

**Additional Agenda for 160<sup>th</sup> OCC Meeting****AA.1. Reliability of Telemetry (Agenda by NRLDC)**

Based on CERC/CEA regulations and decisions of TCC/NRPC, the telemetry integration is being ensured before charging of new system element at ISTS (super grid) level. However, the reliability of data from newly integrated sub-stations is still very poor. Though the telemetry integration is ensured before charging the new element, the reliability of telemetry is not at all ensured. Reliability of telemetry for some of the stations is poor since its integration.

| Northern Region summary sheet and details of current status of implementation of telemetry system |                  |                       |     |                        |     |                  |     |                        |     |                  |               |                                     |            |  |
|---------------------------------------------------------------------------------------------------|------------------|-----------------------|-----|------------------------|-----|------------------|-----|------------------------|-----|------------------|---------------|-------------------------------------|------------|--|
|                                                                                                   |                  |                       |     |                        |     |                  |     |                        |     |                  | Updated Till: |                                     | 30.04.2019 |  |
| Sl. No.                                                                                           | User Name        | Total Nos of Stations |     | Telemetry not Provided |     |                  |     | Telemetry Intermittent |     |                  |               | Total non-availability of data in % |            |  |
|                                                                                                   |                  |                       |     | Total nos of           |     | Non-availability |     | Total nos of           |     | Non-availability |               |                                     |            |  |
|                                                                                                   |                  | GS                    | SS  | GS                     | SS  | GS               | SS  | GS                     | SS  | GS               | SS            | GS                                  | SS         |  |
| 1                                                                                                 | Punjab           | 17                    | 173 | -                      | 86  | -                | 50% | 4                      | 21  | 24%              | 12%           | 24%                                 | 62%        |  |
| 2                                                                                                 | Haryana          | 5                     | 70  | -                      | 13  | -                | 19% | -                      | -   | -                | -             | -                                   | 19%        |  |
| 3                                                                                                 | Rajasthan        | 20                    | 223 | -                      | -   | -                | -   | 1                      | 4   | 5%               | 2%            | 5%                                  | 2%         |  |
| 4                                                                                                 | Delhi            | 6                     | 43  | -                      | -   | -                | -   | -                      | 5   | -                | 12%           | -                                   | 12%        |  |
| 5                                                                                                 | UP               | 22                    | 180 | -                      | -   | -                | -   | 3                      | 50  | 14%              | 28%           | 14%                                 | 28%        |  |
| 6                                                                                                 | Uttarakhand      | 10                    | 29  | -                      | -   | -                | -   | 6                      | 27  | 60%              | 93%           | 60%                                 | 93%        |  |
| 7                                                                                                 | HP               | 15                    | 25  | -                      | -   | -                | -   | 3                      | -   | 20%              | -             | 20%                                 | -          |  |
| 8                                                                                                 | JK               | 4                     | 17  | 3                      | 12  | 75%              | 71% | 1                      | 5   | 25%              | 29%           | 100%                                | 100%       |  |
| 9                                                                                                 | POWERGRID        | -                     | 80  | -                      | -   | -                | -   | -                      | 5   | -                | 6%            | -                                   | 6%         |  |
| 10                                                                                                | NTPC             | 14                    | -   | -                      | -   | -                | -   | -                      | -   | -                | -             | -                                   | -          |  |
| 11                                                                                                | NHPC             | 14                    | -   | -                      | -   | -                | -   | 4                      | -   | 29%              | -             | 29%                                 | -          |  |
| 12                                                                                                | NPCIL            | 5                     | -   | -                      | -   | -                | -   | -                      | -   | -                | -             | -                                   | -          |  |
| 13                                                                                                | NJPC             | 2                     | -   | -                      | -   | -                | -   | 1                      | -   | 50%              | -             | 50%                                 | -          |  |
| 14                                                                                                | THDC             | 2                     | -   | -                      | -   | -                | -   | 1                      | -   | 50%              | -             | 50%                                 | -          |  |
| 15                                                                                                | BBMB             | 6                     | 16  | -                      | -   | -                | -   | -                      | -   | -                | -             | -                                   | -          |  |
| 16                                                                                                | IPP/JV/Patran    | 6                     | 2   | -                      | -   | -                | -   | 2                      | 1   | 33%              | 50%           | 33%                                 | 50%        |  |
|                                                                                                   | TOTAL            | 148                   | 858 | 3                      | 111 | 2%               | 13% | 26                     | 118 | 18%              | 14%           | 20%                                 | 27%        |  |
|                                                                                                   | Total (over all) | 1006                  |     | 114                    |     | 11%              |     | 144                    |     | 14%              |               | 26%                                 |            |  |

Note: The above % is based on number of RTU/gateway reporting and not based on number of measurands. It would much lower percentage based on number of measurands.

Also even though the telemetry is available, correct Digital telemetry is not available. Proper status of CBs and Isolators is required for SE to form network model resembling to actual Power System Model via Topology Processor.

Suspected/Inverted status of switches lead to formation of wrong topology and difficulty in smooth grid monitoring/operation.

The above issue of non-availability of telemetry data was deliberated in the 42<sup>nd</sup> TCC and 45<sup>th</sup> NRPC meeting, wherein it was decided that **No shutdown/ charging code** shall be issued by NRLDC for ISTS lines in case of non-availability of data telemetry of that particular element.

**Members may take a note.**

**AA.2. Load Crash in Northern Region on 12<sup>th</sup> June 2019 (Agenda by NRLDC)**

Sudden thunder storm/rainfall during summer/monsoon in NR is probable phenomenon and subsequent load crash in range of 7-15 GW in region as a whole. Such fast reduction of large load causes frequency/voltage excursions, line loading etc. There have been number of instances of tower collapse & damage also in the past during such thunder storms which resulted in constraints in supply power for extended duration of time. Apart from EHV line outage on tower collapse, line faults, nearly 30-40 lines used to be opened manually to control high voltage.

Recently on 12th June 2019, load crash of **11.6GW** occurred in Northern Grid on account of dust storm/ thunderstorm within **2hrs 30minutes** time span.

Punjab, Haryana, Rajasthan, Uttar Pradesh, Uttarakhand, Chandigarh & Delhi were the major affected state control area during load crash. Demand crash in Punjab started first at 16:00hrs itself followed by Rajasthan & Haryana at 16:10hrs and 17:30hrs respectively. Delhi demand started decreasing at 18:30hrs. Uttar Pradesh demand was already 2000MW lesser than previous day on account of pleasant weather in central area of Uttar Pradesh, its demand started decreasing at 18:50hrs. Uttarakhand demand started decreasing at 19:00hrs, Chandigarh started decreasing after 19:30hrs of 12<sup>th</sup> Jun 2019. Maximum demand crash of Northern Region was **12405MW** at 19:26hrs of 12<sup>th</sup> Jun 2019 as compared to previous day. Maximum load crash of affected state control area is tabulated below:

| State Control Area | Demand Met (MW) at 19:26hrs of 11th June'19 | Demand Met (MW) at 19:26hrs of 12th June'19 | Demand Reduction (in MW) | Minimum Demand Met (in MW) | Load Crash Amount (in MW) and duration                |
|--------------------|---------------------------------------------|---------------------------------------------|--------------------------|----------------------------|-------------------------------------------------------|
| Punjab             | 8102                                        | 4981                                        | 3121                     | 4904 (18:53hrs)            | 4400MW in 03:00hrs (Started in 15:53hrs of 12th June) |
| Haryana            | 8087                                        | 4149                                        | 3938                     | 3801 (19:59hrs)            | 4450MW in 02:30hrs (Started in 17:29hrs of 12th June) |
| Rajasthan          | 9656                                        | 8738                                        | 918                      | 8414 (18:09hrs)            | 2750MW in 02:00hrs (Started in 16:10hrs of 12th June) |
| Uttar Pradesh      | 20619                                       | 17021                                       | 3598                     | 17021 (19:26hrs)           | 1300MW in 00:35hrs (Started in 18:50hrs of 12th June) |

|                     |              |              |              |                             |                                                                           |
|---------------------|--------------|--------------|--------------|-----------------------------|---------------------------------------------------------------------------|
| Delhi               | 5423         | 4671         | 752          | 4667<br>(19:13hrs)          | 1000 MW in<br>00:42hrs (Started<br>in 18:31hrs of 12th<br>June)           |
| Chandigarh          | 317          | 310          | 7            | 106<br>(20:08hrs)           | 200 MW in<br>00:30hrs (Started<br>in 19:36hrs of 12th<br>June)            |
| J&K                 | 2149         | 2257         | -108         |                             |                                                                           |
| Uttarakhand         | 1812         | 1735         | 77           | 1492<br>(22:02hrs)          | 400 MW in<br>01:00hrs (started<br>at 19:02hrs of 17th<br>May)             |
| Himachal<br>Pradesh | 1120         | 1022         | 98           | 837<br>(21:00hrs)           |                                                                           |
| Northern<br>Region  | <b>57241</b> | <b>44836</b> | <b>12405</b> | <b>44836<br/>(19:26hrs)</b> | <b>11600MW in<br/>02:30hrs (started<br/>at 16:50hrs of<br/>12th June)</b> |

Total 22 number of 400 and above voltage level lines/elements tripped on phase to earth fault during thunderstorm. List of the tripped elements is attached as **Annexure-AA.2**

Utilities are requested to kindly submit the detailed report and prepare the presentation on experience of load crash considering the following points:

- Load Crash (in MW) in the State
- Analysis of Thermal Generation backing down in the state (till technical minimum or not, if not than reason of the same needs to be discussed)
- Analysis of fast ramping down of state generation during reduction in demand met.
- Reason of large deviation from the schedule
- Line tripping & tower collapse (132 kV and above)
- Line manually opened on high voltage in state Grid
- Future remedial measures (Improvement in action taken for future)
- Weather monitoring and warning/alerts issued or not?

**Utilities may kindly present and member may like to discuss.**

### **AA.3. Stabilization period for Flue Gas Desulphurization (FGD) units (Agenda by Jhajjar Power Limited)**

Jhajjar Power Limited (JPL) vide letter Ref No. JPL/NRPC/FD/09836 dated 12.06.2019 (**Annexure-AA.3**), has highlighted certain operational issues which are being encountered by them in achieving the continuous operation of its installed FGD and meeting the Environmental norms of < 200 mg/Nm<sup>3</sup> on real time continuous basis. Various issues being encountered are highlighted below:

1. Inconsistent lime-stone quality: Variation in quality of lime-stone used in FGD leads to frequent deviation in FGD operational parameters
2. In initial stabilization stage, frequent cleaning of Absorber tower, its nozzle and de-mister system is required. This requires shut down of FGD and thus the plant need to be stopped.
3. Wide variation of Sulphur % in coal materialized from various CIL subsidiaries, this leads to sudden exceedance in SO<sub>x</sub> and plant load has to be reduced to comply with norms.
4. The acid content of the produced by-product is very corrosive in nature leading to frequent damages to analysers. This leads to either abnormally high/low value of SO<sub>x</sub> being reported and a non-compliance from real time operation. In these cases, either units have to be shut down or load has to be reduced to meet the norms.
5. More frequent shutdown of FGD equipment like RC pumps, De-mister in initial stabilization phase and may led to unwanted exceedance.
6. FGD operating regime during start-up/shutdown: Currently, there are no standard guidelines for thermal power plants to meet the norms while operating FGD during (Unit) start-up/shutdown
7. No operational expertise in market for FGD operation and maintenance manpower. It leads to more time is rectification of O&M issues in initial period and led to unwanted exceedance and not meeting the norms.

Based on the above mentioned issues, JPL has requested for NRPC/ CEA intervention in the following areas:

1. At least 3 years of stabilization period to be allowed after date of commissioning. In the first year the power plant may be required to ensure FGD availability at 70% of the plant availability, in the second year 80% of the plant availability and in the third year availability should be 90% of the plant availability

After 3rd year Plants should be considered fully complying with the norms provided it operated FGD more than 95% of Plant availability

2. **No clarity on EC norms adherence:** There is a need to clarifying the terms on which Sox emission norms must be met. While, controlling Sox emission less than 200mg/NM<sup>3</sup> could be guiding parameter, this cannot be met on continuous basis.

JPL propose that, annual ceiling emission target at the normative Plant load factor of 80%, with FGD availability of 70/80/90/95 % burning Indian coal having an average Sulphur (say 0.5%) may be fixed for each power plant. If cumulative annual quantity of SO<sub>x</sub> is within the ceiling limit, the power station should be considered as fully compliant with the emission norms. As per CLP experience in other countries,

compliance in meeting the norms on annual basis like in Hong Kong and European countries.

3. CEA to propose to MOEF&CC the standard operating guideline for thermal power plant's which also includes the FGD operating regime during start up and shutdown conditions. Minimum [24h] stabilization time should be given post reaching to full/stable load for meeting the SO<sub>2</sub> norms.

### **Members may deliberate**

#### **AA.4. Facilitating NO<sub>x</sub> Combustion Modification tuning in Unit-5, Stage-II of Dadri Thermal plant (Agenda by NTPC)**

In reference to the combustion modification done (towards NO<sub>x</sub> reduction) in Unit-5, Dadri Thermal plant and it's connected tuning of SOFA (Separated Over Fire Air) dampers, the modification has been in line with the phasing plan for the implementation of new Environment Norms for thermal power plants.

MOEFCC Gazette notification dated 7/12/2015 (**Annexure-AA.4(I)**) mandates new environment standards on emission limits. Further, CPCB directive letter dated 11/12/2017 to NTPC, Dadri (**Annexure-aa.4(II)**) specified deadline for implementation and compliance as 2019.

The Norms mandates limits of emission levels in Particulate matter, SO<sub>x</sub>, NO<sub>x</sub> and Mercury levels. Based on the MOP recommendation, the NTPC, Dadri was to take measures on installation of low NO<sub>x</sub> burners, providing overfire air(OFA) and achieve progressive reduction so as to comply NO<sub>x</sub> emission levels as per the notification, by 2019. Accordingly, Combustion Modification was done in Unit-5 NCPS Dadri Thermal plant, during its recent overhaul. it's connected tuning of SOFA (Separated Over Fire Air) dampers is yet to be done. The modification was carried out by M/s General Electric(GE), in which the major changes in boiler and its controls are as follows:

1. Modification in Boiler wind box
2. Modification in Free Flow areas of wind box
3. Introduction SOFA dampers
4. SADC damper modification
5. Modified Combustion equipment

The efficacy and functioning of the boiler depends on tuning of the newly envisaged control equipment. The tuning process involves series of test iteration based on data collection and reduction through computer processing. The designers suggested to have a minimum of 40-50 test cycles. After the detailed discussions with the supplier, the optimum tuning time requirement is decided to be 10Hrs continuously in a day for 10 days, which facilitates a minimum of 20 test with different combinations of combustion with mills. The load during the testing time should be at full capacity.

1. Requiring minimum schedule of 750MW in stage-II, Dadri - for 10 hrs continuously in a day for 10 days (Presently Technical minimum schedule is 510MW which excludes AGC of 50MW).

2. During the testing time (10 Hrs continuously in a day), AGC for unit-5 shall be made off.
3. During the testing time (10 Hrs continuously in a day), SCED for stage-II should be excluded

**Alternatively:**

1. Unit- 6 may be given under reserve shutdown keeping Unit-5 schedule full (465 MW) - for 10Hrs continuously in a day for 10 days.
2. SCED for stage-II should be excluded.
3. AGC shall be made off in Unit-5 during the testing.

**Members may deliberate.**

**AA.5. Mismatch in real time data at SLDC and data used for deviation charges account**

A meeting was held on 28.05.2018 at CERC for determination of deviation charges. Minutes of meeting is enclosed at **Annexure-AA.5**.

In the meeting it was decided that the representatives of Haryana & Punjab shall share the latest data with NRPC and also the details of stations/ locations where problems are faced. NRPC was also requested to take up issue at NRPC level and if it still remains unresolved, NRPC may write to CERC, updating the status & action expected from CERC.

**In compliance to the above, Haryana and Punjab SLDC are requested to share the latest data so that CERC could be intimated in this regard.**

| S. No | Element Name                 | Type | Voltage Level | Owner  | Outage     |       | Revival    |       | Reason / Remarks                                                                                                                                                                                                       | Category As per CEA Grid Standard |
|-------|------------------------------|------|---------------|--------|------------|-------|------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
|       |                              |      |               |        | Date       | Time  | Date       | Time  |                                                                                                                                                                                                                        |                                   |
| 1     | Balia-Patna 1                | Line | 400 kV        | PGCIL  | 06-12-2019 | 15:11 | 06-12-2019 | 17:14 | Phase to earth faultB-N fault.Fault distance 145.3 km from Balia. Fault current 3.46 kA                                                                                                                                |                                   |
| 2     | Balia-Patna 4                | Line | 400 kV        | PGCIL  | 06-12-2019 | 15:11 | *          | *     | Phase to earth faultR-N fault.Fault distance 103.2 km from Balia. Fault current 5.246 kA                                                                                                                               | GI-2                              |
| 3     | Balia 400 kV Bus 1           | BUS  | 400 kV        | PGCIL  | 06-12-2019 | 15:11 | 06-12-2019 | 15:57 | LBB/ Bus Bar Protection operated due to stucked main CB of 400 kV Balia-Patna ckt-4                                                                                                                                    |                                   |
| 4     | Balia-Biharsharif 1          | Line | 400 kV        | PGCIL  | 06-12-2019 | 15:24 | 06-12-2019 | 18:57 | Phase to earth faultY-N fault.Fault distance 143 km from Balia. Fault current 3.5 kA                                                                                                                                   |                                   |
| 5     | Balia-Biharsharif 2          | Line | 400 kV        | PGCIL  | 06-12-2019 | 15:57 | *          | *     | Phase to earth faultR-N fault.Fault distance 181.03 km from Balia. Fault current 2.96 kA                                                                                                                               |                                   |
| 6     | Varanasi-Biharsharif 2       | Line | 400 kV        | PGCIL  | 06-12-2019 | 16:42 | 06-12-2019 | 18:18 | Tripped on B-N fault, Fault distance is 181.32km from Varanasi end, Fault current is 2.96kA                                                                                                                            |                                   |
| 7     | Agra-Sikar ckt-1             | Line | 400 kV        | PGCIL  | 06-12-2019 | 17:01 | *          | *     | Tripped on Y-N fault, Fault distance is 274km from Agra end, Fault current is 1.7kA                                                                                                                                    | GI-2                              |
| 8     | Agra-Sikar ckt-2             | Line | 400 kV        | PGCIL  | 06-12-2019 | 17:01 | *          | *     | Tripped on Y-N fault, Fault distance is 248km from Agra end, Fault current is 1.86kA                                                                                                                                   |                                   |
| 9     | Alwar II-Hindaun II -1       | Line | 400 kV        | RRVPL  | 06-12-2019 | 17:05 | 06-12-2019 | 17:53 | Tripped on R-N fault, Fault distance is 73.27km from Alwar end, Fault current is 3.11kA                                                                                                                                |                                   |
| 10    | Bhiwadi-Hisar                | Line | 400 kV        | PGCIL  | 06-12-2019 | 18:03 | 06-12-2019 | 22:20 | Phase to earth faultDue to OPGW of between loc no. 8 --9 of 400 kv bhiwadi - kotputli line has been broken in heavy wind storm. Tripped on B-N fault, Fault distance is 199.8km from Hisar end, Fault current is 2.4kA |                                   |
| 11    | Meerut - Moga                | Line | 765 kV        | PGCIL  | 06-12-2019 | 18:12 | 06-12-2019 | 19:12 | Phase to earth faultY-N, FD=15.6km from meerut end,FC=3.3KA                                                                                                                                                            |                                   |
| 12    | Gurgaon-Manesar 1            | Line | 400 kV        | PGCIL  | 06-12-2019 | 18:23 | 06-12-2019 | 22:38 | R-N fault, FD=2.4km,FC=24.3KA                                                                                                                                                                                          |                                   |
| 13    | Patiala-Patran               | Line | 400 kV        | PGCIL  | 06-12-2019 | 18:23 | 06-12-2019 | 19:39 | Y-N fault                                                                                                                                                                                                              |                                   |
| 14    | Ballabhgarh-Tuglaqabad ckt-2 | Line | 400 kV        | PGCIL  | 06-12-2019 | 18:24 | *          | *     | Tripped on B-N fault, Fault distance is 22.6km from Tughlakabad end, Fault current is 8.3kA                                                                                                                            |                                   |
| 15    | Ludhiana-Koldam ckt-1        | Line | 400 kV        | PGCIL  | 06-12-2019 | 18:38 | *          | *     | Tripped on Y-B fault, Fault distance is 29.8km from Ludhiana end, Fault current is 13kA                                                                                                                                |                                   |
| 16    | Ludhiana-Koldam ckt-2        | Line | 400 kV        | PGCIL  | 06-12-2019 | 19:14 | *          | *     | Tripped on R-N fault, Fault distance is 151km from Ludhiana end, Fault current is 3kA                                                                                                                                  |                                   |
| 17    | Tanda-Sultanpur              | Line | 400 kV        | UPPTCL | 06-12-2019 | 19:14 | 06-12-2019 | 22:07 | Due to heavy sparking and melting TB (terminal block) of bus bar protection panel at 400kV substation sultanpur                                                                                                        |                                   |
| 18    | Jind-Kirori 2(HVPNL)         | Line | 400 kV        | HVPNL  | 06-12-2019 | 19:40 | *          | *     | Phase to phase faultY-B phase, FD=35km from kirori end,FC=6.7KA                                                                                                                                                        |                                   |
| 19    | Jind(PG)-Kurukshetra(PG) 2   | Line | 400 kV        | PGCIL  | 06-12-2019 | 19:50 | 06-12-2019 | 22:09 | B-N fault                                                                                                                                                                                                              |                                   |
| 20    | Muzaffarnagar 315 MVA ICT 2  | ICT  | 400/220 kV    | UPPTCL | 06-12-2019 | 19:58 | 06-12-2019 | 22:50 | Buchholz Relay operated                                                                                                                                                                                                |                                   |
| 21    | Bhiwadi-Kotputli             | Line | 400 kV        | PGCIL  | 06-12-2019 | 20:33 | 06-12-2019 | 22:23 | Due to OPGW of between loc no. 8 --9 of 400 kv bhiwadi - kotputli line has been broken in heavy wind storm                                                                                                             |                                   |
| 22    | 400kV Jhatikara-Mundka 2     | Line | 400 kV        | Delhi  | 06-12-2019 | 19:10 | *          | *     | Manually opened due to Y-Ph conductor damaged at Mundka end                                                                                                                                                            |                                   |



Our Ref : JPL/NRPC/FD/09836

Date : June 12, 2019

**The Member Secretary**

**Northern Regional Power Committee**

18-A, Shaheed Jeet Singh Marg, Katwaria Sarai  
New Delhi -110016

**Subject: Stabilization period for Flue Gas Desulphurization (FGD) Units**

Dear Sir,

This is in relation to the 158<sup>th</sup> OCC meeting held at NRPC office on April 23, 2019 to discuss various issues including the status of installation and operation of FGD in various power plants. In course of the meeting, JPL provided brief status of its FGD which is in operation since February 1, 2019 as per the phasing plan released by CEA. Whilst JPL mostly meet the Environment Norm for SO<sub>x</sub> < 200mg/Nm<sup>3</sup> on continuous real time basis, due to various operational issues faced in newly re-commissioned FGD, at times, JPL has to either shut down its units or reduced the load to rectify the issue in FGD area if there is any exceedance in parameters.

During this meeting, JPL has also highlighted various operational issues which have been faced to achieve the continuous operation of its installed FGD and meeting Environment norms of < 200 mg/Nm<sup>3</sup> on the real time continuous basis. It is pertinent to note that all these issues being faced are operational in nature and owing to new operation of FGD in India for which much of expertise is not available in Indian market. In house manpower is being trained on operating the newly commissioned FGD system. New O&M issues are faced on daily basis and are being resolved on real time basis.

**Various issue which are general in nature are highlighted below:**

1. Inconsistent lime-stone quality: Variation in quality of lime-stone used in FGD leads to frequent deviation in FGD operational parameters
2. In initial stabilization stage, frequent cleaning of Absorber tower, its nozzle and de-mister system is required. This requires shut down of FGD and thus the plant need to be stopped.
3. Wide variation of Sulphur % in coal materialized from various CIL subsidiaries, this leads to sudden exceedance in SO<sub>x</sub> and plant load has to be reduced to comply with norms.
4. The acid content of the produced by-product is very corrosive in nature leading to frequent damages to analysers. This leads to either abnormally high/low value of SO<sub>x</sub> being reported and a non-compliance from real time operation. In these cases, either units have to be shut down or load has to be reduced to meet the norms.
5. More frequent shutdown of FGD equipment like RC pumps, De-mister in initial stabilization phase and may led to unwanted exceedance.
6. **FGD operating regime during start-up/shutdown:** Currently, there are no standard guidelines for thermal power plants to meet the norms while operating FGD during (Unit) start-up/shutdown

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A Member of CLP Group





7. No operational expertise in market for FGD operation and maintenance manpower. It leads to more time is rectification of O&M issues in initial period and led to unwanted exceedance and not meeting the norms.

**NRPC/ CEA intervention requirement** is in following area.

1. At least 3 years of stabilization period to be allowed after date of commissioning. In the first year the power plant may be required to ensure FGD availability at 70% of the plant availability, in the second year 80% of the plant availability and in the third year availability should be 90% of the plant availability.

After 3<sup>rd</sup> year Plants should be considered fully complying with the norms provided it operated FGD more than 95% of Plant availability

2. **No clarity on EC norms adherence:** There is a need to clarifying the terms on which Sox emission norms must be met. While, controlling Sox emission less than 200mg/NM3 could be guiding parameter, this cannot be met on continuous basis.

JPL propose that, annual ceiling emission target at the normative Plant load factor of 80%, with FGD availability of 70/80/90/95% burning Indian coal having an average Sulphur (say 0.5%) may be fixed for each power plant. If cumulative annual quantity of SO<sub>x</sub> is within the ceiling limit, the power station should be considered as fully compliant with the emission norms. As per CLP experience in other countries, compliance in meeting the norms on annual basis like in Hong Kong and European countries

3. CEA to propose to MOEF&CC the standard operating guideline for thermal power plant's which also includes the FGD operating regime during start up and shutdown conditions. Minimum [24h] stabilization time should be given post reaching to full/stable load for meeting the SO<sub>2</sub> norms.

JPL is the first power plant to operate its FGD after the new environmental norms have been ratified and is currently the only power plant in the northern region. Soon numerous of power-plants throughout India will have newly installed FGD facing similar teething troubles. If these power plants are required to shut down units each time there is a problem with FGD, the whole power supply scenario in the country may become very unpredictable, it may result in grid disturbances also.

JPL request NRPC offices to consider various operational issues highlighted above and request CEA for intervention in way forward to key issues mention above. This can be benefits to all stakeholders when they will actual start of operation of FGD plant and required compliance to be met as per phasing plan.

We solicit your cooperation in this regard.

Thanking You,

Yours Sincerely,

**For Jhajar Power Limited**

  
**Karunakar Jha**

**General Manager, Commercial**



# भारत का राजपत्र The Gazette of India

असाधारण

EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (ii)

PART II—Section 3—Sub-section (ii)

प्राधिकार से प्रकाशित

PUBLISHED BY AUTHORITY

सं. 2620]

नई दिल्ली, मंगलवार, दिसम्बर 8, 2015/अग्रहायण 17, 1937

No. 2620]

NEW DELHI, TUESDAY, DECEMBER 8, 2015/AGRAHAYANA 17, 1937

**पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय****अधिसूचना**

नई दिल्ली, 7 दिसम्बर, 2015

**का.आ. 3305(अ).**— केंद्रीय सरकार, पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का 29) की धारा 6 और धारा 25 द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए पर्यावरण (संरक्षण) नियम, 1986 का और संशोधन करने के लिए निम्नलिखित नियम बनाती है, अर्थात् :—

1.(1) इन नियमों का संक्षिप्त नाम पर्यावरण (संरक्षण) संशोधन नियम, 2015 है।

(2) ये उनके राजपत्र में प्रकाशन की तारीख को प्रवृत्त होंगे।

2. पर्यावरण (संरक्षण) नियम, 1986 की अनुसूची 1 में,—

(क) क्रम सं. 5 और उससे संबंधित प्रविष्टियों के स्थान पर निम्नलिखित क्रम सं. और प्रविष्टियां अंतःस्थापित की जाएंगी, अर्थात् :—

| क्रम सं. | उद्योग                                 | मापदंड   | मानक                                                                                                                                                                                                               |
|----------|----------------------------------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | 2                                      | 3        | 4                                                                                                                                                                                                                  |
| 5क       | ताप विद्युत संयंत्र<br>(जल उपभोग सीमा) | जल उपभोग | 1. एक बार शीतलन (ओटीसी) के माध्यम से सभी संयंत्र शीतलन टावरों (सीटी) को प्रतिष्ठापित करेंगे और अधिसूचना की तारीख से दो वर्ष की अवधि के भीतर अधिकतम 3.5m <sup>3</sup> /MWh के विनिर्दिष्ट जल उपभोग को हासिल करेंगे। |

|  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--|--|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |  |  | <p>II. सभी विद्यमान सीटी-आधारित संयंत्र <math>3.5\text{m}^3/\text{MWh}</math> इस अधिसूचना के प्रकाशन की तारीख से दो वर्ष के भीतर अधिकतम <math>3.5\text{m}^3/\text{MWh}</math> तक के विनिर्दिष्ट जल उपभोग को कम करेंगे।</p> <p>III. जनवरी, 2017 के पश्चात् प्रतिष्ठापित किए जाने वाले नए संयंत्र अधिकतम <math>2.5\text{m}^3/\text{MWh}</math> तक के विनिर्दिष्ट जल उपभोग को पूरा करेंगे और शून्य जल दुर्व्यय को हासिल करेंगे।</p> |
|--|--|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

(ख) क्रम सं. 25 और उससे संबंधित प्रविष्टियों के पश्चात् निम्नलिखित क्रम सं. और प्रविष्टियां रखी जाएंगी, अर्थात्:—

| क्रम सं. | उद्योग | मापदंड                                                                     | मानक                                                                                                                                           |
|----------|--------|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | 2      | 3                                                                          | 4                                                                                                                                              |
|          |        | विवक्त पदार्थ                                                              | $100\text{ mg/Nm}^3$                                                                                                                           |
|          |        | सल्फर डायोक्साइड ( $\text{SO}_2$ )                                         | $600\text{ mg/Nm}^3$ (500 मेगावाट से कम क्षमता की इकाईयों से लघु इकाईयां)<br>$200\text{ mg/Nm}^3$ (500 मेगावाट और उससे अधिक क्षमता की इकाईयां) |
|          |        | नाइट्रोजन के आक्साइड ( $\text{NO}_x$ )                                     | $300\text{ mg/Nm}^3$                                                                                                                           |
|          |        | पारा (Hg)                                                                  | $0.03\text{ mg/Nm}^3$ (500 मेगावाट और उससे अधिक क्षमता की इकाईयां)                                                                             |
|          |        | 1 जनवरी, 2003 के पश्चात् 31 दिसंबर, 2016* तक प्रतिष्ठापित टीपीपी (इकाईयां) |                                                                                                                                                |
|          |        | विवक्त पदार्थ                                                              | $50\text{ mg/Nm}^3$                                                                                                                            |
|          |        | सल्फर डायोक्साइड ( $\text{SO}_2$ )                                         | $600\text{ mg/Nm}^3$ (500 मेगावाट से कम क्षमता की इकाईयों से लघु इकाईयां)<br>$200\text{ mg/Nm}^3$ (500 मेगावाट और उससे अधिक क्षमता की इकाईयां) |
|          |        | नाइट्रोजन के आक्साइड ( $\text{NO}_x$ )                                     | $300\text{ mg/Nm}^3$                                                                                                                           |
|          |        | पारा (Hg)                                                                  | $0.03\text{ mg/Nm}^3$                                                                                                                          |
|          |        | 1 जनवरी, 2017** से प्रतिष्ठापित टीपीपी (इकाईयां)                           |                                                                                                                                                |
|          |        | विवक्त पदार्थ                                                              | $30\text{ mg/Nm}^3$                                                                                                                            |
|          |        | सल्फर डायोक्साइड ( $\text{SO}_2$ )                                         | $100\text{ mg/Nm}^3$                                                                                                                           |
|          |        | नाइट्रोजन के आक्साइड                                                       | $100\text{ mg/Nm}^3$                                                                                                                           |

|  |            |                         |
|--|------------|-------------------------|
|  | (NOx)      |                         |
|  | पारा ( Hg) | 0.03 mg/Nm <sup>3</sup> |

\* टीपीपी (इकाईयां) इस अधिसूचना के प्रकाशन की तारीख से दो वर्ष के भीतर परिसीमाओं को पूरा करेंगी।

\*\* इसके अंतर्गत सभी टीपीपी (इकाईयां) हैं, जिन्हें पर्यावरणीय निकासी प्रदान की गई है और संनिर्माण के अधीन है।

[फा. सं. क्यू-15017/40/2007-सीपीडब्ल्यू]

डा. राशिद हसन, सलाहकार

**टिप्पण :-** मूल नियम भारत के राजपत्र, असाधारण, भाग II, खंड 3, उपखंड (ii) में सं. का.आ. 844(अ) 19 नवंबर, 1986 द्वारा प्रकाशित किए गए थे और उनका पश्चातवर्ती का.आ. 433(अ) तारीख 18 अप्रैल, 1987 ; सा.का.नि. 176(अ) तारीख 2 अप्रैल, 1996; सा.का.नि. 97 (अ), तारीख 18 फरवरी, 2009 ; सा.का.नि. 149(अ) तारीख 4 मार्च, 2009 ; सा.का.नि. 543(अ) तारीख 22 जुलाई, 2009 ; सा.का.नि. 739(अ) तारीख 9 सितम्बर, 2010 ; सा.का.नि. 809(अ) तारीख 4 अक्टूबर, 2010, सा.का.नि. 215(अ) तारीख 15 मार्च, 2011 ; सा.का.नि. 221(अ) तारीख 18 मार्च, 2011 ; सा.का.नि. 354(अ) तारीख 2 मई, 2011 ; सा.का.नि. 424(अ) तारीख 1 जून, 2011 ; सा.का.नि. 446(अ) तारीख 13 जून, 2011 ; सा.का.नि. 152(अ) तारीख 16 मार्च, 2012 ; सा.का.नि. 266(अ) तारीख 30 मार्च, 2012 ; सा.का.नि. 277(अ) तारीख 31 मार्च, 2012; सा.का.नि. 820(अ) तारीख 9 नवम्बर, 2012 ; सा.का.नि. 176(अ) तारीख 18 मार्च, 2013 ; सा.का.नि. 535(अ) तारीख 7 अगस्त, 2013 ; सा.का.नि. 771(अ) तारीख 11 दिसम्बर, 2013 ; सा.का.नि. 2(अ) तारीख 2 जनवरी, 2014 ; सा.का.नि. 229(अ) तारीख 28 मार्च, 2014 ; सा.का.नि. 232(अ) तारीख 31 मार्च, 2014 ; सा.का.नि. 325(अ) तारीख 7 मई, 2014, सा.का.नि. 612(अ) तारीख 25 अगस्त, 2014 और अन्तिम संशोधन सा.का.नि. 789(अ) तारीख 11 नवम्बर, 2014 किया गया था।

## MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

### NOTIFICATION

New Delhi, the 7th December, 2015

**S.O. 3305(E).—** In exercise of the powers conferred by sections 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government hereby makes the following rules further to amend the Environment (Protection) Rules, 1986, namely:—

1. (1) These rules may be called the Environment (Protection) Amendment Rules, 2015.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. In the Environment (Protection) Rules, 1986, in Schedule – I, -

(a) after serial number 5 and entries relating thereto, the following serial number and entries shall be inserted, namely:—

| Sr. No. | Industry                                      | Parameter         | Standards                                                                                                                                                                    |
|---------|-----------------------------------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | 2                                             | 3                 | 4                                                                                                                                                                            |
| “5A.    | Thermal Power Plant (Water consumption limit) | Water consumption | I. All plants with Once Through Cooling (OTC) shall install Cooling Tower (CT) and achieve specific water consumption upto maximum of 3.5m <sup>3</sup> /MWh within a period |

|  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |  |  | <p>of two years from the date of publication of this notification.</p> <p><b>II.</b> All existing CT-based plants reduce specific water consumption upto maximum of 3.5m<sup>3</sup>/MWh within a period of two years from the date of publication of this notification.</p> <p><b>III.</b> New plants to be installed after 1<sup>st</sup> January, 2017 shall have to meet specific water consumption upto maximum of 2.5 m<sup>3</sup>/MWh and achieve zero waste water discharged”;</p> |
|--|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

(b) for serial number 25, and the entries related thereto, the following serial number and entries shall be substituted, namely:-

| Sr. No. | Industry            | Parameter                                                                                              | Standards                                                                                                                                 |
|---------|---------------------|--------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | 2                   | 3                                                                                                      | 4                                                                                                                                         |
| "25.    | Thermal Power Plant | <b>TPPs ( units) installed before 31<sup>st</sup> December, 2003*</b>                                  |                                                                                                                                           |
|         |                     | Particulate Matter                                                                                     | 100 mg/Nm <sup>3</sup>                                                                                                                    |
|         |                     | Sulphur Dioxide ( SO <sub>2</sub> )                                                                    | 600 mg/Nm <sup>3</sup> (Units Smaller than 500MW capacity units)<br>200 mg/Nm <sup>3</sup> (for units having capacity of 500MW and above) |
|         |                     | Oxides of Nitrogen ( NO <sub>x</sub> )                                                                 | 600 mg/Nm <sup>3</sup>                                                                                                                    |
|         |                     | Mercury ( Hg)                                                                                          | 0.03 mg/Nm <sup>3</sup> (for units having capacity of 500MW and above)                                                                    |
|         |                     | <b>TPPs ( units) installed after 1<sup>st</sup> January,2003, upto 31<sup>st</sup> December, 2016*</b> |                                                                                                                                           |
|         |                     | Particulate Matter                                                                                     | 50 mg/Nm <sup>3</sup>                                                                                                                     |
|         |                     | Sulphur Dioxide (SO <sub>2</sub> )                                                                     | 600 mg/Nm <sup>3</sup> (Units Smaller than 500MW capacity units)<br>200 mg/Nm <sup>3</sup> (for units having capacity of 500MW and above) |
|         |                     | Oxides of Nitrogen ( NO <sub>x</sub> )                                                                 | 300 mg/Nm <sup>3</sup>                                                                                                                    |
|         |                     | Mercury ( Hg)                                                                                          | 0.03 mg/Nm <sup>3</sup>                                                                                                                   |
|         |                     | <b>TPPs ( units) to be installed from 1<sup>st</sup> January, 2017**</b>                               |                                                                                                                                           |
|         |                     | Particulate Matter                                                                                     | 30 mg/Nm <sup>3</sup>                                                                                                                     |
|         |                     | Sulphur Dioxide (SO <sub>2</sub> )                                                                     | 100 mg/Nm <sup>3</sup>                                                                                                                    |
|         |                     | Oxides of Nitrogen ( NO <sub>x</sub> )                                                                 | 100 mg/Nm <sup>3</sup>                                                                                                                    |
|         |                     | Mercury ( Hg)                                                                                          | 0.03 mg/Nm <sup>3</sup>                                                                                                                   |

\*TPPs (units) shall meet the limits within two years from date of publication of this notification.

\*\*Includes all the TPPs (units) which have been accorded environmental clearance and are under construction”.

[F. No. Q-15017/40/2007-CPW]

Dr. RASHID HASAN, Advisor

**Note:** - The principal rules were published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i) *vide* number S.O. 844(E), dated the 19<sup>th</sup> November, 1986 and subsequently amended *vide* the following notifications:—

S.O. 433(E), dated 18<sup>th</sup> April 1987; G.S.R. 176(E) dated 2<sup>nd</sup> April, 1996; G.S.R. 97(E), dated the 18<sup>th</sup> February, 2009; G.S.R. 149(E), dated the 4<sup>th</sup> March, 2009; G.S.R. 543(E), dated 22<sup>nd</sup> July, 2009; G.S.R. 739(E), dated the 9<sup>th</sup> September, 2010; G.S.R. 809(E), dated, the 4<sup>th</sup> October, 2010; G.S.R. 215(E), dated the 15<sup>th</sup> March, 2011; G.S.R. 221(E), dated the 18<sup>th</sup> March, 2011; G.S.R. 354(E), dated the 2<sup>nd</sup> May, 2011; G.S.R. 424(E), dated the 1<sup>st</sup> June, 2011; G.S.R. 446(E), dated the 13<sup>th</sup> June, 2011; G.S.R. 152(E), dated the 16<sup>th</sup> March, 2012; G.S.R. 266(E), dated the 30<sup>th</sup> March, 2012; and G.S.R. 277(E), dated the 31<sup>st</sup> March, 2012; and G.S.R. 820(E), dated the 9<sup>th</sup> November, 2012; G.S.R. 176(E), dated the 18<sup>th</sup> March, 2013; G.S.R. 535(E), dated the 7<sup>th</sup> August, 2013; G.S.R. 771(E), dated the 11<sup>th</sup> December, 2013; G.S.R. 2(E), dated the 2<sup>nd</sup> January, 2014; G.S.R. 229(E), dated the 28<sup>th</sup> March, 2014; G.S.R. 232(E), dated the 31<sup>st</sup> March, 2014; G.S.R. 325(E), dated the 07<sup>th</sup> May, 2014, G.S.R. 612(E), dated the 25<sup>th</sup> August, 2014 and lastly amended *vide* notification G.S.R. 789(E), dated 11<sup>th</sup> November, 2014.





**केन्द्रीय प्रदूषण नियंत्रण बोर्ड**  
**CENTRAL POLLUTION CONTROL BOARD**  
 पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय भारत सरकार  
 MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE GOVT. OF INDIA

SPEED POST

B-33014/07/2017-18/IPC-II/TPP/

December 11, 2017

To

Dadri Thermal Power Station (NCTPS)  
 National thermal Power corporation  
 Dadri, Dist: Gautambudhnagar-201008; U.P

Sub: Directions under Section 5 of the Environment (Protection) Act, 1986 regarding compliance of emission limit notified vide notification No.S.O.3305 (E) dated 07.12.2015 - reg.

WHEREAS, taking into consideration pollution from thermal power plants, Ministry of Environment, Forest & Climate Change had issued notification in the year 1984 laying out standards for thermal power plants. Further, the stack height regulation was notified in the year 1989 and effluent standard for thermal power plants was notified in the year 1986. The revised temperature limit of discharge of cooling water from the plants was notified in the year 1999 and thereafter use of beneficiated coal in the plants was issued in June 2002. The fly ash utilization notification was also issued on 14th September, 1999 and amended in the year 2003 and 2009. Thereafter, MoEF&CC vide Notification No. S.O.3305(E) dated 07.12.2015 has amended emission limit for particulate matter and notified new limits for Sulphur dioxide (SO<sub>2</sub>), Oxides of Nitrogen (NO<sub>x</sub>) and mercury emission, and water consumption limit for coal/lignite based thermal power plants. As per the notification dated 07.12.2015, thermal power plants are required to achieve the notified limit within two years from the date of the notification i.e. by 07.12.2017;

WHEREAS, with the implementation of the amendment dated 07.12.2015, it is expected that there would be reduction in emission of PM, Sulphur dioxide and oxide of Nitrogen, which in turn will help in improvement in Ambient Air Quality in and around thermal power plants, besides reduction of mercury emission and water use in the thermal power plants will reduce;

WHEREAS, in the meeting on Coal Washeries (Environment & Forest Clearances) and Emission Norms for Thermal Power Plants chaired by the Hon'ble Minister of Environment, Forest & Climate Change and Minister of Power, Coal & Renewable Energy on June 08, 2016, it was decided that a committee comprising representatives from MoEF & CC, Ministry of Power (MoP), Central electricity Authority (CEA), Ministry of Coal (MoC), Power Grid Corporation of India Limited (PGCI) and Central Pollution Control Board (CPCB) may be constituted to look into the all issues related to implementation of norms;

WHEREAS, following decisions were taken in the meeting:

1  
Dadri Thermal Power Station (NCTPS)

‘परिवेश भवन’ पूर्वी अर्जुन नगर, दिल्ली-110032

Parivesh Bhawan, East Arjun Nagar, Delhi-110032

दूरभाष/Tel : 43102030, 22305792, वेबसाइट/Website : www.cpcb.nic.in



1. MoP/CEA shall submit action plan by December 2016 for phasing out of the power plants commissioned before December, 2003.
2. MoP / CEA shall submit action plan by December, 2016 in respect of power plants commissioned during January, 2004 to December, 2016 indicating unit wise retrofit / renovation for each power plant. The implementation of action plan shall be taken up in backward manner starting from the plants commissioned in the 2015 and the shall be completed by 15.08.2022
3. MoP and CEA shall coordinate with each State Public Sector Undertakings separately for submission of action plan by December, 2016 for all the power plants.

WHEREAS, it was further decided that MoP shall take action for installation of Flue gas Desulphurisation (FGD) if needed to achieve prescribed SO<sub>2</sub> norms based on the SO<sub>2</sub> emission levels from power plants;

WHEREAS, it was also pointed out that NO<sub>x</sub> control technology in case of Indian coal is not established. Selective Catalytic Reduction (SCR) technology is used for NO<sub>x</sub> control, however, its feasibility for Indian coal needs to be established. MoP suggested that Pilot studies may be taken up in two plants and based on the results, further action plan to be drawn regarding retrofitting of SCR in plants to achieve prescribed NO<sub>x</sub> norms;

WHEREAS, the MoP constituted a committee under the Chairmanship of Chairman, Central Electricity Authority (CEA) on 21.09.2016 to prepare an action plan for implementation of new emission limits;

WHEREAS, to ensure compliance of the new emission norms the MOEF&CC convened a meeting on 23.05.2017 in which CEA, NTPC and the Central Pollution Control Board participated;

WHEREAS, the MOEF&CC received a letter from Secretary Ministry of Power *vide* their D.O. letter No. FU-1/2016-IPC dated 30<sup>th</sup> June, 2017 indicating the concerns of various thermal power plants in the country with regard to the compliance with the new emission norms for the thermal power plants notified on 7.12.2015 particularly w.r.t. Particulate Matter (PM), Sulphur dioxide (SO<sub>2</sub>) & Oxides of Nitrogen (NO<sub>x</sub>);

WHEREAS, it was noted that out of present 196667 MW installed capacity, about 60 % capacity (1,15,214 MW) meets the new PM norms with existing ESP installations. Remaining capacity of 64,334 MW which does not meet the new environmental norms regarding PM, requiring retrofitting additional fields in Electrostatic Precipitator (ESP)/replacement of ESP in existing plants to meet the new emission norms of PM;

WHEREAS, Ministry of Power after consultation with Central electricity Authority informed that retrofitting additional fields in ESP/replacement of ESP in existing plants will need complete shutdown of 4-6 months for each unit;

2  
Dadri Thermal Power Station (NCTPS)

WHEREAS, in order to meet SO<sub>2</sub> emission norms, FGD system shall be required to be installed in all plants. MoP informed that about 30-36 months required for design & engineering, approvals, funds arrangements, tendering, erection and commissioning of FGD. Besides, planned shutdown will be required as all plants cannot be shut down simultaneously. Another challenge highlighted for installation of FGD was availability of technologies/suppliers. In addition, issues relating to availability of good quality lime stone for operation of FGD and disposal of Gypsum to run the FGD in existing plants were also taken note of;

WHEREAS, the standard of 300 & 100 mg/NM<sup>3</sup> would require installation of Selective Non Catalytic Reduction (SNCR) or Selective Non Catalytic Reduction (SCR). While these technologies are established globally, these are not established for Indian Coal, which has high ash content. Therefore, it was decided to engage various technology vendors to run pilots at NTPC stations to validate technology of SNCR/SCR system for Indian coal;

WHEREAS, the Ministry of Power in the letter dated 30.06.2017 enclosed the report outlining the plan of action for implementation of the new norms keeping in mind the techno-economic feasibility and ensuring availability of power to all at affordable cost without any disruption;

WHEREAS, as per the phasing plan proposed by MOP after consultation with CEA and Regional Power Committees, out of the installed capacity of 1, 87,162 MW ( as on December, 2016), 8217 MW have been identified for retirement/already retired. Further, 12,974 MW of capacity already have either CFBC boilers or FGDs.

WHEREAS, a phasing plan was proposed for the balance 163971 MW of coal based thermal capacity for achieving compliance with 145977 MW capacity proposing installation of FGDs within a period of 7 years to be undertaken in a phased manner. About 3205 MW of coal based capacity was stated to be compliant with revised norms of SO<sub>2</sub> emission;

WHEREAS, it was further noted that approximately about 16789 MW would not be able to install FGDs due to various constraints which include lack of space, etc.;

WHEREAS, CEA has worked out the requirement of capacity of coal based thermal power plants including hydro, wind, solar, gas based units to meet the estimated peak demand of 225 GW in 2021-22;

WHEREAS, MoP suggested that the compliance period of PM for the plants installing FGD may be kept same as per the FGD phasing plan;

WHEREAS, it was requested that for implementation of NO<sub>x</sub> norms in the plants installed before 31.12.2003 a period of three years may be permitted to achieve specified standards of 600 mg/Nm<sup>3</sup>. For other plants a



relaxation of 600 mg/Nm<sup>3</sup> in place of 300 and 100 mg/Nm<sup>3</sup> for a period of 3 years was also requested;

WHEREAS, taking into account the issues/concerns raised by the MoP and the sensitivity involved in the matter as it relates to general public of the country, the Ministry undertook detailed analysis of each of the issues in the meetings held on 06.07.2017, 27.07.2017, 11.08.2017 and 01.09.2017. These meetings were also attended by the various stakeholders including Ministry of Power, CEA, NTPC etc.;

WHEREAS, MOEF & CC in the meeting with MoP, CEA, NTPC & CPCB etc. held on September 1, 2017 decided that the action plan submitted by MoP for 7 years i.e. up to 2024 was too long and it should instead commence from 2018 and implemented by 2022 with respect to all pollutants. It was further suggested that action plan should be revised prioritising the plants located in critically polluted area /close to habitation /urban area. Based on the decisions taken in the meeting Ministry of Power vide letter No. FU-1/2017-IPC dated 13.10.2017 submitted the revised action plan, to implement/phasing FGD installation/ ESP upgradation to meet new emission norms for thermal power plants;

WHEREAS, as per the revised plan submitted by the MoP vide letter dated 13.10.17, 650 units comprising 196667 MW need to meet the new emission limits. Out of 650 units, FGD will be installed to achieve the emission limit of SO<sub>2</sub> by the year 2022 in all 415 units comprising 161522 MW (01 unit by 2018, 08 units by 2019, and 55 units by 2020, 172 units by 2021 and 178 units by 2022, for 01 units with 150 MW capacity plan is not received). Remaining 235 units comprised of 35145 MW either complying with SO<sub>2</sub> emission limits or planned for phasing out;

WHEREAS, ESP upgradation to achieve emission limit of particulate matter will be completed by the year 2022 in PM for 231 units comprising of 65925 MW capacity out of 650 units (01 unit by 2018, 02 units by 2019, 28 units by 2020, 97 units by 2021 and 94 units by 2022, for 09 units of 1400 MW capacity plan by 2022);

WHEREAS, with regard to compliance of emission limit of NO<sub>x</sub>, it is suggested that pre combustion modification such as in situ modification in boiler, installation of Low NO<sub>x</sub> burners and Over Fire Air shall be adopted besides installation of SCR/SNCR systems wherever needed by the year 2022;

WHEREAS, electricity is cleanest form of energy which helps in mitigating house hold air pollution which is matter of concern;

WHEREAS, there is need to provide electricity supply to people who do not yet have access to it;

WHEREAS, taking into consideration the technical challenges and time requirements for installation of FGD and other technologies to meet the new emission limits, the MoEF&CC vide its letter F. No. Q-15017/40/2007-CPW

dated 07.12.2017 has directed CPCB to direct all the thermal power plants to ensure compliance with the norms laid down in the 07.12.2015 notification in accordance with the revised Plan submitted by the Ministry of Power letter dated 13.10.2017 as well as NOx by 2022;

WHEREAS, the Ministry of Environment, Forest & Climate Change, Government of India, vide Notifications No. S. O. 157 (E) of 27.02.1996 and S. O. 730 (E) dated 10.07.2002, has delegated the powers vested under Section 5 of the Environment (Protection) Act, 1986 (29 of 1986) to the Chairman, Central Pollution Control Board, to issue directions to any industry or any local body or any other authority for violations of the standards and rules notified under the Environment (Protection) Rules, 1986 and amendment thereof.

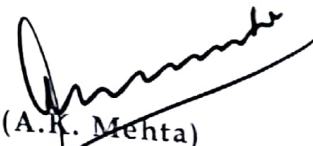
NOW, THEREFORE, taking into consideration all material facts including environmental concerns and ensuring stability of power supply and need for phasing the implementation, in exercise of powers vested under Section 5 of the Environment (Protection) Act, 1986, following directions are issued to M/s Dadri Thermal Power Station (NCTPS), NTPC Ltd. :

- i. That plant shall meet PM emission limit immediately by installing Electrostatic Precipitator.
- ii. That plant shall install FGD by December 31, 2019 in Unit 1,2,3,4,5 & 6 respectively so as to comply SO<sub>2</sub> emission limit.
- iii. That plant shall take immediate measure like installation of low NOx burners, providing Over Fire Air (OFA) etc. and achieve progressive reduction so as to comply NOx emission limit by the year 2019

The time line mentioned above (i to iii) for compliance of PM, SO<sub>2</sub> & NOx emission limits shall be reviewed by CPCB within a period of three months and shall be brought down further considering the location specificity of the plant such as critical polluted area/ closeness to habitation/ urban area.

The time line for compliance of water consumption limit shall also be finalised in consultation of plants

M/s Dadri Thermal Power Station (NCTPS), NTPC Ltd shall ensure compliance of directions mentioned above (i to iii) failing which action will be taken under the appropriate provisions of the Environment (Protection) Act, 1986.

  
(A.K. Mehta)  
Chairman  


**CENTRAL ELECTRICITY REGULATORY COMMISSION**  
**3<sup>rd</sup> & 4<sup>th</sup> Floor, Chanderlok Building, 36, Janpath, New Delhi-110001**

Date: 13.2.2019

**Subject:** Minutes of 2<sup>nd</sup> Meeting on Real time data at SLDC vs data used for deviation charges accounts.

Please find enclosed the minutes of meeting for the 2nd meeting regarding real time data at SLDC vs data used for deviation charges accounts held on 28.5.2018 at CERC.

2. You are requested to comply the direction as per minutes.



(Sanoj Kumar Jha)  
Secretary, CERC

Encl: As per mailing list

1. Chairman, Haryana Vidyut Prasaran Nigam Limited, Shakti Bhawan, Sector 06, Panchkula - 134109
2. The Chairman cum Managing Director, Punjab State Power Corporation Limited, PSEB Head Office, The Mall, Patiala-147001
3. The Chairman cum Managing Director, Power Grid Corporation of India Limited, Saudamini, Plot No. 2, Sector-29, Gurgaon-122001 (Haryana)
4. The Chairman cum Managing Director, POSOCO, B-9, Qutub Institutional Area, Katwaria sarai, New Delhi-110016
5. Member Secretary, Northern Regional Power Committee, 18-A, Qutab Institutional Area, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110016
6. The Managing Director, Haryana Vidyut Prasaran Nigam Limited (HVPNL) Shakti Bhawan, Sector 6, Panchkula - 134109
7. The Chairman and Managing Director, Punjab State Transmission Corp. Ltd. (PSTCL), Regd. Office, PSEB Head Office, The Mall, Patiala-147001
8. The Chief Engineer, State Load Dispatch Centre, SLDC Complex, PSTCL, Near 220 kV G/Stn, Ablawal, Patiala 147001
9. The Managing Director, State Load Despatch Centre, Haryana, Behind BBMB Power house, Sewah, Panipat, Haryana 132103
10. The Chairman/Managing Director, Haryana Power Purchase Centre (HPPC), Vidyut Sadan, Plot No.C 16, Sector-6, Panchkula-134109, Haryana
11. The Director Distribution, Punjab State Power Corporation Ltd. (PSPCL), The Mall, PSEB head Office, Baradari, Patiala, Punjab-147001



**CENTRAL ELECTRICITY REGULATORY COMMISSION**  
**3<sup>rd</sup> & 4<sup>th</sup> Floor, Chanderlok Building, 36, Janpath, New Delhi-110001**

2<sup>nd</sup> Meeting at CERC: Determination of deviation charges: Real time data at SLDC vs data used for deviation charges accounts.

1. Meeting on above subject was held at CERC, Conference Hall, Upper Ground Floor (Front Side), Chanderlok Building, 36 Janpath, New Delhi on 28.5.2018. The representatives of HVPNL, PSPCL, HPPC, Powergrid, POSOCO, NRPC and Staff of the Commission were present during the meeting. List of participants is at **Annexure-I**.
2. Secretary, CERC welcomed all the participants to the meeting. He informed that meeting has been convened to discuss on the report submitted by the HVPNL, PSPCL and POSOCO in compliance to the minutes of meeting issued dated 30.10.2017.
3. Joint Chief (Engg.), CERC briefed the participants on the issue. She submitted that during the last meeting held on 6.9.2017, Haryana & Punjab representatives had submitted that there is difference in the SEM UI data computed by NRPC vs net SEM UI data computed by SLDC. POSOCO representative during the last meeting has submitted that SCADA and SEM points are different. Further, POSOCO representative had submitted that the main reason of mismatch is communication failure (under PGCIL). In view of these, Powergrid has also been called for the meeting. She further stated that
  - a) HVPNL vide letter dated 16.11.2017 has submitted that out of 102 points (ISTS interface), for 40 no. of points-SEM & SCADA points are same. There is a minor difference in SEM & SCADA data (<1%). Haryana representative may update the latest status of mismatch of SCADA vs SEM data and any other issue. Haryana representative may also state if they still want any action point, keeping in view the difference is less than 1%.
  - b) PSTCL vide letter dated 20.12.2017 has submitted that out of 90 interface points, 88 points are same for SEM & SCADA input. Punjab representative may update the latest status of mismatch of SCADA vs SEM data.
  - c) POSOCO has filed report only for HVPNL. POSOCO may update the status of PSPCL as sought during meeting held on 6.9.2017.
  - d) PGCIL may comment on observation of POSOCO that main reason of mismatch is communication failure (under PGCIL).

- e) POSOCO has also submitted action plan for improvement. Haryana, Punjab and PGCIL representatives may provide its views or any suggestion on the same.
4. Haryana, SLDC representative submitted that 74 points constitute the HVPNL drawl and recently in the month of May, 2018 it has been observed that the difference between SEM & SCADA data has been less than 1%. However, there are few special cases which is created due to telemetry failure, communication or RTU failure where differences observed is higher. He further submitted that SLDC measures only 74 points through SCADA out of 102 SEM points because differences were higher in 102 SEM points as compared to 74 interface points. That's why from operational point of view, they didn't find any merit to disturb the existing arrangement and it should be easily functional to operators, keeping in view grid security and real time operation of the system.
  5. Chief (Engg.), CERC asked Haryana, SLDC representative if they have encountered higher differences at their direct interface point and if they are able to find the reasons for the same? Haryana, SLDC representative replied that at their interface point, differences are higher. The reason is that no. of telemetry have rapidly increased the accuracy class of transducers (0.5) and SEMs (0.25) are altogether different. Also, due to increase in telemetry, RTUs have increased and with the increase in no.s of RTUs the problems may also increase. All 220 kV RTUs are through optical fibres, hence Communication problem is resolved. Further, he also submitted that recently one project was implemented (funded by government) through which Haryana has built 97 nodes and communication problem has been resolved to a large extent.
  6. Secretary, CERC asked to Haryana Discoms whether the differences between the SCADA vs SEM data has decreased and if that is so, to what extent or percentage? Haryana Discom representative submitted that there are still many slots where the deviation is more than and it which is random. He showed the excel file of day wise, slot-wise comparison of drawls for the month of MARCH-18, APRIL-18 & MAY-18 and highlighted the mismatch greater than 100 MW. Presentation by Haryana Discoms is annexed at **Annexure-II**.
  7. Joint Chief (Engg.), CERC asked Haryana, SLDC representative whether the 74 interface points referred, are ISTS drawal points and if they are the same as 102 points where SEM meters are installed. There should not be differences between these 2 points. Haryana, SLDC representative replied that altogether they are not different, but voltage level difference is there. SEM is at lower voltage & 74 points (SCADA) is at higher voltage. She further asked to indicate their suggestion to minimize the differences. He replied that 74 drawal points are considered and it seems ok from operational point of view. However, when distribution representative uses to measure from SEM point slot-wise there is an issue, which can be

elaborated by Discom representative. Discom representative replied that seeing the error quantum, there is still scope for further improvement.

8. Chief (Engg.), CERC suggested that for Discoms to rely upon meters, wherever SEM point are there, discoms should also be given SCADA point nearby SEM point so that they would be able to manage their deviations.
9. GM (SCADA), NRLDC, POSOCO submitted that even if SCADA and SEM point will be same, the no of point will be more, and there will be questions of accumulating these additional points. If the number of points will increase then reliability of telemetry will be affected as there will be increase in unreliable no. of points. If the telemetry fails then more will the probability be of inaccuracies. He further stated that telemetry failure is increasing.
10. NRLDC, POSOCO representative gave a presentation and showed graphical plot for Haryana and Punjab for SEM vs SCADA plot. He submitted that drawal schedule is calculated based on reliably available telemetry points. He submitted that average deviation incase of Haryana for the month of April, 2018 and May, 2018 is less than 3%. He also submitted that comparison on block basis deviation is around 1% on most of the days. Higher deviation is due to telemetry failure. Presentation by POSOCO is annexed at **Annexure-III**.
11. Haryana, Discom representative stated that they have placed work order for setting up their own meters in parallel to the SEM meters present at interface boundary, which will provide them data in real time. Secretary, CERC asked the representative whether meter installation has been started and will these help them in reducing the error? Haryana representative replied that atleast redundancy will increase and if any doubt will be there they can take cognizance of same.
12. PGCIL representative submitted that as regard Communication failure, there may be chances that hardly 2-3 days communication failure can happen in a month. For balance days a bench mark of quantum of total difference can be made and in ideal condition what should be differences is to be fixed and then deliberation can be done.
13. PSPCL, Punjab representative stated that there is still inconsistency in data recorded from SEM & SCADA. Many a times, when they see underdrawl on their meters, they find that there is overdrawal when it is billed. He further submitted that as far as 2017-18 data is considered, as per SCADA they have surrendered 1000 LU i.e they have done underdrawal, however as per SEM they have surrendered only 455 LU and they have to pay Rs. 90 crore.

14. C.E/SLDC, PSTCL stated that they are facing communication failure and for resolving the same they are trying to have alternate route also, so that even if there is one route failure it will have redundancy from other and chances of failure of both are less. Chief (Engg), CERC asked PSTCL representative that out of 90 interface points, 88 points are same for SEM & SCADA input for Punjab, and still error is coming. In such a situation, the only possible reason appears to be error in the metering and that requires calibration. Punjab representative replied that recently they have compared standard meter with RTU & Energy meter of PGCIL and Punjab and they found that there is no calibration issue & calculation is also same problem lies in RTU.
15. Joint Chief (Engg.), CERC stated that overdrawal & underdrawal data is very important for RLDC to take action as RLDC uses such data of inter-State drawalto operate ancillary services.
16. Secretary, CERC asked SLDC representatives as to how will they operate with Discoms real time data which will be made available by Discoms. Further, he suggested that both Discoms & SLDCs should sit together and discuss at RPC forum on what action can be taken on data received by Discoms in real time.
17. Joint Chief (Engg.), CERC asked Powergrid representative about the steps being taken by them to improve the Communication failure & also what is percentage of failure. PGCIL representative replied that around 75-80% stations have been configured on dual path, however OPGW fibre installation is going on. It will still take 1.5-2 yrs for all stations to be configured on dual path & redundant path.
18. Secretary, CERC asked NRPC representative to discuss the issue and find out if any technical issue is to be resolved so that deviation in data can be minimized. NRPC representative stated that U.P Discoms have also recorded problem of deviation and same was examined & a Committee was formed. As per recommendation of Committee, a procedure was also laid down & adopted. He further stated that though overall deviation may be less than 1% but in some of cases and in some lines it is around 25%. He submitted that they have identified 20-25 stations of UP & 10-12 stations of PGCIL, where major deviations were recorded and they have asked them to take action & if there is requirement to change faulty transducers, SEM etc. As a result of these, it was seen that out of initial 25 locations, it is now only 6 locations or so where problem is there and overall deviation has reduced to less than 1%.
19. **Conclusions:**
  - a) It was observed that differences in SEM & SCADA data have decreased from 3% to 1%. It was agreed that error should be reduced further as far as possible.

- b) It was also agreed that the data of the new meter installed by Discoms should be shared with SLDC/RLDCs also so that action can be taken by respective SLDC/RLDCs.
- c) PGCIL was requested to take suitable steps to resolve the issue of telemetry failure & to get suitable backup of communication data.
- d) Representatives of Haryana & Punjab were advised to share the latest data with NRPC and also share the details of stations/locations where problems are faced. NRPC was requested to take up issue at NRPC level and if it still remains unresolved, then NRPC may write to CERC, updating the status & action expected from CERC.

Meeting ended with thanks to the chair.



List of Participants in the Meeting

| Sl.No | Name             | Designation/Organisation   |
|-------|------------------|----------------------------|
| 1     | Sanoj Kumar Jha  | Secretary, CERC            |
| 2     | S.C.Srivastava   | Chief (Engg.), CERC        |
| 3     | Shilpa Agarwal   | Joint Chief (Engg.), CERC  |
| 4     | M.M.Choudhary    | Dy. Chief (Engg.), CERC    |
| 5     | G.Ramanjaneyulu  | Asst. Chief (Engg), CERC   |
| 6     | Gaurav Kumar     | Associate (Engg), CERC     |
| 7     | R.K.Kaushik      | SE/SLDC & C, HVPN          |
| 8     | Rakesh Jolly     | CE/SO & Comml., HVPN       |
| 9     | Arvind Chaudhary | XEN/SO, UHBUN, PKL         |
| 10    | Anupam Katiyar   | SE/SO, UHBVN               |
| 11    | Ashok            | UHBVN                      |
| 12    | Debasis Deo      | GM, NRLDC, POSOCO          |
| 13    | Ankur Gulati     | Dy. Mgr., NRLDC, POSOCO    |
| 14    | A.S.Kushwaha     | G.M(LD&C), Powergrid       |
| 15    | Y.K.Dikshit      | G.M(Engg./ULDC), Powergrid |
| 16    | Dr.Sunita Chohan | DGM (LD&C), Powergrid      |
| 17    | KNM Rao          | Ass.GM, NRPC               |
| 18    | Harmesh Kumar    | CE/SLDC, PSTCL             |
| 19    | Madan Singh      | SE/SLDC, PSTCL             |
| 20    | Iqbal Singh      | ASE, PSPCL                 |
| 21    | Praveen Yadav    | XEN/SO, DHBVN              |
| 22    | S.Goswami        | Sr.Mgr, Tata Power-DDL     |

## MISMATCH BETWEEN THE DRAWL DATA AS LOGGED BY SLDC/PANIPAT AND THAT GENERATED BY THE NRPC FROM METERED DATA

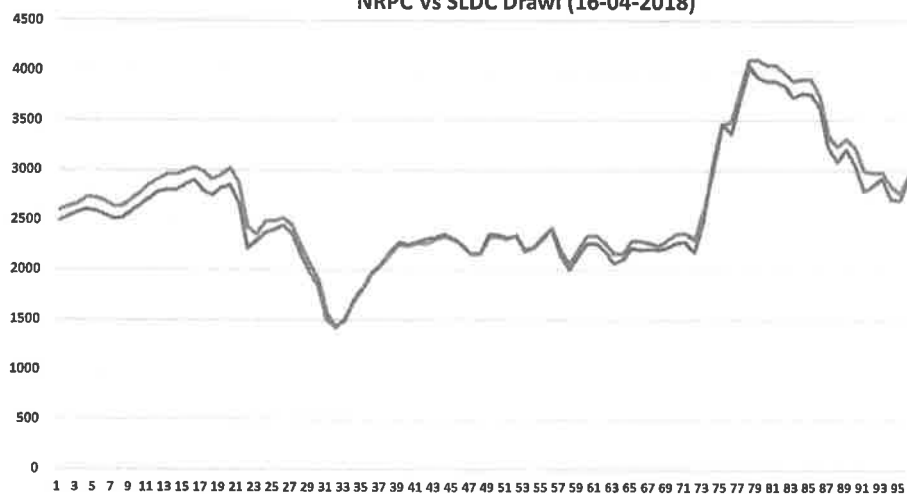
DAY WISE SLOT-WISE COMPARISON OF DRAWLS  
HAS BEEN PREPARED FOR MARCH-18, APRIL-18 &  
MAY-18

MISMATCH GREATER THAN 100MW HAS BEEN  
HIGHLIGHTED

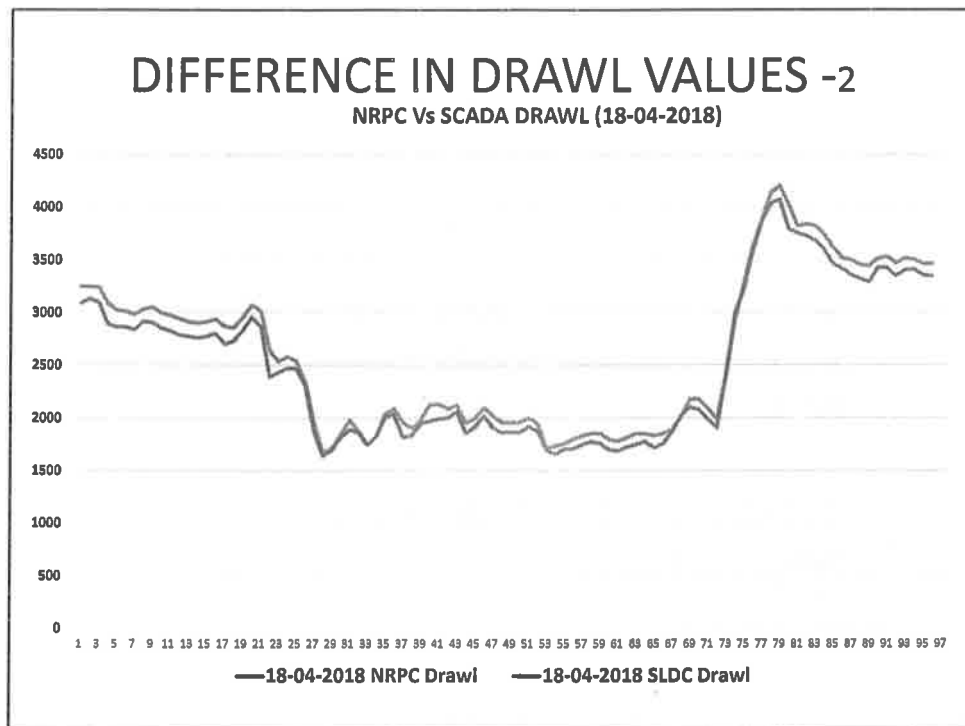
[Link](#)

## DIFFERENCE IN DRAWL VALUES -1

NRPC Vs SLDC Drawl (16-04-2018)



—16-04-2018 NRPC —16-04-2018 SLDC







| SLOT | 01-05-2018 | 02-05-2018 | 03-05-2018 | 04-05-2018 | 05-05-2018 | 06-05-2018 | 07-05-2018 | 08-05-2018 | 09-05-2018 | 10-05-2018 | 11-05-2018 | 12-05-2018 | 13-05-2018 |
|------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 1    | 100        | 162        | 96         | 90         | 139        | 80         | 136        | -100       | -15        | 62         | -47        | -129       | 0          |
| 2    | 93         | 157        | 54         | 110        | 132        | 139        | 175        | -96        | -59        | 17         | 81         | 186        | 91         |
| 3    | 89         | 165        | 100        | 85         | 149        | 90         | 163        | -76        | -28        | 109        | 149        | 60         | 147        |
| 4    | 79         | 150        | 87         | 66         | 148        | 45         | 147        | -33        | 0          | 55         | 156        | 4          | 152        |
| 5    | 89         | 162        | 0          | 72         | 162        | 90         | 145        | 2          | 30         | 49         | 98         | 134        | 155        |
| 6    | 92         | 137        | -50        | 82         | 168        | 160        | 148        | 3          | 23         | 112        | 36         | 21         | 167        |
| 7    | 66         | 137        | -11        | 84         | 121        | 110        | 147        | -32        | 3          | 107        | 38         | 58         | 188        |
| 8    | 75         | 128        | 6          | 61         | 128        | 53         | 133        | 11         | 9          | 98         | 88         | 56         | 166        |
| 9    | 67         | 148        | 4          | 70         | 150        | 99         | 151        | 8          | 24         | 158        | 139        | 12         | 181        |
| 10   | 63         | 133        | 10         | 86         | 143        | 101        | 143        | 13         | 33         | 140        | 62         | 98         | 186        |
| 11   | 87         | 139        | 11         | 70         | 145        | 61         | 126        | 25         | 22         | 127        | 108        | 91         | 161        |
| 12   | 102        | 136        | 5          | 75         | 164        | 132        | 129        | 5          | 8          | 86         | 68         | 121        | 161        |
| 13   | 77         | 127        | -12        | 96         | 107        | 112        | 104        | 36         | 12         | 103        | 76         | 95         | 107        |
| 14   | 87         | 137        | -12        | 75         | 77         | 86         | 127        | 21         | 20         | 129        | 23         | 73         | 84         |
| 15   | 68         | 121        | 4          | 81         | 71         | 96         | 133        | 23         | 12         | 133        | 43         | 59         | 76         |
| 16   | 54         | 105        | -28        | 86         | 78         | 92         | 89         | 29         | 40         | 125        | 64         | 59         | 90         |
| 17   | 150        | 194        | -34        | 99         | 159        | 85         | 109        | 36         | 50         | 124        | 67         | 36         | 105        |
| 18   | 76         | 132        | -26        | 72         | 91         | 76         | 140        | 8          | 19         | 127        | 14         | 55         | 141        |
| 19   | 40         | 157        | -27        | 64         | 74         | 46         | 223        | 22         | 30         | 122        | 62         | 52         | 162        |
| 20   | 36         | 67         | -14        | 80         | 84         | 102        | 130        | -25        | 49         | 119        | 102        | 54         | 237        |
| 21   | 94         | 147        | 35         | 113        | 146        | 160        | 214        | 29         | 134        | 213        | 287        | 176        | 252        |
| 22   | 214        | 172        | 103        | 180        | 224        | 217        | 141        | -2         | 70         | 110        | -35        | 56         | 99         |
| 23   | -56        | -23        | 139        | 50         | 58         | 22         | 27         | 34         | -5         | 110        | 233        | 15         | 105        |
| 24   | 22         | 30         | -9         | 60         | 30         | 28         | 21         | 46         | 12         | 120        | 48         | 122        | 142        |
| 25   | 32         | 51         | -1         | 84         | 71         | 96         | 92         | 72         | 42         | 104        | 12         | 86         | 144        |
| 26   | 9          | 93         | 5          | 67         | 78         | 92         | 123        | 35         | 10         | 65         | 78         | 29         | 174        |
| 27   | 29         | 49         | 83         | 26         | 94         | 140        | 88         | 86         | 21         | 153        | 131        | 99         | 141        |
| 28   | 54         | 32         | 97         | 90         | 70         | 4          | 115        | 89         | -22        | 172        | 145        | 77         | 126        |
| 29   | 52         | 33         | 99         | 55         | 76         | 102        | 152        | -16        | 55         | 122        | 70         | 109        | 149        |
| 30   | 41         | 52         | 88         | 62         | 99         | 56         | 177        | 145        | 38         | 107        | 59         | 18         | 87         |
| 31   | 71         | 70         | 83         | 77         | 94         | 77         | 142        | 61         | -2         | 98         | 69         | -8         | 63         |
| 32   | 60         | 67         | 73         | 67         | 79         | 97         | 79         | 65         | -3         | 105        | 81         | 30         | 56         |
| 33   | 43         | 41         | 87         | 52         | 91         | 103        | 57         | 46         | -13        | 100        | 90         | 140        | 65         |
| 34   | 22         | 36         | 72         | 8          | 85         | 108        | 48         | 50         | -15        | 101        | -18        | 80         | 45         |
| 35   | 35         | 37         | 134        | 30         | 66         | 86         | 69         | -18        | 32         | 82         | 63         | 106        | 97         |
| 36   | 32         | 55         | 70         | 15         | 88         | 121        | 125        | 66         | -39        | 75         | 20         | 48         | 73         |
| 37   | 36         | 51         | 140        | 4          | 77         | 81         | 94         | 20         | -63        | 75         | 40         | 96         | 77         |
| 38   | 48         | 64         | 4          | 49         | 44         | 109        | 102        | 67         | -15        | 32         | 1          | 47         | 47         |
| 39   | 68         | 40         | 43         | 55         | 115        | 80         | 80         | 84         | -36        | 57         | 75         | 63         | 35         |
| 40   | 39         | 54         | 78         | 24         | 91         | 74         | 89         | 36         | 17         | 58         | 97         | 34         | 60         |
| 41   | 54         | 99         | 86         | 29         | 83         | 94         | 104        | 59         | 102        | 77         | 27         | 56         | 83         |
| 42   | 95         | 94         | 70         | 59         | 86         | 113        | 102        | 28         | 2          | 46         | 101        | 66         | 68         |
| 43   | 52         | 62         | 90         | 39         | 42         | 104        | 124        | 126        | -38        | 109        | -4         | 67         | 58         |
| 44   | 41         | 54         | 68         | 32         | 80         | 83         | 97         | 104        | -56        | 83         | 75         | 62         | 70         |
| 45   | 2          | 60         | 64         | 50         | 91         | 83         | 156        | 34         | -67        | 80         | 70         | 53         | 115        |
| 46   | 27         | 72         | 65         | 176        | 44         | 86         | 99         | 22         | -19        | 59         | 48         | 52         | 85         |
| 47   | 43         | 61         | 78         | 133        | 61         | 69         | 117        | 27         | 1          | 45         | 118        | 49         | 74         |
| 48   | 23         | 89         | 87         | 158        | 41         | 74         | 102        | 78         | -49        | 41         | -16        | 26         | 12         |
| 49   | -45        | 45         | 53         | 130        | 63         | 76         | 41         | 47         | -45        | 118        | -22        | 217        | 79         |
| 50   | 19         | 59         | 38         | 183        | 87         | 46         | 55         | -9         | 1          | -25        | -5         | -15        | 27         |
| 51   | 94         | 88         | 92         | 163        | 60         | 86         | 120        | 23         | 32         | 16         | 36         | 5          | 52         |
| 52   | 62         | 102        | 84         | 138        | 61         | 47         | 92         | 141        | 21         | 20         | 305        | -14        | 55         |
| 53   | 81         | 124        | 124        | 61         | 71         | 97         | 117        | 50         | 59         | 119        | 308        | 104        | 82         |
| 54   | 44         | 41         | 80         | 59         | 244        | 35         | 58         | 104        | 11         | 83         | 41         | 63         | 77         |
| 55   | 68         | 27         | 75         | 111        | 162        | 43         | 90         | 73         | 5          | 51         | 117        | 36         | 59         |
| 56   | 42         | 48         | 60         | 97         | 143        | 21         | 159        | 57         | 74         | 76         | 90         | 91         | 20         |
| 57   | 114        | 87         | 96         | 115        | 118        | 72         | 202        | 71         | 48         | 87         | 43         | 103        | 145        |
| 58   | 56         | 53         | 71         | 27         | -36        | 14         | 98         | 40         | -40        | 43         | 56         | -16        | 58         |
| 59   | 7          | 53         | 62         | 45         | 57         | 2          | 30         | 70         | 6          | 34         | 46         | 22         | 54         |
| 60   | 26         | 94         | 58         | 60         | 28         | 12         | 67         | 14         | -10        | 37         | 52         | 52         | 43         |
| 61   | 48         | 104        | 77         | 36         | 33         | 32         | 36         | 31         | -98        | 68         | 38         | 86         | 24         |
| 62   | 32         | 97         | 40         | 34         | 36         | 77         | 70         | -13        | -3         | 69         | 55         | 117        | 47         |
| 63   | 45         | 69         | 88         | 35         | 56         | 51         | 68         | -26        | 25         | 37         | -1         | 62         | 104        |
| 64   | 2          | 65         | 57         | -40        | 13         | -59        | 90         | -16        | 60         | 88         | 25         | 79         | 14         |
| 65   | 103        | 139        | 109        | 69         | 38         | 187        | 78         | 16         | -26        | -20        | -100       | -95        | 27         |
| 66   | 83         | 78         | 63         | 37         | 57         | 131        | 126        | 51         | 2          | 131        | 162        | 134        | 104        |
| 67   | 94         | 47         | 114        | 20         | 6          | 64         | 96         | 13         | 32         | 64         | -83        | -4         | 250        |
| 68   | 101        | -130       | 66         | 38         | 49         | -19        | 59         | -19        | 29         | -10        | 8          | 46         | 208        |
| 69   | 124        | -105       | 82         | 67         | 109        | -10        | 105        | 80         | -26        | 131        | 48         | 79         | 194        |
| 70   | 100        | 83         | 74         | 70         | -1         | 3          | 105        | 78         | 161        | -43        | 97         | 62         | 36         |



|    |     |      |     |     |     |     |     |     |     |     |     |     |     |
|----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 71 | 91  | 68   | 64  | 93  | 110 | 28  | 105 | 110 | -64 | 141 | 79  | -27 | 75  |
| 72 | 40  | -5   | 115 | 80  | 72  | -5  | 92  | 22  | -39 | 59  | 11  | -47 | 58  |
| 73 | 56  | -5   | 22  | 19  | 3   | 5   | 100 | -67 | 65  | 69  | 10  | -48 | 179 |
| 74 | 92  | 83   | 9   | -13 | -14 | 125 | -73 | 15  | 21  | 52  | -63 | -73 | 37  |
| 75 | -65 | 100  | 35  | -19 | 2   | 1   | 12  | 29  | 115 | 110 | -3  | 39  | -4  |
| 76 | -1  | 52   | 66  | 68  | 59  | -22 | 15  | -87 | 119 | 62  | 4   | 55  | 143 |
| 77 | 57  | 3    | 50  | 111 | -13 | 94  | -19 | -17 | 77  | 154 | 9   | -24 | 63  |
| 78 | 48  | -7   | 51  | 35  | 5   | 15  | 16  | 12  | 273 | 110 | 5   | 38  | -4  |
| 79 | 174 | 53   | 67  | 86  | 142 | 107 | 38  | -17 | 194 | 170 | -5  | 20  | 90  |
| 80 | 115 | 62   | 102 | 143 | 103 | 115 | 24  | 4   | 176 | 142 | 105 | 22  | 33  |
| 81 | 108 | 69   | 116 | 54  | 68  | 145 | 73  | 38  | 98  | 174 | 141 | -1  | -2  |
| 82 | 118 | 39   | 134 | 94  | 64  | 118 | 4   | 94  | 104 | 72  | 49  | 50  | -7  |
| 83 | 161 | 119  | 102 | 111 | 246 | 130 | 17  | 67  | 113 | 128 | 41  | 27  | 22  |
| 84 | 116 | 94   | 106 | 138 | 94  | 129 | -11 | -20 | 151 | 119 | 89  | 93  | 7   |
| 85 | 111 | 112  | 111 | 149 | 88  | 111 | 3   | -12 | 132 | 142 | 128 | 53  | 15  |
| 86 | 110 | 333  | 97  | 120 | 147 | 142 | 75  | -26 | 118 | 142 | 137 | -21 | -37 |
| 87 | 152 | 336  | 116 | 197 | 81  | 139 | 93  | 30  | 143 | 157 | 27  | 113 | -8  |
| 88 | 142 | 56   | 129 | 143 | 76  | 152 | 14  | 37  | 160 | 131 | 185 | 68  | 34  |
| 89 | 147 | 67   | 186 | 129 | 190 | 168 | 4   | 58  | 191 | 109 | 79  | 113 | 25  |
| 90 | 91  | 267  | 117 | 138 | 74  | 78  | 77  | 49  | 100 | 223 | 82  | 2   | 26  |
| 91 | 129 | 163  | 83  | 160 | 67  | 79  | -24 | 183 | 84  | 152 | 125 | 52  | 43  |
| 92 | 144 | -36  | 122 | 152 | 137 | 109 | 261 | 22  | 111 | 109 | 109 | -38 | 68  |
| 93 | 127 | -330 | 128 | 117 | 32  | 161 | 123 | -14 | 102 | 13  | -41 | 96  | 56  |
| 94 | 166 | 4    | 151 | 141 | 100 | 111 | -34 | 40  | -96 | 30  | 154 | 69  | 64  |
| 95 | 175 | 81   | 76  | 140 | 148 | 136 | -3  | -17 | 56  | 120 | 151 | 15  | 77  |
| 96 | 175 | 85   | 146 | 139 | 66  | 131 | -63 | -2  | 102 | 93  | 65  | 79  | 68  |

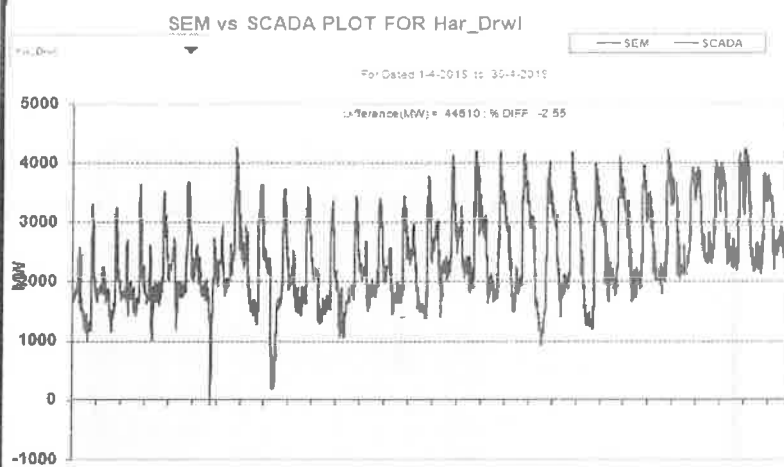
## Meeting on Real time data availability at SLDC vs Data used for Deviation Charges Accounts

Date : 28<sup>th</sup> May, 2018

### Present Practice

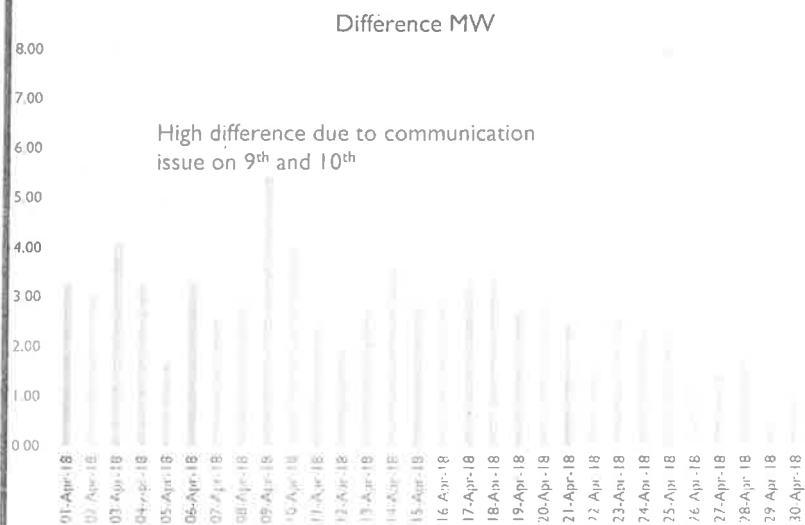
- ✓ Drawal schedule is calculated based on reliably available telemetry points
- ✓ Separate Calculation has been implemented at RLDC as well SLDC for validation
- ✓ Error is calculated on line to line basis with interface meter data
- ✓ The deviation is also compared with Interface Meter on weekly basis
- ✓ Errors more than 3% is reported at RPC level for incorporating corrections
- ✓ Effort are being made to restore/correct the telemetry on priority basis
- ✓ No separate SCADA is available Intra-State / DISCOM Area
- ✓ No separate deviation ( Schedule Vs Actual ) monitored

## Comparison of Haryana for April 2018



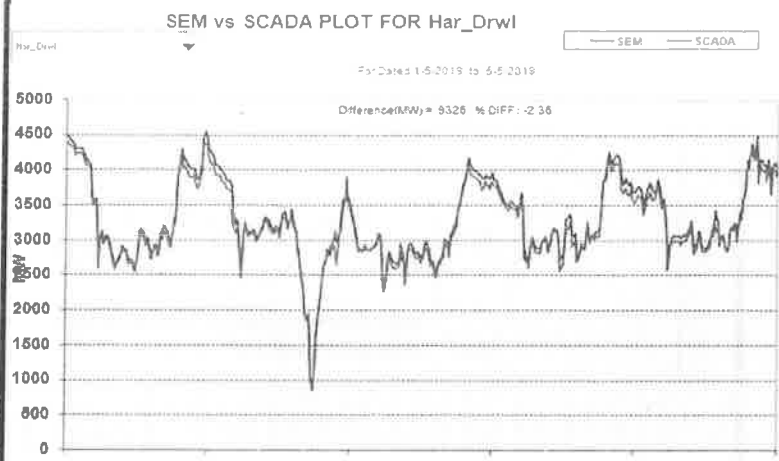
Average Deviation is less than 3%

## Difference between SCADA and SEM



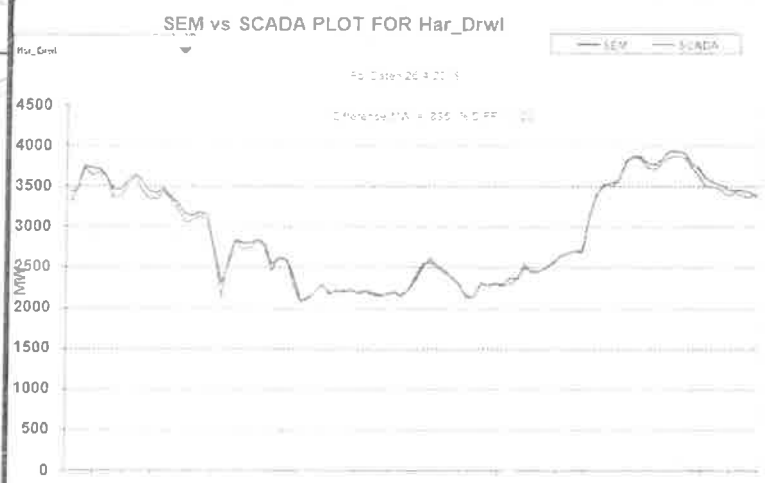
Average difference is less than 2.5%

## Comparison of Haryana for May 2018



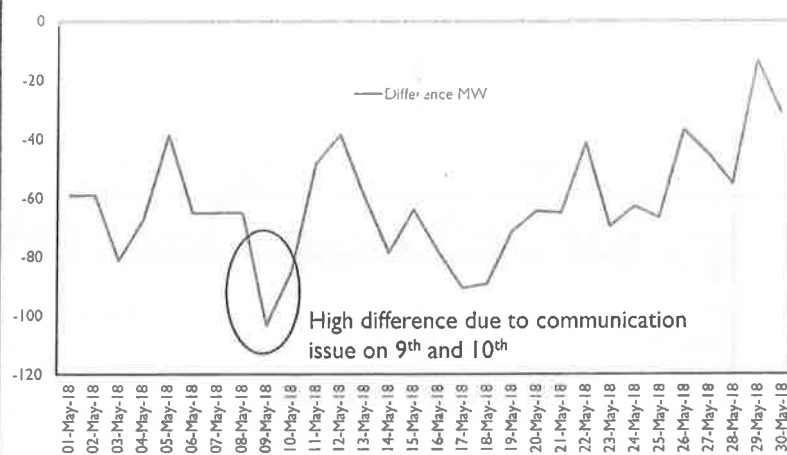
Average Deviation is less than 3%

## Comparison on block (15 mins) basis



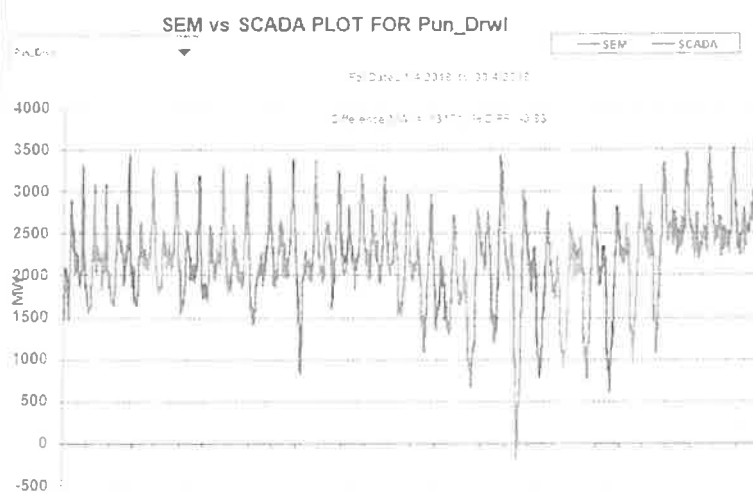
Deviation is around 1% on most of the days. Higher deviation due to failure in Telemetry

## Daily Comparison



Average MW difference between SCADA and SEM is around 50 MW, which is less than 2%

## Comparison of Punjab for April 2018



Deviation is less than 1 %

## Reasons for Deviations in SCADA data & Interface meter data

### Data Source

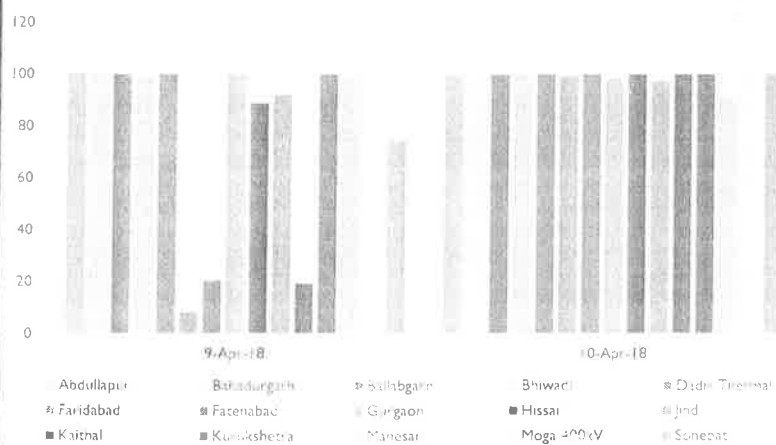
- SCADA is the real time data, the interface meter data being compared is received post facto for comparison.
- Energy meters records the energy in 15 mins interval with faster scan rate, the SCADA energy is calculated based on active power which is recorded in 10 sec interval.
- while looking at the comparison, the basic difference while recording are to be considered.

### Data Availability

Telemetry failure may occur due to the following reasons:

- Communication failure
- RTU failure / database corruption in SAS / RTU
- PT fuse failure
- Faulty transducers

## Communication Availability from ISTS station on 09<sup>th</sup> and 10<sup>th</sup> April

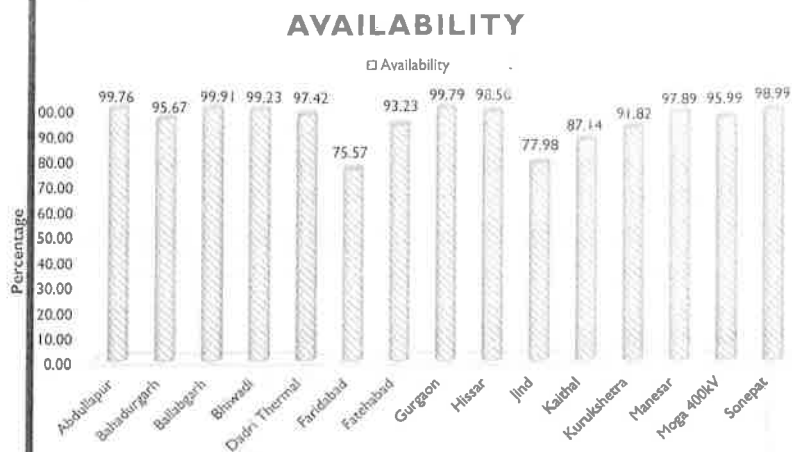


Less availability due to issue in Max at Ballabgarh

Drawal affected due to non availability of data from Fatehabad / Kaithal / Sonapat



## Availability of ISTS stations for the month of April



Haryana drawal is effected due to less availability of Faridabad / Kaithal / Manesar

## Interface point not telemetered

### PSTCL

- Majra
- 220 KV Moga
- Nabha
- Ajitwal
- Naraingarh

### HVPNL

- 66 KV Gurgaon
- 132 KV Bahadurgarh
- 132 KV Sonapat
- 220 KV Rampur
- 220 KV Cheeka
- 220 KV Mau
- 220 KV Bawal

- Presently Other end points(ICT) has been used

## Non-Availability of Telemetry

- Telemetry not available from following interface points:
  - 66 KV Pinjore-IT Park2
  - 33 KV Rohtak Road-Gurgaon
  - 33 KV Rohtak Road-Bahadurgarh

## Data Comparison / Accuracy

### Data accuracy

- Accuracy class of the recording instruments in interface meter and SCADA is also different.
- Accuracy class of SCADA is 0.5s, the accuracy class of the interface meter data is 0.2s which is more accurate.
- SCADA serves its main purpose of monitoring the Power system in real time, the errors due to lesser inaccuracy is acceptable and these data are not used for commercial calculations and accounting.

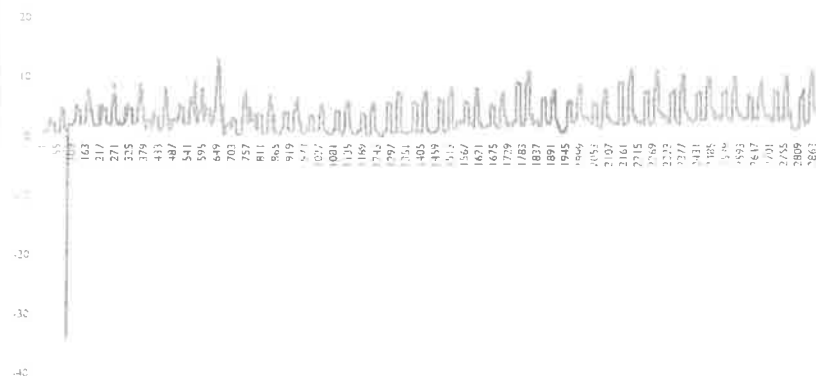
## Data Comparison / Accuracy

### Computation of Data

- No possibility of removal of errors on real time except through manual substitution in real time only.
- SCADA data, being compared with the interface meter data, is inclusive of such errors either due to telemetry failure or due to non-availability of telemetry.
- SCADA system does not automatically includes correct set of readings.
- Since the interface meter data points are checked on post facto basis, the bad data are removed from the computation and substituted through check meter/stand-by meter data and hence are free from such errors.

## Comparison of Implemented Schedule & NRPC DSM Account schedule

### Difference



Average Difference of around 5 MW

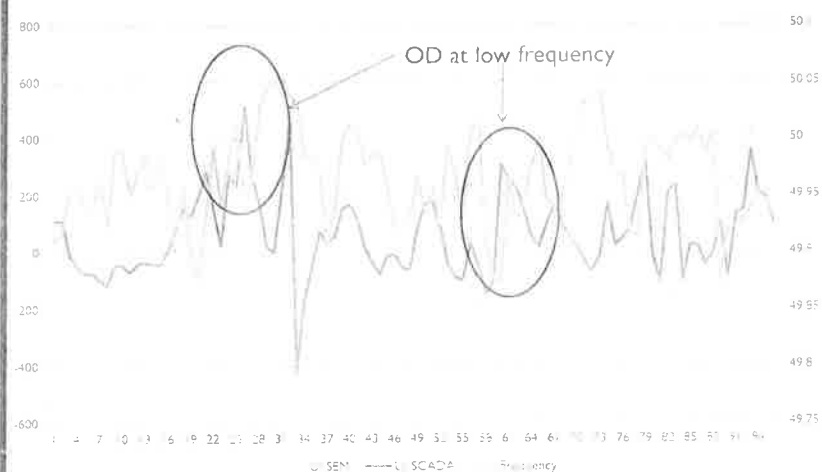
## Comparison of Schedule SCADA Vs NRPC Schedule

Implemented Schedule and SCADA Schedule  
15th April'18 to 30th April'18



- ✓ Normally the schedule is updated in real time from Scheduling software
- ✓ Real time update of schedule sometimes missed for Inter Regional LTA. However, the same is informed to concerned Utility.
- ✓ Effort are being made to reduce the same through automation across RLDCs. Less time in case fast change, as the processing is serial in nature.

## Comparison of UI SCADA/SEM Vs Frequency



Large Deviation at hour boundary at low frequency

## Availability of real time data from Interface Meters

- The interface meter can provide average 15 mins data of the previous 15 minutes block
- Current system is not capable of transmitting data in real-time
- Present meters does not support real time data transmission (Up-gradation / Replacement is required to ensure real-time data from AMR system)

### Issues :

- Similar communication problem shall affect the calculation
- Real time processing through selection of correct meters not possible
- Error in meters (time correction and faulty meter reading will affect calculation)

## Steps towards Improvement

- Reliable Telemetry
  - Telemetry data from both end of interface points
  - Redundant communication with route diversity
  - Availability of telemetry of all interface points
  - Reporting of telemetry error and correction their off – NRPC level decision
  - Procedure finalized for error reporting and correction
- Interface point wise comparison of SCADA and interface meter data shall regularly be done by SLDCs to find out the errors at the earliest
- DISCOMs should have their own SCADA and telemetry availability so that drawal can be calculated at their end deviation could be monitored.

## Time Correction – Main Meter

Discrepancy Report by RLDCs

Haryana

| LocID | Meter_No. | Catgry | Place of Installation                  |
|-------|-----------|--------|----------------------------------------|
| HR-13 | NP-1694-A | M      | ICT-I (400 kV) at Abdullapur-PG        |
| HR-18 | NP-1343-A | M      | 220 kV Hissar IA-2 at Hissar-PG        |
| HR-38 | NP-1344-A | M      | 220 kV Fatehabad-I at Hissar-PG        |
| HR-39 | NP-3128-A | M      | 220 kV Fatehabad-2 at Hissar-PG        |
| HR-68 | NR-3846-A | M      | ICT-2 (400 kV)500MVA at Bahadurgarh-PG |

Punjab

| S.No. | LocID | Meter_No  | Catgry | Place of Installation                  |
|-------|-------|-----------|--------|----------------------------------------|
| 459   | PS-01 | NP-8268-A | M      | 400 kV Jalandhar(PG) at Nakodar-PSEB   |
| 460   | PS-02 | NP-8267-A | M      | 400 kV Kurukshetra(PG) at Nakodar-PSEB |
| 462   | PS-04 | NR-3438-A | M      | 400 kV ICT-I at Patran-PTCL            |
| 464   | PS-06 | NR-3431-A | M      | 400 kV ICT-II at Patran-PTCL           |

## SEM Data Processing/Metering Error

Discrepancy Report by RLDCs

Haryana Area

|           |                                      |           |          |                        |                     |                                                                                               |
|-----------|--------------------------------------|-----------|----------|------------------------|---------------------|-----------------------------------------------------------------------------------------------|
| Pinjore   | 220 kV Baddi at Pinjore-HVPN         | NP-1406-A | Read hrs | 0000 hrs of 13.11.2017 | 2345 hrs 08.04.2018 | Other end readings were used for drawal calculation. ACTION: Pinjore-HVPN Problem Continues   |
| Panchkula | 220 kV Kurukshetra at Panchkula-HVPN | NP-1407-A | Read hrs | 0000 hrs of 13.11.2017 | 2345 hrs 08.04.2018 | Other end readings were used for drawal calculation. ACTION: Panchkula-HVPN Problem Continues |

Punjab Area

|                 |                                             |           |          |                        |                        |                                                                                               |
|-----------------|---------------------------------------------|-----------|----------|------------------------|------------------------|-----------------------------------------------------------------------------------------------|
| Ranjitsagar HPS | 220 kV Hiranagar-I at Ranjitsagar HPS PSEB  | NP-1416-A | Read hrs | 0000 hrs of 09.09.2013 | 2345 hrs of 08.04.2018 | ACTION: RANJITSAGAR PSEB Problem Continues                                                    |
| Ranjitsagar HPS | 220 kV Hiranagar-II at Ranjitsagar HPS PSEB | NP-1417-A | Read hrs | 0000 hrs of 09.09.2013 | 2345 hrs of 03.07.2016 | ACTION: RANJITSAGAR PSEB Problem Continues                                                    |
| Mohali          | 66 kV Hira-52 Ch-1 at Mohali PSEB           | NP-1418-A | Read hrs | 0000 hrs of 09.09.2013 | 2345 hrs of 08.04.2018 | Starting meter reading was used for drawal calculation. ACTION: MOHALI PSEB Problem Continues |

## Implementation of SAMAST guidelines

- SAMAST report was accepted by Technical committee of Forum of Regulators on 22<sup>nd</sup> July 2016.
- The report deals with requirements for Scheduling, Accounting, Metering and Settlement system to be implemented in State level ( Control Area based / DISCOM level )
- SLDCs/DISCOMs should start implementing SAMAST in their State to resolve Accounting, Metering and Settlement issues.

THANK YOU