environmental components.

Spatial boundaries are crucial to decide on whether impacts are likely to occur at local, regional, national or international level. The rehabilitation of substations and construction of new lines and substations in Dar es Salaam will have wide ranging implications that could be felt locally, regionally, and probably nationally thus, causing impacts as far as to those areas. In the case of this project, the core impact area consists of communities and institutions. This core impact area is surrounded by an immediate impact area, an area that is outside but plays important role or bears relatively some of the impacts (positively or negatively).

CHAPTER THREE

3.0 STAKEHOLDERS CONSULTATION AND ANALYSIS

3.1 Stakeholders Consultation

Consultation of stakeholders is a very important component in the EIA process. It is one of the key factors that enhance environmental governance. Stakeholders are individuals, groups of individuals or institutions that have interest in the proposed project. This includes those positively and negatively affected by the project. Stakeholders' participation involves processes whereby all those with an interest in the outcome of a project actively participate in decisions on planning and management of the proposed development.

It is a Government policy that beneficiaries of and members of public living near new project sites (both public and private) are consulted to seek their views and opinions regarding the projects before they are implemented. To that end, this scoping exercise was carried out in line with NEMC requirements, JICA guidelines for Environmental and Social considerations and in general good practice by the Proponent to remain compliant with the law. The Public consultation process involved visiting the areas along which the proposed distribution lines and substations will be constructed. The stakeholders were identified and consulted with the objective of describing the existing socio-economic conditions within the proposed project area of influence and the immediate surroundings.

Specific objectives was to Consult and gather recommendations from the local administration which involves Regional Commissioner, District Commissioners, Municipal Directors, Municipal Officers, Ward and Mtaa leaders and communities that have a stake in the project and provide an opportunity to all the stakeholders and communities in the areas where the proposed project is expected to pass to raise issues and concerns pertaining to the project, and allow the identification of alternatives and recommendations. The study involved a participatory approach in the preparation of the scoping exercise. This entailed seeking information/experience from stakeholders such as ward and Mtaa leaderships, local representatives and other institutions who have been involved in one way or another in the implementation of the project.

In order to get views in the ward and Mtaa level the team opted to use the Focus Group Discussion method which involves different people such as ward leaders, Mtaa leaders, youth representatives, women representatives and old people representatives. Open-ended questionnaires were also administered to households and small business enterprises neighbouring the site. Concerns, views and opinions from the respondents were received.

Consultation with stakeholders has been initiated and will be continued through the ESIA process to ensure regular communication between the project proponent and PAPs. This allows for the provision of updates, changes, alteration, and new concerns where necessary from both the project proponent and PAPs such that both parties have a common perception as to what the project entails.

The team conducted FGD (Focus Group Discussion) in these wards which will be affected by the project and public meeting in some street. The meetings aimed at informing the community about the project and the associated impacts. FGD members were informed of the positive and adverse impacts of the project include loss of land, possibilities of increase spread of HIV/AIDS especially during construction phase, as well as other Environmental and social impacts associated with the project. FGD members were also sensitized on their right to be compensated and applicable compensation norms if they will be affected. Further they were given an opportunity to ask questions, raise their concerns and provide information to the team on different issues concerning the project. Identified Issues of Concern during Meetings with Stakeholders are as follows:-

3.1.1 Consultation Meetings with Municipal Authorities

Consultation meetings with RAS office Ilala, Municipal authorities Ilala and Kinondoni, DC'S office Ilala and Kinondoni were held and the aim of the meeting was to discuss the project with officials and obtain relevant data and information from the respective offices.

Most of the consulted district councils and municipal officials agreed to the importance of the proposed development project to the regional and local communities' development. They had the following concerns:-

- TANESCO should now opt using the underground cables instead of overhead transmission lines.
- Another concern was the issue of compensation. If TANESCO project is going to affect people compensation procedures should be done in order to avoid misunderstanding with the community and communication should pass through Municipal offices, ward and Mtaa levels in order to make them aware of what is going on about the project.
- TANESCO should educate the community about the project in order to avoid conflict, there might be different challenges but if education will be clearly provided the project will be successful.

3.1.2 Consultation Meetings with TANROADS

During scoping exercise consultation meeting with Manager TANROADS Dar region was done and he had different opinion as follows:-

- TANESCO should have good plan with their project in order to avoid using road reserve. Using road reserve is not a proper plan so the company should prepare for compensation when implementing the project regardless the cost. Using underground cables is the best option nowadays so the company should opt using this method.
- Those who will be found in the road reserve are encroachers and are not entitled for compensation. But if TANESCO is going to use area which is out of the road reserve then compensation should be paid.
- TANESCO have a big challenge concerning theft of their properties and these thieves do cooperate with TANESCO staff so security should be increased in the transformers and other properties.
- TANESCO should be friendly to environment, the behavior of cutting trees during clearance of the line and leave trees is bad and it bring bad reputation to the company. After pruning trees cleaning should be done.

3.1.3 Consultation Meetings with DAWASA

Consultation meeting was conducted with Eng. Bunyese who had different views as follows:-

- Surveyor from TANESCO should observe what is inside the proposed route and it will be good to have a joint survey with DAWASA officers in order to observe what is in the proposed route and advice accordingly.
- He insisted that there must be cooperation between TANESCO and other stakeholders so as to eye mark other property inside road reserves which belongs to other companies.

- In order to make a project success they advice TANESCO to pass the distribution line (from Tegeta S/S on the way to Bagamoyo road project) on the left side of the road from the substation because they have another large water pipe project on the right side which is expected to start soon. But if that option will not be good for TANESCO then the company will have to wait until we are done with our water project.

3.1.4 Consultation Meetings with TTCL

During scoping exercise consultation meeting with TTCL was done and they had these concern:-

- The project is good in order to make it successful there must be cooperation between TTCL, DAWASA, TANROADS and respective municipals. He advised TANESCO to arrange a day so as to have site visit to conduct joint survey with all stakeholders as this will enable the company to have a good plan with the project after identifying all properties which belongs to other companies in the proposed route.

3.1.5 Consultation Meetings with Local Communities

Public participation process followed the guidelines as stipulated in the Environmental Management Act No. 20 of 2004, Part XIV regarding public participation in environmental decision-making. To facilitate an open and transparent process, interested and likely to be affected persons were identified all along the proposed route and later informed of the proposed project development and subsequent phases of the project. The positive impacts and negative impacts of the project and the corresponding mitigation measures were also described in details. Finally, at the end of the meeting, the communities were given an opportunity to ask questions, give comments, warnings, observations and opinions. These comments, observations, questions and opinions received from each person have been summarized and are addressed below. The meetings involved many people, among others, from 15 wards of 2 Municipals in Dar es Salaam region in which proposed project pass through. List of their names and signature is shown in **Appendix III.**

Consultation meeting with local communities was conducted through focus group discussion meetings, public meeting and open ended questionnaires. These meetings involved local leaders, community members (representative of women, youth, and old people) and TANESCO team.

The consulted wards based on the proposed routes were:

- Mchikichini, Upanga East and Upanga West in Ilala Municipal Council,
- Makurumla, Kawe, Mzimuni, Kunduchi, Wazo, Msasani, Mabibo, Ubungo, Mikocheni and Makumbusho ward in Kinondoni Municipal Council.

Consultation in each ward commenced by stating the objective of the consultation meeting i.e. inform the FGD members about the project and what the proponent will do to address the potential impacts of the project.

Summary of the main issues raised during the consultation meetings and their responses

- How the project would be beneficial to the community.
  The ESIA team thanked the residents for their participation and responded to their questions informing them that the project has its benefits and drawbacks. Some of the benefits highlighted were:
  - Gains in the local and national economy thus leading to increase in revenue.

- Access to reliable power.
- Informal sector benefits.
- Improved security in the area due to street lightning.
- Direct and indirect skilled and non-skilled employment opportunities

- How safe would one be if he/she lives near the substation?
  - For safety issues, it is highly recommended that no one lives too close to the substation and this would be adhered to. In addition the following is done:
  - It will be built by experienced personnel.
  - Perimeter fencing, Security and lightning.
  - Entry to the substation is restricted, only authorized officers are allowed.
- Some of the drawbacks of the projects identified were:
  - Air and noise pollution during construction.
  - Oil spillage during construction.
  - Possibility of occurrence of accidents on the site during construction.
  - Presence of the substation may expose people to accidents and health hazards.
  - It was responded that In view of occupational health and safety concerns, the proponent will ensure health, safety and welfare of workers to prevent accidents in the course of employment and additionally provision of PPE would reduce the impacts of dust and minimize exposure to a variety of hazards respectively.
- Wanted to know whether the locals would be employed during the construction and operation phase of the project. The community expressed fear that local youths may be side lined in securing employment opportunities especially during the construction phase of the proposed project. “The contractor may decline to employ youths here and use his staff” the community asserted.
  - The team emphasized that locals will be given first priority in employment especially casual employment, the contractor will be advised to contract locals in the project area.
- Compensation of the properties to the affected people to be done before construction of the project and that proper valuation of properties and payment be made in time and should be adequate to enable PAPs get alternative housing.
  - It was responded that in deed compensation will be paid before construction starts according to Land Acts 1999.
  - The valuation process is vested to Chief Government Valuer and TANESCO being public company cannot pay beyond the Chief Government Valuer’s opinion
- Awareness on the valuation and compensation of the properties procedures to the affected people by the project. This is because most people are unaware of the procedures involved during valuation and compensation exercise.
  - TANESCO agreed that is the problem during the valuation exercise and promised to continue raising awareness during the detailed ESIA study. Further, TANESCO will ensure that engaged valuers conduct awareness meetings with PAPs before the valuation of properties starts.
- Wanted to know how will issues relating HIV/AIDS to the construction workers and community be dealt.
  - It was responded that HIV/AIDS awareness within the community is very high but the project will continue to educate and sensitize workers and the community on how to avoid HIV/AIDS during the project implementation.

- Adverts and brochures will be erected and distributed to workers to warn and to remind people to take care for themselves. In addition condoms will be put at special areas for self-help.

The main issues that were raised by the community through questionnaires included the following:

- The project will enhance the reliability and security of electricity supply in the region in addition to increasing the region's power supply. This will help meet the increasing demand for power supply and minimize the frequency of power outages.
- The construction, operation and decommissioning of the proposed substation will create employment opportunities for both skilled and unskilled personnel.
- Some stakeholders especially the community was concerned about the possibility of occurrence of accidents such as electrocution and machine/vehicle misses during the construction and operation phase of the proposed project.
- Increase in reliability and security of power supply in the region will enhance efficiency and productivity of other sectors including health, education, water supply, livestock production and industry.
- With increased lighting in the area and presence of guards on the project site the security of the area will be enhanced.
- Electricity supply to hospitals and dispensaries in the project area would enhance delivery of services such as laboratory, surgical, immunization, among others.
- Improved health and education sector.

Disadvantages of the projects were identified as follows through questionnaires:

- Noise pollution during construction. The construction and decommissioning works of the substation will most likely be noisy due to the moving machines (mixers, tippers, drilling etc.) and incoming vehicles to deliver construction materials to site or take away debris.
- Exhaust emissions are likely to be generated by the motored equipment during the construction and decommissioning phase of the proposed substation. Motor vehicles that will be used to ferry construction materials, take away debris during decommissioning phase or those used for general operation activities (operation phase) will also have impacts on air quality.
- Dust emission is likely to occur during the site clearance, excavation and spreading of the topsoil during construction. They are also likely to occur during the decommissioning phase. Motor vehicles accessing the site may also lead to dust emissions.
- Motorized machinery on the proposed site may be containing moving parts which will require continuous oiling to minimise the usual corrosion or wear and tear. There is also a potential for oil spills and accidents during oil transportation, storage and operations of the transformers and batteries.
- Possibility of occurrence of accidents on the site during construction.
- Presence of the substation may expose people to accidents and health hazards.

Therefore, all these concerns will be addressed in the EIA document that will include the preparation of Environmental and Social Management and Monitoring Plans (ESMP).

CHAPTER FOUR

4.0: IDENTIFICATION OF ISSUES AND PROBLEMS

This chapter describes existing problems and issues identified during scoping study that will make a reference frame to mark out the potential environmental impacts that might arise during implementation of the proposed project. The information is based on the information collected from the secondary and primary sources including documentary review, interview with key informants, household questionnaires, community meetings and experts' observations.

4.1: Administration

The transmission line will be constructed from Ilala substation to Ubungo substation along the existing 132kV line II in Dar es Salaam City crossing the two municipalities of Kinondoni and Ilala. Three new substations (Jangwani S/S, Msasani S/S, Mwanyamala S/S) with respective distribution lines will be constructed in Kinondoni Municipal Council while the remaining one new substation (Muhimbili S/S) with their respective lines are located in Ilala Municipal Council.

4.2: Physical Features at Site

- Flora

Currently in the project area there is planted species of Mwarobaini (*Neem Azederachta indica)*, Mkrismas (*Deronix regia).* Other part vegetation covered by shrubs, short grasses and few tall trees with little part of indigenous tree species. The surrounding area of the project area is not covered with any endanger trees species since project area is located in town. The currently existing vegetation cover along the project area is as illustrated in the Figure 4.1 below.

Figure 4.1: Part of flora along the proposed project alongside to Oysterbay road

- Fauna

According to interviews with members of the community, Ilala and Kinondoni municipal records and physical inspection in the industry areas does not have any major wildlife since

project area in that place. Common animals on the project site seen include birds ("*Kunguru"*), lizards, butterflies, grasshoppers, ants of various kinds and many other invertebrates. But more details about fauna found alongside the proposed project will be presented in ESIA study.

4.3: Current zoning:

The Substations, Transmission and Distribution lines are in Dar es Salaam city covering Kinondoni and Ilala Municipalities.

4.4: Energy and water supply

Since the project will be in the urban areas, it is expected to have no camps constructed, and the power source during construction is mainly expected to be TANESCO's electric power. However, diesel generators shall be available as standby source during blackouts. Existing water sources and DAWASCO will be exploited, minimal water is required for construction of the substations, transmission and distribution lines.

CHAPTER FIVE

5.0 SYNTHESIS OF RESULTS OF SCOPING EXERCISE

This Chapter will give an overview of some of the relevant and potential environmental and social issues with their impacts that will be addressed in the next ESIA process. The description is based on a general overview of potential impacts analyzed from the consultation and field trip made in the project areas.

5.1 Potential environmental and social impacts

Power project usually involves survey and design, mobilization, construction, demobilization operation and decommissioning. These phases are likely to have some impacts on certain aspects of the biophysical and social economic environment either positively or negatively and sometime neutral. Therefore, it is anticipated that there will be environmental and social impacts affecting various groups socially and economically. It is further anticipated that the communities will have to be protected from any negative impacts, while opportunities to be offered by the project need to be made visible to the communities. Those various groups likely to be affected by the project were closely involved in raising their concerns of the project which are addressed in the previous chapters of this scoping report.

The prediction of impacts is based on the entitlement matrix, knowledge of the expert on such project and their secondary and synergetic/ cumulative effects for the biophysical environment and local community. The assessment and valuation of impacts for different project components is characterized based on the following parameters:

- **A+/-:** significant positive/negative impact is expected
- **A+/-:** Positive/negative impact is expected to some extent.
- **C+/-:** Extent of positive/negative impact is unknown. (A further examination is needed, and impact could be clarified as the study progresses).
- **D:** No impact is expected

Table 5.1 below provides a list of foreseen environmental and social impacts of the rehabilitation of substation and construction of new lines and substations.

Table 5.1: Summaries of Possible Environmental and Social Impacts of the Proposed Project

Category	No.	Item	Degree of Potential Impacts in project phases			Potential Impacts
			Pre-Construction	Construction	Operation	
Pollution Control	1.	Air Quality	B-	B-	D	Pre-Construction and Construction: -Generation of Dust and Exhaust gas from construction machine and vehicles. Operation: -There will be no emissions of air pollutants from the operation.
	2.	Water Quality	D	D	D	Pre-Construction, Construction and Operation: -There will be no pollution of water during both phases since project area is far away from source of water.
	3.	Soil Erosion	B-	B-	D	Pre-Construction and Construction: -The construction works associated with the site preparation, vegetation clearance for RoW involve minor earthworks which include excavation of foundations (in substation_, excavation of holes for wooden poles and backfilling will lead to soil erosion and pollution. Operation: -There will be no soil erosion during this phase.
	4.	Waste	B-	B-	B-	Pre-Construction and Construction: -Generation of domestic and industrial waste from construction sites. Operation: - If Waste Oil in transformers is not properly handled, waste oil will be carried outside the site with storm water.
	5.	Soil Contamination	B-	B-	B-	Pre-Construction and Construction: -If waste Oil for construction machine and vehicle is not properly handled, waste oil will contaminate the soil and leach into underground water. Operation: -If Waste Oil in transformers is not properly handled, it will contaminate the soil and leach into underground water.
	6.	Noise &Vibration	B-		D	Pre-Construction and Construction: -Generation of noise and vibration due to movement of machine and vehicles.

Category	No.	Item	Degree of Potential Impacts in project phases			Potential Impacts
			Pre-Construction	Construction	Operation	
				B-		Operation: -There will be no noise/vibration pollutants during the operation phase.
	7.	Land Subsidence	D	D	D	Pre-Construction/Construction/Operation: -There will be no extensive underground water use for the construction work that will cause land subsidence.
	8.	Odor	D	D	D	Pre-Construction/Construction/Operation: - There are no activities anticipated in this project that might cause odor complaints.
	9.	Sediment	D	D	D	Pre-Construction/Construction/Operation: - There are no activities anticipated in this project that might affect the quality of sediment(e.g. Contamination by Heavy Metal)
Natural Environment	10.	Ecosystem	A-	A-	A-	Pre-Construction/Construction: -There are some Important Bird Areas that might be affected by the construction work. Operation: -There are other migratory birds in this area and the modification of transmission line might cause electrocution and collision.
	11.	Hydrology	D	D	D	Pre-Construction/Construction/Operation: There will be no extensive cutting and filling in the construction work that will cause impacts on surface water and underground water flow.
	12.	Topography and Geology	D	D	D	Pre-Construction/Construction/Operation: There will be no extensive cutting and filling in the construction work that will cause impacts on topography and geology nature of the project area.
	13.	Impact on Vegetation	B-	B-	B-	Pre-Construction and Construction: -Some clearance of vegetation cover will occur during both phases although impacts will be small since the project will pass in road reserves. Operation: - Low maintenance of the RoW will involve clearing of vegetation using mechanical methods. This will lead to permanent control of vegetation within RoW.

Category	No.	Item	Degree of Potential Impacts in project phases			Potential Impacts
			Pre-Construction	Construction	Operation	
Social Environment	14.	Resettlement	A-	A-	D	Pre-Construction and Construction -There are number of Project Affected Families (PAFs) in which will be determined RAP study. Operation: -There are no activities anticipated in this project that might cause resettlement
	15.	Poor	A-	A-	D	Pre-Construction and Construction: -The poor who are affected by this project need to be included in the Resettlement Action Plan and HIV/AIDs Prevention Plan. Operation: -There are no activities anticipated in this project that might cause resettlement
	16.	Local economy such as Employment and improvement of livelihood	B+	B+	B+	Pre-Construction: -There would be little opportunities for employment and economic activities in this stage. Construction: -There will be employment opportunities and demand for construction materials during construction. Operation: -Business opportunities will be created with the newly delivered of stable electricity.
	17.	Cultural Heritage	C-	C-	D	Pre-Construction and Construction: There are no heritage sites along the proposed project area that are already confirmed by the relevant authorities. However, local archeological, historical, cultural, and religious heritage sites might be found during construction. Operation: -There will be no activities having impacts on local archeological, historical, cultural, and religious heritage sites.
	18.	Gender	B-		D	Pre-Construction/Construction -Gender issues that might be caused in Resettlement and HIV/AIDS prevention activities will be addressed in the

Category	No.	Item	Degree of Potential Impacts in project phases			Potential Impacts
			Pre-Construction	Construction	Operation	
				B-		Resettlement Action Plan and HIV/AIDs prevention plan. Operation: There will be no activities having impacts on Gender issues.
	19.	Infectious Disease such as HIV/AIDS	B-	B-	D	Pre-Construction/Construction - HIV and STDs might be brought due to immigration of workers associated with the project. Operation: There will be no activities having impacts on infectious diseases
	20.	Accident and Safety Issues	B-	B-	B-	Pre-Construction/Construction -Without proper measures for construction, accidents on the public roads might happen. Operation: -The power lines might be cut by accident or natural disaster.
	21.	Water use	B-	B-	D	Construction -Water for construction work will be necessary and taken from nearest water sources, boreholes or rivers. Pre-Construction/Operation: -Water will not be necessary for the operation

Note:

- **A+/-:** significant positive/negative impact is expected
- **A+/-:** Positive/negative impact is expected to some extent.
- **C+/-:** Extent of positive/negative impact is unknown. (A further examination is needed, and impact could be clarified as the study progresses).
- **D:** No impact is expected

CHAPTER SIX

6.0 PROJECT ALTERNATIVES

Project alternative refers to the considerations made in the course of developing the project that would achieve the same project objectives. Consideration of project alternatives is crucial in ensuring that the developer and decision–makers have a wider base from which they can choose the most appropriate option and more proactive sides of environmental assessment. This process serves to enhance the project design through an examination of the potential options instead of only focusing on the more defensive task of reducing adverse impacts of a single design. This calls for the comparison of feasible alternatives for the proposed project site, technology, and/or operational alternatives. In this scoping report, the following alternatives are considered and will be examined in detail during the EIA process

6.1 No project alternative:

The no project alternative entails retaining the current status quo without developing the project and therefore foregoing such investment. Based on the analysis of current situations of electricity, power demand and network reasonability in the City, that is to say Dar es Salaam City will not solve the problem of low power supply capacity of the existing power infrastructures.

Also it will not improve power availability in Dar es Salaam City and failed to help the development of socio-economic activities, industries and big investment in Dar es Salaam region. Quality of life of residents who restricted on energy use will not improve. All will still spending lot money for fuel, maintenance and spares which could have been spend on other social benefits.

In fact this decision will not disturb the existing environment and will not take any land of the PAPs. However, it will deny the economic gains through employment, government revenues indirectly from development of socio-economic activities, industries and big investment around project regions and social development in the region. TANESCO will not gain the benefits accrued from solve the problem of low power supply capacity in Dar es Salaam City.

In other words the “Zero Option” is not in line with the Government policies of improving the investment development in order to achieve the requirements of National Strategy for Growth and Reduction of Poverty (NSGRP/MKUKUTA) as envisaged in the Tanzania’s Development Vision (Vision 2025) which stresses on development and commitment to regional and other international initiatives for social and economic development.

6.2 Transmission and distribution lines Alternatives

The transmission and distribution lines can be constructed overhead lines and underground cables. However, the choice of the transmission and distribution lines depends on many factors including the costs and time factors. The major advantage of overhead lines is that cheap, less time consumption and does not require more knowledge especially during construction compared to other forms of power lines. The proposed project has only underground cables alternatives.

6.2.1 Underground cables

Underground cables are more expensive, time consumption and require more knowledge especially during laying down of the cables compared to overhead power lines. This option is ruled out due to investment costs and other viewpoint as explain above.

6.3 Alternative Transmission Line Routes Selection

Currently there is only one route selection which based on construction costs and reduced anticipated environmental and social-economical impacts. The current design proposes the distribution line routes be located along existing roads reserves, that is TANROADS' and Municipal Councils' so as to minimize the environmental and social impacts i.e. resettlement of people along the proposed routes. Detail evaluation of TL will be undertaking during ESIA study.

6.4 Alternative Locations for Substations

Currently there are no preliminary alternative locations for substations since upgrading of Ilala and Msasani substation will take place inside the existing Substations owned by TANESCO and others new substations will be constructed within located areas as per proposed designed.

These existing locations of substations have been proposed in order to reduce social-economical impacts since and environmental impacts will be low.

CHAPTER SEVEN

7.0 CONCLUSION

This Scoping report has been developed in a careful, open consensus process that involves extensive review at several levels and opportunity for comment from both interested and affected parties. The analysis of the project has evidenced that the proposed project of rehabilitation of substations and construction of new lines and substations in Dar es Salaam will improve power availability in Dar es salaam and help the development of socio-economic activities, industry and improvement of livelihood in Dar es salaam.

The project will accelerate economic growth in project area and the country at large due to socio-economic benefits that are credited with this electricity project. Although there are potential impacts that shall be associated with the development of this project, the EIA study will assess these impacts in detail according to the developed and approved Terms of Reference (ToR) and address all the environmental and social issues found during field visit and raised by interested and affected parties. However, there will be negative impacts as well that nevertheless proposed mitigation measures to improve or eliminate the potential effects can be mitigated accordingly during planning of the project and during the implementation phases of the project. The final EIA study should analyse the potential impacts and present the detailed mitigation measures. The final report will have a chapter on the environmental and social management and monitoring plans.

The impacts will include employment to local community members, increase in Government revenue and improvement of standards of living. However, despite the outlined positive impacts, the proposed project will have some negative impacts such as soil erosion and landslides, pollution to (Air, Water, soil) mostly during construction phase, and increased waste (solid and liquid) generation among others. The extent and significance of these impacts will be assessed during ESIA study and their mitigation measures will be addressed in the Environmental Management Plan (EMP) of the project.

CHAPTER EIGHT

8.0 DRAFT TERMS OF REFERENCE FOR UNDERTAKING THE ESIA STUDY

Environmental and Social Impact Assessment Study for the rehabilitation of substations and construction of new lines and substations in Dar es Salaam

1.0 Introduction

TANESCO is a Parastatal Company that is wholly owned by the government of Tanzania. The company's core business is generation, transmission, distribution and sale of electricity to the Tanzania mainland and bulk power to Zanzibar.

The Government of Tanzania through Tanzania Electric Supply Company (TANESCO) is planning to undertake rehabilitation of substations and construction of new lines and substations in Dar es Salaam City. Under the Japanese International Corporation Agency (JICA) funding, TANESCO has completed carrying out a conceptual detailed design study of the proposed transmission and distribution line routes and substations.

The overall objective of the project is to provide increased access to electricity with sustainable effects on poverty reduction by facilitating income generation and improved social services. The technical objective of the project is to stabilize the grid system, increase power supply, improve reliability of the power supplied in Dar es salaam city, as well as to increase the extent of TANESCO's distribution network in the city in order to be able to provide electricity to commercial business activities, water pumping, secondary schools, medical services, streetlights, residential houses, agro-processing activities etc. in the project area.

The proposed project has five (5) components which are:

- Reinforcement of Ilala substation and existing 132 kV transmission line from Ilala substation to Ubungo substation (7.5 km)
- Construction of new Jangwani Beach substation (33/11kV) and construction of distribution line (33kV) from Jangwani beach substation to Tegeta substation (6.5km)
- Construction of Muhimbili substation (33/11kV) and construction of distribution line (33kV) from Muhimbili to City Center substation (2km)
- Construction of Mwananyamala substation (33/11kV) and construction of distribution line (33kV) from Mwananyamala substation to Makumbusho substation (1.1km)
- Expansion of Msasani substation (33/11kV) and expansion of distribution line (33kV) from Msasani substation to Makumbusho substation (7.6km)

2.0 Project Area

The transmission line will be constructed from Ilala substation to Ubungo substation along the existing 132kV line II in Dar es salaam City crossing the two municipalities of Kinondoni and Ilala. Three new substations with respective distribution lines will be constructed in Kinondoni Municipal Council while the remaining two substations with their respective lines are located in Ilala Municipal Council.

The current design proposes the distribution line routes be located along existing roads reserves, that is TANROADS' and Municipal Councils' so as to minimize the environmental

and social impacts i.e. resettlement of people along the proposed routes. The project areas are accessible by road.

3.0 Objective

The purpose of this Terms of Reference (ToR) is to provide guidance to the consultant or study team to carry out a comprehensive Environmental and Social Impact Assessment (ESIA) for the proposed project according to the financier guidelines (JICA), national laws and regulations (Environmental Management Act CAP 191 of 2004 and Environmental Impact Assessment and Audit Regulation of 2005).

The ESIA is intended to identify potential impacts of the project (physical, biological and social economic), justify optimal choices that would minimize or avoid potential negative impacts and design appropriate environmental and social management plan (ESMP) to address and mitigate impacts that cannot be avoided.

ESIA will also identify opportunities for environmental enhancement and sustainable development that could be implemented. The ESMP will describe in detail the mitigation measures to be implemented, including the estimated cost, schedule and organization needed to implement it. The monitoring process schedule and any social and environmental management capacity building and institutional strengthening that may be required for responsible institutions involved in the project.

The specific objectives of ESIA study are:-

- Review and documents the baseline data and information on both the natural environment i.e. physical, biological and man – made environment including social economic conditions of the proposed project areas;
- To identify, predict and evaluate potential positive and negative impacts of proposed transmission line power project including substations;
- To develop mitigation measures that aim at eliminating or minimizing the potential negative impact and promote the positive ones and recommended appropriate mitigating measures to be incorporate in the engineering designs;

4.0 Approach

In order to achieve the objectives outlined above and taking the matter as an urgent with NEMC decision, the ESIA study are envisaged to be pursued in the following three main stages:

Stage I: Project registration and submission of project brief to National Environment Management Council. The client in collaboration with consultant shall fill the registration forms; prepare project briefs of the project for carrying out ESIA study to be submitted to NEMC for approval.

Stage II: Carrying out Scoping Study and preparation of ToR: The Consultant shall carry out an environmental scoping exercise and should comply with existing environmental standards in the country i.e. Environmental Management Acts CAP 191 of 2004 and Environmental Assessment and Audit Regulation of 2005.

Stage III: Carrying out full ESIA study after NEMC approve scoping report and ToR for all project components, including infrastructural works, power line and substation.

5.0 Requirements

The ESIA and ESMP must comply with local standards in Tanzania i.e. Environmental Management Act Cap 191 of 2004 and its Environmental Impact Assessment and Audit regulation of 2005 and should meet financier's guideline, current internationally accepted standards of information gathering, reporting and analysis.

Environmental and Social Impact Assessment (ESIA) will be carried out in the proposed project area of probable project influence as already defined and delineated, covering both the construction and operation phases of the project and by using both qualitative and quantitative methods.

6.0. Environmental and Social Impact Assessment

For the Environmental and Social Impact Assessment the consultant(s) will:

- Describe the proposed project by providing a synthetic description of the project relevant components and presenting plans, maps, figures and tables.
- Identify and describe the policy, legal and administrative (institutional) framework relevant to the project.
- Define and justify the project study area for the assessment of environmental and social impacts.
- Describe and analyse the physical, biological and human (social) environment conditions in the study area before project implementation. This analysis shall include the interrelations between environmental and social components and the importance that the society and local populations attach to these components, in order to identify the environmental and social components of high value or presenting a particular interest.
- Describe and analyse potential environmental impacts i.e. negative and positive and propose / recommend mitigation measures to minimize or avoid the impacts.
- Present and analyse alternatives to the proposed project, including the "without project" option, by identifying and comparing the alternatives on the basis of technology, location, design, economic, construction technique, maintainability, environmental and social criteria, capital, and operating cost, institutional and monitoring requirement.
- Conduct resource evaluation or cost benefit analysis of the project

7.0 Environmental and Social Management Plan (ESMP)

Define appropriate mitigation/enhancement measures to prevent, minimise, mitigate, or compensate for adverse impacts or to enhance the project environmental and social benefits, including responsibilities and associated costs. The ESMP should include (but not limited to) the following:

- Recommendation of feasible and cost-effective measures to prevent or reduce significant negative impacts to acceptable levels
- Estimate of the magnitude of impacts and costs of mitigation measures.

- Consideration for compensation to affected parties for impacts that cannot be mitigated
- Set of *best practices* measures to be followed in order to avoid some of the impacts during construction and operation phases of the project
- Identification of institutional needs to implement environmental and social assessment recommendations including a review of the authority and capability of relevant institutions. Recommend steps to strengthen or expand these institutions to ensure that effective environmental management and monitoring will occur.
- Description of detailed arrangements required for monitoring implementation of mitigating measures and the impacts of the project during construction and operation.
- Proposed work programs, budget estimates, schedules, responsibilities for implementation, and other necessary support services to implement the ESMP.

As appropriate, prepare an environmental hazard plan including an analysis of the risk of accident, the identification of appropriate security measures and the development of a preliminary contingency plan.

8.0 Public Participation

Carry out consultations with primary and secondary stakeholders in order to obtain their views on and preoccupations about the project. These consultations shall occur during the preparation of the ESIA report to identify key environmental and social issues and impacts, and after completion of the draft ESIA Report to obtain comments from stakeholders on the proposed mitigation/enhancement measures.

The consultant will prepare a thorough consultation program and a record (with evidence of picture, adverts and signatures) of meetings, communications and comments to be part of ESIA study and presented to the environmental authority (NEMC).

9.0 Reporting

The ESIA Report shall be presented in a clear and concise manner and focus on relevant and significant environmental and social issues that assist in understanding the project and its impacts. The scope and level of details of the Report shall be proportional to the project's potential impacts.

The ESIA Report shall describe the scientific approach adopted to carry out the studies. In particular, the models, methods and criteria used in the studies shall be presented and explained. The Report shall also include maps and drawings at the appropriate scale and refer to all consulted documents.

ESIA Report shall contain items and arrangement according to the Environmental Impact Assessment and Audit Regulations, 2005. In addition, all relevant consults should have signatures against their names.

I. **Draft final report** 1 soft and 15 hard copies to be submitted to NEMC for review, comments and further actions regarding this draft report. The consultant shall produce Report in English with non technical executive summary in English and Kiswahili languages.

II. **Final report** 1 soft and 5 hard copies amended in response to opinions / comments given by TAC meeting will be submitted to NEMC as final ESIA report. The consultant shall produce report in English with separate bound non technical executive summary in both English and Kiswahili languages.

10.0 ESIA Study Team

The study team will involve consultant and experts with demonstrable practical experience in conducting EIA studies for linear projects.

The study team shall in briefly comprise of at least the following key personnel with the specializations listed below:

- Team Leader – Environmental Expert – Registered with NEMC as EIA expert
- Sociologist – Economic expert
- Ecologist
- Land use and land management expert
- Mapping / GIS expert
- Surveyors
- Other experts including but not limited to: Waste management expert, Transmission and Distribution line expert, RAP expert etc.

11.0 Time Frame

It is anticipated that the duration of the study commencing from the date of approval of these terms of references by NEMC to the date of submission of final ESIA report for the proposed project will be two (2) month calendar.

REFERENCES

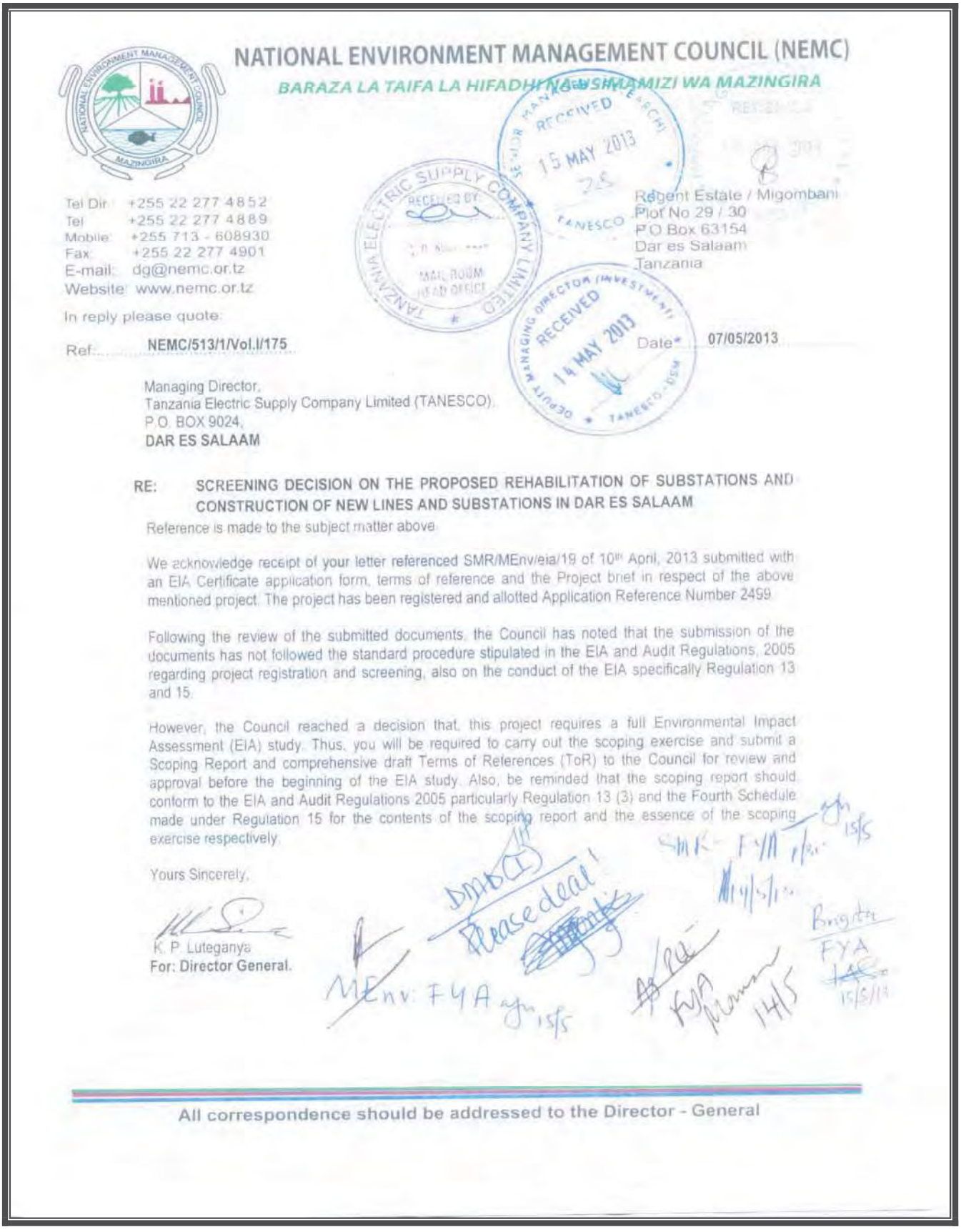
- JICA PREPARATORY SURVEY TEAM-Yachiyo Engineering Co. Ltd and West Japan Engineering Consultants, Inc. (April, 2013). *Field Report Preparatory Survey On The Project For Rehabilitation Of Substations And Construction Of New Lines And Substations In Dar Es Salaam In The United Republic Of Tanzania-Part 1*

- JICA (April, 2004). *Japan International Cooperation Agency Guidelines for Environmental and Social considerations*

- United Republic of Tanzania (URT) (2004). *Environmental Management Act (EMA)*. Government Printers, Dar es Salaam.

- United Republic of Tanzania (URT) (2005). *Environmental Impact Assessment and Audit Regulations G.N. No 339*. Government Printers, Dar es Salaam.

Appendix I: Screening Decision from NEMC for undertaking Scoping Exercise



NATIONAL ENVIRONMENT MANAGEMENT COUNCIL (NEMC)

BARAZA LA TAIFA LA HIFADHI NA USHAMIZI WA MAZINGIRA

RECEIVED 15 MAY 2013 TANESCO

TANZANIA ELECTRIC SUPPLY COMPANY LIMITED RECEIVED BY MAIL ROOM HEAD OFFICE

DEPUTY MANAGING DIRECTOR (INVESTMENT) RECEIVED 14 MAY 2013 TANESCO - DSM

Tel Dir +255 22 277 4852
Tel +255 22 277 4889
Mobile +255 713 - 608930
Fax +255 22 277 4901
E-mail: dg@nemc.or.tz
Website: www.nemc.or.tz

Regent Estate / Migombani
Plot No 29 / 30
P O Box 63154
Dar es Salaam
Tanzania

In reply please quote:

Ref: NEMC/513/1/Vol.I/175 Date: 07/05/2013

Managing Director,
Tanzania Electric Supply Company Limited (TANESCO),
P.O. BOX 9024,
DAR ES SALAAM

RE: SCREENING DECISION ON THE PROPOSED REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW LINES AND SUBSTATIONS IN DAR ES SALAAM

Reference is made to the subject matter above.

We acknowledge receipt of your letter referenced SMR/MEnv/eia/19 of 10th April, 2013 submitted with an EIA Certificate application form, terms of reference and the Project brief in respect of the above mentioned project. The project has been registered and allotted Application Reference Number 2499.

Following the review of the submitted documents, the Council has noted that the submission of the documents has not followed the standard procedure stipulated in the EIA and Audit Regulations, 2005 regarding project registration and screening, also on the conduct of the EIA specifically Regulation 13 and 15.

However, the Council reached a decision that, this project requires a full Environmental Impact Assessment (EIA) study. Thus, you will be required to carry out the scoping exercise and submit a Scoping Report and comprehensive draft Terms of References (ToR) to the Council for review and approval before the beginning of the EIA study. Also, be reminded that the scoping report should conform to the EIA and Audit Regulations 2005 particularly Regulation 13 (3) and the Fourth Schedule made under Regulation 15 for the contents of the scoping report and the essence of the scoping exercise respectively.

Yours Sincerely,

K. P. Luteganya
For: Director General.

All correspondence should be addressed to the Director - General

Appendix II: Photo Documentation during Scoping Exercise

Figure 1: Community members raising their concerns during Scoping study at Kigogo ward

Figure 2: Focus group Discussion with people living near the proposed 33kV Distribution line from City centre S/S to Muhimbili S/S at Upanga-West ward.

Figure 3: Environmental Expert explaining about the project to the people around proposed project

Figure 4: Vegetation coverage found at proposed site of Muhimbili S/S

Appendix III: Attendance Register for the Consulted People during Scoping Exercise

11.7 Agreement on the mode of compensation of graves at Ubungo Kisiwani and Midizini in Kinondoni and Ilala Districts.

YAH: kukubaliana Malipo ya Makaburi yalipwe Sana!

Rejea kichwa cha Habari sisi waathirika tuliyoziko eneo la Ufi ambao Makaburi yetu yapo eneo la Mradi wa TANESCO, tumekubaliana kuwa sisi wote tulipwe sana gharama za Makaburi bila kujali aina ya Maendeleo yaliyokatajika au Dini ili kuepuka malalamiko

ahsante:

Wenu:

1: MATHEW GEORGE KABATA 0714-788704

2: MWINDE A. NGONDYA 0652-60494

YAH: Kuiteua Mwenyekiti wa Serikali ya Mtaa wa Ubungo kisiwani kusimama Kwa niaba ya waathirika wa Makabu ya eneo la Ufi:

Rejea kichwa cha habari, sisi waathirika tulioziko eneo la Ufi ambao Makaburi yetu yapo eneo la Mradi wa TANESCO tuna mteua Mwenyekiti wa Mtaa ndg: JOVIN MANYOTO NDIMBO asimame yetu katika zoezi la Tathimini: Malipo yote yatakanayo na tathimini yatapokelewa na Mwathirika Mwenyewe

Ahsante

Wako

1. MATHEW G. KABATA Sgn. 0714-788704
2. MWINDE A. NGONDYA – 0652-604

Kwa niaba ya waathirika:

1. JINA	ANAPOISHI	JINSIA	SHUGHULI JA KIUCHUMI
1. STEPHEN GAMA	MABIBO FARASI		BIASHARA
2. KENNY M. LUTTONGA	MUDIZINI		BIASHARA
3. PAUL M. KAZYOBA	UB KIGUANI		BIASHARA
4. DALILA S. MSAFIRI	MUDIZINI		BIASHARA
5. MARIBU SALUM	UB KIGUANI		BIASHARA
6. ELIZABERT NCHIMBI	MABIBO		BIASHARA
7. AZIZI MPUCHILA	MUDIZINI		BIASHARA
8. PENFORD P. ICHO	MUDIZINI		ATHUMISHI
9. ETINA G. SEKAFUNO	MUDIZINI		BIASHARA
10. ANNA G. MBATIA	MUDIZINI		MSTAAFU
11. ENOCK E. MGANGA	UB KIGUANI		FUNDI
12. TITUS F. CHOTA	UB KIGUANI		BIASHARA
13. AJAJILE MWANJALILE	MABIBO		FUNDI
14. BARIKI MS. MANONGI	MABIBO		MTUMISHI

11.9 Confirmation of the number of graves ward and stree officials to be removed at Ubungo Kisiwani and Midizini

HALMASHAURI YA MANISPAA YA KINONDONI
BARUA ZOTE ZITUMWE KWA AFISA MTENDAJI KATA YA UBUNGO

Simu Na:0784 317908/ 0715 317908
Unapojibu tafadhali taja:
Kumb Na KMC/UT/UB/VOL/2013

OFISI YA AFISA MTENDAJI
KATA YA UBUNGO
P.O.Box 31902
MANISPAA YA KINONDONI
DAR ES SALAAM
TAREHE 30/6/2013

RAH: UTHAMINISHAJI WA MAKABURI ENEO LA UTT MTAA WA UBUNGO KISIWANI.

Tafadhali rejea kichwa cha habari hapo juu.

OFISI YA AFISA MTENDAJI KATA YA UBUNGO KISIWANI NA OFISI YA MTAA WA KISIWANI. TUMEFANIKIWA KUHAKIKISHA NA KUONA ENEO LA MAKABURI TAMBUZI KWA KUSHIRIKIANA NA WANANCHI WA MAENEO HUSIKA CHINI KIFUNU. PAMOJA NA WAJUMBE WA KAMATI. YUMO TA MAKABURI KWA ENEO LA UTT - UBUNGO KISIWANI NI 185.

Nawasilisha.

SHABANI KAMAI
AFISA MTENDAJI KATA YA UBUNGO

JOHN NDIMBO
MWENYEKITI WA MTAA KISIWANI

① MJUMBE WA KAMATI. MKUU NG'ONGA

② MJUMBE WA KAMATI UTT MTAMBUZI KAMBATA

DATE 30/10/2013

3

OFISI YA SERIKALI YA MTAA MADIZINI KUPITIA MWENYEKITI WA MTAA NA AFISA MTENDAJI MTAA TUMEONA ENEO LA MAKABURI YALIOONEKANA TUKIWA NA WATAALAM KUTOKA CHUO KIKUU TUMESHUHUDIA TUKIWA NA WAJUMBE WA KAMATI YA WAATHIRIKA TUMESHUHUDIA MAKABURI YALIOONEKANA (20) ISHIRINI.

MWENYEKITI — [signature] — MWATUMA SHOMARI

MTENDAJI — [signature] — PENFORD P. KIZO

Mjumbe wa Kamati : Mkande Ng'ondya [signature]

Mjumbe wa Kamati Wafi [signature] Matiaw Kalala

*enlivo

11.10 Photos of the Meeting with stakeholders

Meeting with stakeholders at Ubungo Kisiwani in Kinondoni District

Meeting with stakeholders at Mchikichini in Ilala District

11.11 Household Questionnaire

THE ABBRIVIATED RESETTLEMENT ACTION PLAN FOR THE REHABILITATION AND CONSTRUCTION OF NEW LINES AND SUBSTATIONS IN DAR ES SALAAM

SOCIO-ECONOMIC BASELINE CENSUS SURVEY FOR PROJECT AFFECTED PERSONS (PAPs)
PAP QUESTIONNAIRE

Name of Enumerator.....Date.....Questionnaire No.....

1.0 Name of PAP.....Sex.....

2.0 IDENTIFICATION

District	
Ward	
Mtaa	

3.0 Category of Impact
1.
2.
3.
(Graves, House, Annex structure, Crops)

4.0 Category of PAP
1. Legal owner of land
2. Encroacher
3. Both

5.0 PAP and Household Demographic/Census Information

ID	Name	Relationship to Head	Sex	Age	Marital Status	Vulnerable	Education Level
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

Relationship to Head: 1=Head; 2=Spouse; 3=Child; 4=Grandchild; 5=Parent; 6=Brother; 7=Sister; 8=In-law; 9=Friends 10=Other relative; 11=Other person
Sex: 1=Male; 2=Female
Marital Status: 1=Married; 2=Widowed; 3=Divorced; 4=Single; 5=Separated; 6=Co-habitation
Education Level: 1=None; 2=Primary; 3=Secondary; 4=College; 5=Technical/Vocation; 6=Attending primary School; 7=Drop-out primary school; 8=Drop-out secondary school; 9=Attending secondary school; 10=University
Vulnerability: (1) Widow (2) Orphan (3) Elderly (4) Disabled (5) Disease/Injury (6) Others

6. 0 Primary Economic Activities and Incomes of PAPs

ID	Type of Work	Duration	Location	Income earnings/sales last annual (Tshs)
1				
2				

7. 0 Secondary Economic Activities and Incomes of PAPs

ID	Type of Work	Duration	Location	Income earnings/sales last annual (Tshs)
1				
2				

Type of work: 1=Salaried; 2= Commerce; 3=Fisher; 4=Farmer, 5= Mason 6=Petty trading;

8.0 Land and Land Sizes of PAPs

	Aspects	Numbers/Sizes
	Number of plots owned by PAP in the city/ area.	
	Size of plot owned by PAP	
	How did you acquire the area/land	

1=Purchased; 2=Inherited; 3=Encroached

2

9.0 Type of crops cultivated on affected land under the PAP

	Type of crops	Use of crops
i		
ii		
iii		
iv		
v		

Type: 1=Cassava; 2=Paddy; 3=Cashew; 4=Coconut; 5=Maize; 6=G/Nuts; 7=Beans; 8=Fruits; 9=Sweet Potatoes; 10=Other;
Use Primary and Secondary: 1=For household consumption; 2=For sale 3=For both household consumption and for sale

10.0 Income from crops for the past two years

	Income last three years	Amount (Tsh.) Estimated
i	2011	
ii	2012	

11.0: Housing and Living Condition
11 (a) Type of House

House	Floor	Wall	Roof	Number of rooms	Use	Number of houses

11 (b) Type of floors
1=Mud; 2=Cement; 3=Floor tiles; 4=Timber 5=Mud and cement; 6=Cement and floor tiles; 7= Other
11 (c) Type of walls
1=Poles and mud; 2=Burnt bricks; 3=Cement blocks; 4=Other
11 (d) Type of roof
1=Grass; 2=Corrugated iron sheets; 3=Tiles; 4=Concrete; 5=Other
Use: 1=Residence; 2=Commercial; 3=Both residential and commercial 4=Other

11 (e) Toilet facilities	

1=Flush toilet; 2=Pit latrine (VIP) 3=Pit latrine; 4=None; 5=Others

12.0 Type and number of Property/entity likely to be affected

	Property/entity	Yes/No	Number of property
	House		
	Business Structure		
	Other structures (outbuildings)		
	Graves		
	Permanent crops		
	Seasonal crops		

1= Yes, 2= No

3

13.0 Are you willing to relocate to another area if the way leave goes through your land or property?

14.0: Preferred alternative site to relocate

In the Ward	
Outside the ward/area but in the District	
Outside the District	

15.0 Preferred mode of compensation

In-kind compensation	
Cash compensation	

1 = In-kind compensation
2 = Cash compensation

16.0 Availability of suitable substitute land for purchase or rent after compensation
1=Available 2=Not available

17.0 Availability of houses for rent after compensation in the area .....
1=Available 2=Not available

18.0 What kind of benefits/positive impacts do you expect from the proposed development.....

.....

19.0 What kind of loss/negativeimpacts do you expect from the proposed project?

.....

.....

20.0 (Magnitude of impacts)
1. Need relocation within the same plot
2. Need relocation out of the plot
3. No relocation required