Design, Development, Supply and commissioning of two islanding schemes at selected location in the State of Gujarat

State Load Despatch Centre

Vadodara, Gujarat

ISLANDING SCHEME IN GUJARAT STATE: -

The islanding schemes are to be formed with anticipated load-generation balance and with tripping of predetermined load/ ICTs/ EHV lines generators. In every islanding scheme, it is necessary that adequate automated mechanism should be in placed achieving load generation balance in the islanded sub-system. SCADA visibility of generation and load of New islanding shall be made available.

For successful island formation during blackout, Demand Side Management with fine control of load at Distribution level (11/22/33kV) should be incorporated in islanding schemes by using PLC logic and the scheme should be facilitated with Load -Generation comparison for islanded portion on 24 x 7 Hrs. basis on SCADA.

Considering the above requirements, SLDC has made design of two islanding schemes (Kutch and Jamnagar Islanding Scheme).

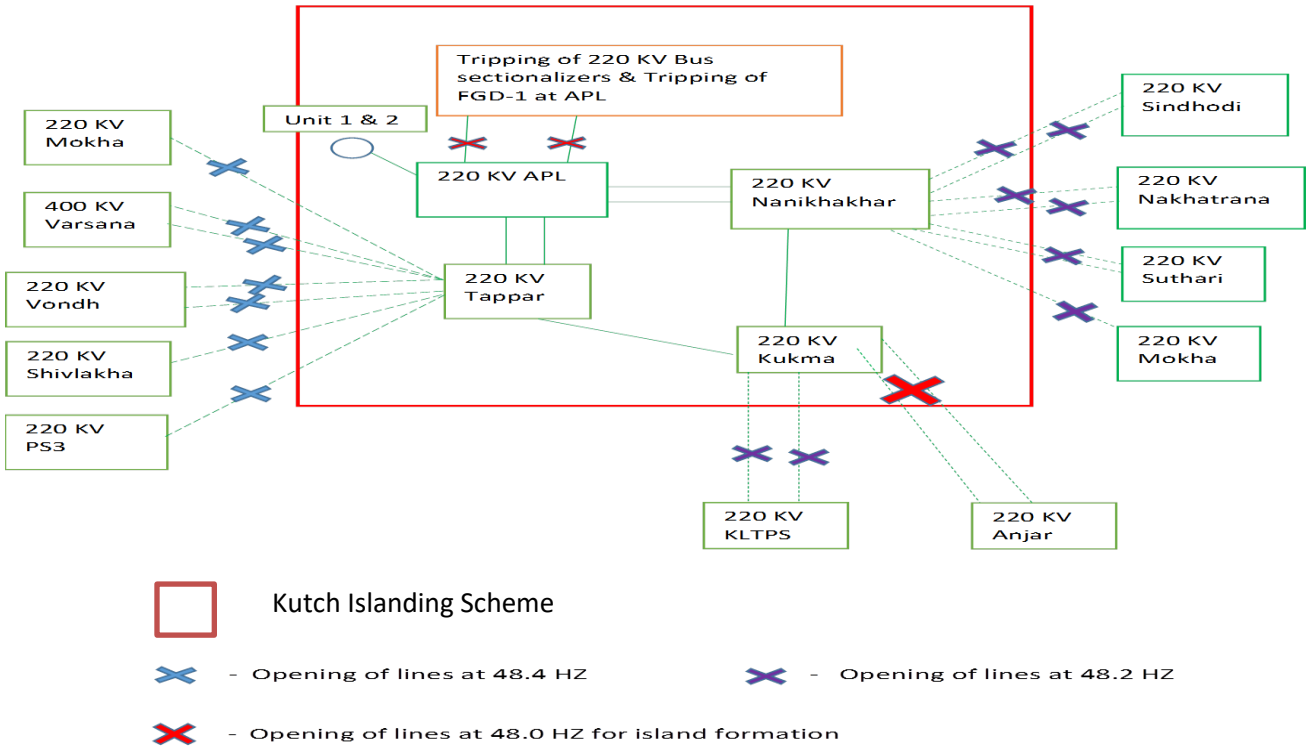
Islanding shall be operated with minimum one generating unit with designated load as per logic specifications defining in this document.

Kutch islanding scheme with APL PS:

The generating units of APL Stage – 1 (330 MW x 2) and around load of 470 MW of 220 kV Nanikhakhar, Tappar and Kukma S/S will participate in islanding schemes. The details of generation and load are as under:-

Details of generators participate in islanding				**Detail of load**	
Name of Generating Stations	**IC**	**Ex-bus capability**	**Tech min**	**Name of S/S**	**Load in MW**
APL, Mundra	2 X 330 = 660 MW	600	400	220 KV Kukma	170
				220 KV Nanikhakhar	180
				220 KV Tappar	160
				Total	**470**

The schematic diagram of kutch islanding scheme is as under:



The proposed actions at various stages of islanding schemes are as under:

Islanding Frequency 48.00 HZ		
1	48.60 Hz	66 kV RE feeder curtailment
2	Action at 48.40 Hz	Load – Generation balance (Comparison of Analog I/P of APL 1 & 2 and 66 kV feeders load) balancing action of excess load curtailment (66 kV feeder tripping)
3	Action at 48.40 Hz and if at least one unit of APL on bar	Opening of all 220 kV lines at Tappar except 220 kV D/C APL - Tappar and 220 kV S/C Tappar - Kukma line i.e. opening of following lines 1. 220 kV D/C Tappar - Vondh line 2. 220 kV D/C Tappar - Varsana 3. 220 kV S/C Tappar - Shivlakha 4. 220 kV S/C Tappar - PS3 5. 220 kV Tappar - Mokha

4	Action at 48.20 Hz	Opening of all 220 kV lines at Nanikhakhar except 220 kV D/C APL - Nanikhakhar and 220 kV S/C Nanikhakhar – Kukma i.e. opening of 1. 220 kV D/C Nanikhakhar - Sidhodi 2. 220 kV D/C Nanikhakhar - Nakhatrana 3. 220 kV D/C Nanikhakhar - Suthari 4. 220 kV Nanikhakhar-Mokha line 5. 220 KV D/C KLTPS-Kukma
5	Action at 48.00 Hz and if at least one unit of APL on bar	Opening of 1. 220 KV Bus sectionalizers at APL 2. Tripping of FGD-1 at APL 3. 220 kV D/C Kukma - Anjar line
5	At 47.80 Hz	Load – Generation balance (Comparison of Analog I/P of APL 1 & 2 and 66 kV feeders load) balancing action of excess load curtailment (66 kV feeder tripping)

The kutch islanding scheme infrastructures will be separate from existing SCADA / PMUs infrastructures.

1. The master controller will be installed at 220 kV Tappar S/S. The slave devices for data and command transfer will be at APL, 220 kV Nanikhakhar, 220 kV Kukma and 220 kV APL generating station.
2. All 66 kV feeders and transformer bays MW / MVAR and circuit breaker status data of 220 kV Nanikhakhar, 220 kV Tappar & 220 kV Kukma S/S and APL Unit 1 & 2 generation and status data will be integrated in master controller.
3. The main roles of master controller are:
   a) Monitoring load – generation data
   b) To identify the excess load as per the set frequency parameter and to extend tripping command to excess load as per logic provided by SLDC as per C.
   c) To initiate actions according to various logics integrated for formation of island as per above table.
4. The communication between master and slaves will be in the scope of SLDC GETCO. It will be on OPGW, in case of non-availability of OPGW, other communication media like

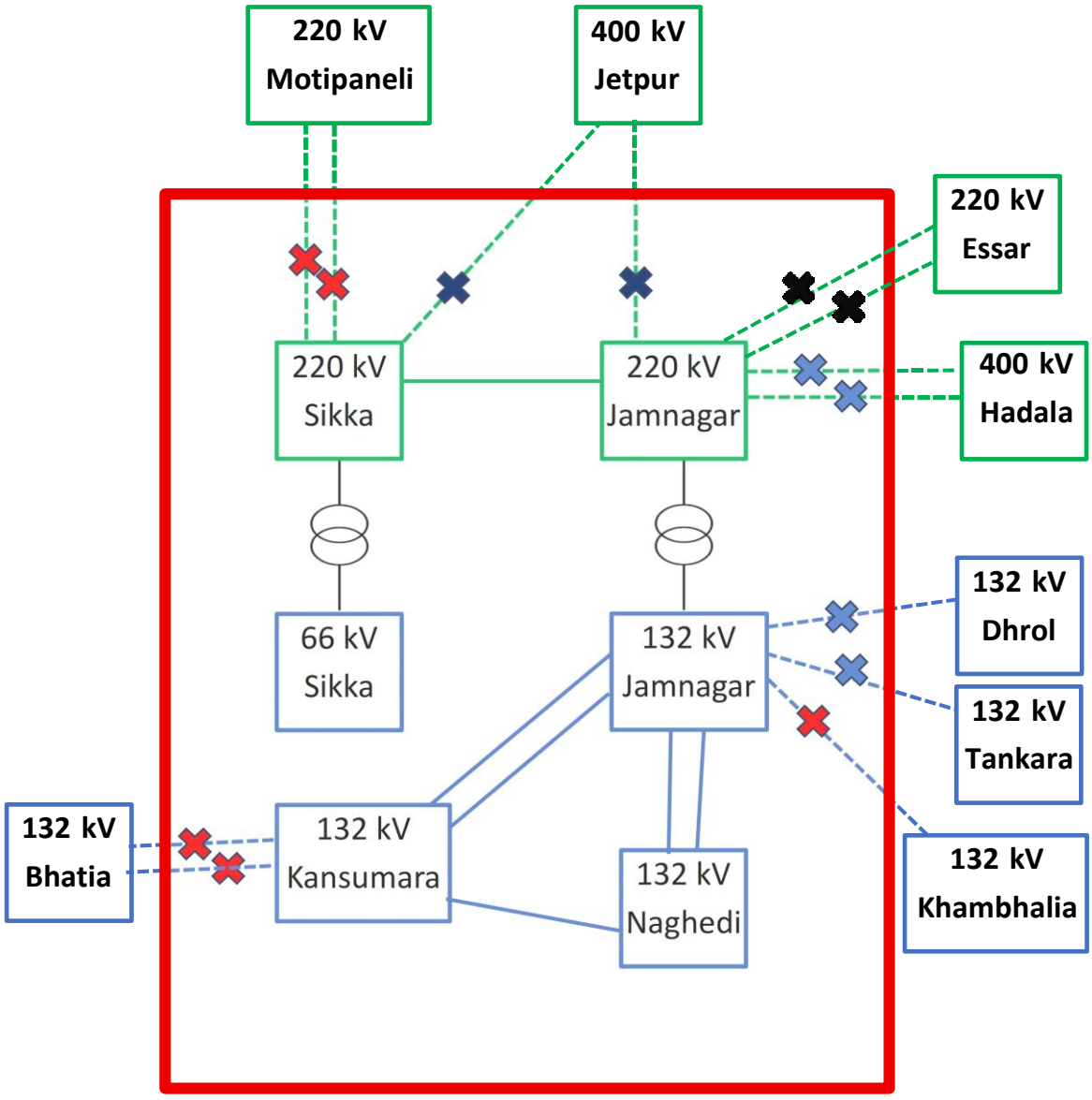
PLCC link or 2 MBPS lease line will be provided. Bidder has to made the system accordingly and has to give return consent with biddinng document.

Jamnagar islanding scheme with Sikka TPS:

Two units of 250 MW each of Sikka TPS and load of 132 kV Sikka, 132 kV Naghedi and 220 kV Jamnagar S/S will participate in islanding schemes. The details of generation and load are as under:

Details of generators participate in islanding				**Detail of load**	
Name of Generating stations	IC	Ex -bus capability	Tech Min	Name of S/S	Average Load in MW
STPS	2 x 250 MW = 500 MW	475	(160 x 2) = 320	220 KV Jamnagar	150
				132 KV Naghedi	110
				Sikka TPS	50
				Total	310

The schematic diagram of islanding scheme is as under:



- Opening of lines at 48.4 Hz
- Opening of lines at 48.2 Hz
- Opening of lines at 48.0 Hz for island formation
- Islanding Scheme

The proposed actions at various stages of islanding schemes are as under:

Islanding Frequency 48.00 HZ		
1	48.60 Hz	66 kV RE feeder curtailment kV **RE feeder curtailment**
2	Action at 48.40 Hz	Load – Generation balance (Comparison of Analog I/P of STPS 3 & 4and 66 kV feeders load) balancing action of excess load curtailment (66 kV feeder tripping)
3	Action at 48.40 Hz and if at least one unit of STPS on bar	Opening of 1. 220 kV D/C Hadala - Jamnagar line 2. 132 kV S/C Jamnagar - Dhrol 3. 132 kV S/C Jamnagar - Tankara
4	Action at 48.20 Hz	Opening of 220 kV Jetpur – Jamnagar and 220 kV S/C Sikka - Jetpur
5	Action at 48.00 Hz and if at least one unit of STPS on bar (Creation of island)	1. 220 kV D/C Sikka - Motipaneli line 2. 132 kV D/C Sikka - Bhatia line 3. 132 kV Jamnagar - Khambhalia line
5	At 47.80 Hz	Load – Generation balance (Comparison of Analog I/P of STPS 3 & 4 and 66 kV feeders load) balancing action of excess load curtailment

The system architecture is as under:

The islanding scheme infrastructures will be separate from existing SCADA / PMUs infrastructures.

1. The master controller of Jamnagar – Sikka islanding scheme will be at 220 KV Jamnagar S/S. 66 kV feeders and transformer bays MW / MVAR and circuit breaker status data of Sikka, Naghedi, Jamnagar S/S and Sikka Unit 1 & 2 generation, and status data shall require to be integrated in master controller.
2. The main roles of master controller are:-
   a) Monitoring load – generation data
   b) To identify the excess load as per the set frequency parameter and to extend tripping command to excess load.
   c) To initiate actions according to various logics integrated for formation of island.

3. The communication between master and slaves will be on OPGW. Till installation of OPGWG, the communication is on PLCC link or 2 MBPS lease line will be provided.