ORISSA ELECTRICITY REGULATORY COMMISSION
BIDYUT NIYAMAK BHAWAN
UNIT-VIII, BHUBANESWAR – 751012
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Present : Shri B.K. Das, Chairperson
Shri S.K. Jena, Member
Shri K. C. Badu, Member

Dated the 13th day of March, 2008

Case No.37/2007

In the matter of : An application under clause 1.13 and 1.8 of Orissa Grid Code (OGC) Regulations, 2006 for settlement of dispute.

And

In the matter of : An appropriate direction to the OPTCL (STU and Transmission Licensee) to permit energisation of the 132 KV switching station installed by the petitioner.

And

In the matter of : M/s. Beekay Steel & Power Ltd., Barbil, Keonjhar represented through Sri D. Passary, Director **Petitioner**

Vrs.

M/s. OPTCL, represented through its Chairman-cum-Managing Director **Respondent**

Date of hearing : 15.01.2008

Mr. L. Pangari, Advocate, Mr. R.P. Mahapatra, Authorised Representative of the petitioner, Mr. J.K. Mishra, GM(Telecom), OPTCL are present.

AND

Case No.38/2007

In the matter of : An application under clause 1.13 of the Orissa Grid Code Regulations, 2006 for settlement of dispute

And

In the matter of : Direction to the OPTCL (STU and Transmission licensee) not to insist on provision of PLCC for speech and data communication in the 132 KV s/s constructed by M/s. MSP Metallics Ltd., Jharsuguda,

And

In the matter of : M/s. MSP Metallics Ltd., New Alipore, Kolkata represented through P.K. Dey, Director **Petitioner**

Vrs.

M/s. OPTCL, represented through its Chairman-cum-Managing Director **Respondent**

Date of hearing : 24.12.2007

Mr. R.P. Mahapatra, Authorised Representative of the petitioner, Mr. J.K. Mishra, GM(Telecom) , OPTCL, Mr. B.N. Mohapatra, GM (GO), SLDC and Mr. S.K. Das, AGM, SLDC are present.

AND

Case No.45/2007

In the matter of : An application under clause 1.13 and 1.8 of Orissa Grid Code (OGC) Regulations, 2006 for settlement of dispute

And

In the matter of : An appropriate direction to the OPTCL (STU and Transmission Licensee) to permit energisation of the 220 KV Bay constructed by M/s. Rohit Ferro Tech Ltd.

And

In the matter of : M/s. Rohit Ferro Tech Ltd., Jajpur, represented through Sri Ashok K. Pattnaik, Sr. GM (Co-ordination) **Petitioner**

Vrs.

M/s. OPTCL represented through its Chairman-cum-Managing Director **Respondent**

Date of hearing : 24.12.2007

Mr. R.P. Mahapatra, Authorised Representative of the petitioner, Mr. J.K. Mishra, GM(Telecom) , OPTCL, Mr. B.N. Mohapatra GM (GO), SLDC and Mr. S.K. Das, AGM, SLDC are present.

AND

Case No.47/2007

In the matter of : An application under clause 1.13 and 1.8 of Orissa Grid Code (OGC) Regulations, 2006 for settlement of dispute

And

In the matter of : An appropriate direction to the OPTCL (STU and Transmission Licensee) to permit energisation of the 132 KV s/s constructed by M/s. Emami Paper Mills Ltd., Balasore

And

In the matter of : M/s. Emami Paper Mills Ltd., Balasore, represented through Sri M.B.S. Nair, President **Petitioner**

Vrs.

M/s. OPTCL represented through its Chairman-cum-Managing Director **Respondent**

Date of hearing : 17.12.2007

Mr. R.P. Mahapatra, Authorised Representative of the petitioner, Mr. J.K. Mishra, GM(Telecom) , OPTCL are present.

1.0 M/s Beekay Steels & Power Ltd., Dist. Keonjher, Orissa (Case No.37/2007) is setting up an integrated steel plant for which sanction has been accorded by the OPTCL for a LILO arrangement from the 132 kV line between Bolani and Barjamunda in Keonjhar District of Orissa. OPTCL had approved the list of vendors for procurement of various equipment M/s.BPL and M/s.ABB were approved as vendors for PLCC equipments. OPTCL directed the petitioner for providing PLCC and data transmission facility to enable data acquisition system to be integrated with OPTCL SCADA network in line with the provisions of Orissa Grid Code, 2006. This was challenged by the petitioner on the ground that it is the responsibility of the transmission licensee to establish connection between its transmission s/s. and the SLDC. OPTCL has not established PLCC link from the switching station (OPTCL transmission system) to SLDC via Joda/Tarkera. The petitioner requested G.M.(Telecom) vide letter 23.04.2007 that exemption may be allowed for the provisions of PLCC and data communication facility to SLDC. Further, PLCC channel routing unto Rourkela with provisions of repeaters at Rourkela and Barjamunda appears to be unreasonable and unwarranted. The said arrangement shall saddle the petitioner with additional heavy financial burden.

1.1 The petitioner, thereafter, approached the Commission with a request to direct the respondent for exemption of the provisions of the OGC to enable him to avail power supply subject to such terms and conditions that may be stipulated by the Commission.

1.2 M/s MSP Metallics Ltd. Kolkata (Case No.38/2007) is setting up a mini blast furnace sponge iron unit as well as induction furnace at Jharsuguda. They

were permitted to avail 18 MVA power at 132 kV by OPTCL. OPTCL directed the petitioner for provision of PLCC equipment for data and voice communication in the 132 kV S/S in the premises of the petitioner. This is under challenge in this petition with a request for a direction to OPTCL not to insist on the provision of PLCC for speech and data communication in the 132 kV S/S of the petitioner.

1.3 M/s Rohit Ferro Tech Ltd., Kalinga Nagar, Dist. Jajpur (Case No.45/2007)is setting up a Ferro Alloys Plant and was permitted by OPTCL to avail power supply to the extent of 40 MVA in 2006-07. The power was to be received at 220 kV from the new Duburi 400/220 kV S/S. OPTCL directed the petitioner quoting the provisions of OGC for provision of PLCC equipment for protection and data communication upto SLDC, Bhubaneswar which has been challenged in this petition with a prayer to the Commission for a direction to OPTCL not to insist on provision of the aforesaid equipments on the ground that the data as needed by OPTCL are really not needed by SLDC for operation of the grid either during normal or abnormal grid conditions.

1.4 M/s Emami Paper Mills, Balgopalpur, Dist. Balasore (Case No.47/2007) is setting up a paper manufacturing unit with CGP capacity of 15 MW at Balgopalpur, Balasore in Orissa. They have been accorded permission for supply up to 14 MVA of emergency power at 132 kv. OPTCL directed the petitioner for installation of PLCC equipments as well as for provision interfacing equipment by the petitioner in the nearest grid s/s for transmission of speech/data to SLDC, Bhubaneswar through sub-LDCs as may be required. The OPTCL also directed for installation of Distance Protection Relays with carrier inter-tripping schemes for protection of the transmission line. This contention has been challenged in the said petition with a prayer to direct OPTCL not to insist on the aforesaid requirements.

1.5 The Commission observes that the cases are analogous in nature for which we have decided to pass a common order. The regulation 1.13 of the Orissa Grid Code Regulations, 2006 on settlement of disputes, provides that *any*

dispute regarding interpretation of any part of the OGC provision between any user and the STU /SLDC the matter may be referred to the Commission for its decision. The Commission's decision *shall be final and binding*. The issues raised before us relate to interpretation of the various provisions of OGC. Hence, the Commission has decided to pass an order in the matter.

1.6. Regulation 1.8 of OGC empowers the Commission for grant "Any exemption from the provisions of OGC. It will be effective only after approval of the Commission, for which the Agencies will have to file a petition in advance to this Commission."

1.7 In Case No.37/2007, the Commission in its interim order dt.07.08.2007 had directed OPTCL to energise the line to the petitioner's plant pending finalization of orders on their petition.

1.8 In Case No.38/2007, the Commission had directed in its interim order dt.27.09.2007 to energise the 132 KV line from Budhipadar 220 kV Grid S/S subject to finalization of their petition.

1.9 In Case No.45/2007, likewise permission was granted for energization of Bay No.18 of new Duburi Grid S/S and extension of power supply to the petitioner in its interim order dt.27.09.07 subject to the final outcome of this petition.

1.10 In Case No.47/2007 also in its interim order dt.17.12.2007, OPTCL was directed to energize the petitioner's plant and the matter regarding interpretation of Orissa Grid Code shall be taken up subsequently. The Commission has also stated that the out come of the final order shall be binding on all parties and the interim order, if considered necessary, shall stand amended accordingly.

1.11 Instead of narrating each and every case, we are taking case No.47/2007 i.e M/s Emami Paper Mills Ltd., Balgopalpur, Balasore.

CHAPTER-2

2. This is a petition arising out of a filing made by M/s. Emami Papers Mills Ltd., Balgopalpur, P.O.Rasulpur, Dist-Balasore – 756 020 for giving a direction to the Orissa Power Transmission Corporation Ltd., (OPTCL) the STU and transmission licensee not to insist on provision of PLCC for speech and data communication in the 132 KV s/s of the petitioner being constructed at Balgopalpur, Balasore.

2.1 The fact of the case is that the petitioner is setting up an 85000 TPA paper manufacturing unit with a CGP of 15 MW capacity at Balgopalpur, Balasore. They are duly permitted for supply of emergency power up to 14 MVA at 132 KV According to that, 132 KV transmission line to be constructed by the petitioner is to be connected to the 132 KV feeder bay of the 220/132 KV Balasore grid s/s for supply of power only during off peak hours.

2.2 The said feeder bay and the associated 132 KV transmission line at Balgopalpur 220/132 KV grid s/s are to be constructed by the petitioner as per OPTCL terms and conditions.

2.3 The respondent vide their letter No.TR/WKL/IV/203/2005/2941 dt.23.11.06 approved the take off arrangement for power supply to the petitioner from the grid s/s at Balasore.

2.4 Subsequently, vide the letter No.211 dt.20.01.07, respondent forwarded the bill of materials for provision of Power Line Carrier Connection (PLCC) between the s/s of the petitioner and the 220/132 KV Balasore grid s/s of the respondent. This was followed up by the letter No.208 dt.20.01.07 of the respondent intimating an approved list of vendors for procurement, installation and commissioning of PLCC equipments.

2.5 In the said vendors list, the transducerless RTU was specified to be of M/s. ABB make as well as an alternate make of transducers was also mentioned. (Para 6 of the petition)

2.6 M/s. ABB does not supply directly the PLCC equipments. The offers submitted through the channel partner are vetted by M/s.ABB. For achieving economic advantage and to be fair to everybody, the petitioner invited quotations from M/s. ABB and AREVA (T&D) India Limited and M/s. BPL Ltd. Technical offers thus received were submitted to the respondent on 16.05.07. The respondent was reminded vide letter No.6.6. 2007 for comments on the technical specifications to enable the petitioner for procurement of PLCC equipments.

2.7 The Respondent OPTCL in their letter No.1702 dt.19.06.07 to the petitioner did not make any adverse comments on the offer of M/s.AREVA (T&D). The comparative statements of the technical and performance features of M/s.ABB, M/s.AREVA(T&D) and M/s.BPL were attached to the aforesaid letter (para 10 of the petition)

2.8 The petitioner placed order on M/s.AREVA (T&D) Ltd., Bhubaneswar on 24th August, 2007.

2.9 The respondent is insisting that the petitioner and the other EHT consumers provide voice and data communications up to SLDC, Bhubaneswar including all interfacing equipment at intermediate grid s/s. The respondent is also threatening not to extend power supply unless the PLCC equipment according to its demand are installed and commissioned.

2.10 The respondent is insisting on voice and data communication to be provided by the user of STS. The action of the respondent is not in accordance with the statute and in support of that the petitioner quotes clauses 1.13, 4.11, 4.13(d), 10.8(1)(2) & (3) of the OGC Regulations, 2006 along with clause 11.2

(3)(viii) and prays to allow necessary relief by way of exemption from providing such PLCC equipment before energisation of the 132 KV line.

2.11 The respondent OPTCL submitted that its recommendations are not to promote monopolistic business practice. They recommend for certain products basing on the following basic criteria. (para 6 of the petition)

(a) Quality of performance and the equipment suitability in OPTCL grid system
(b) Indigenous availability.
(c) After sales support of the supplying firm.
(d) Acquaintance of OPTCL's technical manpower to handle such equipment.

2.12 The petitioner, with an ulterior motive to overrule the provisions of OGC, 2006, have sent to it (vide letter dt.16.05.07) offers from 3 vendors violating the approved list of vendors communicated to them vide OPTCL letter No.211 dt.20.01.07. They had communicated to the petitioner vide letter No.1702 dt.19.06.07 that the equipments particularly from OPTCL's vendor's list need to be sent to OPTCL for according necessary approval. The respondent as the STU is required to recommend (as per Regulation of 11 of OGC) the specification of communication SCADA equipments to be used in the STS.

2.13 The petitioner acting on its own has placed the purchase on M/s AREVA in contraventions to the recommendations made by OPTCL. The respondent accepts the contentions of the petitioner about their existence for SCADA & PLCC. In that context they have quoted relevant regulations namely (a) Regulation 4.13(1)(d) under the title "Site Responsibility Schedule (b) Regulation 10.1, i.e." Introduction under Chapter -10 (Metering communication and data acquisition) (c) Regulation 4.11 (Data Communication). The respondent countered it by saying that it is not due to any procedure framed by OPTCL but due to the extant provisions of OGC.

2.14 It is only implementing the Regulations made under OGC, which have been misconceived by the petitioner as a threat (Para 10 of the respondent's submission) to their business.

2.15 The petitioner has wrongly interpreted the model connection agreement format available at Annexure-1 under Chaper-4 (Regulation 4.5) as a provision under the OGC. According to the respondent, the contents of the model format was not binding as per provisions under OGC, but a guideline depicting the essential feature as stipulated under Regulation 4.5. They further submitted that in view of the implementation of the intra state ABT with effect form 01.01.08, provision of SCADA and PLCC are highly essential requirement to be fulfilled by each user of the STS.

2.16 The Respondent as well as the Petitioner are bound to fulfill the stipulated requirements stated under Chapter-10 of the OGC, which under the head "Introduction" under Regulation 10, provides that the minimum operational and commercial metering communication and data acquisition requirements are to be provided by each user at the point of interconnection and also at the cross boundary circuits. The term "user" is defined under regulation 1.19(124) of the OGC which includes EHT consumers as well.

2.17 As per provision under regulations 10.8(1)(Vii) of the OGC, for effective control of the transmission system, SLDC is required to monitor real time data relating to active and reactive power flow in each transmission line connected to users like the petitioner. The respondent has only complied with the requirements stipulated under regulation 10.8(3) of OGC by providing a complete SCADA network covering a huge transmission system spread across the entire state of Orissa, with provision of interconnection with regional grid system i.e. ERLDC, Kolkata. The respondent quotes Regulation 10.5 of the OGC regarding SCADA and point out that all users shall make available outputs of their respective operational meters to the SCADA interface equipment.

2.18 The contentions of the petitioner by the reproducing certain observation made by the CERC vide order dt.07.03.07 in petition No.24/2007 has got no relevance to the present context. The issue on which order has been framed by CERC relates to the inter-state short term open access. Therefore, the said order is not applicable to EHT consumers who are availing power supply at the radial mode with a CGP.

2.19 Besides, the respondent has challenged the said order of CERC in the Hon'ble High Court of Orissa in the writ petition WP(C) No.3803 of 2007. The matter being sub-judice. It is not appropriate to draw any conclusion at this stage.

2.20 The respondent countered that the inference drawn by the petitioner in para 14 in its petition that in accordance with CERC order and OGC provisions, the EHT consumer with or without CGP are not required to provide PLCC equipment for speech and data transmission at its s/s. The respondent submitted that contentions made therein are misleading as well as an attempt to malign the OGC.

2.21 The contention of the petitioner that as CGPs of capacity more than 100 MW and above are to be members of the Grid Coordination Committee, small CGPs need not be subjected to the provision of 11.2 (3)(viii). This argument does not stand to reason. On that basis one need not infer that the generation data of small capacity CGPs are not relevant for SLDC. While discharging the SLDC functions, the respondent is solely responsible for system security and system operation relating to the STS.

2.22 Finally, in view of the contention and submission made therein respondent prayed to reject the prayer of the petitioner and direct the petitioner to provide voice and data communication through PLCC as per the provisions of OGC at the earliest before charging of their s/s under consideration

2.23 Subsequent to the public hearing on 12.10.07 the petitioner by way of written note of argument made some additional submission which was not made in the original petition and also by way of a rejoinder to the counter of the respondent. The thrust of petition argument was that

2.24 Regulation 4.11 of OGC requires that “reliable and efficient speech and data communication system shall be provided to facilitate supervision/control of the grid by the SLDC under normal and abnormal conditions.

2.25 According to the Model Connection Agreement annexed to Chaper-4 of OGC regulation, 2006, the mode of communication of the CGP with SLDC shall be telephone/fax/carrier communication.

2.26 Chapter-10 deals with Metering and Communication and Data Acquisition. Regulation 10.8 specifically stipulates that the real time data is needed by the SLDC for effective control of the transmission system. The generators and the transmission licensee are mandated to provide transducers to transmit the specified data to the SLDC on real time basis.

2.27 The petitioner submitted that Model Connection Agreement shall not be binding as the provision of the OGC and as contended by the Respondent is mis-interpretation of the provision that SCADA and PLCC are essential for implementation of intra state ABT effective from 01.01.08. is far from truth. In ABT regime energy drawl during any 15 minutes period will only be required for determination of penalty and bonus. The Respondent is providing such readings relating to its s/s through outsourced agencies to SLDC and ERLDC as it does not have facility for online transmission. SCADA and PLCC communication have nothing to do with the implementation of the ABT.

2.28 There is no provision for procurement of materials from the approved vendor list as per Regulation 4.11 of the OGC as stated by the respondent.

2.29 The equipment of AREVA make has already been utilized by the respondent in its SCADA system. The ABB is operating through a channel partner who is quoting unusually high prices. The respondent has made a lot of adverse comments against equipments of BPL make. Therefore, the petitioner placed purchase order on M/s.AREVA (T&D) India. Out of the three firms from whom offers were received.

2.30 The respondent vide para 9 of its counter has not mentioned about any deficiency for the procurement of AREVA (T&D) India make equipments.

2.31 On the issue of terms and conditions of the connection agreement, Chapter-4 it must be noted that para –iii (g)(v) provides for mode of connection and connectivity with SLDC which shall be through telephone/fax/carrier communication. There is no stipulation regarding provision of RTU by the EHT consumer in the connection agreement. The Respondent is debarred from entering into the connection agreement in any format other than the model connection agreement provided in the OGC.

2.32 Regulation 4.8(3)(a) stipulates the fault clearing time of breakers as 160 m.sec. with 220 KV and 132 KV system with provisions of back up protections. There is no stipulations regarding inter tripping of breakers using carrier communication system.

2.33 Regulation 4.11 deals with the Data Communication Facilities.

The following stipulations are made therein.

(i) Reliable and efficient speech and data communication systems shall be provided to facilitate necessary communication and data exchange and supervision/control of the grid by the SLDC under normal and abnormal conditions.

(ii) All agencies including CGS who are allowed open access shall provide systems to telemeter power system parameters such as flow, voltage, status of switches/transformer taps etc.

(iii) The associated communication system to facilitate data flow up to the SLDC as the case may be shall also be established by the concerned agency as agreed by STU in the Connection agreement.

The above provisions make it clear that any data communication to SLDC need to be provided by CGS who is allowed open access and also by the concerned agency as per the connection agreement. The concerned Agency has been more clearly defined in the Chapter -10 of the OGC code.

2.34 According to Regulation 4.16 of the OGC the users shall provide the transmission licensee with data as specified in the Data Registration. Chapter -12 provides that only generators and captive generating plants shall provide online data to the SLDC. The EHT consumers who are also users are therefore not required to provide online data.

2.35 According to Regulation 6.5(2), generators have to regulate generation and CGPs regulate their export according to daily generation schedule and the SLDC will dispatch by incorporating all generation and imports from CGPs in the day ahead schedule or rescheduling due to unforeseen circumstances.

2.36 Regulation 6.5(3) stipulates that dispatch instructions shall be issued by e-mail/telephonic confirmation by exchange of names of operators sending and receiving the same. All such oral instructions shall be complied and written confirmation shall be issued promptly by fax/teleprinter or otherwise.

Therefore, the above provisions do not mandate for installation of PLCC for speech communication.

2.37 Regulation 7.3(4) provides generators and CGPs shall submit data to SLDC as listed in Data Registration Chapter-12 termed as “Monitoring of

Generation. Chapter-12 deals with the provision of online data. The EHT consumer is not required to submit online data.

2.38 Regulation 9.7(1)(b) provides that three zone static or electro magnetic distance protection with permissive inter trip for accelerating tripping at remote end in case of zone-2 fault as main protection, is to be provided. The back up will be three phase directional over current and earth fault protection. One pole tripping and single shot single pole auto-reclosing with adjustable dead time shall be provided. It has been mentioned in note that for short transmission lines alternative appropriate protection schemes may be adopted. The length of 132 KV line from Budhipadar s/s of the respondent to the s/s of a petitioner is only 0.592 K.M. For such a short line even Distance Protection Relays are not required and the question of providing carrier inter tripping is unnecessary. Secondly, inter tripping at the remote end for radial feeder is also not called for.

2.39 The petitioner submitted that Regulation 10.2 defines the minimum acceptable metering and communication and data acquisition requirement to enable the transmission licensee to manage the transmission system in a safe and economic manner consistent with the licensee requirements.

2.40 Regulation 10.3(2) specifies the operational information for both real time and recording purpose to be provided in relation to each generating unit at each power station.

2.41 Regulation 10.4(2) provides that the licensees shall install operational metering, so as to provide operational information for both real time and recording purposes in relation to each feeder, transformer and compensation device at each s/s. It also specifies the data to be provided.

2.42 Regulation 10.7 mandates the licensee to provide independent dedicated communication links for voice communication for written communication and for data acquisition between all power stations, transmission system s/s and SLDC.

It also stipulates other links to be established by the licensee and method of dialing etc.

2.43 Regulation 10.8(1) stipulates the real time data required by the SLDC for the effective control of the transmission system. This includes data only from power stations, power drawn from external interconnection and in each transmission line.

2.44 Regulation 10.8.(2)(3) stipulates that generators and transmission licensee shall provide necessary transducers for transmission of required data specified in Regulation 10.8(1) above.

2.45 Therefore, Chapter-10 dealing with Communication and Data Acquisition has no provision whatsoever that an EHT consumer shall provide PLCC equipment for speech and data communication with SLDC.

2.46 Regulation 12.2 states that the objective of the data registration chapter is to list all the data required to be provided by users to the transmission licensee and vice versa in accordance with the provision of the OGC.

2.47 Annex C-5 is the only provision stipulating users who are required to submit data on real time basis, According to which, only generators and CGPs are to provide the respective data.

2.48 Even though there is a stipulations for the CGP to provide real time data the same has to be read along with Regulation 11.2 (3) (Viii) which states that only one representative of CGP from the state having installed capacity of more than 100 MW shall be a member of the grid coordination committee. Since, the objective of SLDC is to enable it to control the grid in normal and abnormal conditions (vide Reg.4.11), any loss of generation of CGP of a gross capacity of only 15 MW is certainly not going to affect the overall grid position and therefore monitoring of such CGPs on real time is unnecessary.

2.49 The petitioner intends to supply 1 MW or more of power to GRIDCO on execution of the PPA. This transaction, therefore, is an open access transaction and the orders dt.06.03.07 of the CERC in petition no.24/2007 in para 11 (g) & 12 shall be applicable to this case, which states that there is no need for online monitoring for actual injection /drawl and consequently real time data is needed for SCADA or PLCC. There is no stay that the Hon'ble High Court of Orissa has given against the orders of CERC and the CERC being a superior forum it should be binding on all.

2.50 To summarize it, the petitioner states that no PLCC equipment for speech and data communication or protection is needed to be provided. However, the petitioner has already placed the purchase order and expects to Commission by 31st of March, 2008 under the supervision of respondent, subject to drawing being approved by them by 31.10.2007.

2.51 If the Commission decides the PLCC equipments are not required, the expenditure incurred by the petitioner to provide the equipment should be reimbursed by the respondent.

2.52 On the other hand OPTCL refuted the issues raised by the petitioners and insisted that in keeping with the letter and spirit of O.G.C. and other allied provisions the petitioners shall have to provide speech and data communication up to SLDC. They shall also provide for Distance Protection Relays with carrier intertripping before interconnection to the STU.

2.53 The petitioner M/s MSP Metallics Ltd. registered as Case No.38 of 2007 prayed to the Commission for impleading SLDC as a respondent in this case on the ground that the SLDC as a separate entity has a legal obligation to discharge its function independently as provided in Electricity Act, 2003. Since, speech and data communication is to be established between SLDC and the various grid s/s of OPTCL and other users of the system views and observations of SLDC as an independent entity is very relevant even though it is under the administrative

control of OPTCL. Keeping this thing in view the Commission decided to implead SLDC and directed for issue of notice for appearance and filing of reply in the matter to be heard on 24.12.2007. On 24.12.2007, five more days time was allowed to SLDC to file the reply. The submissions of SLDC are as follows:

2.54 SLDC repeated the same argument as was advanced by OPTCL. An extract of SLDC submission is given:

"10.0 – In Chapter 4 of the Indian Electricity Grid Code, Connection Condition of any user to a power system has been defined. Clause 4.10 and 4.12 a (III) are intended to cover requirements of data communication, tele-metering and real time operation. An extract of the same are given here:

2.54 ***Data and Communication Facilities***

(a) Reliable and efficient speech and data communication systems shall be provided to facilitate necessary communication and data exchange, and supervision/control of the grid by the RLDC, under normal and abnormal conditions. All agencies shall provide systems to telemeter power system parameter such as flow, voltage and status of switches/transformer taps etc. in line with interface requirements and other guideline made available to RLDC/SLDC. The associated communication system to facilitate data flow up to RLDC/SLDC, as the case may be, shall also be established by the concerned agency as specified by CTU in connection agreement. <u>All agencies in coordination with CTU shall provide the required facilities at their respective ends</u> and RLDC/SLDC as specified in the connection agreement."

(b) All agencies connected to or planning to connect to ISTS would ensure providing of <u>RTU and other communication equipment, as specified by RLDC/SLDC, for sending real time data to SLDC</u>/RLDC at

least before date of commercial operation of the generating stations or sub-station/line being connected to ISTS.

2.55 The above provisions are also incorporated in Regulations 4.11 and 4.13 (1)(d) of the Orissa Grid Code. Irrespective of the fact whether somebody avails open access or not, these conditions of the Grid Code can not be violated until any amendment is made to the said Code by order of the Commission.

2.56 It is further submitted that the requirement of SCADA and PLCC for Data and Speech communication at SLDC for operational purposes have been deliberated before CERC, New Delhi on 11.12.2007 (M/s NBVL Vrs. WRLDC & Others). The order of the Hon'ble CERC in the said petition is yet to be passed."

2.57 SLDC submitted that in CERC order in petition No.24/2007 it is no where mentioned that data and speech communication need not be established by the EHT consumers. In this context, they also quoted the Reg.4.11 and 4.13(d) of OGC. The SLDC submitted that the provision under Reg. 10.7 & 10.8 of OGC relate to responsibility of the transmission licensee on establishment of data transmission and voice communication within its transmission system and by that it does not relieve the petitioner of this responsibility of establishing data transmission and voice communication.

2.58 That without prejudice to the submissions made herein above, SLDC further quoted the provisions of OGC as under:

Provision under Regulation 6.4(9) of the OGC:

However, notwithstanding the above, the SLDC may direct the Distribution Licensees/Trading Licensees/Bulk Consumers/SGS/CGP to increase/decrease their drawl/generation in case of contingencies e.g. overloading of lines/transformers, abnormal voltages and threat to system security. Such directions shall immediately be acted upon. In case the situation does not call for very urgent action, and SLDC has some time for

analysis, it shall be checked whether the situation has arisen due to deviations from schedules, or due to any power flows pursuant to short-term Open Access. These shall be got terminated first in above sequence, before an action, which would affect the scheduled supplies from SGS/CGP to the Long Term Customers is initiated.

2.59 Besides, for operation of EMS package under ULDC scheme, the power flow data (MW & MVAr) in all the transmission lines are required on real time basis.

2.60 The event logging of the Petitioner's s/s is not possible without installation of RTU by the Petitioner (User) in its premises.

2.61 There shall not be any discrimination between Users in respect of compliance of codal provisions (in this case installation of SCADA/PLCC equipments).

2.62 SLDC submitted that in view of the facts stated earlier real time data transmission of EHT consumers connected to STS are required at SLDC.

CHAPTER - 3

3. The issue before us is regarding provision of connectivity with OPTCL transmission system by the system users namely the prospective EHT consumers and Captive Generating Plants. OPTCL has directed for provision of PLCC & SCADA as a precondition for connecting to their system in accordance with OGC.

3.1 Therefore, the Commission has to decide whether PLCC speech communication equipment is at all necessary between the EHT consumer & the grid s/s and SLDC?

3.2 Whether data communication is to be provided by the EHT consumer with CGP from the s/s right up to the State Load Despatch Centre?

3.3 Whether arrangement for interfacing with SCADA have to be provided by the EHT consumers upto the various grid S/Ss of the state grid for transmission of speech and data upto the substation and whether such consumers shall be required to provide necessary arrangement for transmission of speech and data to SLDC, Bhubaneswar through sub-SLDC?

3.4 Whether carrier inter tripping is to be provided by the EHT consumers when the power supply is made in radial mode and even when static distance protection relay with back up relay is provided ?

3.5 Whether OPTCL shall reimburse the cost of equipments procured by the petitioners, if the Commission decides that PLCC equipments need not be provided by the petitioners?

3.6 We have decided to pass a common order considering that the issues raised are common in nature though, we heard it in separate sessions.

3.7 There is commonality of approach with regard to the provision of online speech and data communication by both the OPTCL as the transmission licensee and the SLDC the system operator. It has become imperative not only to interpret the provision of the OGC but also have a bit of explanation for better appreciation of the intents of OGC rather than limiting to interpretation of the provisions.

CHAPTER - 4

4. The first issue relates to provision of PLCC or Power Line Carrier Communication. We shall discuss whether PLCC speech communication equipment is at all necessary between the EHT consumer & the grid s/s and SLDC?

4.1 The IS 9482: 1996 (Reaffirmed 2006) issued by the Bureau of Indian Standard deals with single sight band power line carrier terminal/specification. An extract gives a simple explanation about PLCC.

Extracts are given in italics.

"The complexity and extensive size of present day electricity generation, transmission and distribution systems are such that it is possible to control them only by means of an associated and often equally large and complex telecommunication system having a high order of reliability. The facilities which can normally be provided as part of the telecommunication system can be listed as follows:

i. *Telephony (operation, maintenance and administration speech circuits);*
ii. *Facsimile transmission\;*
iii. *Telegraphy;*
iv. *Tele-control;*
v. *Load frequency control;*
vi. *Tele-protection; and*
vii. *Data Transmission*

The communication channels can be provided by circuits leased from public facilities by means of utility-owned private circuits or, national regulations permitting, by a combination of both types or circuits generally calls for the provision of multiple routing, preferably by geographically diverse routes.

In many countries, Power Line Carrier (PLC) channels represent a main part of the utility-owned telecommunication system. A circuit which would normally be routed via a PLC channel may also be routed via a channel using a different transmission medium, such as a point to point radio or open-wire circuit. Since, in many cases,

automatic switching is used, the actual rerouting, although predetermined, is unpredictable. It is important, therefore, that the voice frequency input and output criteria of all equipment used in the communications system are compatible. This compatibility is also beneficial in creating the ability to interchange and interwork equipment from different sources."

4.2 IS 9528 Part-I-1980 (Reaffirmed 2001) is a manual for planning of (SSB) PLC system. Certain extract of the said publication for better application of the PLC.

"0.2 The transmission of electrical energy from the production plants to the load centre sand the interconnection of plants for reasons of economy and security has resulted in the development of complex national and international networks. Such systems require extensive telecommunications facilities for speech and data, such as telegraph, telemetering, telecontrol and protection signals extending between control centres and generating stations, switching stations and supply points.

The electricity industries use a variety of transmission media for their communication system depending on the required information band-width, the economic and various technical factors. The electrical industries are unique in that they have available to them very reliable physical paths, namely, the power lines which interconnect the points of generation and supply and between which the signals can be transmitted by means of HF carrier. Amongst the systems in extensive use in addition to power line carrier are rented circuits (public telephone company, national telecommunications authority) buried and overhead cables, and privately owned radio links.

Power line carrier telephone systems are not normally interconnected with the public telephone network and are therefore considered as private (utility-owned) systems."

5. *Section II Applications:*

4. Types of Usage

4.1 General – Power Line Carrier Systems are principally used to carry:

a) Either analogue information in the form of speech; or

b) digital or analogue information, termed 'signals' representing telegraph, telemetering, telecommunication, data, etc. or both.

XXXXX XXXXX XXXX

4.2 Telephony – PLC systems may be used to provide speech facilities ranging from a simplex party line system to integrated private automatic subscriber trunk dialing networks, sometimes equipped with priority facilities for operationally important subscribers.

Four-wire tandem switching is normal practice.

XXXXX XXXXX XXXX

4.3 Telegraphy and Facsimile – Private telegraph (tele-printers) facilities are also operated over PLC circuits. Such applications may also include facsimile transmission.

Some power utilities favour the tele-printer in operational management due to the fact that hard copies of the information exchanged are produced both at the command and at the execute levels. Both point-to-point and switched circuits are used.

XXXXX XXXXX XXXX

4.4 Tele-control and Tele-indications – For the purpose of providing tele-control and tele-indication facilities. PLC systems generally use coded signals in order to achieve a high degree of security over the PLC systems and avoid mal-operation or loss of information.

XXXXX XXXXX XXXX

4.5 Tele-protection – In order to prevent danger to life, damage to plant and also to ensure the best possible continuity of supply, any power system shall be protected against faults. In order to do this, high speed signals are transmitted between the ends of a line.

IS : 9528 (Part I) – 1980:

4.5.1 Three types of protection systems are in general use:

(a) for direct tripping of a circuit-breaker from a protection device at the other end of the line;

(b) for transferring discrete information from the protection relays at one end of the line to those at the other, for example, to perform an accelerate or blocking function; and

(c) for transmitting analogue information between the protective devices at each end of the line to control the operation of the relays.

Protection signaling shall be capable of being received during power system fault conditions which may introduce additional noise and attenuation in the circuit at time of transmission.

The permissible maximum overall signaling time of a protection channel is quite small, typically less than 50 ms.

Protection equipment may share a channel in the utility telecommunications system (for example, a VF channel) in a multi-purpose PLC system, or may require a complete carrier frequency channel. The choice will depend on the security required, time for operation and on economic and/or bandwidth availability considerations.

Protection signaling equipment is characterized by the limited time available for the transmission and the recognition of the tele-protection signal transmitted very infrequently (a few times per

annum) at unpredictable times. They invariably require an extremely high probability of achieving 'wanted' operation, and an extremely low probability of 'unwanted' action (for example, false tripping due to noise) and 'missing' action (delay or total failure to trip or to block, whichever is appropriate, when required to do so).

In certain PLC systems (used for tele-protection) the carrier signal is normally quiescent and it is only sent for the brief and infrequent time when a protection signal is required to be transmitted. Often a clock test facility is included whereby a brief test signal is sent through the complete system at regular intervals of, say, 30 minutes to prove the equipment as being healthy.

In questions of frequency assignment where the risks of possible interference from PLC transmitters require to be considered, it is clear that different considerations apply to such quiescent carrier systems as opposed to the conventional PLC systems in which speech and other signals necessitate continuous transmission of carrier.

In PLC systems when protection signals are included, it has become common practice in some parts of the world to disable the speech circuit and all or some predetermined superimposed channels while active protection signals are transmitted so that the level of the protection signal may be boosted accordingly.

4.3 With the above background of PLCC we further delve into the issues relating to speech, data communication between the STU/ Transmission Licensee and (a) a captive generator (b) EHT consumers with multiple circuits connected to the nearest grid s/s (c) EHT consumers connected through radial feeders both short and long lines and (d) customers availing open access out of the above.

4.4 The petitioners have cited the order passed on 6th March, 2007 in Petition No.24/2007.

4.5 The Central Electricity Regulatory Commission in short "CERC" had observed in para 10 of their order dated 6th March, 2007 in petition No.24/2007 that

> *" …… we would also like to impress upon all those associated with the power sector of the need to contribute for the growth of the sector to help in overcoming the power shortage by facilitating, conveying all surplus power to the utilities who are deficit in power, to the extent technically feasible."*

4.6 In para 11(g) of the said order they have further observed that "since mismatch between the scheduled and actual drawal/injection by an open access customer shall be accounted through the UI mechanism as clarified above, and the said utilities would be unaffected operationally and financially, there is no need for on line monitoring of actual injection/drawal, and subsequently no real need for SCADA and PLCC. The absence of SCADA and PLCC, therefore, cannot be accepted as a reason for not allowing open access.

4.7 Citing the above order the petitioner have submitted that in accordance with the order of CERC dt.6th March, 07 in petition No.24/07 the consumers with CGP need not provide PLCC equipment for speech and data transmission at its s/s. Therefore, the provision of such a system should not be insisted upon. The data on generation of power by the small capacity CGPs are not very relevant for the SLDC. Shutting down or running of these CGPs are not going to affect the state grid.

4.8 The aforesaid order of CERC was passed in connection with grant of inter-state open access to a user of the system. The order which was under challenge in the Hon'ble High Court of Orissa by the GRIDCO registered as Case

No.WP(C) No.3803 of 2007 has been stayed by High Court & remanded to CERC vide order dt.11.12.07.

4.9 In this connection also it is also necessary to refer to the Central electricity Authority Notification of 21st February, 2007 regarding Central Electricity Authority (Technical Standards for connectivity to the (Grid) Regulation, 2007. This Regulation has been published as required by s/s(2) of section 177 of the Electricity Act, 2003. (36 of 2003) In exercise of powers conferred by section 7 and clause (b) of section 73 the CEA has made the aforesaid regulations for regulating the technical standards for connectivity to the grid.

4.10 Extracts from the said Regulation are given below :

> ***"Regulation 3 Applicability of the Regulations***
> *These Regulations shall be applicable to all the Users, Requesters, Central Transmission Utility and State Transmission Utility.*
>
> ***Regulation 4 Objectives***
> *(1) The aim of these regulations is to ensure the safe operation, integrity and reliability of the grid.*
> *Regulation 2 (25) Requester means a person such as a Generating Company including captive generating plant of Transmission licensee (excluding Central transmission Utility and State transmission Utility) or Distribution Licensee or Bulk Consumer, who is seeking connection of his new or expanded electrical plant to the grid at voltage level 33 KV and above."*

4.11 All the petitioners in these cases are seeking new connection at voltage level higher than 33 KV. Hence, they can be termed as "Requester".

4.12 This Regulation therefore would apply to all these petitioners along with relevant provisions of the Orissa Grid Code and all other applicable rules and regulations under the Act.

4.13 Chapter-4 of OGC specifies the "technical and design criteria and standards to be complied with by the transmission licensee and other Users connected for seeking Connection to the Transmission system to maintain uniformity and quality across the system. This includes

a) Procedure for connection to the state transmission system
b) Site responsibility schedule; and
c) Connection agreement."

4.14 Regulation 4.11 provides that reliable and efficient speech and data communication shall be provided to facilitate necessary communication and data exchange and supervision/control of the grid by the SLDC, under normal and abnormal conditions.

4.15 The connection agreement (annexure 1 to Chapter-4 para (c) III(g)(V) provides : -

'Mode of Communication and connectivity and communication with the SLDC: telephone/fax/carrier communication.

(h) 'Communication arrangement': the user shall be required to provide voice and other communication facility as decided by SLDC'.

4.16 In 4.13 of OGC dealing with responsibilities for operational safety. In sub-para (3) Communication-Generators "Dispatch instruction shall be issued by e-mail/telephone, confirmed by exchange of names of operators sending and receiving the same and login the same at each end. All such oral instructions

shall be complied with forthwith and a written confirmation shall be issued promptly by fax, tele-printer or otherwise.

4.17 The contention of the OPTCL that the model connection agreement, available at Annexure-1 under Chapter-4.5 is not binding is not sustainable.

4.18 In Regulation 4.5 it is emphasized that the connection agreement **shall** include specific conditions requiring both parties to comply as such the model connection agreement is a format approved under OGC and hence is to be followed by both the transmission licensee and the users to maintain uniformity and quality across the system.

4.19 The Grid Code gives the option to SLDC to give a decision which shall be binding on the users with regard to the communication arrangement as quoted earlier. The OGC was framed for an indeterminate group of users. Hence, it has to be followed in letter and spirit. Any deficiency noted during actual working can be acted upon to make it more congenial to meet the objective of the Act.

4.20 Hence, SLDC has been given the option to decide the Mode of Communication to be adopted by the users out of the alternatives namely telephone/fax/carrier communication.

4.21 The next question is to what extent SLDC is justified is asking for the PLCC mode of Communication in preference to telephone/fax?

4.22 Regulation 10.1 of the OGC specifies the minimum operational and commercial metering, communication and data acquisition etc. to be provided by each user at the interconnection points and also at the cross boundary circuits.

4.23 Regulation 10.7 deals specifically on communication. An extract

"Independent dedicated communication links for voice communication, for written communication and for data acquisition shall be installed by the licensee between all Power Stations, transmission System sub-stations and SLDC. In addition, similar links between adjacent Transmission System sub-stations shall be established. Communication shall be available by dialing discrete numbers and also through Hot line by lifting the telephone hand set. Hot line links shall be established by the Transmission Licensee between Power Station/ important sub-station and SLDC".

4.24 It was argued on behalf of the petitioners that PLCC kind of communication is not mandated in the OGC and hence, should not be insisted upon for the EHT consumers.

4.25 A reading of 10.7 clearly stipulates that it has to be an independent dedicated communication link for voice communication and for written communication. Besides, communication shall be established by dialing discreet numbers and also through hot line by lifting the telephone handset. The objective of the Reg. is to provide as much as privacy and security to the means of communication. Hence, the choice of SLDC for PLCC communication is well within the prescriptions of OGC.

4.26 Therefore, legally and technically there should be no objection of providing speech communication through PLCC as the SLDC has been empowered to give a choice about the mode of communication from amongst the alternatives.

4.27 The objective of 10.7 is to develop a secured system of communication. It goes without saying that the PLCC system, is in use for quite long time, is an effective and secured means of communication in the power system. Therefore the choice of SLDC for PLCC communication in preference to FAX/TELEPHONE is quite acceptable and need to be established. Therefore, all users connected to

the STU/transmission licensee shall provide PLCC communication in their jurisdiction.

4.28 This also finds a place in CEA Regulation as quoted below.

Regulation 6 General Connectivity Conditions

(3) The requester and user shall provide necessary facilities for voice and data communication and transfer of on-line operational data, such as voltage, frequency, link flows, and status of breaker and isolator position and other parameters as prescribed by the Appropriate Load Despatch Centre.

(4) The requester shall cooperate with the Regional Power Committee, and Appropriate Load Despatch Centres in respect of the matters listed below, but not limited to :

(a) protection coordination and settings of its protective relays accordingly;

(b) agree to maintain meters and communication system in its jurisdiction in good condition;

(c) participate in contingency operations such as load shedding, increasing or reducing generation, is-landing, black start, providing start-up power and restoration as per the procedure decided by the Appropriate Load Despatch Centre;

(5) The requester and user shall make arrangements for integration of the controls and telemetering features of his system into the Automatic Generation Control, Automatic Load Shedding, Special Protection System. Energy Management System and Supervisory control and Data Acquisition System of the respective state or region.

4.29 As provided in Regulation 4.11 of the OGC all agencies in coordination with STU are required to provide facilities at their respective ends and SLDC as agreed in the connection agreement.

4.30 It need not be emphasized that as specified in 4..13.1(d) that all agencies connected to or planning to connect to STS would ensure provision of RTU and other communication equipments, as specified by SLDC.

4.31 Next we will address the provision of PLCC by the users upto which level of connectivity with the Transmission system/SLDC.

4.32 CEA Regulation 6(3) read with (4)(b), (5) enjoins responsibility on the requester i.e. the petitioners to maintain meters and communication system in their jurisdiction in good condition and shall provide voice and data communication facilities as decided by SLDC.

4.33 The OGC Regulation also provides that installation for voice communication, written communication and data acquisition shall be installed by the licensee between all power stations, transmission systems s/s and SLDC. It also states that hot line links shall be established by the transmission licensee between power stations/important s/s. and SLDC. The intention of the Regulation is that the communication link between SLDC upto the level of important s/s shall have to be provided by the transmission licensee. This issue can be further elaborated.

4.34 A transmission licensee has to make an investment for sending speech communication providing hardware, software, personnel etc. This can be done only at the expense of all the consumers of DISTCOs of the state through realization of transmission charges. This includes all the EHT consumers and also the CGPs when they use the system. A single consumer availing power supply through a radial feeder at EHT or a grid s/s of the licensee meant for power supply to a group of consumers or a network connected to a CGP is physically required to be connected to the grid network for continuity or it becomes technically a part of transmission network.

4.35 The intrastate Transmission system can be split as technical considerations into different User groups for the purpose of our discussion.

(a) The backbone grid network at EHT that connects generating station to the major s/s throughout the state.

(b) Radial feeders to meet the demand of area load as well as independent users including EHT consumers,

(c) captive generating plants etc. connected to the transmission system.

(d) The users seeking open access.

4.36 In the present arrangement of determination of transmission charges the entire cost of transmission is shared by all the consumers including the users which also includes all the radially connected user including the CGPs to the extent of their use as the OERC has been following the postage stamp method of determination of transmission charges.

4.37 Widely dispersed low voltage/high voltage consumers (not directed connected to the grid s/s) through out the State may not need direct communication connectivity to the Grid s/s or SLDC from their premises but to the nearest point of transmission substation. But, additional expenditure is involved for dispatching communication information of all EHT consumers and CGPs to the SLDC from the level of grid s/s upto SLDC. This investment in communication by the transmission licensee is an additional burden which is being shared by all other consumers. There is also another consideration that due to coexistence of low voltage, high voltage, extra high voltage consumers in the network there is better utilization of the system. Absence or withdrawl of any consumer group from the system will pose a financial burden on the group that remains connected to any electricity utility's system.

4.38 OPTCL in their rejoinder submitted to the Commission on 14 February, 2008 in case No.37/07 have submitted that they have allowed M/s Beekay Steels

and Power Ltd. to utilize BPL make carrier for providing speech as well as data communication facility to SLDC to the nearest Multiplexere (MUX) point available at Tarkera Grid S/S.

4.39 Further OPTCL has submitted that they have *"invested huge amount of the order of Rs.108 cr. in creating the basic telecom infrastructure for data acquisition facility at SLDC. The concerned industry are required to extend their data to the nearest MUX point of OPTCL system only for data connectivity to SLDC as for the rest of the part of data transmission i.e. from the MUX point to the respective sub-LDC level and SLDC, Bhubaneswar are being taken care of by the OPTCL. Hence, the petitioner is required and should provide their data connectivity to nearest MUX point at Tarkera S/S using their PLCC channel at their own cost like other industries in the state. ….. "*

4.40. We answer the first issue as raised in para 3.1 as thus

(a) The model connection agreement is a format approved under OGC & hence is to be followed by both the Users and the transmission licensee to maintain uniformity and quality across the system (para 4.18)

(b) We also agree with the prayer of the SLDC that there shall not be any discrimination between Users in respect of compliance of codal provisions regarding installation of SCADA/PLCC equipments.

(c) PLCC shall be installed at the Users end in their jurisdiction, whether they are EHT consumers or CGPs or any person including CGP seeking intra-state open access & shall maintain the communication system in good condition.

(d) As laid down in Regulation 10.7 of OGC the STU/Transmission Licensee have to install dedicated communication links for voice communication and written communication and data transmission between all power stations, Transmission system s/s and SLDC. As required under Regulations 10.4.2, 10.5 and 10.8.3 of the OGC, the Transmission Licensee shall provide transducers for transmission of data from each s/s. to SLDC. In other words, the STU/Transmission licensee shall provide for PLCC & data communication from the grid s/s upto SLDC in accordance with this provision of the OGC.

CHAPTER-5

5. Next issue relate to data transmission. Whether data communication is to be provided by the EHT consumer with CGP from the s/s right up to the State Load Despatch Centre?

5.1 This is interesting to observe that 4.13 (2) deals on the issue of data despatch instructions.

5.2 Despatch instructions shall be in standard format. These instructions include declared availability and other parameters, which have been made available by the State Generator to SLDC and also include time, power station, generating units (total export in the case of CGP), name of operators sending and receiving the same. Despatch instructions may include:

(i) To switch a generator into or out of service
(ii) Details of reserve to be carried on a unit
(iii) To increase or decrease MVAr generation to assist with voltage profile.
(iv) To begin pre-planned Black Start procedures.
(v) To hold spinning reserve.
(vi) To hold Generating Units on standby.

5.3 Looking at the information requirement it is necessary that an established mode of communication like PLCC or any other advanced form of communication should continue to be established between a CGP and the nearest point of the transmission licensee who should pass on these instructions to the SLDC.

5.4 To meet the requirement of data transmission to SLDC, 4.13(d) of the OGC is referred by OPTCL as under :

"4.13(d) All agencies connected to or planning to connect to STS would ensure providing of RTU and other communication equipment, as specified by SLDC, for

sending real-time data to SLDC at least before the date of commercial operation of the generating stations or sub-station/line being connected to STS."

4.16 DATA REQUIREMENTS

Users shall provide the Transmission Licensee with data for this Chapter as specified in the Data Registration Chapter.

6.5 SCHEDULING AND DESPATCH PROCEDURE

x x x x x x

(2) GENERATION DESPATCH

All generators shall regulate generation and CGPs regulate their export according to the daily generation schedule.

All Generating Units, other than those in a CGP, will be subject to central despatch instructions. CGPs will be subject to these instructions as applicable to their respective exports to the licensee.

SLDC will despatch by instruction all generation and imports from CGPs according to the fifteen minutes block day ahead generation schedule, unless rescheduling is required due to unforeseen circumstances.

On the day of operation (00.00 to 24.00 hours), in the event of a contingency, SLDC may revise their Drawal Schedule from any / all ISGS and Chukha Hydro Power Station within entitlement. ERLDC will revise and issue Drawal Schedule in consultation with SLDC. All such revisions shall be effective one hour after first advice given to ERLDC.

In absence of any despatch instructions by SLDC, State Generators and CGPs shall generate/export according to the day ahead generation schedule.

6.8 DATA REQUIREMENTS

Users shall provide SLDC with data for this Section as specified in the Data Registration Chapter.

7.1 INTRODUCTION

The monitoring by SLDC of Generating Unit output, and active and reactive reserve capacity is important to evaluate the performance of plant.

7.3.1 MONITORING PROCEDURE

(4) Data Requirement

Generators and CGPs shall submit data to SLDC as listed in data Registration Chapter-12, termed as Monitoring of Generation.

10.2 METERING AND COMMUNICATION AND DATA ACQUISTION OBJECTIVE

The objective of this Chapter is to define the minimum acceptable metering and communication and data acquisition requirements to enable the Transmission licensee to manage the Transmission System in a safe and economic manner consistent with licence requirements.

10.3 GENERATION OPERATIONAL METERING

(1) This section specifies the facilities that shall be provided, certain practices that shall be employed for monitoring output and response of Power Stations and Generating Units and shall not apply to Power Stations with a capacity below 5 MW.

(2) The generator shall install operational metering to the STU specification so as to provide operational information for both real time and recording purposes in relation to each Generating Unit at each Power Station in respect of :

(i) Bus Voltage

(ii) Frequency

(iii) MW

(iv) MVAr

and any other additional data as agreed between the Transmission Licensee and generator.

10.4 TRANMISSION SYSTEM OPERATIONAL METERING

(1) This section specifies the facilities that shall be provided, certain practices that shall be employed for monitoring electrical supply and load characteristic at each sub-station.

(2) The licensee shall install operational metering so as to provide operational information for both real time and recording purposes in relation to each feeder, transformer and compensation device at each sub-station in respect of :

(i) Bus Voltage

(ii) Frequency

(iii) MW

(iv) MVAr

(v) Power Factor

(vi) Current

10.5 SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA)

(1) The licensee shall install and make operative an operational metering data collection system under SCADA for storage, display and processing of operational metering data. All users shall make available outputs of their respective operational meters to the SCADA interface equipment.

(2) The data collection, storage and display centre - STU shall be the State Load Despatch Centre at Bhubaneswar.

10.8 DATA ACQUISITION

(1) For effective control of the Transmission System, the SLDC needs real time data as follows :

(i) MW generated in each power station

(ii) MW draw from External Interconnection.

(iii) MVAr generated or absorbed in each Power Station.

(iv) MVAr imported or exported from External Interconnection.

(v) Voltage in all system buses.

(vi) Frequency in Transmission System.

(vii) <u>MW & MVAr flow in each transmission line.</u>

(2) Generators shall provide necessary transducers for the transmission of the above data to SLDC.

(3) <u>The Transmission Licensee shall similarly provide necessary transducers in their system for the transmission of the above data to SLDC</u>.

(4) The SLDC shall establish a suitable data transfer link between SLDC and ERLDC for the exchange of operational data.

10.9 AGREED PROCEDURE FOR COMMUNICATION AND DATA TRANSMISSION

Mutually agreed procedures shall be drawn up between the licensee and other Users outlining inter responsibility, accountability and recording of day-to-day communication and data transmission on operational matters.

C.5 MONITORING OF GENERATION

REFERENCE TO: SECTION 9 MONITORING OF GENERATION AND DRAWAL

Item	*To be Submitted By*
i. Generators shall provide hourly generation summation to SLDC.	*To be submitted by real time basis*
ii. CGPs shall provide hourly export/ import MW to SLDC.	*To be submitted by real time basis*
iii. Logged readings of generators to SLDC.	*As required*
iv. Detailed report of Generating Unit trippings on monthly basis.	*In the first week of the succeeding month*

12.1 CHAPTER - 12

DATA REGISTRATION

INTRODUCTION

This Chapter contains a list of all data required by the Transmission Licensee which is to be provided by Users and data required by users to be provided by the Transmission Licensee at times specified in the OGC. Other Chapters of the OGC contain the obligation to submit the data and defines the times when data is to be supplied by users.

5.5 A combined reading of all these provisions of OGC establishes that the SLDC has been conceived as the focal point for monitoring of line flows of all Generators/transmission lines (10.8.1).

5.6 It does not exclude monitoring of radial EHT feeders. In 6.5 (2) 2nd para OGC specifies that all generating units except CGP shall be subject to Central Dispatch instructions but CGPs will be subject to despacth instructions as applicable to their respective exports to the licensee. In the subsequent para it also says that the SLDC will dispatch by instruction all generation and imports from CGPs according to the 15 minutes block day ahead generation schedule etc.

5.7 Now in 10.3 of OGC, it is specified that certain practices shall be employed for monitoring out put and response of power stations and generating unit and shall not apply to power stations with a capacity below 5 MW. The petitioners have argued that such MW/MVAR flow in respect of straight radial feeders would be available right at the grid s/s. end. Hence sending of such data from consumer end should not be insisted upon.

It has been argued by all the four petitioners that accumulation of huge data at the SLDC may not be of much use due to large number of EHT consumers being connected to the system. Besides, smaller loads will have little impact in the overall system operation. The total load of a radial feeder can be

monitored from the grid s/s end. But loads at User end can be taken from operational meters of individual power transformers. (It is hoped that each industry will be having more than one transformer for continuity of power supply). In view of that output of consumer end at EHT shall be made available as an input to the SCADA system of STU/Transmission licensee. This is in conformity with Regulation 4.15 of OGC. Incidentally it may be mentioned that consumers with contract demand 5 MW and above are allowed to be connected at EHT.

5.8 Data acquisition monitoring activities of the generating units is to be carried out by SLDC as provided in Regulation 7.3.1 para-2 of the OGC for monitoring of the generation. Real time monitoring of generation and export/import of CGPs are to be monitored as provided under Appendix-C-5 of OGC which shall exclude Power Stations with a capacity below 5 MW (10.3.1 of the OGC).

5.9 For generation operational metering as provided in Regulation 10.3(2) data relating to real time operation shall be made available in respect of each generating unit but shall not apply to power stations of capacity below 5 MW. (Regulation 10.3.1 of the OGC) According to 10.8.2 all generators shall provide transducers for transmission of data to SLDC. It will exclude power stations of capacity below 5 MW.

5.10 In accordance with Regulation 4.13.1(d) all agencies connected to or planning to connect to STS shall provide RTUs and other communication equipments for sending real time data. They shall make available output of their respective operational meters to SCADA interface equipment installed by the STU/Transmission Licensee (Regulation 10.5 of the OGC). This shall not apply to power stations of capacity below 5 MW.

5.11 Besides, Transmission Licensee has to establish ALDCs to reduce the burden of SLDC and the distribution utilities are to establish DSOCC. Therefore, as a part of overall grid management, all data need to be captured even from

radially connected loads/ Users to facilitate control/monitoring by ALDC/DSOCC of all loads connected to the STS.

CHAPTER-6

6. Whether arrangement for interfacing with SCADA have to be provided by the EHT consumers up to the various grid S/Ss of the state grid for transmission of speech and data up to the substation and whether such consumers shall be required to provide necessary arrangement for transmission of speech and data to SLDC, Bhubaneswar through sub-SLDC?

6.1 Hence, discuss about the SCADA. “SCADA means supervisory control and data acquisition system that acquires data from remote locations over communication links and processes.” It at centralised control location for monitoring, supervision, control as well as decision support.

[Ref: CEA (Technical Standards for Connectivity to the Grid) Regulation, 2007 (2-26)].

6.2 The function of the SCDA system are

- Acquiring data from field equipment
- Processing the acquired data
- Generating alarms and events
- Automatic and supervisory control
- Presenting the data, alarms and events to the operator
- Logging the data
- Generating reports
- Supporting online configuration of the system
- Group control
- Interlocking through software as a back-up to the field interlocks (an interlock is a device or instruction that coordinates two or more processes and prevents one operation from interfering with another)

- Redundant not standby for both the host and the front-end processor (FEP)

(www.cmcltd.com)

6.3 The SCADA system includes input/output signal hardware controllers, human/machine interfacing (HMI) Networks, Communications, databases and software.

6.4 SCADA is a centralized system which monitor and control entire complexes of systems spread out over a large areas. (on the scale of kilometers and miles.) Most site control is performed automatically by the Remote Terminal Units. (RTUs) or by Programmable Logic Controllers (PLCs).

6.5 Data acquisition begins at the RTU or PLC level and includes meter readings and equipment status reports that are communicated to SCADA as required. Data is then compiled and formatted in such a way that a control room operator using the HMI can make supervisory decisions to adjust or override normal RTU (PLC) control. Data may also be fed to a historical often billed on a commodity database management system, to allow training and other analytical auditing. (from weekipedia, the free encyclopedia).

6.6 The three components of SCADA system

a) Multiple Remote Terminal Units (also known as RTUs or outstations)
b) Master stations and HMI computers
c) Communication infrastructure

6.7 The remote terminal unit RTU connects to physical equipments and reads status data such as the open/close status from a switch and reads measurement such as voltage, current etc. by sending signals to equipments the RTU can control equipment such as opening or closing a switch. The RTU can read digital

status data or another measurement data and send out digital commands or analog set points.

6.8 The basic operational features could be as under :

It handles data acquisition from and control to the field. Tele-metered parameters like voltage and current are captured using remote terminal units (RTUs), which are connected to suitable field instrumentation like meters, transducers, etc.

Circuit breakers, isolators and field points with specific status definitions, fall into this category. These devices change state from one position to the other. Some of these positions are defined as abnormal states. These definitions vary, depending on the point types and on the position of the device in the power network.

When a device goes into an abnormal state, an appropriate alarm is generated and displayed. When the device comes back to normal, an event is generated and the alarm is made non-persistent.

A control command is an operation executed to forcibly change the status of a device. This could be a supervisory (given by the operator) or a closed loop (given by the system) control.

Monitoring and control of the user interactions with the field, is done through the man-machine interface (MMI). This full-graphic user-friendly interface provides acquired data through single line diagrams (SLD) and tabular formats. ***(www.cmcltd.com)***

6.9 The concepts are discussed above speaks in general about the system of SCADA.

6.10 Transducers can be defined as a substance or an electrical device that converts input energy of one form into output of another.(examples are microphones or photo electrical cells). An electrical device is that which produces or powered by electricity. The transducers are used in conjunction with RTUs.

6.11 Obviously, data Communication, centralised and distributed data bases, decisions support, real time computing, power system analysis, geographical information processing, graphics and multimedia, distributed process control, simulation and forecasting and Enterprise resource planning (ERP) are unavoidable are an absolute necessity for a transmission utility. Be it, Management Information System (MIS) or maintenance management systems are very specific to transmission and distribution utilities which are to be in position in the system.

6.12 As explained earlier, another feature of SCADA is to utilise it as an effective tool for remote sensing of system parameters. The system can be monitored on a real time basis and also controlled by issuing commands to remote stations where RTUs are located. Therefore, installation of RTU is essential at all users end including the EHT consumers supplied through single circuit also.

6.13 In fact, the current trend is correct network imbalance by way of remote operation of transformer tap changers, feeder switching etc. even at unmanned s/s. Naturally SCADA requires a dedicated communication link. It may be from the s/s unto the central control room both point to point and point to multi point connectivity. This could be provided through optical fiber, leased telephone lines, power line carrier communication or any other advanced means like VSAT or microwave links. We have already given our orders regarding the use of PLCC.

6.14 Chapter – 5 of OGC deals regarding the operational aspect of the state grid. Regulation 5.1 deals on operating policy. It emphasizes that the state grid operates as an integrated unit for enhancing overall operational economy and

reliability. The OGC states that the overall operation of the state grid shall be supervised from the SLDC. Every user to comply with the operating code for deriving maximum benefit from the integrated operation.

6.15 Regulation 5.2 deals about system security aspects. More particularly, it emphasizes that no part of the grid shall be deliberately isolated from rest of the state grid except under emergency situations.

6.17 No important element of the state grid shall be deliberately opened or removed from service at any time except when specifically instructed by SLDC or with specific and prior clearance of SLDC.

6.18 All trippings are to be intimated to SLDC as soon as possible. The STU shall provide adequate and reliable communication facility internally and with other generators, distribution licensees, users to ensure exchange of data information necessary to maintain reliability and security of the grid. Wherever possible, redundancy and alternative path shall be maintained for communication along important routes i.e. SLDC to STU/ALDC/DSOCC.

6.19 SLDC shall direct a beneficiary to curtail its VAR drawl/injection in case the security of grid and safety of an equipment is endangered.

6.20 Regulation 5 specifically deals on Demand Management. Same is quoted :

> *"(1) Introduction*
>
> *This section is concerned with the provisions to be made by SLDC to effect a* ***reduction of demand in the event of insufficient generating capacity, and transfers from external interconnections being not available to meet demand, or in the event of breakdown or operating problems (such as frequency, voltage levels or thermal overloads) on any part of the grid.***
>
> *(2) Manual Demand disconnection*

(a) *As mentioned elsewhere, the Distribution licensees and other Users shall endeavour to restrict their net drawl from the grid to within their respective Drawl Schedules whenever the system frequency is below 49.5 Hz. When the frequency falls below 49.0 Hz, requisite load shedding (manual) shall be carried out to curtail the over-drawl.*

(b) *Further, in case of certain contingencies and/or threat to system security, the* ***SLDC may direct a user*** *to decrease its drawl by a certain quantum. Such directions shall immediately be acted upon.*

(c) *Each User shall make arrangements that will enable manual demand disconnection to take place, as instructed by the SLDC, under normal and/or contingent conditions.*

(d) *The measures taken to reduce the Users drawl from the grid shall not be withdrawn as long as the frequency/voltage remains at a low level, unless specifically permitted by the SLDC."*

6.21 Regulation 6.19 authorized the SLDC to direct the distribution Licensee trading licensees bulk consumers SGP, CGP to increase /decrease their drawl generation in case of contingencies i.e. overloading of/appliance transformers abnormal voltage and threat to system security. Such directions shall immediately be acted upon.

6.22 Regulation 6.1.11 provides all ABT Users should abide by the concept of frequency linked load dispatch and pricing of deviation schedule i.e. UI. Regulation 6.1.14 provides that the SLDC shall be responsible for computation of actual net MWH injection of each SGS/CGP/ISGS and actual net drawl of each beneficiaries, 15 minute-wise based on meter readings.

6.23 From the aforesaid provision it may be observed that the management of the power system is intended to ensure reliability of power supply, security of the system, economy in operation, leading to an efficient over all grid management. Electricity Act, 2003 section 32 define the functions of State Load Despatch

Centre. Among other things it provides for monitoring of grid operation to exercise supervision and control over the intra-state transmission system and to be responsible for carrying out real time operation for grid control and despatch of electricity within the state through secure and economic operation of the state grid in accordance with the Grid Standards and the State Grid Code.

6.24 As per Section 32 of the Act read with Regulation 2.2. of the Orissa Grid Code, the responsibility of the State Load Despatch Centre as a monitoring agency for intra-state networks envisages that they shall have to remain alert so that abnormal situations are avoided and the restorations in case of system disturbances is done with minimum loss of time with an eye to prevent emergent situations leading to system collapse. They shall only be able to discharge this responsibility satisfactory if basically the real time activities that could impact the functions of the system could be monitored readily.

6.25 It also states that the users shall send information /data including Disturbance Recorder/sequential event recorder output etc. to SLDC for purpose of analysis of any grid disturbance/event. No Users shall block any data/information required by the SLDC for maintaining reliability and security of the grid and for analysis of an event.

6.26 Regulation 5.3 of the OGC deals about frequencies management and define responsibilities during the course of falling frequency, rising frequency and also deals about frequency linked pricing mechanism. According to this all Users shall cooperate with the transmission licensee in contributing towards effective control of the system frequency and managing the voltage of the transmission system. SLDC for effective functioning of synchronous grid system shall instruct all generating units including CGPs shall regulate generation/export and hold reserve of active and reactive power.

6.27 Transmission system regulation needs to be controlled by SLDC by adjusting transformer taps and switching of circuits and reactors.

6.28 SLDC shall always endeavour to restrict net drawl within the drawl schedule depending upon the frequency band. The SLDC shall have to utilize internal generation capacity and whenever required **go for load shedding** even. No User shall cause a sudden increase in his load by more than 100 MW without prior intimation and consent of the SLDC. In case of falling frequency requisite load shedding shall be carried out by SLDC by instructing DISTCOs as per pre-arrange schedule. This is in addition to the provision of automatic under frequency and df/dt load shedding in their respective system.

6.29 For voltage management all beneficiaries shall endeavour to minimise the VAR drawl.

6.30 Fluctuations in frequency, voltage, loading of transmission line, under/over loading of transformers etc. goes on changing due to changing load pattern through out the day as well as from season to season and month to month.

6.31 SLDC personnel are to plan continuously for load generation balance at any point of time. In a challenging commercial environment in the ABT regime, the SLDC, for effective running of the system, may be required to plan for load shedding in case of shortage of supply within the state's periphery. The licensee may resort to tripping of non-essential loads for saving the system from collapse. At that point of time, SLDC through sub-LDCs may be required to give appropriate instructions to larger user particularly EHT consumers, CGPs along with other large generators for any remedial action, as in spite of a very stiff UI, rate instances of system over loading are not uncommon.

6.32 The other most important area is safety and security of the power system. Fault Analysis to determine the source of generation of any fault i.e. whether it was initiated at the consumer end or has started from the source or the incomer of the transmission licensee need to be known for preventing recurrence of faults in transmission network that leads to interruption of power supply and cascade

tripping. This is, besides, the point that in the fast change in the use of technology we are planning for automation in distribution operation, creating DSOCCS to implement commercial principles keeping not only in view the objective of intrastate ABT but also continuity & quality of power supply to all class of retail consumers. The standards of performance are to be scrupulously met & consumers are compensated for failure to meet the standard by the DISTCOs.

6.33 Unless information from the consumer/CGP end is collected, the sub-LDCs operator will not be able to balance the load generation gap due to load fluctuations. As stated earlier in case of shortage of supply control may have to be exercised even for isolation of feeders in times of distress. The petitioner has also very rightly submitted during current hearing that if information from all EHT consumers and CGPs come to the SLDC, they will not be able to manage the huge information and it shall not serve any purpose.

6.34 It was argued by the petitioners that any information with respect to the radial loads could as well be monitored from the grid s/s itself requiring no additional equipment at the user end. There is substantial merit in the argument. But the fact remains that installation of an RTU at the user end can as well serve source of information for fault analysis and event logging. A SCADA system in position shall be helpful to the system operator to control the load from the user end also. In stead of total interruption from grid end partial load shedding could be done by tripping only limited EHT loads selectively.

6.35 This addresses the 3rd issue raised in para 3.3. A question has been raised that SLDC may not be seriously affected by the small capacity generators or EHT loads for which information of these things need not be sent to SLDC on real time basis. This is a very valid objection. But, all such generators and EHT load need to be integrated at the sub-LDCs level. The state has been divided to four distribution zones and each distribution company is expected to have a distribution system operation & control centre (DSOCC). They shall be

responsible for load generating balance in their area and may have to plan accordingly to obtain the best commercial advantages through load management. In view of that it is not necessary for all the EHT consumer/ CGPs to send all their real time data right up to the SLDC level but has to be made available up to the point of nearest SCADA interface.

6.36 A licensee shall act as a power pool in his area trying to get the benefit of UI and avoid payment of UI & at the same time is required to meet the demand. As we have stated earlier that for the purpose of load generation balancing meeting the demand supply gap the sub-SLDC operating in the area shall require real time information. Such information could be collected by the use of transducers & RTU at the point of use. With such installation data on voltage, current, MW, MVA, MWH, MVAH and any other electrical parameters could be suitably accessed as required under OGC Regulation 10.8. Besides, the placement of RTUs shall generate necessary information for control (through SCADA) so as to disconnect the faulty areas quickly. This will prevent fault propagation and loss of power to large areas. Loss of power means loss of revenue as well as loss of goodwill.

6.37 The foregoing discussions makes it amply clear that the well intentioned provisions in OGC are binding both on the STU/Transmission Licensee and the User of the system for an economic and efficient system operation. In this connection, OPTCL was directed to furnish information regarding monitoring of large loads by SLDCs of other states. The OPTCL in their rejoinder dt.14.2.08 at page-6 (para-5) has submitted the following:

> *"The Hon'ble Commission desired to know about SCADA implementation in other States.*
> *(i)It is worthwhile to mention here that West Bengal has retained PGCIL to take up their Distribution SCADA arrangement interfacing SLDC SCADA for all load points; 11 kV onwards [Courtesy Sri V.K. Gupta, GM, PGCIL, 16, Nehru Place, New Delhi].*

(ii)Karnataka is monitoring 100% through District Control Centres for all HT/EHT loads.

(iii) Maharashtra has gone for V-Sat connectivity to all distribution pints from 11 kV onwards and owns one dedicated hub of Intelsat Satellite directly.

(iv)Himachal Pradesh has planned 6735 metering points to be covered under distribution SCADA having connectivity to State Load Dispatch Centre. Similar is the situation for Rajsthan.

(v)Andhra Pradesh is monitoring 1175 HT/EHT consumers and having connectivity interface to State LDC at Kothagudam. Andhra Pradesh bagged Golden Award putting PGCIL behind to be as number 2 among Transmission Utilities and Distribution loss of Andhra Pradesh is 17.8% [Courtesy Sri M. Gopal Rao, Director, Transmission, AP] & at the same time issues heavy agricultural subsidy towards energy drawal.

(vi)Kerala has introduced Distribution Open Access and monitoring unto 100% though they have not unbundled."

6.38 Hence, data relevant to the EHT consumers and export/import of CGPs have to be routed through centralized controlled centres to be set up by Distribution companies for availing the incentives and avoidance of penalty in the intra-state ABT regime. Therefore data of EHT consumers as well as CGPs have to be integrated to the grid network of the transmission licensee. Thereafter, data can flow through sub-SLDs to SLDC.

6.39 SCADA arrangements for interface are not yet available in all the grid s/s except for the important ones. Within the transmission system it is the

responsibility of OPTCL to send data/information from SCADA interface to SLDC. OGC does not mandate installation of SCADA interface at all grid s/s. At the User end metering and communication are to be provided within the respective jurisdiction of the licensee & User. RTUs located at User end can send data via PLCC to the point of SCADA interface in case facilities are not available in the nearest s/s of the Transmission license to avoid delay in connectivity for which they may have to provide suitable technical arrangement at intermediate grid s/s upto the point of SCADA interface.

6.40 In accordance with Regulation 4.13.1(d) all agencies connected to or planning to connect to STS shall provide RTUs and other communication equipments for sending real time data. They shall make available output of their respective operational meters to SCADA interface equipment installed by the STU/Transmission Licensee (Regulation 10.5 of the OGC). This shall not apply to power stations of capacity below 5 MW.

CHAPTER-7

7. The next item for discussion is Distance Protection Relays and their applications for transmission lines. Whether carrier inter tripping is to be provided by the EHT consumers when the power supply is made in radial mode and even when static distance protection relay with back up relay is provided ?

7.1 It will be worthwhile to quote the provisions from the Application Guide for Electrical Relays for AC systems i.e. Indian Standard IS 3842(part-V) 1968 dealing with the Distance Protection Relays.

Modern power systems are designed to provide uninterrupted electrical supply, yet the possibility of failure can not be ruled out. The protective relays stand watch and in the event of failures, short circuits or abnormal operating conditions help de-energize the unhealthy section of the power system and restrain interference with the remainder of it and thus limit damage to equipment

and ensure safety of personnel They are also used to indicate the type and location of failure so as to access the effectiveness of the protective schemes.

The features which the protective relays should possess are:

a. *Reliability, that is, to ensure correct action even after long periods of inactivity and also to offer repeated operations under severe conditions;*
b. *Selectivity, that is, to ensure that only the unhealthy part of the system is disconnected;*
c. *Sensitivity, that is, detection of short-circuit or abnormal operating conditions;*
d. *Speed to prevent or minimize damage and risk of instability of rotating plant; and*
e. *Stability, that is, the ability to operate only under those conditions that call for its operation and to remain either passive or biased against operation under all other conditions.*

A distance replay compares the local current with the local voltage as an economical substitute to an ideal protection scheme comparing local current with the remote current. As the operation of such a relay is made dependent on the ratio U/I = Z (Z being the line impedance or a trigonometric function of it), it is also a measure of the line length. Hence the name 'distance' relay.

Besides being used for protection of feeders and transmission lines, the distance relays are sometimes also used for other applications, such as back-up for generators. However, this guide confines itself to only feeders and transmission lines.

7.2 Distance protection schemes have reached very high level of accuracy. As explained in para 10 IS 3842 application of distance relays is the most common thing for transmission line protection.

7.3 In this connection extracts 10.1 to 10.42 are given for a clear understanding:

10.1 Of the various applications possible for a distance measuring relay, its application to transmission line protection is the most common. Instead of the inverse time-distance characteristic used earlier, 'step-ped' time-distance characteristics are now in use. The characteristics may either be 'single-stepped' or 'three-stepped'. A distance measuring relay of conventional design has an inherent instantaneous time-distance characteristic, the operating time becoming infinite at the relay reach point.

10.2 *Owing to the limitations of time overcurrent protection on short feeders and on systems with wide variations in the generating capacity as given in IS:3842 (Part I) 1967*, distance relays are used in preference, to overcurrent relays. Single-step distance relays can be used on feeders where high-set instantaneous overcurrent units can not be used.*

10.3 *Another typical instance where 'single-step' distance protection may be employed is a transformer-feeder. In such a case, it would be possible to set the distance relay to cover 100 percent transformer feeder length instantaneously because even on considering the 'over reach' constituting factors such as 'offset wave' accuracy of the relay calibration, current transformer and voltage transformer errors and errors in line constants, it is often found that the relay will not 'look' through the transformer, or in other words, operate for transformer secondary side faults.*

10.4 *On transmission lines having an 'adjacent' line section, 'three-step' distance relays are used. The first step is usually set to cover up to 80 to 90 percent of the protected line section, and is instantaneous in operation. Setting the first step reach to about 80 to 90 percent of the protected section ensures that the relay will not over-reach and maloperate on faults close to the bus-bar of the adjacent section. This is necessary to allow for the inaccuracies, of the instrument*

transformers, errors in line constants, relay inaccuracies, and overreach effect due to dc transient in the fault current. The setting to the first step should, therefore, take into account the above mentioned points.

10.4.1 The second step is set to extend between 20 to 50 percent of the next section. This ensures that the remote end faults of the protected section will be cleared in zone-2 time.

10.4.2 *The third step is set to cover the entire adjacent section. I may, therefore, be surmised that the second and third steps of a three step scheme serve as back-up to zone-1 protection of the adjacent section. Extension of the measuring relay reach into zone-2 and zone-3 is obtained by changing the taps of the auxiliary voltage transformers or by switching in resistance in the relay restraint circuit at pre-set time intervals by means of a timer relay, which is initiated by the starter relays in the inception of a fault. Alternatively, separate measuring relays may be used for zone-2 and zone-3. This latter arrangement, however, adds to the cost of the protection.*

7.4 Distance relays are used in conjunction with auto re-closing and carrier channel. Extract of IES: 3842 Para-V 1968 para 13

13.1 Distance relays are often required to operate in conjunction with circuit-breaker auto-reclosing schemes to avoid unnecessary interruption of supply on transient faults which are by far the most predominant faults on overhead transmission systems. The requirements of successful auto-reclosing schemes are :

a) Simultaneous and 'instantaneous' de-energisation of the faulted line section from both the ends;

b) Allow a certain and minimum amount of 'dead' time to let the fault are deionise; and

c) Close both ends of the line simultaneously.

13.1.1 For an auto-reclose to be successful, that is, the two systems pulling into step again after the momentary disruption it follows that the tripping and closing operations at the two ends should be 'simultaneous and the time delay under 13.1(b) should be as low as practicable.

13.1.2 The requirements of 13.1(a) and 13.1(c) are achieved by linking the protection at the two ends of a line by means of a 'carrier' channel. The carrier channel principle is used in the following forms;

a) Carrier-intertripping,

b) Carrier-blocking, and

c) Carrier-acceleration.

13.2 Carrier-Intertripping – The distance relays at the two ends A and B cover about 80 percent of the line length in their instantaneous zone-1. Therefore, faults occurring in the middle 60 percent of the line section are 'seen' by both the ends in zone-1 and their tripping is simultaneous. However, for faults occurring in the end 20 percent sections, the relay nearest the fault locates it in its zone-1while the remoter relay locates the same in its zone-2. the nearer tripping relay is therefore made to send a carrier signal to the remoter nontripping relay to bring about simultaneous tripping of the whole line section. Once the two ends trip simultaneously, the auto-reclose relays take over.

7.5 Likewise carrier blocking and carrier acceleration to be utilised for efficient system operation through use of carrier channels

7.6 Utility of a distance protection scheme are well explained in paragraphs foregone. There should no doubt about the provision of distance protection schemes with carrier inter tripping between the grid s/s of the STU/Transmission

licensee and the users capable of injecting power to the transmission system. That is possible in case of users like

Captive Generating Plants connected to the grid

Users connected to the STU/Transmission System through multiple feeders.

7.7 In case of these kinds of users distance protection schemes as per the guidelines of I.S.S. shall have to be provided both at the grid end as well as at the users end.

7.8 In case of EHT consumers connected through single circuits by radial feeders there is no scope of back feeding to the system. Hence, there is no utility of a distance protection relay in respect of such consumers at the consumer end. However, there is need of distance protection scheme for all EHT feeders including radial feeders emanating from the grid substations.

7.9 The distance relay can be applied for the protection of short lines, transformer feeders, Tee lines, double circuit lines as well as it can be applied for single pole and triple pole auto reclosing.

7.10 The distance relay can be applied for 66/33 KV network also.

7.11 This answer the fourth issue raised in para 3.4.

CHAPTER-8

8. Whether OPTCL shall reimburse the cost of equipment procured by the petitioners, if the Commission decides that PLC equipment need not be provided by the petitioners?

8.1 We have given our orders with regard to the installation of PLCC equipment in the jurisdiction of the users as well as we have clarified that the OPTCL shall provide necessary facilities for transmission of relevant data from

the important grid substations to the SLDC. As such, the additional cost incurred by the petitioners if any for procurement of communication equipments for transmission of speech and data within the transmission system of OPTCL upto SLDC need to be addressed.

8.2 OPTCL in their rejoinder of 14.02.08 have already informed that some of the industrial entities have already provided PLCC and data acquisition RTU examples being M/s Hind Metal & Industries Pvt. Ltd. and Nava Bharat Ventures Ltd. It is reported that these RTUs shall be useful for providing the facilities of communication to the nearest Multiplexere (MUX) point of OPTCL i.e. at Meramundali Grid Substation. From Meramundali grid S/S, OPTCL has admitted that data shall be transmitted to SLDC through the OPTCL Wide Band Network. OPTCL has intimated that Beekay Steels has been asked to provide their data connectivity to the nearest MUX point of OPTCL i.e. at Tarkera Grid S/S. The Commission approves the proposal of OPTCL which is in line with the principles now set out in this order.

8.3 There is substantial force in the argument of OPTCL that the OGC was kept in draft stage for petty long time and opportunity was afforded to all concern before its finalization. It is now observed that disputes have been raised after signing of connectivity agreement with OPTCL and even after placement of order for procurement of PLCC and SCADA system. In case of doubt or dispute, the matter should have been referred at that stage of signing connectivity agreement.

8.4 The petitioners had requested that in case the Commission decides not to allow the provision of PLCC from the consumer's premises unto the SLDC than the expenditure involved for procurement of these provisions need to be recovered from the OPTCL. The Commission would like to observe that the petitioners should have raise this issue before placing purchase orders rather than after having procured the matters and raising this just before commissioning of their s/s. In fact they have come before the commission but for the delay in procurement of these which otherwise they would have put it in place.

8.5 Reimbursement of the expenditure involved for procurement of communication equipments from the location of SCADA upto SLDC by the users, if any arises out of a contractual agreement between the Transmission Licensee and the consumers/Users. The Commission is not the appropriate forum for its adjudication.

8.6 On the issue of AREVA make equipments vis-à-vis other manufactures we would like to observe that for connecting to OPTCL system by EHT consumers/CGP it would have been desirable to take up such extension by OPTCL itself and avoid the kind of litigation with regard to the use of a particular type of equipment. Subject to technical compatibility and availability of maintenance facilities, OPTCL should accept equipments of other suppliers/manufacturers as well.

This disposes off the fifth issue raised in para 3.6.

CHAPTER - 9

We finally lay down the following guidelines for connection with the State Transmission System (STS).

1. The model connection agreement is a format approved under OGC & hence is to be followed by both the STU/Transmission licensee & Users to maintain uniformity and quality across the system.

2 We also agree with the prayer of the SLDC that there shall not be any discrimination between Users in respect of compliance of codal provisions regarding installation of SCADA/PLCC equipments.

3. PLCC shall be installed at the Users end in their jurisdiction, whether they are EHT consumers or CGPs or any person including CGP seeking intra-state open access & shall maintain the communication system in good condition.

4. As laid down in Regulation 10.7 of OGC the STU/Transmission Licensee have to install dedicated communication links for voice communication and written communication and data transmission between all power stations, Transmission system s/s and SLDC. As required under Regulations 10.4.2, 10.5 and 10.8.3 of the OGC, the Transmission Licensee shall provide transducers for transmission of data from each s/s. to SLDC. In other words, the STU/Transmission licensee shall provide for PLCC & data communication from the grid s/s upto SLDC in accordance with this provision of the OGC.

5 Data acquisition monitoring activities of the generating units is to be carried out by SLDC as provided in Regulation 7.3.1 para-2 of the OGC for monitoring of the generation. Real time monitoring of generation and export/import of CGPs are to be monitored as provided under Appendix-C-5 of OGC which shall exclude Power Stations with a capacity below 5 MW (10.3.1 of the OGC).

6. For generation operational metering as provided in Regulation 10.3(2) data relating to real time operation shall be made available in respect of each generating unit but shall not apply to power stations of capacity below 5 MW. (Regulation 10.3.1 of the OGC)

7. In accordance with Regulation 4.13.1(d) all agencies connected to or planning to connect to STS shall provide Remote Terminal Units (RTUs) and other communication equipments for sending real time data. They shall make available output of their respective operational meters to SCADA interface equipment installed by the STU/Transmission Licensee (Regulation 10.5 of the OGC). Obviously, this will also apply to the generators who shall provide transducers for transmission of data unto the point of SCADA interface for transmission to SLDC in accordance with 10.8.8.2 of the OGC. This shall not apply to power stations of capacity below 5 MW.

8. Besides, Transmission Licensee has to establish Area Load Despatch Centres (ALDCs) to reduce the burden of SLDC and the distribution utilities are

to establish Distribution System Operation & Control Centre (DSOCC). Therefore, as a part of overall grid management, all data need to be captured even from radially connected loads/ Users to facilitate control/monitoring by ALDC/DSOCC of all loads connected to the STS.

9. There shall be provision of distance protection schemes with carrier inter tripping between the grid s/s of the STU/Transmission licensee and the users capable of injecting power to the transmission system. This should be used in case of Captive Generating Plants connected to the grid and for those Users connected to the STU/Transmission System through multiple feeders.

10. In case of users as indicated above distance protection schemes as per the guidelines of Indian Standard Specification (ISS) shall have to be provided both at the grid end as well as at the users end.

11. In case of EHT consumers connected through single circuits by radial feeders there is no scope of back feeding to the system. Hence, there is no utility of a distance protection relay in respect of such consumers at the consumer end. However, there is need of distance protection scheme for all EHT feeders including radial feeders emanating from the grid substations.

12. The distance relay can be applied for the protection of short lines, Transformer feeders, to Tee lines, double circuit lines as well as it can be applied for single pole and triple pole auto reclosing.

13. The distance relay can be applied for 66/33 KV network also.

14. The dispute regarding reimbursement of the expenditure involved for procurement of communication equipments from the location of SCADA unto SLDC by the users, if any arises out of a contractual agreement between the Transmission Licensee and the consumers/Users, the Commission is not the appropriate forum for its adjudication.

15. On the issue of AREVA make equipments vis-à-vis other manufactures we would like to observe that for connecting to OPTCL system by EHT consumers/CGP it would have been desirable to take up such extension by OPTCL itself and avoid the kind of litigation with regard to the use of a particular type of equipment. Subject to technical compatibility and availability of maintenance facilities, OPTCL should accept equipments of other suppliers/manufacturers as well.

16. Having laid down the detailed guidelines in this Chapter, we now specifically address the prayer of the petitioners as below :

Beekay Steels & Power Limited.

1. Subject to technical compatibility & availability of maintenance facilities as laid down earlier OPTCL may accept equipments/manufactures instead of only specifying ABB make equipment.

2. The petitioner shall make available the data as well as voice communication and data communication with RTU facilities upto the nearest SCADA interface point at Tarkera. Data transmission from SCADA interface to SLDC shall be carried out by OPTCL.

Rohit Ferro –Tech Ltd.

1. The petitioner shall provide RTU, speech & data communication facilities upto the SCADA interface point. From the SCADA interface point at new Duburi s/s upto SLDC necessary connectivity shall be provided by OPTCL.
2. Since power supply shall be given through a single radial feeder, carrier inter-tripping is not required to be provided at consume end.

MSP Metalics Ltd.

1. Since it is being fed through a radial feeder, distance protection with carrier inter-tripping is not required at consumer end.

2. RTU, PLCC, voice and data communication is to be provided to the nearest s/s i.e. Budhipadar only, beyond which it is the responsibility of OPTCL to send data to sub-LDC/SLDC. This communication link is being approved so that there shall not be any discrimination between the users in respect of compliance of codal provisions.

Emami Paper Mills Ltd.

1. Subject to technical compatibility & maintenance facilities, equipment of makes other than ABB should be accepted by OPTCL.
2. RTU, Voice and data communication through PLCC up to the nearest SCADA interface point shall be provided by the petitioner. Beyond that including the intermediate grid S/S through sub-SLDC to SLDC shall be provided by OPTCL.

Since, a CGP is being connected to the grid s/s, distance protection with carrier inter-tripping have to be provided at the respective ends.

The present order disposes of the bunch of petitions filed before us in the matter.

Sd/-	Sd/-	Sd/-
(K.C. Badu)	**(S.K. Jena)**	**(B.K. Das)**
Member	**Member**	**Chairperson**