

**CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI**

I.A No. 4/IA/2022

in

Petition No. 92/MP/2021

Coram:

Shri P. K. Pujari, Chairperson

Shri I. S. Jha, Member

Shri Arun Goyal, Member

Shri P. K. Singh, Member

Date of Order: 1.06.2022

In the matter of:

Interlocutory application for placing on record subsequent events and praying for directions in Petition No.92/MP/2021 (Petition under Section 79 (1) (c) and (d) of the Electricity Act, 2003 in terms of the direction issued pursuant to the 2nd Meeting of Validation Committee for the application Period from 1st July 2020 to 30th September, 2020 for implementation of CERC (Sharing of Inter-State Transmission Charges and Losses) Regulations, 2010 ("Validation Committee).

And

1. Essar Power Transmission Company Limited,
Lower Ground Floor, Hotel Treebo Conclave Riviera,
A-20, Kailash Colony,
New Delhi- 110048.

.....Petitioner

Versus

1. Power Grid Corporation of India Limited,
B-9, Qutab Industrial Area, Katwaria Sarai,
New Delhi-110016.

.....Respondent No.1

2. Western Regional Load Despatch Centre,
F-3, M.I.D.C. Area, Marol, Andheri (East),
Mumbai-400093.

.....Respondent No.2

3. M.P. Power Management Company Limited,
Shakti Bhawan, Rampur, Jabalpur,
Madhya Pradesh- 482008.

.....Respondent No.3

4. National Load Despatch Centre,
Power System Operation Corporation Limited,
B-9 (1st Floor), Qutab Institutional Area, Katwaria Sarai,
New Delhi -110016

.....Respondent No.4

5. Western Regional Power Committee,
F-3, MIDC Area, Marol,
Opposite SEEPZ, Central Road,

Parties Present:

Shri Alok Shankar, Advocate, EPTCL
Ms. Suparna Srivastava, Advocate, CTUIL
Shri Tushar Mathur, Advocate, CTUIL
Ms. Soumya Singh, Advocate, CTUIL
Shri Sachin Sharma, Advocate, CTUIL
Shri Manoj Dubey, Advocate, MPPMCL
Shri Partha Sarathi Das, CTUIL
Shri Pratyush Singh, CTUIL
Shri Swapnil Verma, CTUIL
Shri Siddharth Sharma, CTUIL
Shri Ranjeet Singh Rajput, CTUIL
Shri Kavya Bhardwaj, CTUIL
Shri Aditya Das Pradesh, WRLDC/POSOCO
Shri Alok Kumar Mishra, WRLDC/POSOCO
Shri Anindya Khare, MPPMCL

Order

The Petitioner has filed Petition No. 92/MP/2021 with the following prayers:

- a. *Admit the present petition;*
- b. *Determine the Annual fixed cost for the LILO assets for 2013-14.*
- c. *Determine the transmission tariff / provisional transmission tariff for the LILO assets for 2013-14.*
- d. *Direct CTU to recover transmission charges of LILO from EPMPL.*
- e. *Segregate the tariff for the LILO at EPMPL from other assets of the Petitioner.*
- f. *Determine the effective date of billing.*
- g. *To direct CTU to recover interest for Stage-1 tariff and tariff determined for LILO for the unpaid period.*
- h. *Pass any other appropriate Order/ Directions.*

2. Meanwhile Petitioner has filed instant Interlocutory Application 4/IA/2022 with following prayers:

- a. *Admit the present application and take on record the study by CTU and WRPC Report;*
- b. *Hold that LILO at Mahan is a permanent element of ISTS network and thus tariff in full recoverable from the POC pool.*
- c. *Restore the entire tariff disbursement to EPTCL for stg-1 assets from PoC pool at annual tariff of Rs. 7992.35 Lakhs.*
- d. *Direct CTU to disburse arrears for the period when tariff wasn't received by EPTCL for the LILO line.*
- e. *Pass any other appropriate Order/ Directions.*

Submissions of Petitioner

3. Petitioner has mainly submitted as follows:

(a) The present petition No. 92/MP/2021 was filed since tariff of the LILO on S/C of Vindhyachal-Korba Line at Mahan and Gandhar Hazira Line, both being licensed asset of EPTCL, were excluded from POC Pool in terms of the direction issued pursuant to the 2nd Meeting of Validation Committee for the Application Period from 1st July 2020 to 30th September, 2020 for implementation of CERC (Sharing of Inter-State Transmission Charges and Losses) Regulations, 2010 ("Validation Committee"). In order to ensure resumption of tariff payment at the earliest, the petitioner was constrained to file the present petition.

(b) Commission vide order dated 21.01.2020 in Petition No. 132/MP/2018 directed as follows:

"27. On perusal of submissions of the Petitioner and Respondent MPPMCL and reply of the Petitioner to the queries of the Commission vide RoP dated 20.12.2018, we observe that though LILO was considered to be only a temporary element at inception, subsequent system studies suggest that the LILO may be continued as a permanent element in order to enhance grid stability....."

29. Keeping in view the fact that the Petitioner has stated that the 400 kV Essar-Mahan to Sipat requires additional anchoring and that CEA, CTU, WRPC, Respondents 1 and 2 in a meeting held on 28.06.2017 agreed that the LILO would help to take care of oscillations in the grid under outage of one circuit of Mahan TPS- Bilaspur pooling station 400 kV D/C line, we agree to the request of the Petitioner to continue the LILO for a further period of six months. However, since the current system studies point out that due to LILO, there is increase in fault level at Vindhyachal, the Petitioner is directed to complete the system studies within two months, deliberate the same in WRPC, discuss with CEA and take appropriate action for rectifying the fault level and submit a report to the Commission along with copy of the system studies and deliberations for taking an appropriate view with regard to the continuance or otherwise of the LILO."

(c) Vide order dated 21.01.2020 in Petition No. 132/MP/2018, CTU was directed to conduct a study as regards the increase in fault level at Vindhyanchal owing to the LILO. The said study was to be deliberated before WRPC and discussed with CEA.

- (d) Since the above mentioned study was not submitted by CTU, this Commission vide ROP for hearing on 19.03.2021 in Petition No. 92/MP/2021 called upon CTU to furnish the same within three weeks.
- (e) CTU vide its letter dated 20.04.2021 furnished the study to this Hon'ble Commission. The report is produced and marked as Annexure-A to the Application.
- (f) Vide order dated 04.06.2021 in IA 32/2021 under Petition No. 92/MP/2021 Commission directed CTU to submit its final report on the LILO, after deliberations in the WRPC meeting.
- (g) WRPC constituents have resolved that the LILO on s/c of Vindhyachal-Korba line is required to be retained. WRPC meeting was attended by all stakeholders inter alia representatives of MP Transco, CSPDCL and Gujrat Transco. Upon detailed deliberations on various options, it was concluded that LILO shall be retained and breakers at Mahan end shall be kept open to ensure power flow only through the Mahan- Sipat line in normal circumstance. The Report based on the Meeting held to discuss the reliable evacuation of power from 2x600 MW units of Mahan TPS under full dispatch & studies carried out by CTU is produced and marked as Annexure-B to the Application.
- (h) In accordance with the conclusions and recommendations submitted by the WRPC, it is recommended now that the LILO line at Vindhyachal- Korba of ETPCL be retained in the system as a permanent element of ISTS network. In terms of the conclusions and recommendations provided by WRPC and the proposed schematic diagram of the arrangement also represented above, it is seen that there is increase in line length of the 400 kV Vindhayacha-Korba Circuit due to LILO portion. Thus, it can also be fairly concluded that LILO is not a dedicated line to EPMP and is a part of ISTS network.
- (i) It is therefore prayed that the tariff of EPTCL for entire stage-1 assets including LILO line in terms of CERC order dated 19.12.2018 in Petition No.

33/RP/2016, Petition No. 173/TT/2013 and Petition No. 111/TT/2015 determined at Rs.7992.35 lakhs annually be restored at the earliest. It is also prayed EPTCL be reimbursed the arrears for reduced tariff period.

Hearing dated 29.3.2022

4. The instant application was listed for hearing on 29.3.2022. During the hearing, the Petitioner submitted that CTUIL has submitted the “Study Report on LILO of Vindhayachal-Korba 400 kV Line at Mahan TPS” to the Commission vide affidavit dated 20.4.2021 and has recommended that the LILO may be connected in contingent conditions under which the breaker at Vindhayachal end may be closed. The Commission specifically asked the Petitioner to show the paragraph in the report submitted by CTU vide Affidavit dated 19.1.2022 where usage of LILO in contingency arrangement as indicated by the Petitioner has been recommended by the CTU. Despite repeated directions to show the paragraph in the report of the CTU submitted by CTU vide Affidavit dated 19.1.2022 where continuation of LILO under contingency has been suggested as claimed by the Petitioner, the Petitioner failed to show the same. Instead, the Petitioner submitted that the transmission license granted by the Commission vide order dated 10.4.2008 includes the LILO and accordingly prayed that the tariff for LILO may be allowed to be recovered through the PoC mechanism.

5. The CTU submitted that WRPC in its report dated 9.11.2021 recommended Case-2 i.e LILO of Vindhayachal-Korba 400 kV Line should be bypassed. A meeting was held on 23.12.2021, where WRPC, CEA, CTUIL were present to review the modalities of implementation of the proposal recommended by WRPC in its report dated 9.11.2021 and EPMPPL was requested to inform the feasibility of implementation of LILO of Vindhayachal-Korba 400 kV line bypassed at Mahan TPS by keeping the breaker open at Essar Mahan. After deliberations, it was decided by all the stakeholders including Petitioner that the LILO should be bypassed at Mahan TPS vide looping arrangement

through jumpers at suitable location prior to the last D/C Tower. The line side isolators would be kept in open condition while Circuit Breakers at Mahan TPS end should be kept closed.

6. The technical representative appearing on behalf CTUIL submitted that the LILO normally is not required. However, LILO can be retained as contingency arrangement and LILO can be kept in bypass and can be taken readily into service if required, in case both circuits of Essar-Bilaspur line go under outage. The Commission asked the technical representative of CTU to show where in the report submitted by CTUIL vide Affidavit dated 19.1.2022 such arrangement of connection of LILO under Essar-Bilaspur line outage has been suggested. The technical representative of CTUIL failed to show the same.

7. The Commission observed that these submissions of CTUIL are contrary to what has been suggested by CTUIL itself in the report submitted by it vide Affidavit dated 19.1.2022. As per the said report submitted vide Affidavit dated 19.1.2022, under contingency condition only SPS has been suggested and not such connection of LILO as stated by the technical representative of CTU. The Commission observed that as per the report submitted by CTUIL vide Affidavit dated 19.1.2022, continuation of LILO is not required, and rather, continuation of LILO has adverse effect at Vindhyachal. The Commission observed that as per the report, even when Essar-Bilaspur line is available with connection of LILO, situation becomes unmanageable at Vindhyachal and it is not understood on what basis CTU is making the submissions that it shall be manageable when Essar-Bilaspur line is not available.

8. The Commission further observed that CTUIL should confine its submissions to the report it has submitted to the Commission after detailed deliberations and due consultations with all the relevant stakeholders including the Petitioner.

Analysis and Decision

9. After going through the pleadings and perusal of documents available on record, the limited issue which arises for our consideration is whether LILO of 400 kV S/C Vindhyachal-Korba Transmission Line (“LILO”) at Mahan is to be continued or discontinued. In support of its prayer, the Petitioner has stated that in accordance with the conclusions and recommendations submitted by WRPC, LILO line at Vindhyachal-Korba of ETPCL may be retained in the system as a permanent element of ISTS network. During the hearing dated 29.3.2022, the Petitioner relied on “Study Report on LILO of Vindhayachal-Korba 400 kV Line at Mahan TPS” dated 20.4.2021. Referring to the report dated 20.04.2021, the Petitioner submitted that the LILO may be connected in contingent conditions under which the breaker at Vindhayachal end may be closed.

10. It is important at this stage to reiterate the background under which the said LILO had been constructed, which is as follows:

- (a) Essar Power MP Limited (EPMPL) has set up a 1200 MW (2x600 MW) thermal power plant (in short, “the Generating Station”) at district Singrauli in the State of Madhya Pradesh and had entered into Long Term Power Purchase Agreement (PPA) with Essar Steel for supply of 450 MW of power for a period of 12 years. According to the PPA, power from the Generating Station was to be evacuated through the 400 kV D/C Mahan-Sipat Transmission Line terminating at WR Pooling Station at Bilaspur. The evacuation system from the Generating Station was developed by the Petitioner, pursuant to inter-State transmission license granted by the Commission vide Order dated 10.4.2008. The license was subsequently modified vide Order dated 15.9.2009.

- (b) The transmission license was granted vide order dated 10.4.2008 for the following transmission lines and sub-stations:

Transmission lines

- (i) 400 kV (triple conductor) D/C transmission line from Mahan to Sipat Pooling sub-station.
- (ii) LILO of existing 400 kV S/C Vindyanchal-Korba transmission line of PGCIL at Mahan.
- (iii) 400 kV D/C (twin conductor) transmission line from Gandhar NTPC switch yard to Hazira.
- (iv) 400 kV D/C (quad conductor) transmission line from Mahan to Sipat Pooling sub-station.

Sub-stations

- (i) 3X500 MVA, 400/220kV sub-station at Hazira.
- (ii) 2x50 MVAR line reactors at Sipat pooling sub-station.
- (iii) 2x50 MVAR line reactors at Mahan. (iv) 1x80 MVAR, 420 kV Switchable bus reactors at Mahan TPS along with its associated 400 kV bay
- (v) 2 Number 400 kV line bays at Sipat pooling sub-station. (vi) 2 Number 400 kV line bays at Gandhar (NTPC) switchyard. (vii) Number 400 kV line bays at Mahan TPS.

- (c) Vide Order dated 12.2.2008 in Petition No. 157/2007, it is noted as follows:

“The Central Transmission Utility while recommending the transmission license for petitioner, vide its letter dated 18.1.2008, has filed its suggestions/comments on the applicant primarily as under:

(i) Development of pooling point near Sipat may require long time and it may be difficult to complete work till commissioning of Mahan TPS. Therefore, it was decided that to facilitate grid connectivity, initially LILO of one circuit of 400 kV Vindhyaachal-Korba transmission line may be carried out at Mahan TPS as an interim arrangement for carrying out power transfer on short term basis depending upon transmission capacity available.

(ii) The generating company has to make arrangement for start-up power and pay transmission charges for the same. The CTU has to be apprised of this arrangement.”

- (d) Thus, the LILO was proposed in the above backdrop of delay of pooling point near Sipat as an interim arrangement.

- (e) This has been affirmed by CTU in its submissions in Petition No. 132/MP/2018, as noted in the Order dated 21.1.2020 in Petition No. 132/MP/2018 as under:

“d) Were system studies conducted while planning and was concluded that LILO should be interim.

a. The Petitioner has answered in the affirmative and submitted that studies were conducted and various alternatives were evolved in the 9th meeting of WR constituents on LTOA held on 30.07.2007 considering injection of 1200MW power from Mahan TPS to WR grid. It was deliberated that a number of generation projects are proposed to come up in the same complex (MP/Chhattisgarh) in almost the same time frame. Accordingly, it was decided to develop a 765/400kV WR pooling station near Sipat & other associated system strengthening works for injection of power from Mahan TPS. However, the exact location of the proposed WR Pooling station was not known at the planning stage.

b. It was also deliberated that development of 400/765kV Pooling station and other strengthening works may require long time and it may be difficult to complete these works before the commissioning of Mahan TPS generating unit. In view of the above, it was decided that to facilitate grid connectivity of Mahan generation project, initially, LILO of one circuit of 400 kV line between Vindhychal and Korba STPS may be carried out at Mahan TPS by M/s Essar Power M.P Ltd. and power transfer may be carried out on short-term basis depending upon transmission capacity availability. However, on the completion of the transmission system identified for LTA, the above LILO arrangement of Vindhychal-Korba line at Mahan TPS shall be removed and the line shall be restored in its original configuration by M/s Essar Power at their cost.”

- (f) Essar Power M.P Limited approached the Commission vide Petition No. 10/MP/2018 seeking continuation of interim LILO arrangement of 400 kV Vindhychal-Korba circuit beyond 20.1.2018. The Commission vide order dated 19.1.2018 observed as under :

*“10. Keeping in view the decision in the minutes of the meeting in CEA held on 5.1.2018, **we direct the Petitioner to ensure completion of the Mahan-Sipat line by 31.3.2018.** Till that time, status quo shall be maintained. If the transmission line is not commissioned by the Petitioner on or before 31.3.2018, **CTU shall take immediate necessary action for disconnection of the LILO arrangement with effect from 1.4.2018.***

11. The Petitioner is directed to submit the fortnightly progress report of the execution of transmission line.”

- (g) The Commission mandated Essar Power to complete Mahan-Sipat line by 31.3.2018 and directed CTU to take action for disconnection of LILO arrangement from 1.4.2018 if the transmission line is not commissioned by the Petitioner on or before 31.3.2018.

- (h) PGCIL filed Petition No. 132/MP/2018 seeking continuation of LILO of 400 kV S/c Vindhyachal-Korba transmission line at Mahan Super Thermal Power Station subject to completion of 400kv D/C Mahan-Sipat transmission line by the Essar Power Transmission Company Limited. The Commission vide order dated 21.1.2020 in Petition No. 132/MP/2018 has observed as under:

“27. On perusal of submissions of the Petitioner and Respondent MPPMCL and reply of the Petitioner to the queries of the Commission vide RoP dated 20.12.2018, we observe that though LILO was considered to be only a temporary element at inception, subsequent system studies suggest that the LILO may be continued as a permanent element in order to enhance grid stability. While hearing the plea of the Respondent 1 and 2 to make the LILO a permanent element, APTEL had granted liberty to Respondents 1 and 2 to approach appropriate legal forum vide its order dated 27.03.2018. The prayer of the Petitioner in this Petition is “.... continuation of the LILO till finalization of suitable alternatives (if any) as may be identified through system studies to address the high short circuit level issue”. Thus, the Petitioner is similar to that for which liberty was granted to the Respondents 1 and 2 by APTEL.

29. Keeping in view the fact that the Petitioner has stated that the 400 kV Essar Mahan to Sipat requires additional anchoring and that CEA, CTU, WRPC, Respondents 1 and 2 in a meeting held on 28.06.2017 agreed that the LILO would help to take care of oscillations in the grid under outage of one circuit of Mahan TPS Bilaspur pooling station 400 kV D/C line, we agree to the request of the Petitioner to continue the LILO for a further period of six months. However, since the current system studies point out that due to LILO, there is increase in fault level at Vindhyachal, the Petitioner is directed to complete the system studies within two months, deliberate the same in WRPC, discuss with CEA and take appropriate action for rectifying the fault level and submit a report to the Commission along-with copy of the system studies and deliberations for taking an appropriate view with regard to the continuance or otherwise of the LILO.

30. MPPMCL has submitted that continuation of LILO as a permanent element would burden the beneficiaries with the additional PoC charge of LILO of Vindhyachal – Korba 400kV S/c line at Mahan TPS. We observe that Essar Mahan has already relinquished its full LTA as on 30.4.2018 as noted in Order dated 7.10.2019 in Petition No. 187/MP/2017. We also observe that the instant LILO line is the dedicated line of Essar Mahan. Accordingly, the generating station is liable to pay transmission charges for same.....

*.....
Accordingly, till the Commission takes a final view as per para 29 above, the Respondent No.1 will be liable to pay the transmission charges for the instant LILO line.”*

11. Thus, in the order dated 21.1.2020 in Petition No. 132/MP/2018, the Commission, in light of increase in fault level at Vindhyachal, directed the CTU to complete the system

studies within two months and submit a report to the Commission along with copy of the system studies and deliberations for taking an appropriate view with regard to the continuance or otherwise of the LILO.

12. We observe that CTUIL has filed two reports dated 20.4.2021 and 19.1.2022. The Report dated 20.4.2021 was filed prior to discussions at WRPC forum and the Report dated 19.1.2022 was filed after due consultations at WRPC. WRPC has filed the Report based on discussions at WRPC vide its letter dated 9.11.2021, which Petitioner has also placed on record vide the instant application.

13. WRPC vide its Report dated 9.11.2021 has submitted as follows :

“1) Advantages and Disadvantages of Case1: Existing Arrangement (With Essar Mahan TPS – Wr Pooling Station 400 kV D/c(triple) line + LILO of one circuit of 400 kV Vindhyachal – Korba STPP D/c line at Essar Mahan TPS in service):

Disadvantages:

a) The steady state power flow is more towards Vindhyachal and Korba. This requires system strengthening in the future to address these issues.

b) The utilization of WR pool is low. This naturally means the WR Pool resources are less utilized, leading to higher voltages.

c) There is an incremental power flow towards Korba complex, because of the 400kV Vindhyachal-Korba line LILO at EM. The downstream network of CSPTCL, from Korba(W) to CSPTCL transmission system is getting congested due to this incremental power and it is adversely affecting the drawl/TTC of CSPTCL/CSPDCL from the grid.

d) The Short Circuit level at Vindhyachal increases.

The keeping of the LILO intact thus has no advantages and only disadvantages.

Hence, not recommended.

2) Advantages and Disadvantages of Case2: (With Bypassing arrangement) (With Essar Mahan TPS – Wr Pooling Station 400 kV D/c(triple) line + LILO of one circuit of 400 kV Vindhyachal – Korba STPP D/c line at Essar Mahan TPS bypassed at Mahan)

Advantages:

a) The steady state power flow from EM is all towards WR Pool.

b) The utilization of WR pool is very high and is as per the planned system.

c) The Short Circuit level at Vindhaychal decreases.

d) There is no flow towards Korba complex or Vindhaychal complex. This ensures no required additional system strengthening.

e) N-1 transient three phases fault contingency can be handled by tripping an unit at EM through SPS.

Disadvantages:

a) No known disadvantages.

Hence, Case 2 is strongly recommended

3) Advantages and Disadvantages of Case3: CTU Proposed arrangement (With Essar Mahan TPS – Wr Pooling Station 400 kV D/c(triple) line + LILO of one circuit of 400 kV Vindhyachal – Korba STPP D/c line at Essar Mahan TPS with Mahan-Vidnhachal line open)

Disadvantages:

a) The steady state power flow is towards WR Pool and Korba (more than 50%).

b) The utilization of WR pool is lower and gives rise to same disadvantages discussed in Case 1.

c) The flow towards Korba puts restriction on Chhattisgarh TTC. This is not acceptable to Chhattisgarh.

d) There is flow towards Korba complex and requires additional system strengthening.

e) It breaks the connection between Vindhachal and Korba, facilitating small signal instability. WR had experienced actually small moving oscillations due to the opening of the line in real time, and so risking this situation again is not worthy.

f) There are oscillations seen in the nearby EM complex under N-1-1 contingency as highlighted in Chapter -1 (d) & (f).

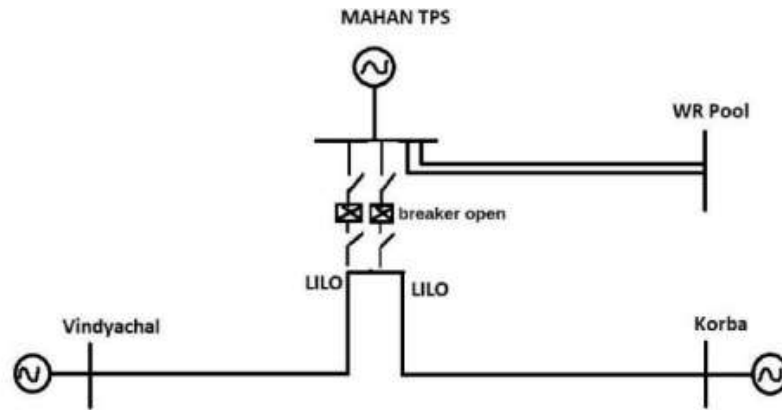
Advantages:

a) None is seen. The system still requires an SPS for N-1-1 contingency.

Hence, Case3 is not recommended.

Conclusion and Recommendation:

The studies carried out for various scenarios on the base case forwarded by CTU and based on the discussions and views of the stakeholders of WR as given in the report, WRPC recommends, that 400 kV Vindhyachal-Korba line with LILO, can be made direct, by keeping breaker open at Essar Mahan end, so that no Essar Mahan power / WR Pool power flows towards Vindhyachal or Korba, when there is generation at Essar Mahan (See below Figure). The small increase in line length of 400kV Vindhyachal Korba ckt., due to LILO portion is acceptable from studies point of view. It is more important to ensure that EM power does not flow on the line towards Vindhaychal or Korba normally.



14. As per above Report dated 9.11.2021, WRPC concluded that LILO should be kept open and 400kV Vindhyachal-Korba line be made direct.

15. CTU vide affidavit dated 19.1.2022 has submitted the final Report based on WRPC Report dated 9.11.2021. The same is quoted below:

“ Final Report on LILO of Vindhyachal – Korba 400kV line at Mahan TPS

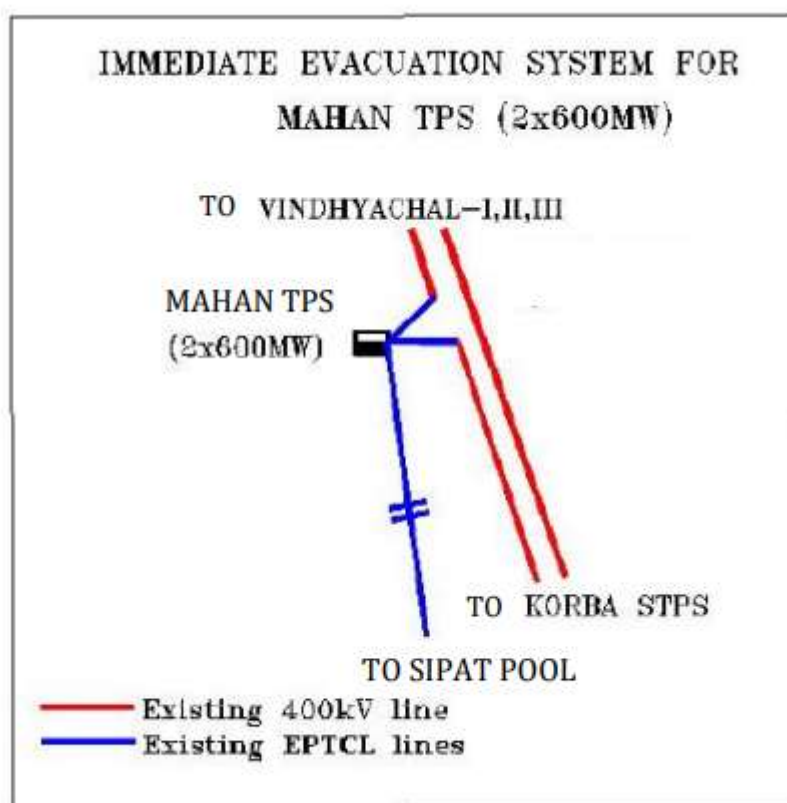
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2. Study Cases & deliberations in WRPC Meeting

Load flow as well as transient stability studies were carried out to determine the adequacy of immediate evacuation system for transfer of power from Mahan TPS. For stability assessment, a permanent three phase to ground fault was simulated on one circuit of the Mahan TPS – Sipat Pool 400kV D/c line close to the Mahan bus which was cleared in 100 ms along with tripping of the line in line with CEA Transmission Planning Criteria, 2013. Following cases were studied considering dispatch of 540MW from each generating unit of Mahan TPS (Total 1080MW) and deliberated in the WRPC forum:

a) Case 1 (Existing arrangement)

With existing LILO arrangement of one circuit of Vindhyachal – Korba STPP 400kV D/c line at Mahan TPS as well as Mahan TPS – Sipat Pool 400kV D/c line (337km)



Results:

Load Flow (in MW)			Stability	Short Circuit
Mahan TPS – Sipat Pool 400kV D/c	Mahan TPS – Vindhyachal 400kV S/c	Mahan TPS – Korba STPS 400kV S/c	Stable / Unstable	Fault level in kA
2x96	671	197	Stable	43

Deliberations in WRPC Meeting:

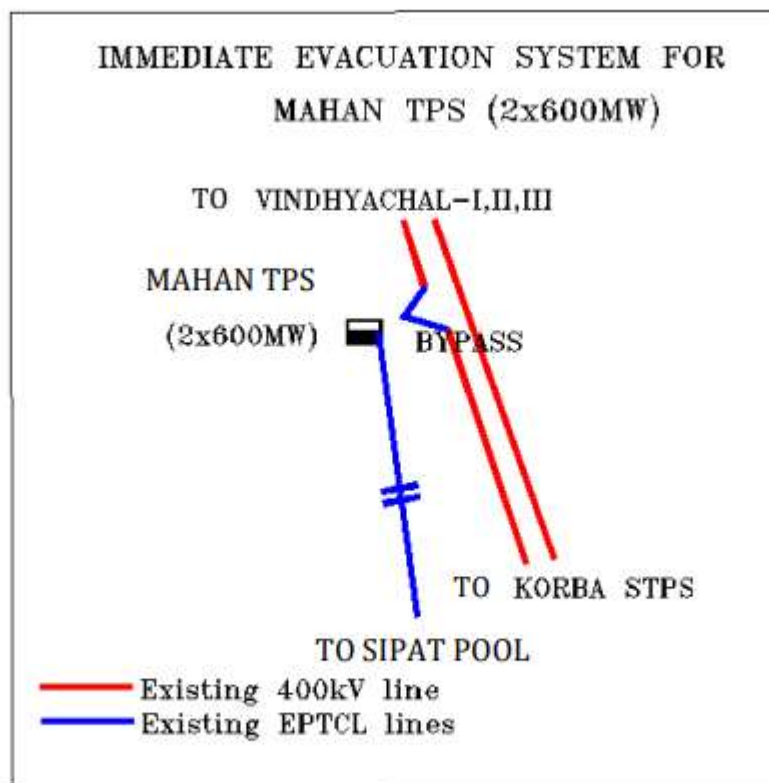
- The steady state power flow is more towards Vindhyachal and Korba. This may require system strengthening in the future to address these issues.
- The utilization of WR pool is low. This naturally means the WR Pool resources are less utilized, leading to higher voltages.
- There is an incremental power flow towards Korba complex, because of the 400kV Vindhyachal-Korba line LILO at Essar Mahan. The downstream network of CSPTCL, from Korba(W) to CSPTCL transmission system is getting congested due to this incremental power and it is adversely affecting the drawl/TTC of CSPTCL/CSPDCL from the grid.

- The Short Circuit level at Vindhyachal increases. Maximum fault current contribution from Mahan TPS (~7.5kA)

In view of the above shortcomings, WRPC did not recommend keeping the LILO intact.

b) Case 2 (LILO Arrangement by passed at Mahan TPS)

With Mahan TPS –Sipat Pooling Station 400kV D/c (quad moose) line + LILO of one circuit of Vindhyachal – Korba STPP 400kV D/c line at Mahan TPS Bypassed at Mahan



Study results:

Load Flow (in MW)			Stability	Short Circuit
Mahan TPS – Sipat Pool 400kV D/c	Mahan TPS – Vindhyachal 400kV S/c	Mahan TPS – Korba STPS 400kV S/c	Stable / Unstable	Fault level in kA
2x533	Bypassed at Mahan TPS	Bypassed at Mahan TPS	Unstable	38

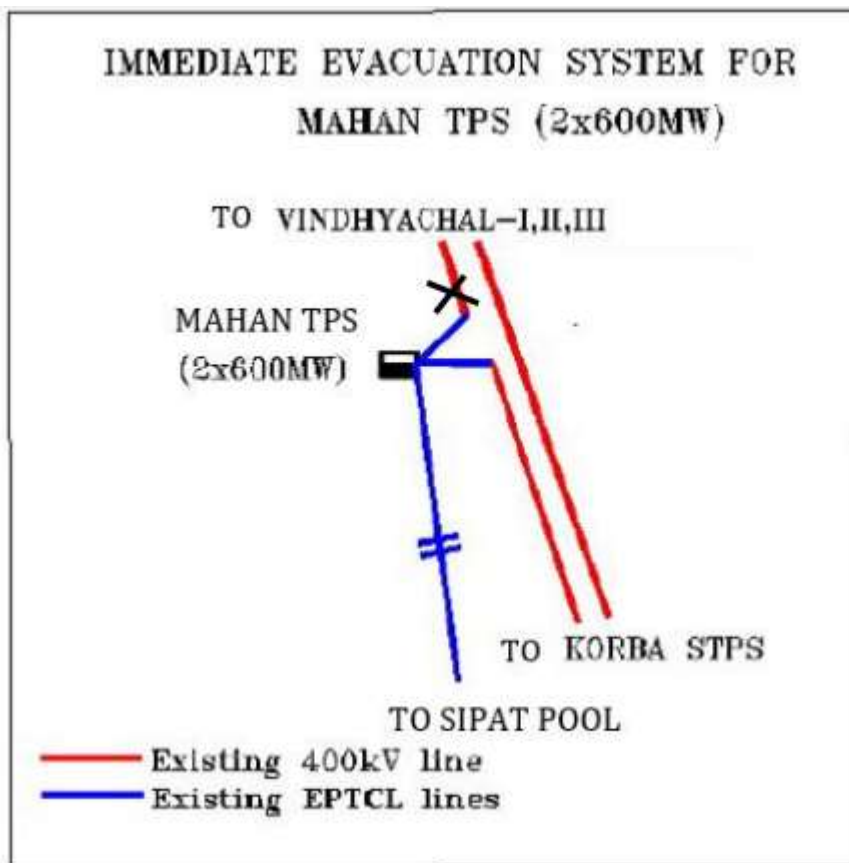
Deliberations in WRPC Meeting:

- *The power flow through immediate evacuation system (to WR Pool) is in order under steady state conditions.*
- *The utilization of WR pool is very high and is as per the planned system.*
- *Fault current at Vindhyachal decreases (below design limit of 40kA)*
- *There is no flow towards Korba complex or Vindhaychal complex. This shall ensure no additional system strengthening.*
- *Undamped oscillations observed under N-1 contingency of outage of Mahan TPS – Sipat (WR) Pool one circuit after a three phase fault can be handled by tripping an unit at Essar Mahan within 100ms after loss of line on three phase fault through a suitable SPS arrangement.*
 - *Since there is no LTA from Essar Mahan TPS, the plant may be operated with above SPS arrangement. Upon receipt of LTA in future, other system augmentations may be explored.*

In view of the above, WRPC strongly recommended the above case (bypassing to be done by keeping breaker open at Essar Mahan end). The small increase in line length of 400kV Vindhyachal Korba ckt., due to the LILO portion (of about 44ckm.) is acceptable from studies point of view. It is more important to ensure that Essar Mahan TPS power does not flow on the line towards Vindhaychal or Korba under normal operating conditions.

c) Case 3 (Mahan–Vindhyachal line section open)

With Mahan TPS Sipat Pooling Station 400kV D/c (quad moose) line + LILO of one circuit of Vindhyacha–Korba STPP 400kV D/c line at Mahan TPS with Mahan TPS–Vindhyachal line open



Study results:

Load Flow (in MW)			Stability	Short Circuit
Mahan TPS – Sipat Pool 400kV D/c	Mahan TPS – Vindhyachal 400kV S/c	Mahan TPS – Korba STPS 400kV S/c	Stable / Unstable	Fault level in kA
2x289	OPEN	488	Stable Unstable under N-1-1 contingency	36

Deliberations in WRPC Meeting:

- The steady state power flow is towards WR Pool and Korba
- The utilization of WR pool is lower and gives rise to same disadvantages discussed in Case 1.
- The flow towards Korba shall put restriction on Chhattisgarh TTC. This is not acceptable to Chhattisgarh.
- There is flow towards Korba complex which shall require additional system strengthening.

- It breaks the connection between Vindhachal and Korba, resulting in small signal instability. WR had actually experienced small moving oscillations due to the opening of the line in real time, and so risking this situation again is not worthy.
- There are oscillations seen in the Essar Mahan complex under N-1-1 contingency (when one ckt of Mahan TPS – Sipat Pooling Station 400kV D/c (quad moose) line is already open and a three-phase fault is created at the Essar Mahan – Korba 400 kV S/c line followed by tripping of the line). The system still requires an SPS for N-1-1 contingency as in Case-2.

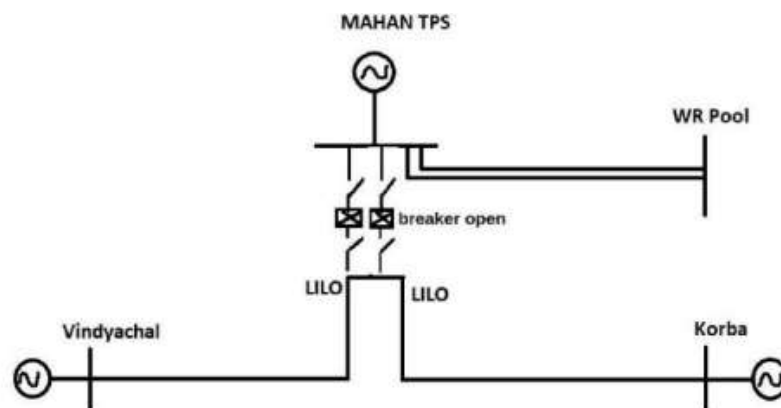
In view of the above shortcomings, WRPC did not recommend Case-3.

The results of transient stability for above three cases are available in the study report at Annexure-I of Enclosure-I. The results of N-1-1 contingency scenario for Case-3 are available in WRPC study report at Annex-I to IV of Enclosure-II.

3. Implementation Modalities of WRPC Proposal

Based on deliberations in meeting convened by WRPC amongst various WR stakeholders on 02.07.2021 to discuss the recommendations for proposed arrangement for reliable evacuation of power from 2x600MW Essar Mahan TPS, the following arrangement was proposed:

Case-2: Mahan TPS– Sipat Pooling Station 400kV D/c (quad moose) line and LILO of one circuit of Vindhyachal – Korba STPP 400kV D/c line at Mahan TPS bypassed at Mahan (by keeping breakers open at Essar Mahan end) as per the schematic below:



However, subsequently on analysis of the proposed scheme based on SLD obtained from EPMPPL it was observed that Vindhyachal & Korba 400kV lines are terminated in two separate dia in Mahan TPS switchyard. Hence, it would not be possible to bypass the LILO line within the switchyard by keeping breakers open. To finalise the modalities of implementation of the above proposal, a separate meeting was held on 23.12.2021 amongst WRPC, CEA, CTU, POSOCO, EPTCL,

EPMPL and various WR constituents (MoM at Enclosure-III) and following modality for bypassing of LILO of Vindhyachal – Korba 400kV line at Mahan TPS was agreed:

- LILO of Vindhyachal – Korba 400kV line to be bypassed at Mahan TPS vide looping arrangement at suitable location prior to the last D/c tower with jumpers(towards Mahan side) kept open for both circuits on the D/c Tower. The line side isolators would be kept in open condition while the Circuit Breakers (both Main & Tie) at Mahan TPS end shall be kept closed.*

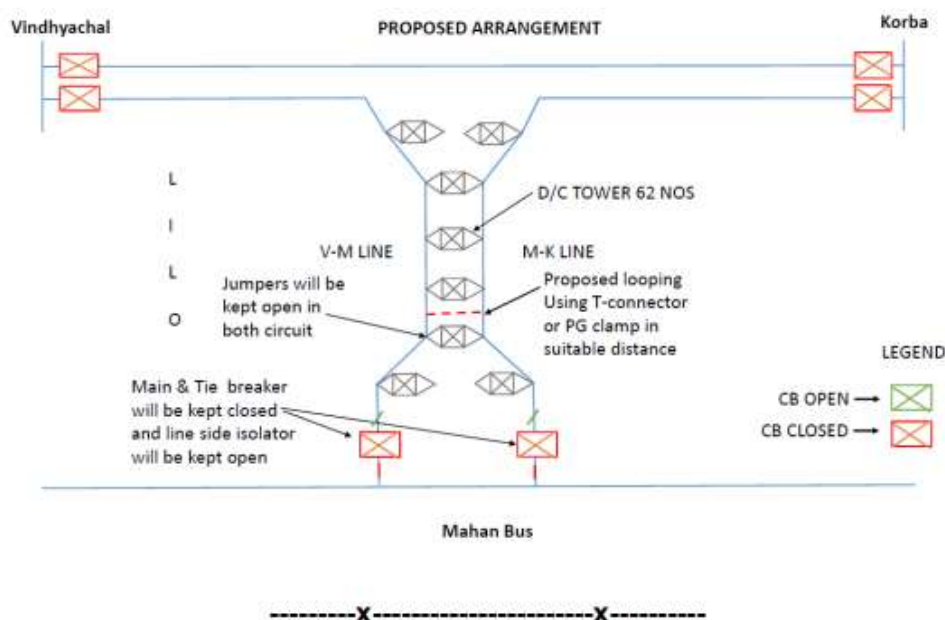
4. Recommendation

In view of the above, the following scheme for reliable evacuation of power from 2x600 MW units of Mahan TPS and control of short circuit contribution from Mahan TPS towards Vindhyachal STPS is recommended (as per Case-2):

- LILO of Vindhyachal – Korba 400kV line to be bypassed at Mahan TPS vide looping arrangement at suitable location prior to the last D/c tower with jumpers(towards Mahan side) kept open for both circuits on the D/c tower(as per schematic below). The line side isolators would be kept in open condition while the Circuit Breakers(both Main & Tie) at Mahan TPS end shall be kept closed.*

- WRLDC & WRPC shall design a suitable SPS arrangement for tripping of one unit (when generation from both units is more than 600MW) at Essar Mahan within 100ms of tripping of one circuit of Mahan TPS – Sipat Pooling Station 400kV D/c (quad moose) line under fault conditions and Essar Mahan TPS shall implement the same.*

- On receipt of LTA application beyond 600MW from M/s EPMPL, system studies would be carried out to finalize the transmission system augmentation including reconfiguration of the LILO as may be required.”*



16. In the Report dated 19.1.2022 filed by CTU in instant Petition No. 92/MP/2021 as quoted above, it has been recommended, based on studies conducted and discussed at WRPC forum that LILO should be kept open. The modalities of opening of LILO have further been agreed in a separate meeting at WRPC held on 23.12.2021 as quoted in the CTU's report dated 19.1.2022.

17. We observe that LILO was an interim arrangement since beginning. The LILO was planned since Essar Mahan–Sipat line was apprehended to be delayed since the pooling point was not identified. CTU has submitted the reasons for planning of LILO in Petition No. 132/MP/2018, which has been recorded in the order dated 21.1.2020 in the said petition as under:

“(d) Were system studies conducted while planning and was concluded that LILO should be interim.

a. The Petitioner has answered in the affirmative and submitted that studies were conducted and various alternatives were evolved in the 9th meeting of WR constituents on LTOA held on 30.07.2007 considering injection of 1200MW power from Mahan TPS to WR grid. It was deliberated that a number of generation projects are proposed to come up in the same complex (MP/Chhattisgarh) in almost the same time frame. Accordingly, it was decided to develop a 765/400kV WR pooling station near Sipat & other associated system strengthening works for injection of power from Mahan TPS. However,

the exact location of the proposed WR Pooling station was not known at the planning stage.

b. It was also deliberated that development of 400/765kV Pooling station and other strengthening works may require long time and it may be difficult to complete these works before the commissioning of Mahan TPS generating unit.

In view of the above, it was decided that to facilitate grid connectivity of Mahan generation project, initially, LILO of one circuit of 400 kV line between Vindhyachal and Korba STPS may be carried out at Mahan TPS by M/s Essar Power M.P Ltd. and power transfer may be carried out on short-term basis depending upon transmission capacity availability. However, on the completion of the transmission system identified for LTA, the above LILO arrangement of Vindhyachal-Korba line at Mahan TPS shall be removed and the line shall be restored in its original configuration by M/s Essar Power at their cost.”

18. CTU vide its report dated 19.1.2022 in instant Petition No. 92/MP/2021 has also submitted that *“As per LTOA intimation dated 23.12.2008, the interim arrangement of LILO of one circuit of Vindhyachal–Korba STPP 400kV D/c line at Mahan TPS was to be removed and restored to original configuration by M/s EPMPPL before start of LTOA.”*

19. The generating station Essar Power M.P. Limited filed Petition No. 10/MP/2018 praying to continue LILO as a permanent element. Commission vide Order dated 19.1.2018 in Petition No. 10/MP/2018 allowed time till 31.3.2018 to complete the Mahaan-Sipat line beyond which LILO was to be disconnected from 1.4.2018. The CTU approached Commission with Petition No. 132/MP/2018 seeking LILO as permanent element and the Commission vide Order dated 21.1.2020 in Petition No. 132/MP/2018 observed as under :

“27. On perusal of submissions of the Petitioner and Respondent MPPMCL and reply of the Petitioner to the queries of the Commission vide RoP dated 20.12.2018, we observe that though LILO was considered to be only a temporary element at inception, subsequent system studies suggest that the LILO may be continued as a permanent element in order to enhance grid stability. While hearing the plea of the Respondent 1 and 2 to make the LILO a permanent element, APTEL had granted liberty to Respondents 1 and 2 to approach appropriate legal forum vide its order dated 27.03.2018. The prayer of the Petitioner in this Petition is “... continuation of the LILO till finalization of suitable alternatives (if any) as may be identified through system studies to address the high short circuit level issue”. Thus, the Petitioner is similar to that for which liberty was granted to the Respondents 1 and 2 by APTEL.

29. Keeping in view the fact that the Petitioner has stated that the 400 kV Essar Mahan to Sipat requires additional anchoring and that CEA, CTU, WRPC, Respondents 1 and 2 in a meeting held on 28.06.2017 agreed that the LILO would help to take care of oscillations in the grid under outage of one circuit of Mahan TPS Bilaspur pooling station 400 kV D/C line, we agree to the request of the Petitioner to continue the LILO for a further period of six months. However, since the current system studies point out that due to LILO, there is increase in fault level at Vindhyachal, the Petitioner is directed to complete the system studies within two months, deliberate the same in WRPC, discuss with CEA and take appropriate action for rectifying the fault level and submit a report to the Commission along-with copy of the system studies and deliberations for taking an appropriate view with regard to the continuance or otherwise of the LILO.

30. MPPMCL has submitted that continuation of LILO as a permanent element would burden the beneficiaries with the additional PoC charge of LILO of Vindhyachal – Korba 400kV S/c line at Mahan TPS. We observe that Essar Mahan has already relinquished its full LTA as on 30.4.2018 as noted in Order dated 7.10.2019 in Petition No. 187/MP/2017. We also observe that the instant LILO line is the dedicated line of Essar Mahan. Accordingly, the generating station is liable to pay transmission charges for same

.....
Accordingly, till the Commission takes a final view as per para 29 above, the Respondent No.1 will be liable to pay the transmission charges for the instant LILO line.”

20. In the above order dated 21.1.2020 in Petition No. 132/MP/2018, Essar Power M.P Limited was made liable to pay the transmission charges for the instant LILO line.

21. We observe that as per the Report dated 19.1.2022 of CTU and Report dated 9.11.2021 of WRPC, continuation of interim LILO is leading to increase in fault level at Vindhyachal, higher voltages and issues in downstream system of Chhattisgarh. We direct that as recommended by WRPC and CTU vide its report dated 19.1.2022 based on system studies, the LILO shall be opened within 15 days of issue of this Order, if not already opened. The modalities of opening of LILO and design of suitable SPS arrangement shall be as finalized in the WRPC forum in its meeting held on 23.12.2021.

22. The Petitioner in the instant application has prayed to treat LILO as a permanent arrangement and recover tariff from the POC pool and restore the entire tariff disbursement to EPTCL for stage-1 assets from the POC pool. We observe that in light of directions for disconnection of LILO based recommendations of WRPC and CTU at paragraph 21 of

this Order, the prayers of the Petitioner does not survive. The Petitioner shall recover tariff in terms of our Order dated 21.1.2020 in Petition No. 132/MP/2018 till disconnection of LILO from Essar Power M.P. Limited. Further unrecovered amount, if any, shall be recovered by the Petitioner from the generating station Essar Power M.P. Limited.

23. This order disposes of the IA No. 4/2022 in Petition No. 92/MP/2021 in terms of the above findings and discussions.

Sd/
(P. K. Singh)
Member

Sd/
(Arun Goyal)
Member

Sd/
(I. S. Jha)
Member

Sd/
(P. K. Pujari)
Chairperson